OZARKS
TRANSPORTATION
ORGANIZATION
A METROPOLITAN PLANNING ORGANIZATION

I-44/Route 13 INTERCHANGE

CONCEPTUAL REPORT

Greene County, Missouri

August 2022

Prepared by:

CMT
Crawford, Murphy & Tilly

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1.0 INTRODUCTION

This study's primary goal is to improve the capacity and safety of Missouri Route 13 from I-44 to Farm Road 94 in Greene County, Missouri. Southbound Route 13 experiences regular 15 to 20-minute delays in long queues. The long queues extend into rural stretches of Route 13 outside Springfield city limits, where stopped traffic is unexpected and leads to back of queue crashes. The I-44 westbound off-ramp to Route 13 also experiences long delays, particularly in the PM peak hour. Queues regularly extend down the ramp onto mainline I-44, which has led to congestion and crashes on I-44 near the off-ramp. The presence of the Dickerson Park Zoo and Ozark Empire Fairgrounds directly east of Route 13 along Norton Road lead to heavy traffic special events. Traffic from the special events has trouble clearing the area due to the congestion along Route 13 between I-44 and Farm Road 94.

The addition of a southbound to eastbound flyover ramp will remove a large turning movement from the interchange operations, freeing up signal timing for other movements. Reconfiguring the Norton Road intersection will reduce impacts between its signal and the signals at the interchange. A J-turn intersection at Farm Road 94 will address severe angle crashes while providing all intersection movements. The close spacing of the Norton Road intersection to the interchange and lack of capacity through the interchange causes lengthy queues on southbound Route 13 and westbound I-44 exiting to Route 13. The growing traffic in the area continues to compound ongoing safety and mobility concerns on Route 13 and adjacent corridors. The project limits are shown in Exhibit 1, which includes approximately 2.0 miles of Route 13. Included within the project limits is the I-44 interchange and three at-grade intersections.

Exhibit 1: MO Route 13 Project Corridor

2.0 BACKGROUND INFORMATION

2.1 PROJECT HISTORY:

In June of 2009, the Missouri Department of Transportation finished construction of the first Diverging Diamond Interchange (DDI) in the United States at I-44 and Route 13. This innovative interchange configuration had previously only been constructed in Europe. and the DDI was chosen for this location due to the heavy left turning movements resulting in heavy back-ups and safety concerns that had developed with the traditional diamond interchange at the location. In addition, the interchange provided major cost savings by utilizing the existing bridge structure over I-44. The interchange proved to be a satisfactory solution to the traffic issues present at the time. Since 2009, the City of Springfield and surrounding areas has continued to see extraordinary growth and the DDI interchange is no longer capable of handling the high volumes of traffic that traverse the route each day. Traffic volumes along Route 13 north of I-44 were 18,300 vehicles per day (vpd) in 2009 and has grown to 23,100 in 2021.

In October of 2021, the Ozarks Transportation Organization (OTO) contracted Crawford, Murphy & Tilly (CMT) to work with the Missouri Department of Transportation (MoDOT), City of Springfield and Greene County to study the Route 13 Interchange and analyze solutions for the ongoing congestion, queueing and crash patterns mentioned in Section 1.0 along Route 13 and I-44. Additionally, Farm Road 94 to the north of the Route 13/I-44 interchange was to be analyzed for solutions to the ongoing safety concerns at the intersection with Route 13.

During the conceptual phase, several alternatives were investigated for the interchange type, interchange location, and roadway alignments. Six interchange options were initially presented to the CORE team, before being narrowed to two types: *Park Street Interchange* and *Southbound to Eastbound Flyover*. Interchange options were refined to determine the preferred type and location in proximity to adjacent features and terrain. These options have been analyzed and are described further in the Conceptual Study Report. Below is the conceptual cost data for the Southbound to Eastbound flyover, the chosen alternative.

CONCEPTUAL COST DATA:

	Cost ($1,000s)
Right of Way:	$5,500
Construction:	$31,621
PE (10%):	$3,162
CE (15%):	$4,743
Utilities:	$850
Total Program Cost:	**$45,876**

2.2 DESCRIPTION OF EXISTING TRANSPORTATION FACILITIES

Study Area

The project is in Springfield, Missouri in Greene County, as shown in Exhibit 1. The study corridor incorporates the Route 13/I-44 Interchange and approximately 2.5 miles of existing Route 13.

Roadways

I-44 within the project area is a four-lane divided roadway classified as "interstate". It has 12-foot-wide lanes with 10' outside and 4' inside shoulders. The average daily traffic within the study corridor is 64,600 vehicles per day (VPD) (31,900 westbound and 32,700 eastbound). The posted speed limit along I-44 is 60 mph.

Exhibit 2: Route 13 Interchange over I-44 (looking north)

Route 13 in the project area is a four-lane divided roadway classified as "freeway or expressway". It has 12-foot-wide lanes with 10' outside and 6' inside shoulders. The average daily traffic within the study corridor is 23,100 VPD north of I-44 and 28,600 vpd south of I-44, carried within two northbound and two southbound lanes. The posted speed limit along Route 13 varies within the project limits (just north of Norton Intersection) with the speed north of this location being 65 mph and 40 mph south of the location.

EXISTING FACILITIES

Beginning Log Mile	**Pavement**		**Year Built**	**Roadbed Width**	**Min. R/W width**	**Access Control**
	Width	**Type**				
I-44 - Log Miles						
77.4	32' Eastbound 32' Westbound	Asphalt Variable Depth	1954	110’	300’	Fully Controlled
Route 13 - Log Miles						
228.75	24' Overall	Asphalt Variable Depth	1954	80’	120'	Partially Controlled

EXISTING BRIDGES

Bridge No.	**Location**	**Type**	**Length**	**Width**	**Year Built**	**Condition Ratings**		
						Deck	**Super**	**Sub**
AO443	Route 13	Concrete Slab	203.00	68.0	1960	Fair	Fair	Satisfactory

2.3 PROPOSED DESIGN CRITERIA

The proposed facilities will keep the same functional classifications with design average daily traffic volumes as seen in **Appendix C.** Per MoDOT’s design standards, the following criteria will be used when designing this facility based on the stated functional classification and traffic in rolling terrain.

Functional Classification	Design Speed	No. & Width of Lanes	Shoulder Width	Roadbed Width	Right of Way	
					Width	**Control**
I-44, Interstate	60 mph	2x 12' mainline lanes	Outside: 10' Inside: 6’	110' and Varies	300' Min	Controlled
Route 13, Freeway or Expressway	40 mph & 65 mph (N. Of Route 13 Interchange)	5 x 12'	Outside: 10’ Inside: 6’	80'	120' Min	Partially Controlled
W Norton Road, Local Road	35 mph	3 x 11'	Type B Gutter	34'	90' Min	Full Access
Farm Road 94, Local Road	30 mph	2 x 11'	2' turf	26'	60' Min	Full Access

2.4 SYSTEM LINKAGE

Facility at the north end of the project: Farm Road 94

Facility at the south end of the project: Evergreen Street

Route 13 runs north-south through the project limits in northern Springfield, Missouri. Ultimately, Route 13 continues north through Greene County to northern Missouri. Interstate 44 (I-44) runs east-west through Greene County passing through the northern limits of Springfield, Missouri, connecting Wichita Falls, TX to Saint Louis, MO. The I-44 and Route 13 corridor is expected to continue experiencing traffic growth, creating added capacity and safety concerns.

Logical Termini

The Federal Highway Administration (FHWA) defines logical termini as “rational end points for a transportation improvement and a review of environmental impacts” (FHWA, 1993). Three principles are used to define these points:

1.0 Termini must be of sufficient length to address environmental matters on a broad scope.
2.0 Termini must be set such that a project is determined to have independent utility and be a reasonable expenditure.
3.0 Termini are placed to not restrict any alternatives or foreseeable improvements.

For this study, the logical termini are specified as:

- At the existing at-grade intersection of Farm Road 94 and Route 13
- At the existing at-grade intersection of Evergreen and Route 13

2.5 INTERCHANGE TRAFFIC PATTERNS

The operations of the I-44 & Route 13 interchange is influenced by the combination of regional and local trips as the interchange serves a major regional highway (Route 13) and a large amount of development. Streetlight Data, derived from background cellular data, was used to develop mobility metrics between geographic zones within the OTO region. Origin-Destination (OD) derived data was compared to traffic count data to ensure reasonableness.

Streetlight data was utilized to perform three levels of OD analyses to understand the travel patterns of traffic using Route 13 within the Springfield region. The OD analyses completed are:

- Route 13 and Interstate 44 Interchange OD
- Midlevel OD
- Regional OD

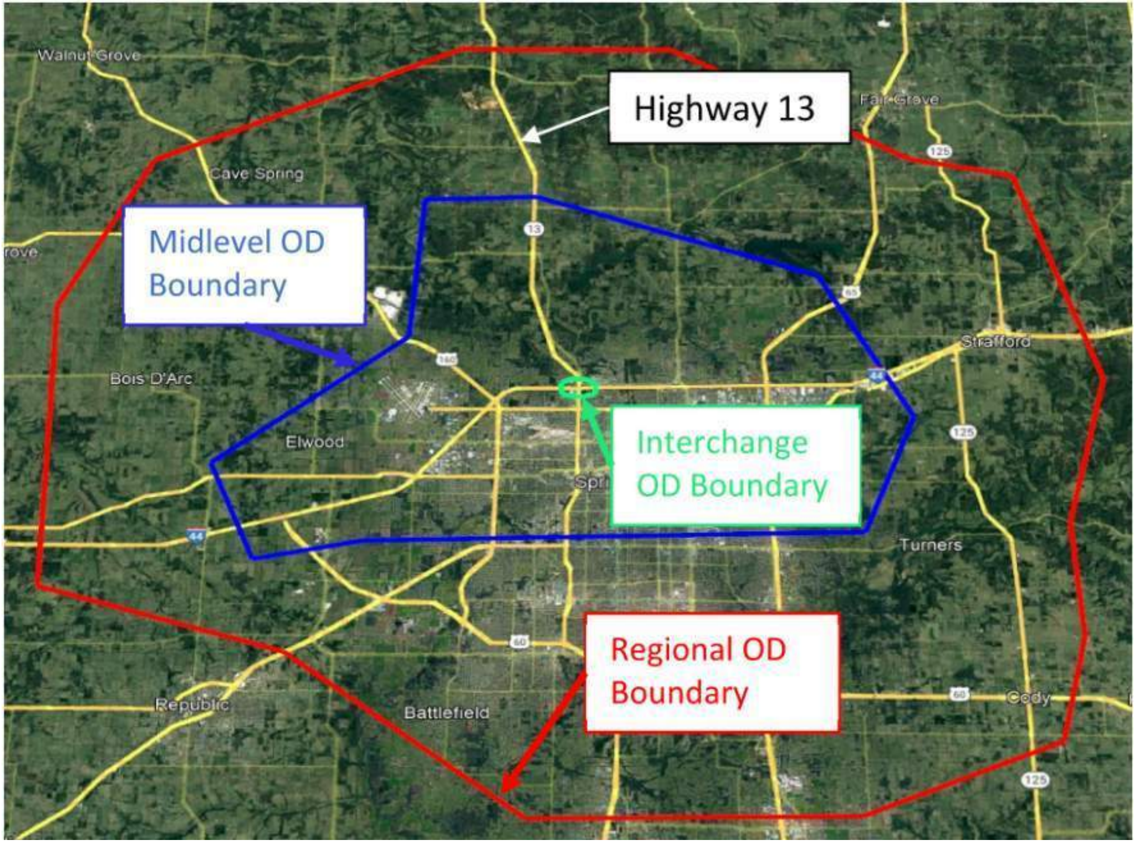


Exhibit 3: Origin-Destination Study Boundaries

The full Origin-Destination Report is provided in **Appendix G**. The findings include:

- At the Regional OD level, of the total traffic entering southbound on Route 13, approximately 75% stay within the analysis boundary. 12% exit at US 65 south, 4% exit at US 60 east, 2% exit at I-44 west, and 1% exit at I-44 east.
- At the Regional OD level, of the total traffic entering eastbound on I-44, approximately 63% stay within the analysis boundary. 21% exit at I-44 east, 7% exit at US 65 south, and 3% exit at US 60 east.
- At the Regional OD level, of the total traffic entering westbound on I-44, approximately 67% stay within the analysis boundary. 20% exit at I-44 west, 10% exit at US 65 south, and 1% exit at US 60 west.
- Approximately 20% of the traffic entering in both directions along I-44 is through traffic.
- At the I-44/Route 13 interchange, predominant travel patterns include heavy through traffic percentages (approximately 35%) and heavy traffic towards I-44 east (41% of the traffic entering from the north and 27% of the traffic entering from the south). 12% to 14% of traffic entering along Route 13 proceeds towards I-44 west.

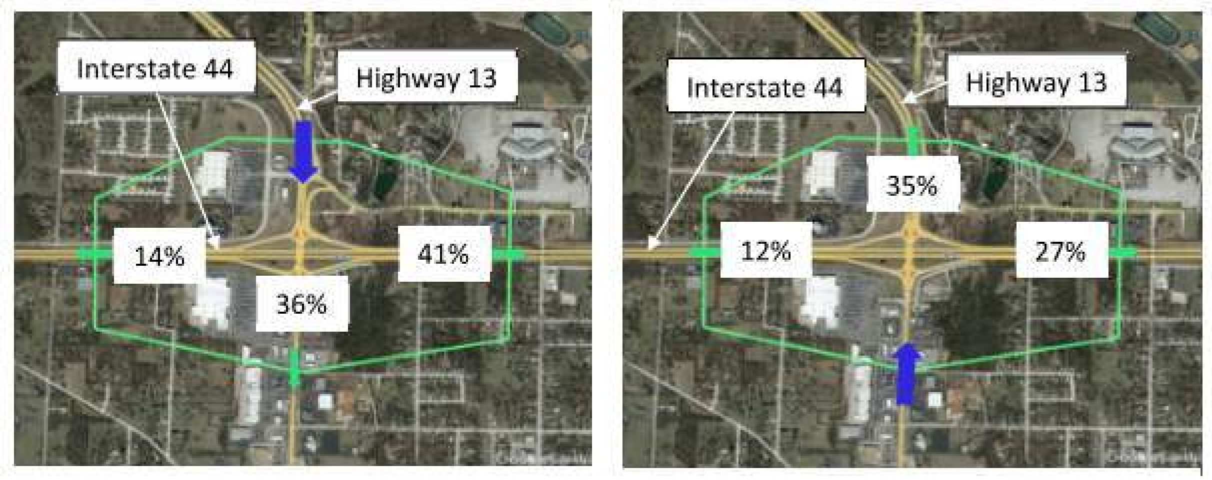


Exhibit 4: Interchange O-D Study Route 13 Traffic Distribution

3.0 OVERVIEW OF PURPOSE AND NEED

Purpose and Need refers to the transportation-related problems of a system that a project is intended to address. It identifies the needs for improvements and justification for those improvements.

The increasing traffic along the corridor creates congestion and safety concerns. Existing traffic demands have resulted in increasing crash frequency. In the past several years, many severe crashes have occurred along the corridor, including several fatalities. These crashes are expected to increase in both frequency and severity as traffic demand increases and vehicle delays grow longer.

The purpose of the proposed action is to improve roadway safety and mobility, accommodating the existing and anticipated traffic levels on the roadway network. Providing better regional traffic mobility will reduce the impacts seen on local roads, as some traffic diverts to avoid the I-44 at Route 13 interchange. Specifically, the proposed transportation improvements will:

- Reduce **congestion** on the existing roadway network and provide transportation system **capacity** to respond to current and reasonably foreseeable travel demand in the region;
- Improve **safety** through the corridor by reducing or eliminating lengthy queues leading to congestion-related crashes on I-44 and Route 13.
- Potentially foster **economic growth** by improving mobility to improve visitor access to the greater Springfield area.

3.1 PUBLIC INVOLVEMENT

To further develop the purpose and need of the project as well as to gain public input and support for the project, significant public involvement was held during the conceptual study.

In November of 2021, two meetings (one local official meeting and one public meeting) were held to gain a more detailed local understanding of the perceived issues associated with the corridor and to gain insight into how the local public changes their travel patterns due to the back-ups occurring in the study area. Along with the meetings, an online survey was conducted by OTO to allow for input from the local public who were unable to attend the meetings. The valuable information obtained during these two meetings helped shape the purpose and need of the project and provided key insights that the design team used in the development of alternatives for the interchange.

In March of 2022, a second public meeting was held to present the developed alternatives to the public. The alternatives were first presented and explained, then the public was allowed to vote on the improvements. As with the first meeting, an online survey was conducted by OTO to allow for input from the local public who were not able to attend the meetings. The online survey this time was preceded by a presentation that explained the alternatives to the public. In addition to voting on preferred improvements, the public were able to supply valuable feedback to the design team on their perceived likes and dislikes for each option. One of the comments received was from a major manufacturing company within the City of Springfield, which led to further dialogue and revisions to the design. Details regarding this dialogue can be found in the below section 3.1.1 - Paul Mueller Vertical Clearance Discussion.

The feedback and voting results from the above public meetings can be found in **Appendix F**.

3.1.1 PAUL MUELLER VERTICAL CLEARANCE DISCUSSION

Officials from Paul Mueller attended the Public Meeting in March of 2022 and raised the issue of their company needing additional vertical clearance for the flyover to accommodate the shipping of their oversized loads. The standard 16.5-foot vertical bridge clearance would have a significant impact on the existing highway-based transportation options for oversize loads departing Paul Mueller's facility at Kansas Expressway and Chestnut Expressway. As a result, additional meetings with the Core Team and with Paul Mueller were held to discuss this request in greater detail. During these additional meetings, Paul Mueller noted that they utilize Route 13 to ship many of their oversized loads out of the City of Springfield due to Route 13 having fewer vertical obstructions than the other routes. They also laid out that the number of oversized loads with heights between 17.5' to 18.5' is increasing with 12 planned this year and 21 planned for next year. This trend is anticipated to increase. As a result, the Paul Mueller Company formally requested an additional 3.5' be added to the bridge vertical clearance for a total clearance of 20'. Based on this information, the group agreed to attempt to adjust the design to accommodate the 20' vertical clearance for the Southbound and Eastbound Flyover over Route 13 to avoid impacts to Paul Mueller and the motoring public that would result in a route change for their oversized loads. The vertical clearance of the Flyover over the westbound on-ramp will remain the standard clearance as many of the structures along I-44 are constructed at or below the standard 16.5' clearance.

3.1.2 DICKERSON PARK ZOO MAINTENANCE ENTRANCE DISCUSSION

Officials from the Dickerson Park Zoo were reviewing the Southbound to Eastbound Flyover plan and realized that the plan didn't show any changes to their maintenance drive just north of the proposed roundabout on Norton Road (see image to the right). Due to this, they reached out to the OTO to set-up a meeting to discuss the impacts to this entrance as part of this plan. On July 14, 2022, a meeting was held with the OTO, MoDOT, City of Springfield, CMT, and Dickerson Park Zoo officials present. During this meeting, officials with the Dickerson Park Zoo expressed their desire to keep the entrance full access as part of the project due to the importance the entrance has on their operations. The entrance is used by larger trucks to bring in supplies and is used for special events held at the zoo. The team relayed that the design shown is a conceptual design and will undergo tweaks during the design process that could ultimately lead to the roundabout intersection changing to a more traditional intersection. Additionally, the team agreed to revise the rendering to show the entrance being reconstructed in its existing location with full access being maintained. Once funding is obtained and the project goes into preliminary design, additional coordination with the Zoo will be held to ensure the entrance provides a safe design while not limiting Zoo operations.

3.2 ACCIDENT DATA, SAFETY ENHANCEMENTS AND ACCESS MANAGEMENT

Crash data was compiled from MoDOT's Transportation Management System's (TMS) Crash Statistics database from January 1, 2018, to December 31, 2021 (4 years of data). I-44 from Melville Road to Grant Avenue and Route 13 from I-44 to Farm Road 94 was analyzed. This allowed the project team to capture trends that may vary year to year. A detailed summary of historical crash data can be found in **Appendix D**.

Fatal And Major Injury Crashes
Four fatal crashes occurred in the study area in the past 4 years.

- After dark in early October 2019, a pedestrian was struck and killed on I-44 westbound at the Route 13 on-ramp.
- A fatal nighttime crash occurred in 2020 at the intersection of Route 13 and Norton Road, killing a pedestrian crossing Route 13.
- An out-of-control crash in July 2020 in sunny conditions resulted in a fatal crash on southbound Route 13 just north of the bridge over Radio Lane.
- In April 2021, a fatal right-angle crash occurred between a vehicle eastbound on Farm Road 94 and a southbound vehicle on Route 13 during daylight conditions.

There were six disabling injuries in the project corridor, four of them occurring along or at intersections on Route 13.

Safety Mitigation / Enhancements
I-44 at Route 13
Installing a southbound to eastbound flyover ramp at the I-44 and Route 13 interchange will grade-separate a high-volume conflicting turning movement from through Route 13 traffic, improving interchange operations. With the high volumes of southbound left turning traffic removed from the main interchange, the interchange will be converted to a standard diamond configuration with added lanes for improved capacity, reducing the queuing that has contributed to some of the crash history.

Route 13 at Norton Road
This existing intersection with substandard spacing to the I-44 interchange westbound ramp terminal will be converted to two offset-T intersections with right-in, right-out control. Norton Road will pass underneath Route 13 and connect to existing Norton Road via roundabout intersections. The existing left turn movements will now make a right turn and travel along the grade-separated Norton Road to complete the same movement.

Route 13 at Farm Road 94

Installing a J-turn at the Route 13 and Farm Road 94 intersection will reduce the potential for right angle and left turn crashes. All intersection movements will be accommodated with this intersection configuration.

Highway Safety Manual (HSM) Analysis Results

The HSM analysis results for the build alternatives and the No Build alternative are shown below. The proposed alternative predicts approximately 9% reduction in crashes annually compared to the No Build alternative for Route 13 and I-44. Additional roadway segments and infrastructure on Norton Road, coupled with an added interchange ramp and increased capacity, lessened the reduction in crashes. It is expected that the reduction in queuing will eliminate more than the predicted number of crashes.

At Route 13 and FR 94, the proposed alternative is expected to reduce the number of crashes by 33%. This alternative shows less reduction in overall crashes (due to less reduction in intersection conflict points), but it accommodates full intersection mobility compared to the RIRO configuration. Crashes are broken out by fatal or injury crashes and property damage only (PDO) crashes.

I-44/Route 13 Safety Analysis Results

Alternative	No. Fatal/Injury Predicted Crashes	No. PDO Predicted Crashes	Total Annual Crashes	Difference from No Build
2022 Existing Conditions	23.40	55.50	78.90	
2030 No Build	25.60	61.90	87.50	
2030 SB-EB Flyover	22.30	58.00	80.30	
2030 Park Street Interchange	22.50	57.30	79.80	
2050 No Build	31.40	77.80	109.20	
2050 SB-EB Flyover	27.00	72.50	99.50	-8.9%
2050 Park Street Interchange	27.10	71.80	98.90	-9.4%

Route 13 at FR 94 Safety Analysis Results

Alternative	No. Fatal/Injury Predicted Crashes	No. PDO Predicted Crashes	Total Annual Crashes	Difference from No Build
2021 Existing Conditions	0.80	1.10	1.90	
2030 No Build	1.00	1.20	2.20	
2030 J-Turn	0.60	0.80	1.40	
2030 RIRO	0.60	0.70	1.30	
2050 No Build	1.20	1.50	2.70	
2050 J-Turn	0.80	1.00	1.80	-33.3%
2050 RIRO	0.60	0.80	1.40	-48.1%

Calibration factors were provided by MoDOT. Varied factors were used for differing facilities. The calibration factors may be found in **Appendix D**.

Non-Motorized Facility Accommodation

Some sidewalks are present along Route 13 within the project limits, but there is no existing east-west connectivity at Norton Road. Pedestrians must travel south to the interchange to safely cross Route 13. This project will install new pedestrian or bicycle facilities that will enhance non-motorized mobility through the project area.

Access Management

I-44 and Route 13 are already limited access facilities. One intersection will be added on Route 13, but the limited mobility from the added intersection and the removal of the Norton Road intersection will improve safety.

3.3 ROADWAY CAPACITY

Synchro 10 software was used to analyze the existing Route 13 corridor at the I-44 interchange. The following table summarizes the average intersection delay for the existing intersections during the morning and evening peak hours for 2022. This table shows the average intersection delay (seconds per vehicle), Level of Service (LOS), volume-to-capacity (v/c) ratio for each approach and overall intersection performance.

Intersection	Approach	2022	
		AM Peak	PM Peak
		Delay (LOS) v/c ratio	Delay (LOS) v/c ratio
MO Route 13 & Norton Road	EB Norton	39.9 (D) 0.87	50.5 (D) 1.10
	WB Norton	52.5 (D) 0.80	48.6 (D) 0.82
	NB Route 13	18.0 (B) 0.64	24.9 (C) 0.80
	SB Route 13	26.5 (C) 0.79	29.3 (C) 0.76
	Overall	**28.3 (C) 0.87**	**32.6 (C) 1.10**
MO Route 13 & WB I-44 Ramps	WB I-44 Ramp	24.3 (C) 0.68	43.1 (D) 0.95
	NB Route 13	14.3 (B) 0.70	25.1 (C) 0.97
	SB Route 13	10.0 (A) 0.77	29.2 (C) 0.45
	Overall	**14.5 (B) 0.77**	**31.1 (C) 0.97**
MO Route 13 & EB I-44 Ramps	EB I-44 Ramp	26.1 (C) 0.73	16.5 (B) 0.40
	NB Route 13	28.2 (C) 0.72	52.7 (D) 0.96
	SB Route 13	8.9 (A) 0.83	15.9 (B) 0.93
	Overall	**16.9 (B) 0.83**	**30.2 (C) 0.96**

As shown above, the Norton Road intersection is currently over capacity with prolonged delays during the PM peak hour. The I-44 interchange is very close to capacity and delays are expected to greatly increase as traffic demands increase along the corridor.

3.4 ROADWAY DEFICIENCIES

From the historical crash data, hot-spot areas with correctable, geometric-related crash history include:

- Norton Road Intersection Spacing
    - The Route 13 and Norton Road intersection does not meet recommended minimum intersection spacing standards. EPG 940.3 requires 1,320’ minimum spacing for a major interchange to the next intersection or left turn opportunity, with more desirable. The Norton Road intersection is only 700’ from the westbound ramp terminal on Route 13.

No other deficiencies were noted within the study limits.

3.5 ADDITIONAL JUSTIFICATION

Other analysis considerations identified through the project development and public outreach processes include:

- Seasonal and Event Traffic along Norton Road at the Zoo and Fair Grounds
- Heavy truck traffic for the Fair Grounds
- Pedestrian safety concerns along Route 13 from I-44 to Kearney
- Future improvements / widening to I-44 should be included within the design.

4.0 ALTERNATIVES ANALYSIS

4.1 ALTERNATIVES DEVELOPMENT – ROUTE 13/I-44

In January 2022, a Core Team meeting involving the Ozarks Transportation Organization (OTO), Missouri Department of Transportation (MoDOT), City of Springfield, and Greene County was held to discuss six (6) different interchange alternatives at Route 13/I-44. The six interchange alternatives presented were:

- Alternative 1 – Expanded Diverging Diamond Interchange (DDI) w/Continuous Green T’s
- Alternative 2 – Traditional Diamond w/Relocated Norton
- Alternative 3 – Single Point Urban Interchange (SPUI)
- Alternative 4 – Park Street Interchange (C-D)
- Alternative 5 – Park Street Interchange (C-D) w/Green T Intersection

- Alternative 6 – Southbound to Eastbound (SB-EB) Flyover

During the January meeting, Alternatives 1, 2, and 3 were eliminated due to the interchange configurations not improving traffic to a satisfactory level to meet the purpose and need. Alternative 5 was also eliminated due to safety concerns with adding another at-grade intersection to Route 13.

Alternatives were developed that are consistent with both MoDOT's *Engineering Policy Guide (EPG*) and the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets.* **Appendix A** shows conceptual layouts of the alternatives that were further analyzed.

Initial screening of the six alternatives was conducted in conjunction with MoDOT. Evaluation matrixes were created for each alternative related to Traffic Operations, Safety, Right of Way, Structures, Environmental, Utilities, Economic Development, Purpose and Need, and Costs.

4.2 ALTERNATIVE ANALYSIS - ROADWAY CAPACITY

Synchro 10 software was used to analyze the impacts of the proposed improvements along the Route 13 corridor at the I-44 interchange. The series of following tables shows the average intersection delay (seconds per vehicle), Level of Service, volume-to-capacity (v/c) ratio for each approach and overall intersection performance for the 2030 and 2050 peak hours.

For these analyses, the OTO Travel Demand Model (TDM) was used to develop projected traffic volumes for the study, including additional traffic forecast projections for different growth scenarios and special events. These added scenarios were used to test the resiliency of the preferred alternative. More information on the traffic forecasts is available in **Appendix H.**

Alternative 1 – Expanded Diverging Diamond Interchange (DDI) w/Continuous Green T's

Alternative 1 keeps the existing Diverging Diamond Interchange (DDI) configuration with additional lanes to expand the capacity. Norton Road is improved by constructing a pair of Continuous Green T intersections. Improvements at the interchange and Norton Road for this alternative both do not have the needed capacity to accommodate the 2050 projected traffic volumes. The northern Norton Road intersection that serves traffic to/from the east is 19% over capacity with a LOS F during the 2050 PM peak. The I-44 interchange is also over capacity during the same peak period.

Route 13 Alternative 1: Expanded DDI					
Intersection	**Approach**	**2030**		**2050**	
		AM Peak	**PM Peak**	**AM Peak**	**PM Peak**
		Delay (LOS)	**Delay (LOS)**	**Delay (LOS)**	**Delay (LOS)**
MO Route 13 & Norton Avenue (N)	WB Norton	34.9 (C) 0.75	27.5 (C) 0.77	48.9 (D) 0.82	108.5 (F) 1.19
	NB Route 13	13.6 (B) 0.66	15.9 (B) 0.81	21.7 (C) 0.79	87.8 (F) 1.18
	SB Route 13	7.6 (A) 0.77	6.3 (A) 0.65	9.0 (A) 0.84	19.0 (B) 1.15
	Overall	**13.5 (B) 0.77**	**15.1 (B) 0.81**	**18.4 (B) 0.84**	**69.8 (E) 1.19**
MO Route 13 & Norton Avenue (S)	EB Norton	40.1 (D) 0.72	18.6 (B) 0.47	73.1 (E) 0.94	50.1 (D) 0.82
	NB Route 13	6.8 (A) 0.65	5.4 (A) 0.56	15.6 (B) 0.89	8.3 (A) 0.89
	SB Route 13	13.8 (B) 0.84	10.4 (B) 0.66	25.7 (C) 0.98	19.3 (B) 0.91
	Overall	**14.6 (B) 0.84**	**8.7 (A) 0.66**	**28.1 (C) 0.98**	**17.0 (B) 0.91**
MO Route 13 & WB I-44 Ramps	WB I-44 Ramp	15.7 (B) 0.36	16.1 (B) 0.64	21.9 (C) 0.46	45.6 (D) 0.99
	NB Route 13	10.9 (B) 0.62	7.4 (A) 0.70	17.5 (B) 0.75	59.7 (E) 1.09
	SB Route 13	12.4 (B) 0.68	7.5 (A) 0.55	11.0 (B) 0.81	13.9 (B) 0.79
	Overall	**12.9 (B) 0.68**	**9.8 (A) 0.70**	**15.2 (B) 0.81**	**38.5 (D) 1.09**
MO Route 13 & EB I-44 Ramps	EB I-44 Ramp	23.4 (C) 0.75	9.3 (A) 0.33	36.1 (D) 0.90	20.2 (C) 0.49
	NB Route 13	18.0 (B) 0.55	16.4 (B) 0.61	25.7 (C) 0.64	28.0 (C) 0.81
	SB Route 13	9.1 (A) 0.78	5.4 (A) 0.54	13.5 (B) 0.92	8.3 (A) 0.81
	Overall	**13.7 (B) 0.78**	**10.9 (B) 0.61**	**20.1 (C) 0.92**	**18.1 (B) 0.81**

(Average Delay (sec/veh), LOS, v/c ratio)

<u>Alternative 2 – Traditional Diamond w/Relocated Norton</u>

Alternative 2 converts the I-44 interchange from a DDI to a conventional diamond interchange. The operational issues with the proximity of Norton Road are addressed by relocating the intersection to the north and increasing capacity. During the 2050 PM peak hour, both the I-44 interchange and Norton Road intersection are over capacity with some approaches operating with unacceptable delays.

Route 13 Alternative 2: Traditional Diamond Interchange					
Intersection	**Approach**	**2030**		**2050**	
		AM Peak	**PM Peak**	**AM Peak**	**PM Peak**
		Delay (LOS)	**Delay (LOS)**	**Delay (LOS)**	**Delay (LOS)**
MO Route 13 & Norton Avenue	EB Norton	30.0 (C) 0.70	33.7 (C) 0.87	17.2 (B) 0.68	60.2 (E) 1.06
	WB Norton	61.8 (E) 0.94	53.1 (D) 0.94	47.6 (D) 0.88	75.0 (E) 0.99
	NB Route 13	19.6 (B) 0.61	28.8 (C) 0.91	25.2 (C) 0.76	45.8 (D) 0.98
	SB Route 13	39.5 (D) 0.93	30.0 (C) 0.66	26.3 (C) 0.56	46.6 (D) 0.91
	Overall	**34.4 (C) 0.94**	**33.1 (C) 0.94**	**27.6 (C) 0.88**	**51.4 (D) 1.06**
MO Route 13 & WB I-44 Ramps	WB I-44 Ramp	26.8 (C) 0.71	35.3 (D) 0.88	29.7 (C) 0.80	74.9 (E) 1.14
	NB Route 13	11.3 (B) 0.38	16.1 (B) 0.75	19.4 (B) 0.51	40.9 (D) 1.03
	SB Route 13	8.0 (A) 0.50	11.7 (B) 0.50	14.1 (B) 0.73	25.2 (C) 0.88
	Overall	**13.5 (B) 0.71**	**19.8 (B) 0.88**	**19.2 (B) 0.80**	**45.1 (D) 1.14**
MO Route 13 & EB I-44 Ramps	EB I-44 Ramp	37.4 (D) 0.82	40.2 (D) 0.72	38.2 (D) 0.89	26.2 (C) 0.66
	NB Route 13	14.5 (B) 0.43	8.2 (A) 0.52	17.4 (B) 0.57	34.7 (C) 0.98
	SB Route 13	17.4 (B) 0.76	23.1 (C) 0.72	20.9 (C) 0.90	12.5 (B) 0.83
	Overall	**19.8 (B) 0.82**	**19.0 (B) 0.72**	**22.8 (C) 0.90**	**23.6 (C) 0.98**

(Average Delay (sec/veh), LOS, v/c ratio)

Alternative 3 – Single Point Urban Interchange (SPUI)

Alternative 3 converts the I-44 interchange to a SPUI to increase the capacity of the interchange and the spacing between the interchange and Norton Road. Improvements to the Norton Road intersection, along with the increased spacing, allow the Norton Road intersection to operate under capacity with acceptable delays. The SPUI intersection operates just over capacity with an overall intersection LOS D.

Route 13 Alternative 3: SPUI					
Intersection	**Approach**	**2030**		**2050**	
		AM Peak	**PM Peak**	**AM Peak**	**PM Peak**
		Delay (LOS)	**Delay (LOS)**	**Delay (LOS)**	**Delay (LOS)**
MO Route 13 & Norton Avenue	EB Norton	24.0 (C) 0.66	32.0 (C) 0.72	39.6 (D) 0.93	39.3 (D) 0.98
	WB Norton	50.4 (D) 0.89	39.1 (D) 0.75	54.0 (D) 0.85	44.9 (D) 0.86
	NB Route 13	19.3 (B) 0.53	22.5 (C) 0.70	29.2 (C) 0.86	31.9 (C) 0.89
	SB Route 13	30.1 (C) 0.82	28.9 (C) 0.50	36.8 (D) 0.88	40.6 (D) 0.87
	Overall	**28.2 (C) 0.89**	**27.5 (C) 0.75**	**36.5 (D) 0.93**	**36.7 (D) 0.98**
MO Route 13 & I-44 Ramps	EB I-44 Ramp	38.4 (D) 0.87	37.7 (D) 0.71	38.1 (D) 0.92	66.5 (E) 0.96
	WB I-44 Ramp	31.5 (C) 0.83	42.0 (D) 0.87	44.0 (D) 0.95	65.1 (E) 1.01
	NB Route 13	14.5 (B) 0.46	19.6 (B) 0.68	16.6 (B) 0.57	35.7 (D) 0.92
	SB Route 13	20.8 (C) 0.79	18.0 (B) 0.45	34.1 (C) 0.97	19.2 (B) 0.55
	Overall	**24.0 (C) 0.87**	**26.4 (C) 0.87**	**33.1 (C) 0.97**	**41.4 (D) 1.01**

(Average Delay (sec/veh), LOS, v/c ratio)

Alternative 4/5 – Park Street Interchange (C-D)

Alternative 4 includes the construction of a new interchange to the west along the Park Street corridor to remove regional trips from the existing Route 13 interchange. Based upon traffic projections from the regional Travel Demand Model, this secondary interchange would divert approximately 22% of the traffic away from the Route 13 interchange. This diversion of traffic would improve operations of both the Norton Road intersection and the I-44 interchange, but the I-44 interchange would still be over capacity in 2050. More improvements not reviewed in this report would also be needed at the existing interchange in addition to the new interchange at Park Street.

Route 13 Alternative 4/5: Park Street Interchange					
Intersection	**Approach**	**2030**		**2050**	
		AM Peak	**PM Peak**	**AM Peak**	**PM Peak**
		Delay (LOS)	**Delay (LOS)**	**Delay (LOS)**	**Delay (LOS)**
MO Route 13 & Norton Avenue	EB Norton	28.1 (C) 0.67	27.4 (C) 0.70	33.9 (C) 0.79	38.5 (D) 0.90
	WB Norton	40.7 (D) 0.76	37.4 (D) 0.70	48.1 (D) 0.70	45.4 (D) 0.77
	NB Route 13	20.2 (C) 0.59	18.6 (B) 0.67	24.7 (C) 0.67	22.4 (C) 0.78
	SB Route 13	23.8 (C) 0.69	21.9 (C) 0.39	30.2 (C) 0.75	29.2 (C) 0.58
	Overall	**25.9 (C) 0.76**	**24.0 (C) 0.70**	**31.7 (C) 0.79**	**30.3 (C) 0.90**
MO Route 13 & WB I-44 Ramps	WB I-44 Ramp	19.6 (B) 0.68	23.2 (C) 0.66	25.0 (C) 0.69	36.1 (D) 0.87
	NB Route 13	3.8 (A) 0.55	5.3 (A) 0.82	4.0 (A) 0.51	15.8 (B) 0.98
	SB Route 13	13.1 (B) 0.75	19.7 (B) 0.75	74.3 (E) 1.05	43.9 (D) 0.91
	Overall	**12.6 (B) 0.75**	**14.7 (B) 0.82**	**44.9 (D) 1.05**	**31.5 (C) 0.98**
MO Route 13 & EB I-44 Ramps	EB I-44 Ramp	31.0 (C) 0.76	16.9 (B) 0.36	32.4 (C) 0.73	22.2 (C) 0.44
	NB Route 13	23.2 (C) 0.70	19.3 (B) 0.90	22.8 (C) 0.62	38.7 (D) 1.02
	SB Route 13	7.7 (A) 0.82	15.5 (B) 0.87	59.2 (E) 1.08	56.1 (E) 1.07
	Overall	**15.6 (B) 0.82**	**17.5 (B) 0.90**	**44.9 (D) 1.08**	**44.8 (D) 1.07**

(Average Delay (sec/veh), LOS, v/c ratio)

Alternative 6 – Southbound to Eastbound (SB-EB) Flyover

The final alternative addresses the heaviest movement through the interchange (southbound Route 13 to eastbound I-44) by constructing a flyover ramp that takes this movement out of the signalized intersections of the interchange. The interchange is reconstructed as a traditional diamond interchange with additional capacity to accommodate the anticipated traffic demands. With the addition of the new flyover ramp, relocation of and improvements to the Norton Road intersection are needed. Improvements to the Norton Road intersection include a new bridge that carries Route 13 over a relocated Norton Road with two new right-in / right-out jug handle connections to northbound and southbound Route 13. Norton Road is relocated to the south at Route 13 to allow for the required vertical clearance under Route 13. With these improvements, the entire Route 13 corridor operates below capacity with acceptable delays through 2050.

Route 13 Alternative 6: Southbound to Eastbound Flyover with Diamond Interchange					
Intersection	**Approach**	**2030**		**2050**	
		AM Peak	**PM Peak**	**AM Peak**	**PM Peak**
		Delay (LOS)	**Delay (LOS)**	**Delay (LOS)**	**Delay (LOS)**
Norton Avenue & West Connector	EB Norton	7.3 (A) 0.16	6.9 (A) 0.17	7.8 (A) 0.21	7.5 (A) 0.22
	WB Norton	2.3 (A) 0.38	2.5 (A) 0.52	2.5 (A) 0.46	2.9 (A) 0.65
	SB Connector	7.4 (A) 0.33	7.4 (A) 0.28	7.7 (A) 0.40	7.7 (A) 0.36
	Overall	**4.6 (A) 0.38**	**4.3 (A) 0.52**	**4.9 (A) 0.46**	**4.7 (A) 0.65**
Norton Avenue & East Connector	EB Norton	4.7 (A) 0.41	7.4 (A) 0.43	5.6 (A) 0.51	11.2 (B) 0.60
	WB Norton	1.6 (A) 0.28	2.0 (A) 0.37	1.7 (A) 0.33	2.3 (A) 0.44
	SB Connector	5.9 (A) 0.28	6.8 (A) 0.49	6.1 (A) 0.34	8.2 (A) 0.62
	Overall	**4.2 (A) 0.41**	**5.3 (A) 0.49**	**4.6 (A) 0.51**	**6.7 (A) 0.62**
MO Route 13 & WB I-44 Ramps	WB I-44 Ramp	24.2 (C) 0.71	24.2 (C) 0.85	41.1 (D) 0.81	29.4 (C) 0.97
	NB Route 13	9.0 (A) 0.68	20.4 (C) 0.66	12.4 (B) 0.35	31.7 (C) 0.90
	SB Route 13	22.6 (C) 0.61	25.8 (C) 0.55	29.1 (C) 0.64	29.6 (C) 0.67
	Overall	**19.4 (B) 0.71**	**23.1 (C) 0.85**	**28.3 (C) 0.81**	**30.3 (C) 0.97**
MO Route 13 & EB I-44 Ramps	EB I-44 Ramp	23.3 (C) 0.51	25.4 (C) 0.42	36.7 (D) 0.60	29.8 (C) 0.49
	NB Route 13	8.9 (A) 0.38	5.8 (A) 0.44	10.1 (B) 0.42	9.3 (A) 0.54
	SB Route 13	9.3 (A) 0.62	1.6 (A) 0.42	14.4 (B) 0.72	3.8 (A) 0.53
	Overall	**11.8 (B) 0.62**	**7.6 (A) 0.44**	**17.3 (B) 0.72**	**10.9 (B) 0.53**

4.3 FINAL STUDY ALTERNATIVES – ROUTE 13/I-44

Based upon the initial screening evaluation, Alternatives 4 and 6 were carried forward for further study. Both alternatives were evaluated using data from the evaluation matrices. Other criteria for optimal location, right of way impacts, constructability, maintenance of traffic and costs were also included. Additionally, traffic scenarios were analyzed using Synchro and VISSIM traffic modeling software. HSM predictive safety analyses were conducted to compare the relative safety performance of the two interchange options.

Alternative 4 – Park Street Interchange (C-D)

Appendix A – Alternative 4 Exhibit shows the conceptual layout. The major features of Alternative 4 include:

- New interchange near Park Street
- Construct approximately 0.8 miles of new Park Street roadway
- Existing Interchange Configuration to remain at Route 13

- Construct Collector-Distributor (C-D) Roadway between the proposed Park Street Interchange and existing Route 13 Interchange
- Existing Route 13 structure over I-44 to be replaced and lengthened to accommodate the C-D Roadway
- Southbound Park Street Flyover to Eastbound C-D Roadway

Benefits

Creating a new interchange west of the existing interchange removes regional traffic from Route 13 prior to the Norton Road intersection and the Route 13 Interchange. The removed traffic results in improved traffic operations of the existing interchange. This alternative also results in minimal impacts to traffic during construction.

Disadvantages

The costs for adding a new interchange and the associated roadway improvements to connect the interchange to Route 13 are considerably higher than performing interchange improvements at the existing interchange. Additionally, the roadway improvements and structures proposed with this improvement would add significant system operations and maintenance costs to MoDOT.

Alternative 6 – Southbound to Eastbound Flyover

Appendix A – Alternative 6 Exhibit shows the conceptual layout. Major features of Alternative 6 include:

- New Southbound Route 13 to Eastbound I-44 Flyover Ramp
- Convert existing diverging diamond interchange into a traditional diamond interchange
- Replacement of the existing Route 13 bridge structure
- Close and relocate the existing west leg of the Norton Intersection to the north
- Convert the east leg of the Norton Intersection to Right-in-right-out
- Norton Road is routed under Route 13 just north of the interchange (Grade-Separated)
- Roundabouts bookend Norton on each side of Route 13 underpass for connection and access to adjacent roadways

Benefits

Converting the existing DDI configuration to a standard diamond interchange provides a more familiar roadway configuration for all road users. The southbound to eastbound flyover removes the heaviest traffic movement from the interchange and creates a free flow movement that results in improved interchange performance. In alleviating the traffic back-ups and separating pedestrian movements by taking them alongside Norton under Route 13, the SB-EB flyover improves the safety of the interchange.

Another key benefit to the SB-EB Flyover is the ability for the project to be constructed in phases, resulting in the ability to improve the intersection in the near term without having to fully fund all the improvements. In total, the project was broken up into four (4) phases that could be constructed separately. These four phases are shown in Exhibit 5. Ultimately, this benefit resulted in Phase 1 of this project being included in the 2022 Statewide Transportation Improvement Plan (STIP) as Job # JSU0079. Section 4.7 – Cost Estimates below provides more information regarding the cost estimates performed as part of the evaluation.

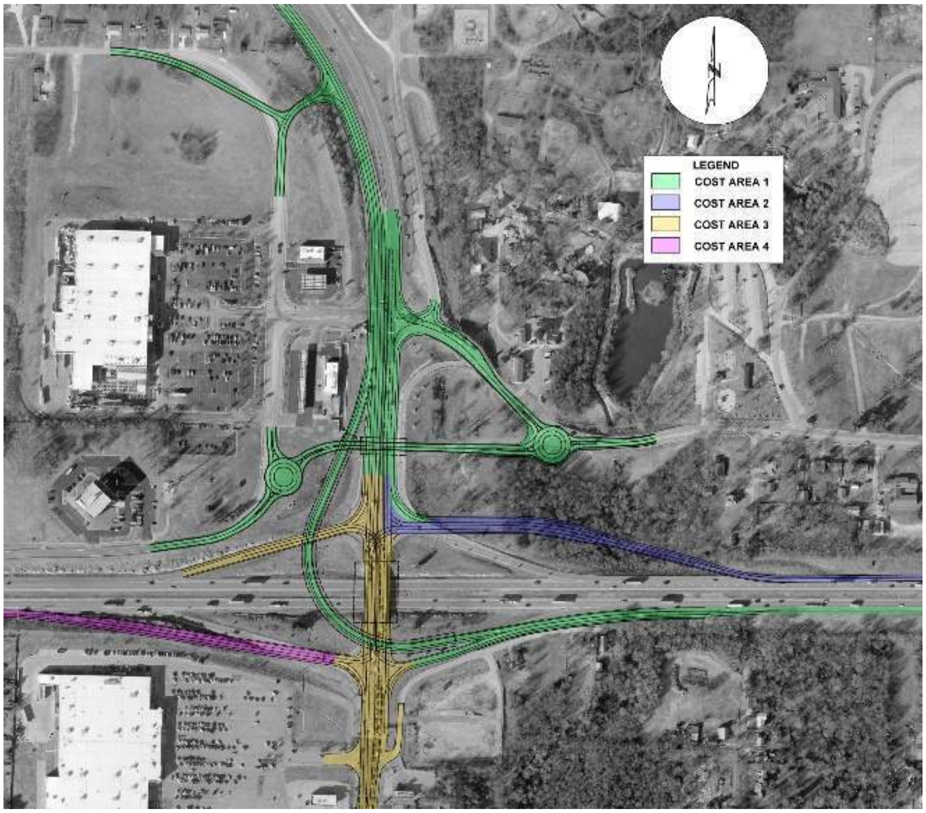


Exhibit 5: SB-EB Flyover Phasing

Disadvantages

This alternative will result in significant travel disruptions during construction and will require an extensive phasing and public outreach plan.

Ultimately, the Southbound to Eastbound Flyover alternative was recommended over the Park Street Interchange alternative due to its ability to fully satisfy the purpose of need for the project in a more cost-effective and efficient manner.

4.4 ROUTE 13 INTERCHANGE REFINEMENTS

The Route 13 interchange was designed with consideration of special events such as the Ozark Empire Fair. This sensitivity analysis included a scenario for traffic peaks at the Fairgrounds and a scenario with higher-than-expected growth to the northwest. The following table shows how the preferred alternative performs under these scenarios. Under these conditions, there are potential operational issues for the westbound ramp terminal and at the jug handle connections along Norton Road. The eastbound roundabout may require additional capacity in the future to accommodate special event traffic peaks. Both roundabouts were analyzed as single-lane roundabouts. These locations will be further analyzed during concept refinement as the project progresses.

	Fair Traffic		**Higher Growth - 2050**	
	2030	**2050**	**AM**	**PM**
WB Ramps	27.3 (C) 0.83	52.5 (D) 1.05	25.0 (C) 0.80	35.5 (D) 0.96
EB Ramps	10.2 (B) 0.46	12.8 (B) 0.57	17.8 (B) 0.72	17.1 (B) 0.58
West Roundabout	4.7 (A) 0.70	5.9 (A) 0.87	4.9 (A) 0.46	4.7 (A) 0.65
East Roundabout	17.3 (C) 0.93	51.1 (F) 1.26	4.6 (A) 0.51	6.7 (A) 0.62

4.5 ALTERNATIVES DEVELOPMENT – FARM ROAD 94

In January 2022, a Core Team meeting involving the Ozarks Transportation Organization (OTO), Missouri Department of Transportation (MoDOT), City of Springfield, and Greene County was held to discuss two (2) different intersection alternatives at Farm Road 94. The two intersection alternatives presented were:

- Alternative 1 – Farm Road 94 J-Turn
- Alternative 2 – Farm Road 94 Right-In, Right-out

During the January meeting, both alternatives were discussed and viewed as viable solutions. The group recommended that both be brought up to the public in the public meeting.

Alternatives were developed that are consistent with both MoDOT's *Engineering Policy Guide (EPG*) and the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets.* **Appendix 1A** shows conceptual layouts of the alternatives that were further analyzed.

Initial screening of the two alternatives was conducted in conjunction with MoDOT. Evaluation matrices were created for each alternative related to Traffic Operations, Safety, Right of Way, Structures, Environmental, Utilities, Economic Development, Purpose and Need, and Costs.

4.6 FINAL STUDY ALTERNATIVES – FARM ROAD 94

Based upon the initial screening evaluation, both alternatives were carried forward for further study. Both alternatives were evaluated using the data from the evaluation matrices. Other criteria for optimal location, right of way impacts, constructability, maintenance of traffic and costs were also included. Traffic scenarios were analyzed using Synchro and VISSIM traffic modeling software. HSM predictive safety analyses were conducted to compare the relative safety performance of the two interchange options.

<u>Alternative 1 – Farm Road 94 J-Turn</u>

Appendix A – Alternative 1 Exhibit shows the conceptual layout. The major features of Alternative 1 include:

- Construct J-Turn Intersection at Farm Road 94
  - Includes Right Turn Lanes for Northbound and Southbound movements
  - Includes Acceleration Lanes for Northbound and Southbound movements
  - Slotted Route 13 Northbound and Southbound left turn lanes

Benefits

The Farm Road 94 intersection has a long crash history, and the implementation of the J-Turn intersection would significantly reduce the crash risk of the intersection while still providing access.

Disadvantages

The current intersection is a full access stop-controlled intersection. The J-Turn intersection would create adverse travel for through and left turn movements from Farm Road 94.

<u>Alternative 2 – Farm Road 94 Right-In-Right-Out</u>

Appendix A – Alternative 2 Exhibit shows the conceptual layout. The major features of Alternative 2 include:

- Construct Right-In-Right-Out Intersection at Farm Road 94
  - Includes Right Turn Lanes for Northbound and Southbound movements
  - Includes Acceleration Lanes for Northbound and Southbound movements

Benefits

The Farm Road 94 intersection has a long crash history, and the implementation of the Right-In-Right-Out intersection would significantly reduce the crash risk of the intersection more than the J-Turn alternative.

Disadvantages

The current intersection is a full access stop-controlled intersection. The Right-In-Right-Out intersection would significantly reduce access resulting in adverse travel and modified travel patterns. Several vehicle movements would be prohibited, requiring taking different routes or making a U-turn at a downstream intersection.

4.7 COST ESTIMATES

High-level conceptual cost estimates were developed for each alternative throughout the process. Cost estimates included Construction Costs, Utility Relocations, Right of Way, Preliminary Engineering (PE), and Construction Engineering (CE). A refined conceptual cost estimate was developed on the selected Improvement Alternate, the SB-EB Flyover and Farm Road 94 J-Turn, and provided to MoDOT for STIP planning purposes. These estimates are attached in **Appendix B**. A summary of the total project costs for each alternative can also be found in **Appendix B.**

4.8 SATISFACTION OF THE PURPOSE AND NEED

The proposed interchange improvements fulfill the project's purpose and need by providing efficient and safe traffic operations for all projected traffic scenarios. The separation of the Southbound to Eastbound movement via the flyover ramp, in addition to the other recommended improvements, will meet the goal of alleviating the congestion while improving safety for all users of the corridor. The proposed interchange is designed to accommodate the elevated traffic generated by the events at the nearby fairground.

5.0 CONSTRUCTION IMPACTS

5.1 UTILITIES

City Utilities of Springfield (CU) has a 30" water main running parallel to Route 13 along the east side of the roadway. There is a high probability this main will be impacted by the grading for the proposed Norton underpass on Route 13 north of I-44. This is a critical facility on CU's water system. The future project schedule should include adequate time for CU to generate relocation plans to mitigate the roadway impacts. If Alternative #6 is selected to move forward, engaging CU engineering as soon as practical to work through and mitigate conflicts will be critical to the project schedule. Due to the demand on this water main, it is highly likely that any cutover work will have to be performed in early spring or late fall, which has the potential to impact project schedule.

CU has a 10" gas main crossing under Route 13 on the north side of I-44. It is a 60-pound main which is on the high end for distribution pressure. CU renewed this main in 2019 with polyethylene as part of a Missouri Public Service Commission mandate to evaluate steel in steel gas facilities. Depending on the proximity of the underpass to the gas main, it might be possible to salvage the existing crossing and only relocate the impacted ends. The existing gas main should be potholed on both sides of Route 13 to confirm the exact location.

CU electric has an aerial 3 phase primary power crossing over I-44 on the east side of Route 13. This line also crosses over Route 13 on the north side of I-44. It appears both crossings will be impacted by the proposed Alternate #6 improvements. With the elevation differential created by the flyover ramp, it is strongly recommended to consider converting these power line crossings from overhead to underground.

Lumen (CenturyLink National) has a 288-count fiber optic line in the I-44 median. I-44 is a reimbursable route as per the agreement between Lumen and MoDOT. Any fiber relocation work necessary to accommodate the flyover bridge bent in the median will be at the expense of the project owner.

As utility conflicts are discovered during the preliminary plan phase, the identified impact(s) are to be brought to the attention of the utility owner. The utility owner is to provide sufficient investigation and develop a tentative relocation plan to mitigate the impact(s). Any additional utility easements necessary to accommodate the relocation work are to be shown on the R/W plans and acquired for the project.

The noted utilities are located in a combination of private easement and public R/W. When impacts are identified, a determination is to be made if those impacts fall within existing easements or within public R/W. Any utility reimbursement by the project owner is to be included within the programming estimate to account for overall project cost. High-Level Conceptual utility relocation costs have been included in the estimates in **Appendix B**.

5.2 MAINTENANCE OF TRAFFIC

A detailed construction phasing plan will be needed for this project to minimize disruptions to the traveling public along Route 13. Construction of the interchange, ramps and other associated roadway improvements are expected to result in significant traffic disruption to Route 13. Impacts to I-44 will be minimalized with much of the impacts resulting from the ramp tie-ins, fly-over ramp construction, and replacement of the existing Route 13 structure over I-44.

Temporary shoulder closures and potential lane closures will be required for construction of retaining walls and bridge piers. Lane closures will likely be required when bridge structures are installed.

5.3 LAND USE WITHIN THE STUDY AREA

Much of the land within the project area consists of developed commercial properties with residential neighborhoods bordering the project limits.

5.4 ENVIRONMENTAL SUMMARY

ENVIRONMENTAL CLASSIFICATION:
A Programmatic Categorical Exclusion (PCE) is the expected classification for this project. The conceptual request for environmental services (RES) submittal was reviewed by MoDOT on June 13, 2022. A updated RES will be submitted at each project development milestone. All environmental concerns that are identified will be addressed.

PUBLIC HEARING/PUBLIC MEETING:
The project at a minimum will require a public meeting with a public hearing being a possibility depending on the ultimate design. Public meetings and engagements have been ongoing and will continue as the project design progresses.

SECTION 4(F) AND SECTION 6(F):
Three recreational facilities are located near the project study area. Dickerson Park Zoo is located in the northeast quadrant of the I-44 and Route 13 interchange. The Ozark Empire Fairgrounds are located along the north side of I-44, east of Route 13. Doling Park is located south of I-44 at the eastern terminus of the project study area. Any impacts to these properties will require Section 4(f) coordination with the property Official with Jurisdiction.

THREATENED AND ENDANGERED SPECIES:
If any trees are removed for the project, they will need to be assessed for potential habitat for the federally endangered Indiana bat and the federally threatened Northern long-eared bat. Sink hole areas are mapped in the northwest quadrant of the I-44 and Route 13 interchange which may provide habitat for the federally endangered gray bat. The project study area will need to be evaluated for the presence of cave/karst features.

404 PERMIT:
The National Wetland Inventory and National Hydrography Dataset indicate multiple streams, including Spring Branch, Dickerson Branch, and Doling Branch, and two freshwater ponds within the project study area. Spring Branch is located in a forested area in the western portion of the project study area. Any impacts to these stream or other jurisdictional waters of the United States identified within the project study area will a 404 permit.

SECTION 106:
No National Register of Historic Places sites are located within or adjacent to the project study area. Soil disturbance outside the existing right-of-way will likely require a Section 106 submittal to the Missouri State Historic Preservation Office and an archaeological survey.

FLOODPLAIN MANAGEMENT (NO RISE CERT.):
The project study area is located in an area of minimal flood hazard, with the exception of the eastern leg of the project study area, which is located in the floodway and 1% and 0.2% annual chance flood hazard zones of Dickerson Branch and Doling Branch. A floodplain development permit will be required if construction occurs in this area.

STORMWATER QUALITY:
Due to the project study area being within a regulated MS4 and Urbanized Area and disturbing greater than one acre, permanent Best Management Practices (BMPs) must be considered.

HAZARDOUS MATERIAL:
Multiple existing and former underground storage tank sites are located within the project study area, with most of them concentrated along Route 13, south of I-44. Impacts to these sites may require additional investigation based on their operating status.

FARMLAND:
Portions of the project study area are located outside the U.S. Census urban area of Springfield, MO. Any new right-of-way and permanent easements will require a farmland impact rating from the U.S. Department of Agriculture Natural Resources Conservation Service.

AIR QUALITY:
Greene County, MO is an attainment area for the Clean Air Act. The project is not expected to result in an exceedance of the National Ambient Air Quality Standards, or the criteria set by the state of Missouri for hydrogen sulfide and sulfuric acid. Fugitive dust and noise from construction and minor traffic disruptions are expected.

NOISE ASSESSMENT:
Noise sensitive areas, including residential areas, churches, and parks, are located within or near the project study area. If the project alternatives meet the criteria of a Type 1 Project, then a noise analysis will be required.

See Appendix E of the Draft Report for Environmental Resources Map and the Conceptual RES Submittal.

6.0 RECOMMENDATIONS

The proposed design includes the addition of a flyover ramp to the I-44 at Route 13 interchange, grade separation and conversion of the Route 13 and Norton Road intersection, and the conversion of the Route 13 at Farm Road 94 intersection to a J-Turn configuration.

These proposed improvements are expected to improve the safety of the corridor and accommodate the design traffic volumes. Further analysis will help refine the design to ensure proper operations for both typical and event-based peak hour traffic demands.

Attachments:
Appendix A – Route 13/I-44 Concept Exhibits
Appendix 1A – Farm Road 94 Concept Exhibits
Appendix B – Concept Project Costs: Engineers Opinion of Probable Project Cost
Appendix C – Traffic Operational Analysis Results
Appendix D – Highway Safety Manual Reports
Appendix E – Environmental Mapping Exhibit & Conceptual RES
Appendix F – Public Involvement Feedback

APPENDIX A – ROUTE 13/I-44 CONCEPT EXHIBITS

North 13 Corridor Study

Ozark Transportation Organization North Highway 13 Corridor Study

STBG-9901(835)

Alternative #1 Expanded DDI

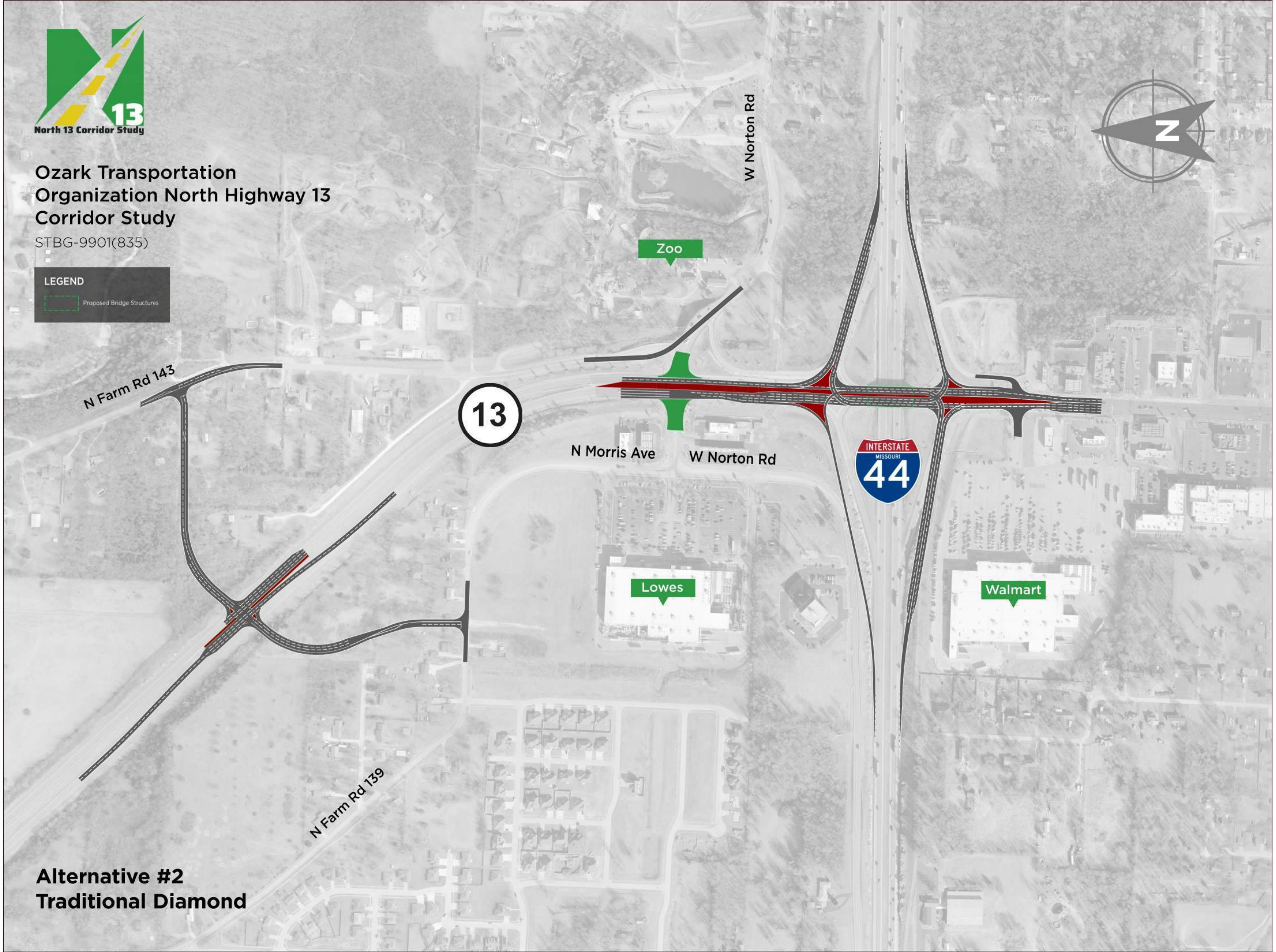
North 13 Corridor Study

Ozark Transportation Organization North Highway 13 Corridor Study

STBG-9901(835)

LEGEND

▭	Proposed Bridge Structures



Alternative #2 Traditional Diamond

North 13 Corridor Study

Ozark Transportation Organization North Highway 13 Corridor Study

STBG-9901(835)

LEGEND

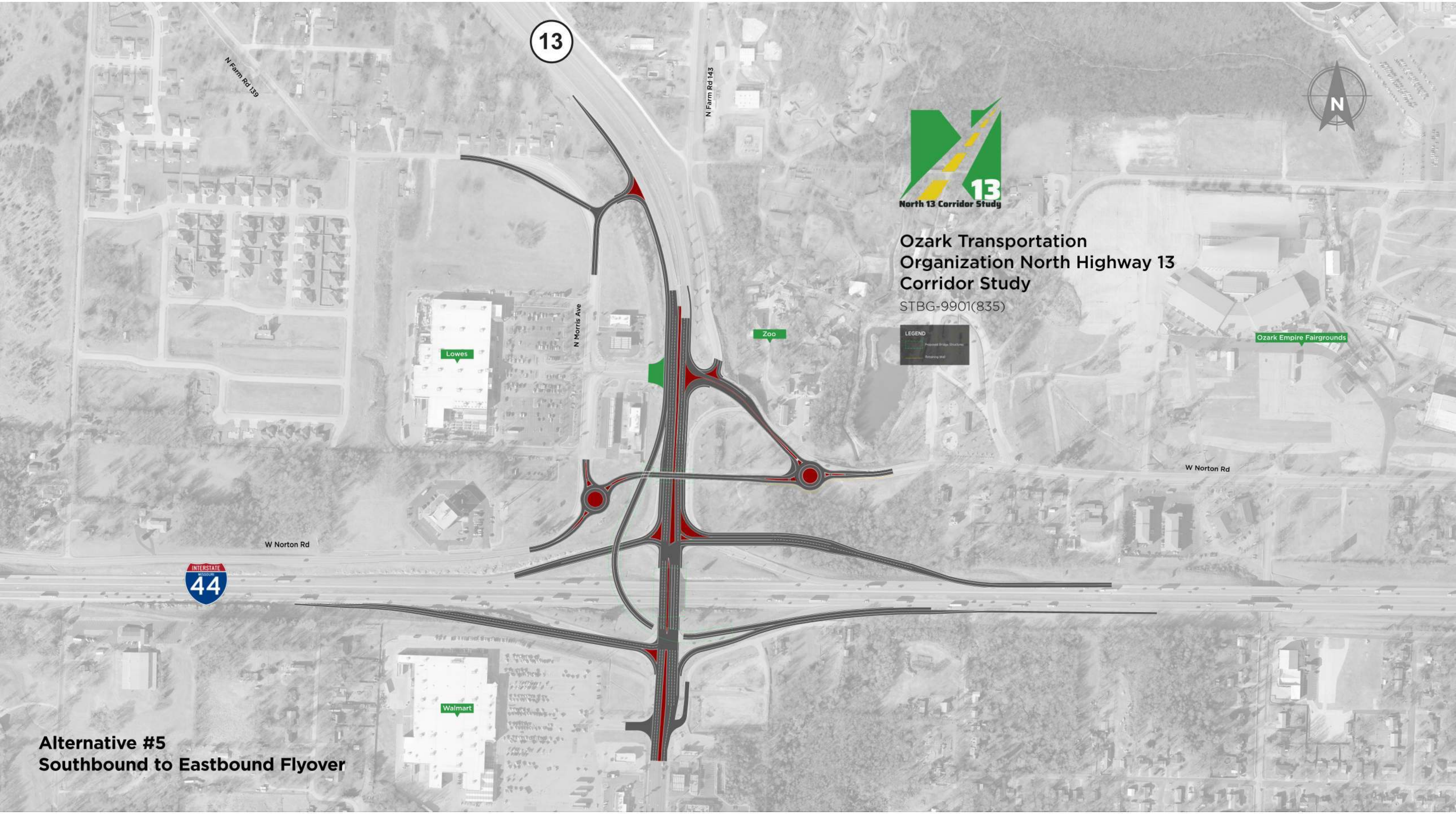
▭ Proposed Bridge Structures

Alternative #3
SPUI (Single-Point Urban Interchange)

Alternative #4
Park Street Interchange

Ozark Transportation Organization North Highway 13 Corridor Study

STBG-9901(835)



Ozark Transportation Organization North Highway 13 Corridor Study

STBG-9901(835)

LEGEND

Proposed Bridge Structures

Retaining Wall

Alternative #5
Southbound to Eastbound Flyover

APPENDIX 1A – FARM ROAD 94 CONCEPT EXHIBITS

North 13 Corridor Study

Ozark Transportation
Organization North Highway 13
Corridor Study

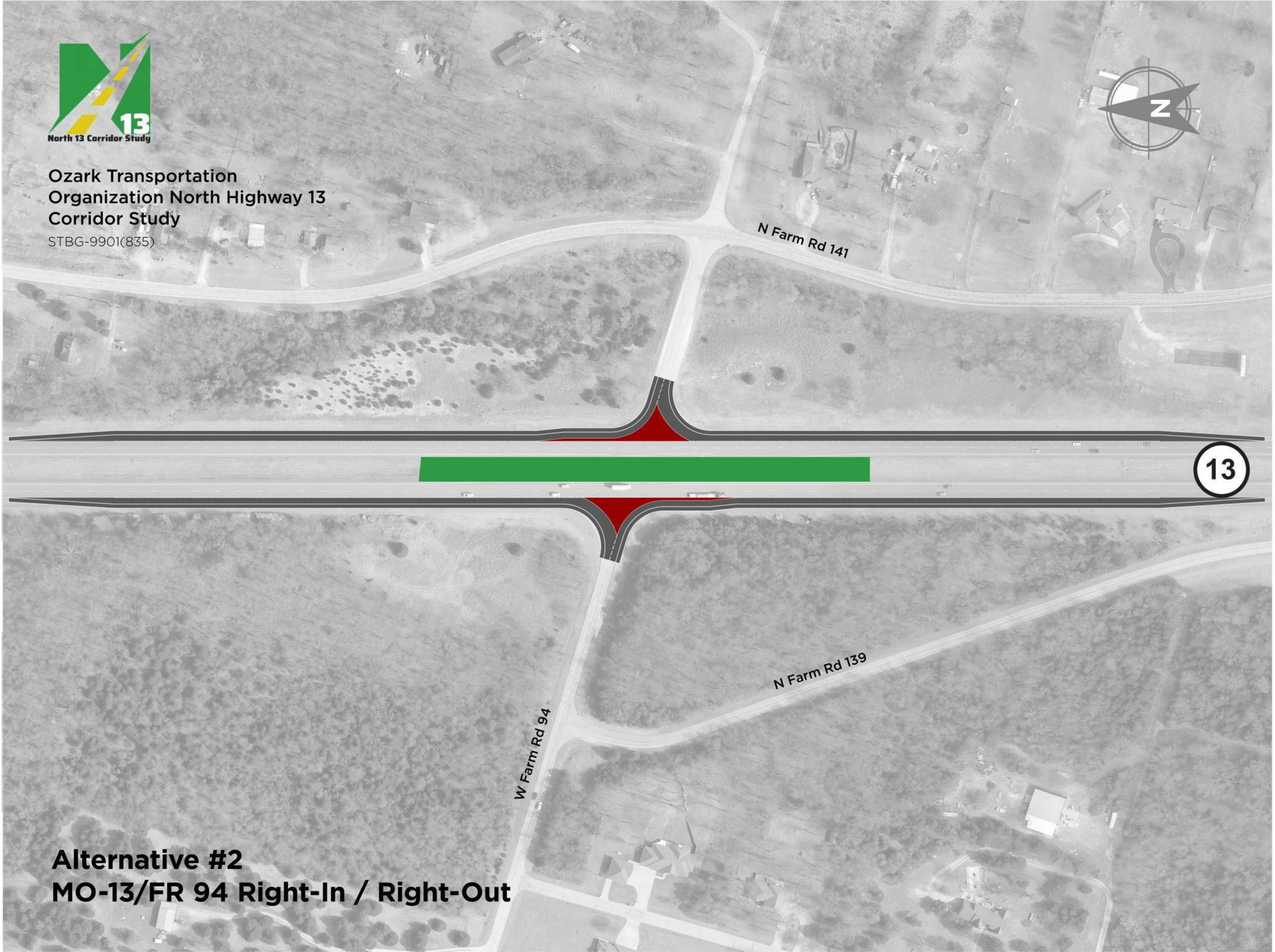
STBG-9901(835)

Alternative #1
MO-13/FR 94 J-Turn

North 13 Corridor Study

Ozark Transportation Organization North Highway 13 Corridor Study

STBG-9901(835)



Alternative #2
MO-13/FR 94 Right-In / Right-Out

APPENDIX B – CONCEPT PROJECT COSTS: ENGINEERS OPINION OF PROBABLE PROJECT COST

OTO - ROUTE 13 & I-44 INTERCHANGE
INTERCHANGE ALTERNATIVE PROGRAM ESTIMATES
April 22, 2022

		Park Street Interchange	SB-EB Flyover and Associated Improvements	Expanded DDI w/Continuous Green T's	Traditional Diamond w/Relocated Norton	Park Street Interchange (C-D) w/Green T Intersection	Single Point Interchange (SPUI)
PROGRAM DOLLARS	Construction Cost	$44,858,738	$31,620,804	$14,061,804	$13,283,859	$37,668,232	$20,680,823
	Preliminary Engineering (10%)	$4,485,874	$3,162,080	$1,406,180	$1,328,386	$3,766,823	$2,068,082
	Construction Engineering (15%)	$6,728,811	$4,743,121	$2,109,271	$1,992,579	$5,650,235	$3,102,123
	Right of Way	$7,500,000	$5,500,000	$100,000	$3,000,000	$7,250,000	$0
	Right of Way Incidentals	$300,000	$50,000	$25,000	$50,000	$325,000	$0
	Utility Relocation Costs	$1,000,000	$850,000	$200,000	$300,000	$750,000	$100,000
	TOTAL	**$64,873,422.18**	**$45,926,005.35**	**$17,902,255.00**	**$19,954,823.75**	**$55,410,289.50**	**$25,951,028.13**
	ESTIMATE ASSUMPTIONS & KEY NOTES	DESIGN ESTIMATE IS BASED ON CONCEPT DESIGN & CAN CHANGE BASED ON FINAL DESIGN APPROVAL					
		ANTICIPATED UTILITY CONFLICTS INCLUDE OVERHEAD TRANSMISSION LINE (ACROSS ROUTE 13), OVERHEAD ELECTRIC (ACROSS I-44), COS SANITARY SEWER AND FIBER IN MEDIAN OF I-44					
		ROW IMPACTS ARE BASED ON CONCEPT DESIGN & 2022 DOLLARS.					

OTO - ROUTE 13 & I-44 INTERCHANGE

SB-EB FLYOVER ESTIMATES

April 1, 2022

CONSTRUCTION DOLLARS (2030)

ITEM	UNIT COSTS		SB-EB Flyover and Associated Improvements	
Removal of Improvements	$200,000.00	/ LS	2	$400,000
Clearing and Grubbing	$3,000.00	/ AC	1	$3,000
Class A Excavation	$10.00	/ CY	20,000.00	$200,000
Class C Excavation	$50.00	/ CY	4,000.00	$200,000
Compacting Embankment	$5.00	/ CY	8,000.00	$40,000
Embankment In Place	$15.00	/ CY	35,000.00	$525,000
Full Depth Pavement	$65.00	/ SY	50,731.19	$3,297,527
Full Depth Shoulder	$55.00	/ SY	13,750.00	$756,250
Base	$9.00	/ SY	85,778.19	$772,004
Curb and Gutter	$40.00	/ LF	7,099.00	$283,960
Interchange Signal	$250,000.00	/ EA	2.00	$500,000
Intersection Signal	$250,000.00	/ EA	-	$0
Lighting	$300,000.00	/ EA	0.70	$210,000
Sidewalk/Medians/Truck Aprons	$70.00	/ SY	4,750.00	$332,500
Drainage	$650,000.00	/ LS	0.50	$325,000
Park St. Interstate Overpass	$175.00	/ SF	-	$0
Ex. Route 13 Overpass Replacement	$175.00	/ SF	22,575.00	$3,950,625
SB-EB Flyover	$175.00	/ SF	40,800.00	$7,140,000
Additional Structure Costs (Additional Height)	$15.00	/ SF	17,024.00	$255,360
NB Park to NB Route 13 Flyover	$175.00	/ SF	-	$0
Bridge over Norton	$175.00	/ SF	6,785.00	$1,187,375
MSE Walls	$70.00	/ SF	32,000.00	$2,240,000
Subtotal				$22,618,601
Mobilization			6.0%	$1,357,116
Erosion Control			2.0%	$452,372
Traffic Control			5.0%	$1,130,930
Signing			1.5%	$339,279
Pavement Marking			1.0%	$226,186
Contractor Furnished Surveying and Staking			1.0%	$226,186
Subtotal				$3,732,069
Contingency	20%			$5,270,134
			Subtotal	**$31,620,804**

PROGRAM DOLLARS

	SB-EB Flyover and Associated Improvements
Construction Cost	$31,620,804
Preliminary Engineering (10%)	$3,162,080
Construction Engineering (15%)	$4,743,121
Right of Way	$5,500,000
Right of Way Incidentals	$50,000
Utility Relocation Costs	$850,000
TOTAL	**$45,926,005.35**

OTO - ROUTE 13 & I-44 INTERCHANGE
FARM ROAD 94 ALTERNATIVE PROGRAM ESTIMATES
April 22, 2022

		Right in/Right Out	J-Turn
PROGRAM DOLLARS	Construction Cost	$1,137,745	$2,458,405
	Preliminary Engineering (15%)	$170,662	$368,761
	Construction Engineering (16%)	$182,039	$393,345
	Right of Way	$0	$0
	Right of Way Incidentals	$0	$0
	Utility Relocation Costs	$10,000	$10,000
	TOTAL	**$1,500,446.27**	**$3,230,511.07**
	ESTIMATE ASSUMPTIONS & KEY NOTES	DESIGN ESTIMATE IS BASED ON CONCEPT DESIGN & CAN CHANGE BASED ON FINAL DESIGN APPROVAL	

OTO - ROUTE 13 & I-44 INTERCHANGE
FARM ROAD 94 J-TURN ESTIMATE
April 22, 2022

CONSTRUCTION DOLLARS (2030)

ITEM	UNIT COSTS		J-Turn	
Removal of Improvements	$5,000.00	/ LS	1	$5,000
Clearing and Grubbing	$3,000.00	/ AC	0	$0
Class A Excavation	$10.00	/ CY	2,500.00	$25,000
Class C Excavation	$50.00	/ CY	250.00	$12,500
Compacting Embankment	$5.00	/ CY	2,000.00	$10,000
Embankment In Place	$15.00	/ CY	2,000.00	$30,000
Full Depth Pavement	$65.00	/ SY	23,850.00	$1,550,250
Median	$70.00	/SY	1,720.00	$120,400
Base	$9.00	/ SY	23,850.00	$214,650
Drainage	$10,000.00	/ LS	1.00	$10,000
Subtotal				$1,977,800
Mobilization			6.0%	$118,668
Erosion Control			1.5%	$29,667
Traffic Control			2.0%	$39,556
Signing			1.5%	$29,667
Pavement Marking			1.0%	$19,778
Contractor Furnished Surveying and Staking			1.0%	$19,778
Subtotal				$257,114
Contingency	10%			$223,491
			Subtotal	**$2,458,405**
			ASSUMES NO ENVIRONMENTAL	
			CONCEPT DESIGN PHASE WITH MANY	
			PROJECT SCHEDULE & INFLATION	

PROGRAM DOLLARS

	J-Turn
Construction Cost	$2,458,405
Preliminary Engineering (15%)	$368,761
Construction Engineering (16%)	$393,345
Right of Way	$0
Right of Way Incidentals	$0
Utility Relocation Costs	$10,000
TOTAL	**$3,230,511.07**
ESTIMATE ASSUMPTIONS & KEY NOTES	DESIGN ESTIMATE IS BASED ON CONCEPT DESIGN & CAN CHANGE BASED ON FINAL DESIGN APPROVAL

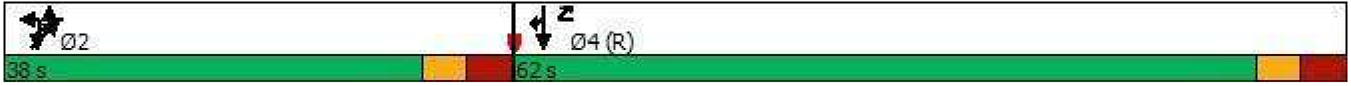
APPENDIX C – TRAFFIC OPERATIONAL ANALYSIS RESULTS

Lane Group	WBL2	WBR2	SBT	SBR2	NEL2	NET
Lane Configurations	↰	↱	↑↑	↱		↰↑
Traffic Volume (vph)	380	400	1390	250	100	660
Future Volume (vph)	380	400	1390	250	100	660
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850		0.850		
Flt Protected	0.950					0.993
Satd. Flow (prot)	1770	1583	3539	1583	0	3514
Flt Permitted	0.950					0.993
Satd. Flow (perm)	1770	1583	3539	1583	0	3514
Right Turn on Red	Yes	Yes		Yes	Yes	
Satd. Flow (RTOR)	43	49		272		43
Link Speed (mph)			45			30
Link Distance (ft)			162			113
Travel Time (s)			2.5			2.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	413	435	1511	272	109	717
Shared Lane Traffic (%)						
Lane Group Flow (vph)	413	435	1511	272	0	826
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)			0			0
Link Offset(ft)			0			0
Crosswalk Width(ft)			16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (ft)	20	20	100	20	20	100
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	6	20	20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Prot	NA	Prot	Split	NA
Protected Phases	2	4	4	4	2	2
Permitted Phases						
Detector Phase	2	4	4	4	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0

Lane Group	WBL2	WBR2	SBT	SBR2	NEL2	NET
Minimum Split (s)	24.9	24.9	24.9	24.9	24.9	24.9
Total Split (s)	38.0	62.0	62.0	62.0	38.0	38.0
Total Split (%)	38.0%	62.0%	62.0%	62.0%	38.0%	38.0%
Maximum Green (s)	31.1	55.1	55.1	55.1	31.1	31.1
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.6	3.6	3.6	3.6	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.9	6.9	6.9	6.9		6.9
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	31.1	55.1	55.1	55.1		31.1
Actuated g/C Ratio	0.31	0.55	0.55	0.55		0.31
v/c Ratio	0.71	0.49	0.78	0.27		0.74
Control Delay	35.1	14.3	10.0	0.6		15.5
Queue Delay	0.0	0.0	0.1	0.0		0.0
Total Delay	35.1	14.3	10.1	0.6		15.5
LOS	D	B	B	A		B
Approach Delay			8.7			15.5
Approach LOS			A			B

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 12 (12%), Referenced to phase 4:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 14.2	Intersection LOS: B
Intersection Capacity Utilization 95.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Route 13 & WB Ramps



	↰	↑	↓	↲	↗	↷
Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑↑		↱↱		
Traffic Volume (vph)	0	1060	0	1640	0	0
Future Volume (vph)	0	1060	0	1640	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	0.88	1.00	1.00
Frt				0.850		
Flt Protected						
Satd. Flow (prot)	0	3539	0	2787	0	0
Flt Permitted						
Satd. Flow (perm)	0	3539	0	2787	0	0
Link Speed (mph)		30	30		45	
Link Distance (ft)		114	450		101	
Travel Time (s)		2.6	10.2		1.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1152	0	1783	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1152	0	1783	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		24	24		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 60.7% ICU Level of Service B

Analysis Period (min) 15

Lane Group	EBL2	EBR2	NBT	NBR2	SWL2	SWT
Lane Configurations	↰	↱	↑↑	↱		↰↑
Traffic Volume (vph)	220	270	540	310	420	1350
Future Volume (vph)	220	270	540	310	420	1350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Lane Util. Factor	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850		0.850		
Flt Protected	0.950					0.988
Satd. Flow (prot)	1770	1583	3539	1583	0	3497
Flt Permitted	0.950					0.988
Satd. Flow (perm)	1770	1583	3539	1583	0	3497
Right Turn on Red	Yes	Yes		Yes	Yes	
Satd. Flow (RTOR)	43	46		337		78
Link Speed (mph)			30			45
Link Distance (ft)			140			161
Travel Time (s)			3.2			2.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	239	293	587	337	457	1467
Shared Lane Traffic (%)						
Lane Group Flow (vph)	239	293	587	337	0	1924
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)			0			0
Link Offset(ft)			0			0
Crosswalk Width(ft)			16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (ft)	20	20	100	20	20	100
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	6	20	20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Prot	NA	custom	Perm	NA
Protected Phases	4	2	2	2		4
Permitted Phases	4	2		2	4	

Lane Group	EBL2	EBR2	NBT	NBR2	SWL2	SWT
Detector Phase	4	2	2	2	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.9	24.9	24.9	24.9	24.9	24.9
Total Split (s)	69.0	31.0	31.0	31.0	69.0	69.0
Total Split (%)	69.0%	31.0%	31.0%	31.0%	69.0%	69.0%
Maximum Green (s)	62.1	24.1	24.1	24.1	62.1	62.1
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.6	3.6	3.6	3.6	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.9	6.9	6.9	6.9		6.9
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	None	None	None	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	63.3	22.9	22.9	22.9		63.3
Actuated g/C Ratio	0.63	0.23	0.23	0.23		0.63
v/c Ratio	0.21	0.74	0.73	0.54		0.86
Control Delay	7.1	41.9	34.1	13.5		10.8
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	7.1	41.9	34.1	13.5		10.8
LOS	A	D	C	B		B
Approach Delay			26.6			10.8
Approach LOS			C			B

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 3 (3%), Referenced to phase 4:EBSW, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 17.5 Intersection LOS: B
Intersection Capacity Utilization 91.5% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 11: Route 13 & EB Ramps

	↘	↰	↱	↗	↓	↙
Lane Group	EBR	WBR2	NBR	NBR2	SBT	SBR
Lane Configurations	↱	↱	↱↱		↑↱	
Traffic Volume (vph)	50	10	840	110	1570	50
Future Volume (vph)	50	10	840	110	1570	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.88	1.00	0.95	0.95
Frt	0.865	0.865	0.850		0.995	
Flt Protected						
Satd. Flow (prot)	1611	1611	2787	0	3522	0
Flt Permitted						
Satd. Flow (perm)	1611	1611	2787	0	3522	0
Link Speed (mph)					45	
Link Distance (ft)					246	
Travel Time (s)					3.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	11	913	120	1707	54
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	11	1033	0	1761	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Right	Right	Right	Right	Left	Right
Median Width(ft)					12	
Link Offset(ft)					0	
Crosswalk Width(ft)					16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	9	9	9		9
Sign Control					Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 55.0% ICU Level of Service A

Analysis Period (min) 15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱
Traffic Volume (vph)	50	80	240	260	80	40	200	590	270	200	1140	50
Future Volume (vph)	50	80	240	260	80	40	200	590	270	200	1140	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	300		50	300		450	300		200
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.887				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3139	0	3433	1863	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.369		
Satd. Flow (perm)	1770	3139	0	3433	1863	1583	3433	3539	1583	1333	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		131				159			293			165
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		401			728			450			1312	
Travel Time (s)		9.1			16.5			10.2			29.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	87	261	283	87	43	217	641	293	217	1239	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	348	0	283	87	43	217	641	293	217	1239	54
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2	6		6

19: Route 13 & Norton

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.2	24.2		11.2	24.2	24.2	11.4	24.4	24.4	11.4	24.4	24.4
Total Split (s)	14.8	24.2		16.0	25.4	25.4	14.0	48.3	48.3	11.5	45.8	45.8
Total Split (%)	14.8%	24.2%		16.0%	25.4%	25.4%	14.0%	48.3%	48.3%	11.5%	45.8%	45.8%
Maximum Green (s)	8.6	18.0		9.8	19.2	19.2	8.3	42.6	42.6	5.8	40.1	40.1
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.3	1.3	1.3	1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2		6.2	6.2	6.2	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	7.7	12.7		9.8	17.1	17.1	10.3	46.3	46.3	50.9	43.5	43.5
Actuated g/C Ratio	0.08	0.13		0.10	0.17	0.17	0.10	0.46	0.46	0.51	0.44	0.44
v/c Ratio	0.40	0.68		0.84	0.27	0.11	0.62	0.39	0.33	0.26	0.81	0.07
Control Delay	52.5	32.3		67.1	39.2	0.5	63.6	10.7	1.3	10.7	30.5	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.5	32.3		67.1	39.2	0.5	63.6	10.7	1.3	10.7	30.5	0.2
LOS	D	C		E	D	A	E	B	A	B	C	A
Approach Delay		35.0			54.3			18.3			26.6	
Approach LOS		C			D			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 28.1 Intersection LOS: C

Intersection Capacity Utilization 74.4% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 19: Route 13 & Norton

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	150	10	50	30	20	20	80	780	50	40	1450	130
Future Volume (vph)	150	10	50	30	20	20	80	780	50	40	1450	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	175		0	200		0	350		300
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.875			0.925			0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1630	0	1770	1723	0	1770	3507	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1630	0	1770	1723	0	1770	3507	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54			22			7				223
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		277			275			420			498	
Travel Time (s)		6.3			6.3			6.4			7.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	11	54	33	22	22	87	848	54	43	1576	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	65	0	33	44	0	87	902	0	43	1576	141
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6

24: Route 13 & Walmart

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	24.0	24.0		24.0	24.0		24.4	24.4		11.4	24.4	24.4
Total Split (s)	24.0	24.0		24.0	24.0		24.4	40.5		11.5	27.6	27.6
Total Split (%)	24.0%	24.0%		24.0%	24.0%		24.4%	40.5%		11.5%	27.6%	27.6%
Maximum Green (s)	18.2	18.2		18.2	18.2		18.5	34.6		5.6	21.7	21.7
Yellow Time (s)	3.7	3.7		3.7	3.7		4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	2.1	2.1		2.1	2.1		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		5.8	5.8		5.9	5.9		5.9	5.9	5.9
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	10.1	9.9		7.4	7.0		10.2	60.9		7.9	56.2	56.2
Actuated g/C Ratio	0.10	0.10		0.07	0.07		0.10	0.61		0.08	0.56	0.56
v/c Ratio	0.47	0.31		0.25	0.31		0.48	0.42		0.31	0.79	0.14
Control Delay	46.6	18.7		47.7	32.1		50.6	14.4		55.0	16.9	0.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	46.6	18.7		47.7	32.1		50.6	14.4		55.0	16.9	0.4
LOS	D	B		D	C		D	B		D	B	A
Approach Delay		38.6			38.8			17.6			16.5	
Approach LOS		D			D			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 46 (46%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

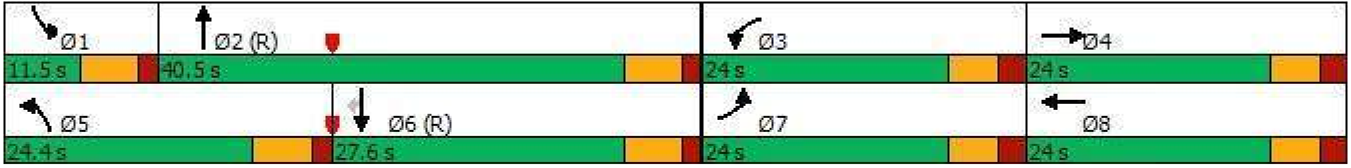
Maximum v/c Ratio: 0.79

Intersection Signal Delay: 19.1 Intersection LOS: B

Intersection Capacity Utilization 70.1% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 24: Route 13 & Walmart



Network Totals

Number of Intersections	6
Control Delay / Veh (s/v)	18
Queue Delay / Veh (s/v)	0
Total Delay / Veh (s/v)	18
Total Delay (hr)	101
Stops / Veh	0.41
Stops (#)	8241
Average Speed (mph)	12
Total Travel Time (hr)	153
Distance Traveled (mi)	1765
Fuel Consumed (gal)	207
Fuel Economy (mpg)	8.5
CO Emissions (kg)	14.48
NOx Emissions (kg)	2.82
VOC Emissions (kg)	3.36
Unserved Vehicles (#)	40
Vehicles in dilemma zone (#)	189
Performance Index	123.8

Lanes, Volumes, Timings

1: Route 13 & WB Ramps

06/20/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱↱	↰↰	↑↑			↑↑↑↑	↱
Traffic Volume (vph)	0	0	0	420	0	460	110	715	0	0	1550	275
Future Volume (vph)	0	0	0	420	0	460	110	715	0	0	1550	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	400		250
Storage Lanes	0		0	2		2	2		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	0.88	0.97	0.95	1.00	1.00	0.86	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	0	2787	3433	3539	0	0	6408	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	0	2787	3433	3539	0	0	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						363						299
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		617			589			523			1671	
Travel Time (s)		14.0			13.4			7.9			25.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	457	0	500	120	777	0	0	1685	299
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	457	0	500	120	777	0	0	1685	299
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Prot		Prot	Prot	NA			NA	Perm
Protected Phases				3		8	5	2			6	
Permitted Phases						8						6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				3		8	5	2			6	6
Switch Phase												
Minimum Initial (s)				5.0		5.0	5.0	5.0			5.0	5.0
Minimum Split (s)				11.0		24.0	11.0	24.0			24.0	24.0
Total Split (s)				31.0		31.0	15.0	64.0			49.0	49.0
Total Split (%)				32.6%		32.6%	15.8%	67.4%			51.6%	51.6%
Maximum Green (s)				25.0		25.0	9.0	58.0			43.0	43.0
Yellow Time (s)				4.0		4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0		2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0		6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0		3.0	3.0	3.0			3.0	3.0
Recall Mode				None		None	None	C-Max			C-Max	C-Max
Walk Time (s)						7.0		7.0			7.0	7.0
Flash Dont Walk (s)						11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)						0		0			0	0
Act Effct Green (s)				17.9		17.9	8.7	65.1			50.5	50.5
Actuated g/C Ratio				0.19		0.19	0.09	0.69			0.53	0.53
v/c Ratio				0.71		0.61	0.38	0.32			0.50	0.30
Control Delay				42.2		12.8	34.9	7.6			9.2	1.5
Queue Delay				0.0		0.0	0.0	0.0			0.0	0.0
Total Delay				42.2		12.8	34.9	7.6			9.2	1.5
LOS				D		B	C	A			A	A
Approach Delay					26.8			11.3			8.0	
Approach LOS					C			B			A	

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 73 (77%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 13.5 Intersection LOS: B
Intersection Capacity Utilization 70.2% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Route 13 & WB Ramps

Lanes, Volumes, Timings
6: Route 13

06/20/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	158	11	26	32	21	21	84	851	53	42	1616	147
Future Volume (vph)	158	11	26	32	21	21	84	851	53	42	1616	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	75		0	150		0	150		200
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.895			0.925			0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1667	0	1770	1723	0	1770	3507	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1667	0	1770	1723	0	1770	3507	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			23			7				105
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		498			484			463			472	
Travel Time (s)		11.3			11.0			7.0			7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	172	12	28	35	23	23	91	925	58	46	1757	160
Shared Lane Traffic (%)												
Lane Group Flow (vph)	172	40	0	35	46	0	91	983	0	46	1757	160
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	24.0	24.0		24.0	24.0		11.4	24.4		11.4	24.4	24.4
Total Split (s)	24.0	24.0		24.0	24.0		16.0	86.6		15.4	86.0	86.0
Total Split (%)	16.0%	16.0%		16.0%	16.0%		10.7%	57.7%		10.3%	57.3%	57.3%
Maximum Green (s)	18.2	18.2		18.2	18.2		10.1	80.7		9.5	80.1	80.1
Yellow Time (s)	3.7	3.7		3.7	3.7		4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	2.1	2.1		2.1	2.1		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		5.8	5.8		5.9	5.9		5.9	5.9	5.9
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	11.9	11.9		8.1	8.1		9.7	84.7		8.2	80.5	80.5
Actuated g/C Ratio	0.09	0.09		0.06	0.06		0.07	0.65		0.06	0.61	0.61
v/c Ratio	0.55	0.23		0.32	0.36		0.69	0.43		0.42	0.81	0.16
Control Delay	64.9	29.5		68.8	44.2		87.8	14.1		73.3	24.8	5.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	2.5	0.0
Total Delay	64.9	29.5		68.8	44.2		87.8	14.1		73.3	27.3	5.2
LOS	E	C		E	D		F	B		E	C	A
Approach Delay		58.2			54.8			20.3			26.6	
Approach LOS		E			D			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 131.1
Natural Cycle: 135
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 27.3 Intersection LOS: C
Intersection Capacity Utilization 75.2% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 6: Route 13

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↱			↑↱	
Traffic Volume (vph)	0	0	55	0	0	11	0	909	121	0	1750	55
Future Volume (vph)	0	0	55	0	0	11	0	909	121	0	1750	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865			0.865		0.982			0.995	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	3476	0	0	3522	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	3476	0	0	3522	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		250			328			472			331	
Travel Time (s)		5.7			7.5			7.2			5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	60	0	0	12	0	988	132	0	1902	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	60	0	0	12	0	1120	0	0	1962	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 60.2% ICU Level of Service B

Analysis Period (min) 15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱					↑↑↑	↱	↰↰	↑↑	
Traffic Volume (vph)	250	0	300	0	0	0	0	575	345	465	1505	0
Future Volume (vph)	250	0	300	0	0	0	0	575	345	465	1505	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3433	0	1583	0	0	0	0	5085	1583	3433	3539	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3433	0	1583	0	0	0	0	5085	1583	3433	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103						375			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		650			687			331			523	
Travel Time (s)		14.8			15.6			5.0			7.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	0	326	0	0	0	0	625	375	505	1636	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	272	0	326	0	0	0	0	625	375	505	1636	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					2	1	1	2	
Detector Template	Left		Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20		20					100	20	20	100	
Trailing Detector (ft)	0		0					0	0	0	0	
Detector 1 Position(ft)	0		0					0	0	0	0	
Detector 1 Size(ft)	20		20					6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			4						2			
Detector Phase	7		4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0		5.0					5.0	5.0	5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	11.0		24.0					24.0	24.0	11.0	24.0	
Total Split (s)	32.0		32.0					36.0	36.0	27.0	63.0	
Total Split (%)	33.7%		33.7%					37.9%	37.9%	28.4%	66.3%	
Maximum Green (s)	26.0		26.0					30.0	30.0	21.0	57.0	
Yellow Time (s)	4.0		4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Recall Mode	None		None					C-Max	C-Max	None	C-Max	
Walk Time (s)			7.0					7.0	7.0		7.0	
Flash Dont Walk (s)			11.0					11.0	11.0		11.0	
Pedestrian Calls (#/hr)			0					0	0		0	
Act Effct Green (s)	19.0		19.0					39.5	39.5	18.5	64.0	
Actuated g/C Ratio	0.20		0.20					0.42	0.42	0.19	0.67	
v/c Ratio	0.40		0.82					0.30	0.43	0.76	0.69	
Control Delay	33.5		40.6					20.6	4.3	49.1	7.5	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.1	
Total Delay	33.5		40.6					20.6	4.3	49.1	7.6	
LOS	C		D					C	A	D	A	
Approach Delay		37.4						14.5			17.4	
Approach LOS		D						B			B	

Intersection Summary

Area Type: Other

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 1 (1%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 19.8 Intersection LOS: B

Intersection Capacity Utilization 70.2% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 13: Route 13 & EB Ramps

	↰	↑	↱	↳	↓	↲	↗	↗	↷	↙	↙	↶
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱		↰↰	↑	↱
Traffic Volume (vph)	225	660	290	215	1275	55	60	90	270	280	90	45
Future Volume (vph)	225	660	290	215	1275	55	60	90	270	280	90	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		450	300		200	100		0	300		50
Storage Lanes	2		0	2		1	2		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	0.95	0.97	1.00	1.00
Frt			0.850			0.850		0.888				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3143	0	3433	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3143	0	3433	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			315			162		183				162
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1671			847			353			374	
Travel Time (s)		25.3			12.8			8.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	717	315	234	1386	60	65	98	293	304	98	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	245	717	315	234	1386	60	65	391	0	304	98	49
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6						8

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	5	2	2	1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.4	24.4	24.4	11.4	24.4	24.4	11.4	24.4		11.4	24.4	24.4
Total Split (s)	13.1	38.7	38.7	17.2	42.8	42.8	11.4	24.4		14.7	27.7	27.7
Total Split (%)	13.8%	40.7%	40.7%	18.1%	45.1%	45.1%	12.0%	25.7%		15.5%	29.2%	29.2%
Maximum Green (s)	7.4	33.0	33.0	11.5	37.1	37.1	5.7	18.7		9.0	22.0	22.0
Yellow Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3		1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7		5.7	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	11.2	39.8	39.8	11.2	39.8	39.8	5.7	12.2		9.0	17.7	17.7
Actuated g/C Ratio	0.12	0.42	0.42	0.12	0.42	0.42	0.06	0.13		0.09	0.19	0.19
v/c Ratio	0.61	0.48	0.37	0.58	0.93	0.08	0.32	0.70		0.94	0.28	0.11
Control Delay	43.6	17.5	5.6	45.4	40.2	0.2	47.2	27.1		80.1	35.6	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	43.6	17.5	5.6	45.4	40.2	0.2	47.2	27.1		80.1	35.6	0.6
LOS	D	B	A	D	D	A	D	C		F	D	A
Approach Delay		19.6			39.5			30.0			61.8	
Approach LOS		B			D			C			E	

Intersection Summary

Area Type: Other

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 57 (60%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 34.4 Intersection LOS: C

Intersection Capacity Utilization 79.9% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 19: Route 13 & Norton

Route 13

Direction	NB	SB	All
Control Delay / Veh (s/v)	14	12	13
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	14	12	13
Total Delay (hr)	24	37	61
Stops / Veh	0.33	0.39	0.37
Stops (#)	2017	4166	6183
Average Speed (mph)	13	17	15
Total Travel Time (hr)	38	68	106
Distance Traveled (mi)	481	1126	1608
Fuel Consumed (gal)	51	113	164
Fuel Economy (mpg)	9.4	10.0	9.8
CO Emissions (kg)	3.60	7.88	11.48
NOx Emissions (kg)	0.70	1.53	2.23
VOC Emissions (kg)	0.83	1.83	2.66
Unserved Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	45	140	185
Performance Index	29.7	48.3	78.0

Network Totals

Number of Intersections	6
Control Delay / Veh (s/v)	16
Queue Delay / Veh (s/v)	0
Total Delay / Veh (s/v)	16
Total Delay (hr)	87
Stops / Veh	0.41
Stops (#)	7929
Average Speed (mph)	13
Total Travel Time (hr)	141
Distance Traveled (mi)	1852
Fuel Consumed (gal)	203
Fuel Economy (mpg)	9.1
CO Emissions (kg)	14.22
NOx Emissions (kg)	2.77
VOC Emissions (kg)	3.30
Unserved Vehicles (#)	0
Vehicles in dilemma zone (#)	185
Performance Index	109.5

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰	↱	↱	↰↰	↑↑			↑↑↑	↱
Traffic Volume (vph)	0	0	0	420	0	460	110	715	0	0	1085	275
Future Volume (vph)	0	0	0	420	0	460	110	715	0	0	1085	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		350
Storage Lanes	0		0	2		1	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	0.95	0.97	0.95	1.00	1.00	0.91	1.00
Frt					0.850	*0.950						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	1504	1681	3433	3539	0	0	5085	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	1504	1681	3433	3539	0	0	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					224							289
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		586			532			506			696	
Travel Time (s)		13.3			8.1			7.7			10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	442	0	484	116	753	0	0	1142	289
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	0	0	442	242	242	116	753	0	0	1142	289
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8	2 8!	5	2!			6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				4	8	2 8	5	2			6	6
Switch Phase												
Minimum Initial (s)				5.0	5.0		5.0	5.0			5.0	5.0
Minimum Split (s)				24.9	24.0		24.9	24.9			24.0	24.0
Total Split (s)				31.0	31.0		26.0	69.0			43.0	43.0
Total Split (%)				31.0%	31.0%		26.0%	69.0%			43.0%	43.0%
Maximum Green (s)				24.1	25.0		19.1	62.1			37.0	37.0
Yellow Time (s)				3.3	4.0		3.3	3.3			4.0	4.0
All-Red Time (s)				3.6	2.0		3.6	3.6			2.0	2.0
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)				6.9	6.0		6.9	6.9			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	3.0
Recall Mode				None	None		Max	C-Max			C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)				11.0	11.0		11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)				0	0		0	0			0	0
Act Effct Green (s)				18.1	19.0	100.0	25.1	68.1			37.0	37.0
Actuated g/C Ratio				0.18	0.19	1.00	0.25	0.68			0.37	0.37
v/c Ratio				0.71	0.52	0.14	0.13	0.31			0.61	0.38
Control Delay				45.0	10.2	0.2	22.5	6.9			27.3	4.2
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				45.0	10.2	0.2	22.5	6.9			27.3	4.2
LOS				D	B	A	C	A			C	A
Approach Delay					24.2			9.0			22.6	
Approach LOS					C			A			C	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 61 (61%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 19.4 Intersection LOS: B

Intersection Capacity Utilization 58.4% ICU Level of Service B

Analysis Period (min) 15

* User Entered Value

! Phase conflict between lane groups.

Splits and Phases: 3: WB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑↑	↑↑	↱
Traffic Volume (vph)	0	550	0	765	1275	270
Future Volume (vph)	0	550	0	765	1275	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			300
Storage Lanes	0	1	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	5085	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	5085	3539	1583
Link Speed (mph)	30			45	45	
Link Distance (ft)	343			942	447	
Travel Time (s)	7.8			14.3	6.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	579	0	805	1342	284
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	579	0	805	1342	284
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Free			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 76.0% ICU Level of Service D

Analysis Period (min) 15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱					↑↑↑↑	↱		↑↑↑	
Traffic Volume (vph)	250	0	300	0	0	0	0	575	345	0	1505	0
Future Volume (vph)	250	0	300	0	0	0	0	575	345	0	1505	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	0		225	0		0
Storage Lanes	2		1	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00	0.91	1.00
Frt			0.850						0.850			
Flt Protected	0.950											
Satd. Flow (prot)	3433	0	1583	0	0	0	0	6408	1583	0	5085	0
Flt Permitted	0.950											
Satd. Flow (perm)	3433	0	1583	0	0	0	0	6408	1583	0	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			43						363			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		611			631			359			506	
Travel Time (s)		13.9			14.3			5.4			7.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	0	316	0	0	0	0	605	363	0	1584	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	263	0	316	0	0	0	0	605	363	0	1584	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					2	1		2	
Detector Template	Left		Right					Thru	Right		Thru	
Leading Detector (ft)	20		20					100	20		100	
Trailing Detector (ft)	0		0					0	0		0	
Detector 1 Position(ft)	0		0					0	0		0	
Detector 1 Size(ft)	20		20					6	20		6	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0		0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type	Prot		Prot					NA	Perm		NA	
Protected Phases	4		4					2			6	
Permitted Phases	4		4						2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4		4					2	2		6	
Switch Phase												
Minimum Initial (s)	5.0		5.0					5.0	5.0		5.0	
Minimum Split (s)	24.9		24.9					24.9	24.9		24.0	
Total Split (s)	44.0		44.0					56.0	56.0		56.0	
Total Split (%)	44.0%		44.0%					56.0%	56.0%		56.0%	
Maximum Green (s)	37.1		37.1					49.1	49.1		50.0	
Yellow Time (s)	3.3		3.3					3.3	3.3		4.0	
All-Red Time (s)	3.6		3.6					3.6	3.6		2.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.9		6.9					6.9	6.9		6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0					3.0	3.0		3.0	
Recall Mode	Max		Max					C-Max	C-Max		C-Max	
Walk Time (s)	7.0		7.0					7.0	7.0		7.0	
Flash Dont Walk (s)	11.0		11.0					11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0		0					0	0		0	
Act Effct Green (s)	37.1		37.1					49.1	49.1		50.0	
Actuated g/C Ratio	0.37		0.37					0.49	0.49		0.50	
v/c Ratio	0.21		0.51					0.19	0.38		0.62	
Control Delay	22.0		24.5					12.7	2.6		9.1	
Queue Delay	0.0		0.0					0.0	0.0		0.2	
Total Delay	22.0		24.5					12.7	2.6		9.3	
LOS	C		C					B	A		A	
Approach Delay		23.3						8.9			9.3	
Approach LOS		C						A			A	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 81 (81%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 11.8	Intersection LOS: B
Intersection Capacity Utilization 58.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: EB Ramps

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↱			↑↑↱	
Traffic Volume (vph)	0	0	55	0	0	11	0	909	121	0	1750	55
Future Volume (vph)	0	0	55	0	0	11	0	909	121	0	1750	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.91	0.91
Frt			0.865			0.865		0.982			0.995	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	3476	0	0	5060	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	3476	0	0	5060	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		315			203			475			359	
Travel Time (s)		7.2			4.6			7.2			5.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	58	0	0	12	0	957	127	0	1842	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	58	0	0	12	0	1084	0	0	1900	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 45.1% ICU Level of Service A

Analysis Period (min) 15

	←	↖	↰	↑	↱	↘	↓	↙	↗	↗
Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations		↱		↑↑	↱		↑↑	↱		
Traffic Volume (vph)	0	105	0	660	515	0	1360	465	0	0
Future Volume (vph)	0	105	0	660	515	0	1360	465	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300	50	300		0	300		0	0	0
Storage Lanes	0	0	0		1	0		1	0	0
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Frt		0.865			0.850			0.850		
Flt Protected										
Satd. Flow (prot)	0	1611	0	3539	1583	0	3539	1583	0	0
Flt Permitted										
Satd. Flow (perm)	0	1611	0	3539	1583	0	3539	1583	0	0
Link Speed (mph)	30			45			45		30	
Link Distance (ft)	728			696			942		213	
Travel Time (s)	16.5			10.5			14.3		4.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	111	0	695	542	0	1432	489	0	0
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	111	0	695	542	0	1432	489	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)	0			0			0		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Sign Control	Free			Free			Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 40.9% ICU Level of Service A

Analysis Period (min) 15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	158	11	26	32	21	21	84	851	53	42	1616	147
Future Volume (vph)	158	11	26	32	21	21	84	851	53	42	1616	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	75		0	250		0	150		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.896			0.925			0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1669	0	1770	1723	0	1770	3507	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1669	0	1770	1723	0	1770	3507	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			22			7				158
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		263			255			419			475	
Travel Time (s)		6.0			5.8			6.3			7.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	166	12	27	34	22	22	88	896	56	44	1701	155
Shared Lane Traffic (%)												
Lane Group Flow (vph)	166	39	0	34	44	0	88	952	0	44	1701	155
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	24.0	24.0		24.0	24.0		11.4	24.4		11.4	24.4	24.4
Total Split (s)	24.0	24.0		24.0	24.0		11.4	40.6		11.4	40.6	40.6
Total Split (%)	24.0%	24.0%		24.0%	24.0%		11.4%	40.6%		11.4%	40.6%	40.6%
Maximum Green (s)	18.2	18.2		18.2	18.2		5.5	34.7		5.5	34.7	34.7
Yellow Time (s)	3.7	3.7		3.7	3.7		4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	2.1	2.1		2.1	2.1		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.8	3.8		3.8	3.8		3.9	3.9		3.9	3.9	3.9
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	12.2	11.9		9.4	9.0		12.6	62.8		9.9	57.9	57.9
Actuated g/C Ratio	0.12	0.12		0.09	0.09		0.13	0.63		0.10	0.58	0.58
v/c Ratio	0.40	0.18		0.20	0.25		0.40	0.43		0.25	0.83	0.16
Control Delay	43.0	21.2		44.1	28.7		44.8	13.6		55.7	16.2	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	43.0	21.2		44.1	28.7		44.8	13.6		55.7	16.2	0.3
LOS	D	C		D	C		D	B		E	B	A
Approach Delay		38.8			35.4			16.3			15.8	
Approach LOS		D			D			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

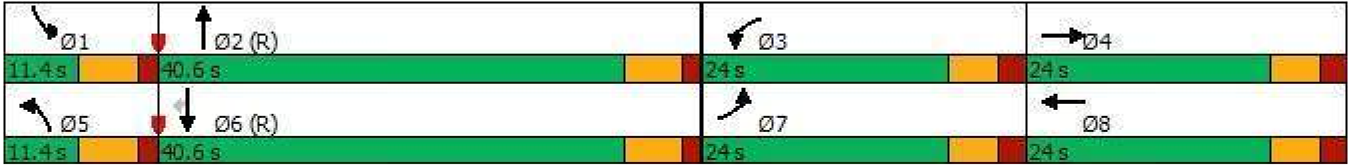
Maximum v/c Ratio: 0.83

Intersection Signal Delay: 17.9 Intersection LOS: B

Intersection Capacity Utilization 70.5% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 24:



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱↱	↰↰	↑↑			↑↑↑↑	↱
Traffic Volume (vph)	0	0	0	335	0	790	155	1345	0	0	1190	275
Future Volume (vph)	0	0	0	335	0	790	155	1345	0	0	1190	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	400		250
Storage Lanes	0		0	2		2	2		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	0.88	0.97	0.95	1.00	1.00	0.86	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	0	2787	3433	3539	0	0	6408	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	0	2787	3433	3539	0	0	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						98						299
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		617			589			523			1671	
Travel Time (s)		14.0			13.4			7.9			25.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	364	0	859	168	1462	0	0	1293	299
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	364	0	859	168	1462	0	0	1293	299
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Prot		Prot	Prot	NA			NA	Perm
Protected Phases				3		8	5	2			6	
Permitted Phases						8						6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				3		8	5	2			6	6
Switch Phase												
Minimum Initial (s)				5.0		5.0	5.0	5.0			5.0	5.0
Minimum Split (s)				11.0		24.0	11.0	24.0			24.0	24.0
Total Split (s)				42.0		42.0	15.0	58.0			43.0	43.0
Total Split (%)				42.0%		42.0%	15.0%	58.0%			43.0%	43.0%
Maximum Green (s)				36.0		36.0	9.0	52.0			37.0	37.0
Yellow Time (s)				4.0		4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0		2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0		6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0		3.0	3.0	3.0			3.0	3.0
Recall Mode				None		None	None	C-Max			C-Max	C-Max
Walk Time (s)						7.0		7.0			7.0	7.0
Flash Dont Walk (s)						11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)						0		0			0	0
Act Effct Green (s)				32.6		32.6	8.9	55.4			40.5	40.5
Actuated g/C Ratio				0.33		0.33	0.09	0.55			0.40	0.40
v/c Ratio				0.33		0.88	0.55	0.75			0.50	0.37
Control Delay				25.7		39.3	47.7	11.3			13.7	3.3
Queue Delay				0.0		0.0	0.0	1.2			0.0	0.0
Total Delay				25.7		39.3	47.7	12.5			13.7	3.3
LOS				C		D	D	B			B	A
Approach Delay					35.3			16.1			11.7	
Approach LOS					D			B			B	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 25 (25%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 19.8 Intersection LOS: B
Intersection Capacity Utilization 74.8% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Route 13 & WB Ramps

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	320	11	158	79	26	42	131	1191	21	42	1108	184
Future Volume (vph)	320	11	158	79	26	42	131	1191	21	42	1108	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	75		0	150		0	150		200
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.860			0.907			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1602	0	1770	1690	0	1770	3529	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1602	0	1770	1690	0	1770	3529	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		172			46			2				158
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		498			484			463			472	
Travel Time (s)		11.3			11.0			7.0			7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	12	172	86	28	46	142	1295	23	46	1204	200
Shared Lane Traffic (%)												
Lane Group Flow (vph)	348	184	0	86	74	0	142	1318	0	46	1204	200
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	24.0	24.0		24.0	24.0		11.4	24.4		11.4	24.4	24.4
Total Split (s)	24.0	24.0		24.0	24.0		14.1	40.5		11.5	37.9	37.9
Total Split (%)	24.0%	24.0%		24.0%	24.0%		14.1%	40.5%		11.5%	37.9%	37.9%
Maximum Green (s)	18.2	18.2		18.2	18.2		8.2	34.6		5.6	32.0	32.0
Yellow Time (s)	3.7	3.7		3.7	3.7		4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	2.1	2.1		2.1	2.1		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		5.8	5.8		5.9	5.9		5.9	5.9	5.9
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	15.5	15.5		10.2	10.2		13.9	50.3		7.8	39.4	39.4
Actuated g/C Ratio	0.16	0.16		0.10	0.10		0.14	0.50		0.08	0.39	0.39
v/c Ratio	0.65	0.47		0.48	0.35		0.58	0.74		0.33	0.86	0.28
Control Delay	45.5	11.1		50.4	23.6		50.9	27.7		55.3	28.0	5.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	45.5	11.1		50.4	23.6		50.9	27.7		55.3	28.0	5.1
LOS	D	B		D	C		D	C		E	C	A
Approach Delay		33.6			38.0			29.9			25.7	
Approach LOS		C			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 79 (79%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

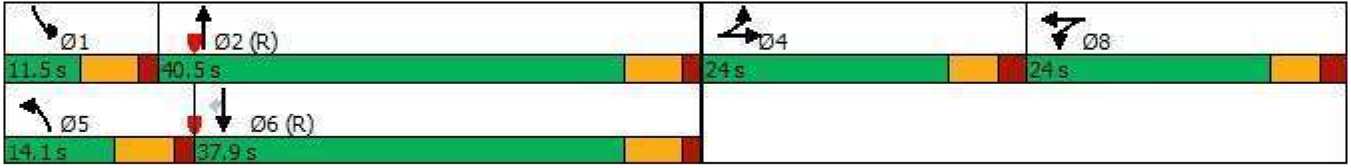
Maximum v/c Ratio: 0.86

Intersection Signal Delay: 29.1 Intersection LOS: C

Intersection Capacity Utilization 72.1% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: Route 13



	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↱			↑↱	
Traffic Volume (vph)	0	0	132	0	0	132	0	1498	55	0	1202	143
Future Volume (vph)	0	0	132	0	0	132	0	1498	55	0	1202	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865			0.865		0.995			0.984	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	3522	0	0	3483	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	3522	0	0	3483	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		250			328			472			331	
Travel Time (s)		5.7			7.5			7.2			5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	143	0	0	143	0	1628	60	0	1307	155
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	143	0	0	143	0	1688	0	0	1462	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 58.0% ICU Level of Service B

Analysis Period (min) 15

Lanes, Volumes, Timings
13: Route 13 & EB Ramps

06/20/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱					↑↑↑	↱	↰↰	↑↑	
Traffic Volume (vph)	315	0	220	0	0	0	0	1185	445	400	1125	0
Future Volume (vph)	315	0	220	0	0	0	0	1185	445	400	1125	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3433	0	1583	0	0	0	0	5085	1583	3433	3539	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3433	0	1583	0	0	0	0	5085	1583	3433	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			98						484			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		650			687			331			523	
Travel Time (s)		14.8			15.6			5.0			7.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	342	0	239	0	0	0	0	1288	484	435	1223	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	342	0	239	0	0	0	0	1288	484	435	1223	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					2	1	1	2	
Detector Template	Left		Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20		20					100	20	20	100	
Trailing Detector (ft)	0		0					0	0	0	0	
Detector 1 Position(ft)	0		0					0	0	0	0	
Detector 1 Size(ft)	20		20					6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			4						2			
Detector Phase	7		4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0		5.0					5.0	5.0	5.0	5.0	

13: Route 13 & EB Ramps

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	11.0		24.0					24.0	24.0	11.0	24.0	
Total Split (s)	28.0		28.0					45.0	45.0	27.0	72.0	
Total Split (%)	28.0%		28.0%					45.0%	45.0%	27.0%	72.0%	
Maximum Green (s)	22.0		22.0					39.0	39.0	21.0	66.0	
Yellow Time (s)	4.0		4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Recall Mode	None		None					C-Max	C-Max	None	C-Max	
Walk Time (s)			7.0					7.0	7.0		7.0	
Flash Dont Walk (s)			11.0					11.0	11.0		11.0	
Pedestrian Calls (#/hr)			0					0	0		0	
Act Effct Green (s)	16.0		16.0					48.5	48.5	17.5	72.0	
Actuated g/C Ratio	0.16		0.16					0.48	0.48	0.18	0.72	
v/c Ratio	0.63		0.72					0.52	0.48	0.72	0.48	
Control Delay	43.9		34.9					10.0	3.4	36.0	17.7	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.8	
Total Delay	43.9		34.9					10.0	3.4	36.0	18.5	
LOS	D		C					A	A	D	B	
Approach Delay		40.2						8.2			23.1	
Approach LOS		D						A			C	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 19.0 Intersection LOS: B

Intersection Capacity Utilization 74.8% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 13: Route 13 & EB Ramps

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱		↰↰	↑	↱
Traffic Volume (vph)	335	1335	465	125	835	60	115	70	295	335	120	140
Future Volume (vph)	335	1335	465	125	835	60	115	70	295	335	120	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		450	300		200	100		0	300		50
Storage Lanes	2		0	2		1	2		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	0.95	0.97	1.00	1.00
Frt			0.850			0.850		0.879				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3111	0	3433	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3111	0	3433	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			447			216		197				216
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1671			847			353			374	
Travel Time (s)		25.3			12.8			8.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	364	1451	505	136	908	65	125	76	321	364	130	152
Shared Lane Traffic (%)												
Lane Group Flow (vph)	364	1451	505	136	908	65	125	397	0	364	130	152
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6						8

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	5	2	2	1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.4	24.4	24.4	11.4	24.4	24.4	11.4	24.4		11.4	24.4	24.4
Total Split (s)	19.3	47.2	47.2	11.4	39.3	39.3	13.2	24.4		17.0	28.2	28.2
Total Split (%)	19.3%	47.2%	47.2%	11.4%	39.3%	39.3%	13.2%	24.4%		17.0%	28.2%	28.2%
Maximum Green (s)	13.6	41.5	41.5	5.7	33.6	33.6	7.5	18.7		11.3	22.5	22.5
Yellow Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3		1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7		5.7	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	14.8	45.3	45.3	8.3	38.8	38.8	7.3	12.3		11.3	16.3	16.3
Actuated g/C Ratio	0.15	0.45	0.45	0.08	0.39	0.39	0.07	0.12		0.11	0.16	0.16
v/c Ratio	0.72	0.91	0.53	0.48	0.66	0.09	0.50	0.87dr		0.94	0.43	0.35
Control Delay	43.1	32.7	7.3	50.0	29.2	0.2	51.7	28.0		78.1	41.2	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	43.1	32.7	7.3	50.0	29.2	0.2	51.7	28.0		78.1	41.2	3.4
LOS	D	C	A	D	C	A	D	C		E	D	A
Approach Delay		28.8			30.0			33.7			53.1	
Approach LOS		C			C			C			D	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 86 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 33.1 Intersection LOS: C
Intersection Capacity Utilization 81.1% ICU Level of Service D
Analysis Period (min) 15
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 19: Norton & Route 13

Measures of Effectiveness

06/20/2022

Route 13

Direction	NB	SB	All
Control Delay / Veh (s/v)	16	15	16
Queue Delay / Veh (s/v)	1	0	0
Total Delay / Veh (s/v)	17	15	16
Total Delay (hr)	48	34	82
Stops / Veh	0.38	0.38	0.38
Stops (#)	3864	3092	6956
Average Speed (mph)	11	15	13
Total Travel Time (hr)	72	56	128
Distance Traveled (mi)	806	826	1631
Fuel Consumed (gal)	95	89	184
Fuel Economy (mpg)	8.5	9.3	8.9
CO Emissions (kg)	6.64	6.23	12.86
NOx Emissions (kg)	1.29	1.21	2.50
VOC Emissions (kg)	1.54	1.44	2.98
Unserved Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	54	183	237
Performance Index	58.9	42.4	101.3

Network Totals

Number of Intersections	6
Control Delay / Veh (s/v)	18
Queue Delay / Veh (s/v)	0
Total Delay / Veh (s/v)	19
Total Delay (hr)	114
Stops / Veh	0.43
Stops (#)	9484
Average Speed (mph)	11
Total Travel Time (hr)	172
Distance Traveled (mi)	1955
Fuel Consumed (gal)	235
Fuel Economy (mpg)	8.3
CO Emissions (kg)	16.43
NOx Emissions (kg)	3.20
VOC Emissions (kg)	3.81
Unserved Vehicles (#)	0
Vehicles in dilemma zone (#)	237
Performance Index	140.8

Lanes, Volumes, Timings
3: WB Ramps

06/20/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰	↱	↱	↰↰	↑↑			↑↑↑	↱
Traffic Volume (vph)	0	0	0	335	0	790	155	1345	0	0	790	275
Future Volume (vph)	0	0	0	335	0	790	155	1345	0	0	790	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		350
Storage Lanes	0		0	2		1	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	0.95	0.97	0.95	1.00	1.00	0.91	1.00
Frt					0.850	*0.950						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	1504	1681	3433	3539	0	0	5085	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	1504	1681	3433	3539	0	0	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					112							289
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		586			532			506			696	
Travel Time (s)		13.3			8.1			7.7			10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	353	0	832	163	1416	0	0	832	289
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	0	0	353	416	416	163	1416	0	0	832	289
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8	2 8!	5	2!			6	
Permitted Phases												6

Lanes, Volumes, Timings
3: WB Ramps

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				4	8	2 8	5	2			6	6
Switch Phase												
Minimum Initial (s)				5.0	5.0		5.0	5.0			5.0	5.0
Minimum Split (s)				24.9	24.0		24.9	24.9			24.0	24.0
Total Split (s)				43.0	43.0		25.0	62.0			37.0	37.0
Total Split (%)				41.0%	41.0%		23.8%	59.0%			35.2%	35.2%
Maximum Green (s)				36.1	37.0		18.1	55.1			31.0	31.0
Yellow Time (s)				3.3	4.0		3.3	3.3			4.0	4.0
All-Red Time (s)				3.6	2.0		3.6	3.6			2.0	2.0
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)				6.9	6.0		6.9	6.9			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	3.0
Recall Mode				None	None		Max	C-Max			C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)				11.0	11.0		11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)				0	0		0	0			0	0
Act Effct Green (s)				27.7	28.6	105.0	26.5	63.5			31.0	31.0
Actuated g/C Ratio				0.26	0.27	1.00	0.25	0.60			0.30	0.30
v/c Ratio				0.39	0.85	0.25	0.19	0.66			0.55	0.43
Control Delay				31.7	41.6	0.4	35.8	18.3			32.9	5.6
Queue Delay				0.0	0.0	0.0	0.0	0.4			0.0	0.0
Total Delay				31.7	41.6	0.4	35.8	18.6			32.9	5.6
LOS				C	D	A	D	B			C	A
Approach Delay					24.2			20.4			25.8	
Approach LOS					C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 105

Offset: 1 (1%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 23.1 Intersection LOS: C

Intersection Capacity Utilization 81.3% ICU Level of Service D

Analysis Period (min) 15

* User Entered Value

! Phase conflict between lane groups.

Splits and Phases: 3: WB Ramps

	↗	↘	↖	↑	↓	↙
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑↑	↑↑	↱
Traffic Volume (vph)	0	630	0	1590	835	185
Future Volume (vph)	0	630	0	1590	835	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			300
Storage Lanes	0	1	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	5085	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	5085	3539	1583
Link Speed (mph)	30			45	45	
Link Distance (ft)	343			942	447	
Travel Time (s)	7.8			14.3	6.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	663	0	1674	879	195
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	663	0	1674	879	195
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Free			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 68.8% ICU Level of Service C

Analysis Period (min) 15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱					↑↑↑↑	↱		↑↑↑	
Traffic Volume (vph)	315	0	220	0	0	0	0	1185	445	0	1125	0
Future Volume (vph)	315	0	220	0	0	0	0	1185	445	0	1125	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	0		225	0		0
Storage Lanes	2		1	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00	0.91	1.00
Frt			0.850						0.850			
Flt Protected	0.950											
Satd. Flow (prot)	3433	0	1583	0	0	0	0	6408	1583	0	5085	0
Flt Permitted	0.950											
Satd. Flow (perm)	3433	0	1583	0	0	0	0	6408	1583	0	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			62						468			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		611			631			359			506	
Travel Time (s)		13.9			14.3			5.4			7.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	332	0	232	0	0	0	0	1247	468	0	1184	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	332	0	232	0	0	0	0	1247	468	0	1184	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					2	1		2	
Detector Template	Left		Right					Thru	Right		Thru	
Leading Detector (ft)	20		20					100	20		100	
Trailing Detector (ft)	0		0					0	0		0	
Detector 1 Position(ft)	0		0					0	0		0	
Detector 1 Size(ft)	20		20					6	20		6	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0		0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type	Prot		Prot					NA	Perm		NA	
Protected Phases	4		4					2			6	
Permitted Phases	4		4						2			

11: EB Ramps

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4		4					2	2		6	
Switch Phase												
Minimum Initial (s)	5.0		5.0					5.0	5.0		5.0	
Minimum Split (s)	24.9		24.9					24.9	24.9		24.0	
Total Split (s)	41.0		41.0					64.0	64.0		64.0	
Total Split (%)	39.0%		39.0%					61.0%	61.0%		61.0%	
Maximum Green (s)	34.1		34.1					57.1	57.1		58.0	
Yellow Time (s)	3.3		3.3					3.3	3.3		4.0	
All-Red Time (s)	3.6		3.6					3.6	3.6		2.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.9		6.9					6.9	6.9		6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0					3.0	3.0		3.0	
Recall Mode	Max		Max					C-Max	C-Max		C-Max	
Walk Time (s)	7.0		7.0					7.0	7.0		7.0	
Flash Dont Walk (s)	11.0		11.0					11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0		0					0	0		0	
Act Effct Green (s)	34.1		34.1					57.1	57.1		58.0	
Actuated g/C Ratio	0.32		0.32					0.54	0.54		0.55	
v/c Ratio	0.30		0.42					0.36	0.44		0.42	
Control Delay	27.4		22.6					7.2	2.0		1.6	
Queue Delay	0.0		0.0					0.0	0.0		0.0	
Total Delay	27.4		22.6					7.2	2.0		1.6	
LOS	C		C					A	A		A	
Approach Delay		25.4						5.8			1.6	
Approach LOS		C						A			A	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 105

Offset: 7 (7%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 7.6 Intersection LOS: A

Intersection Capacity Utilization 81.3% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 11: EB Ramps

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↱			↑↑↱	
Traffic Volume (vph)	0	0	132	0	0	132	0	1498	55	0	1202	143
Future Volume (vph)	0	0	132	0	0	132	0	1498	55	0	1202	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.91	0.91
Frt			0.865			0.865		0.995			0.984	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	3522	0	0	5004	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	3522	0	0	5004	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		315			203			475			359	
Travel Time (s)		7.2			4.6			7.2			5.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	139	0	0	139	0	1577	58	0	1265	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	139	0	0	139	0	1635	0	0	1416	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 58.0% ICU Level of Service B

Analysis Period (min) 15

Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations		↗		↑↑	↗		↑↑	↗		
Traffic Volume (vph)	0	255	0	1335	800	0	1065	400	0	0
Future Volume (vph)	0	255	0	1335	800	0	1065	400	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300	50	300		0	300		0	0	0
Storage Lanes	0	0	0		1	0		1	0	0
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Frt		0.865			0.850			0.850		
Flt Protected										
Satd. Flow (prot)	0	1611	0	3539	1583	0	3539	1583	0	0
Flt Permitted										
Satd. Flow (perm)	0	1611	0	3539	1583	0	3539	1583	0	0
Link Speed (mph)	30			45			45		30	
Link Distance (ft)	728			696			942		213	
Travel Time (s)	16.5			10.5			14.3		4.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	268	0	1405	842	0	1121	421	0	0
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	268	0	1405	842	0	1121	421	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)	0			0			0		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Sign Control	Free			Free			Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 59.4% ICU Level of Service B

Analysis Period (min) 15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Configurations	↰↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	320	11	158	79	26	42	131	1191	21	42	1108	184
Future Volume (vph)	320	11	158	79	26	42	131	1191	21	42	1108	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	75		0	250		0	150		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.860			0.907			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1602	0	1770	1690	0	1770	3529	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1602	0	1770	1690	0	1770	3529	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		166			44			2				190
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		263			255			419			475	
Travel Time (s)		6.0			5.8			6.3			7.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	337	12	166	83	27	44	138	1254	22	44	1166	194
Shared Lane Traffic (%)												
Lane Group Flow (vph)	337	178	0	83	71	0	138	1276	0	44	1166	194
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	24.0	24.0		24.0	24.0		11.4	24.4		11.4	24.4	24.4
Total Split (s)	24.0	24.0		24.0	24.0		14.0	45.6		11.4	43.0	43.0
Total Split (%)	22.9%	22.9%		22.9%	22.9%		13.3%	43.4%		10.9%	41.0%	41.0%
Maximum Green (s)	18.2	18.2		18.2	18.2		8.1	39.7		5.5	37.1	37.1
Yellow Time (s)	3.7	3.7		3.7	3.7		4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	2.1	2.1		2.1	2.1		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.8	3.8		3.8	3.8		3.9	3.9		3.9	3.9	3.9
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	17.2	14.7		12.3	9.6		15.6	59.8		10.1	49.5	49.5
Actuated g/C Ratio	0.16	0.14		0.12	0.09		0.15	0.57		0.10	0.47	0.47
v/c Ratio	0.60	0.49		0.40	0.37		0.53	0.63		0.26	0.70	0.23
Control Delay	45.1	12.4		47.9	26.1		48.5	20.8		46.8	21.2	3.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	45.1	12.4		47.9	26.1		48.5	20.8		46.8	21.2	3.4
LOS	D	B		D	C		D	C		D	C	A
Approach Delay		33.8			37.9			23.5			19.5	
Approach LOS		C			D			C			B	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 105

Offset: 104 (99%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 24.1 Intersection LOS: C

Intersection Capacity Utilization 65.9% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 24:

Lane Group	EBL	EBR2	WBL	WBR2	NBL	NBT	NBR2	SBL	SBT	SBR2
Lane Configurations	↰↰	↱	↰↰	↱↱	↰↰	↑↑↑	↱	↰↰	↑↑	↱
Traffic Volume (vph)	315	220	335	790	155	1030	445	400	790	275
Future Volume (vph)	315	220	335	790	155	1030	445	400	790	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0		350			0		
Storage Lanes	2		2		2			2		
Taper Length (ft)	25		25		25			25		
Lane Util. Factor	0.97	1.00	0.97	0.88	0.97	0.91	1.00	0.97	0.95	1.00
Frt		0.850		0.850			0.850			0.850
Flt Protected	0.950		0.950		0.950			0.950		
Satd. Flow (prot)	3433	1583	3433	2787	3433	5085	1583	3433	3539	1583
Flt Permitted	0.950		0.950		0.950			0.950		
Satd. Flow (perm)	3433	1583	3433	2787	3433	5085	1583	3433	3539	1583
Right Turn on Red		Yes		Yes			Yes			Yes
Satd. Flow (RTOR)		196		120			484			299
Link Speed (mph)						45			45	
Link Distance (ft)						613			938	
Travel Time (s)						9.3			14.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	342	239	364	859	168	1120	484	435	859	299
Shared Lane Traffic (%)										
Lane Group Flow (vph)	342	239	364	859	168	1120	484	435	859	299
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)						48			48	
Link Offset(ft)						0			0	
Crosswalk Width(ft)						16			16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15		9	15		9
Number of Detectors	1	1	1	1	1	2	1	1	2	1
Detector Template	Left	Right	Left	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	20	20	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	20	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)						94			94	
Detector 2 Size(ft)						6			6	
Detector 2 Type						Cl+Ex			Cl+Ex	
Detector 2 Channel										
Detector 2 Extend (s)						0.0			0.0	
Turn Type	Prot	Perm	Prot	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7		3		5	2		1	6	
Permitted Phases		5		1			2			6

Lane Group	EBL	EBR2	WBL	WBR2	NBL	NBT	NBR2	SBL	SBT	SBR2
Detector Phase	7	5	3	1	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	25.0	25.0	12.0	25.0	25.0
Total Split (s)	22.0	23.0	22.0	42.0	23.0	36.0	36.0	42.0	55.0	55.0
Total Split (%)	22.0%	23.0%	22.0%	42.0%	23.0%	36.0%	36.0%	42.0%	55.0%	55.0%
Maximum Green (s)	15.0	16.0	15.0	35.0	16.0	29.0	29.0	35.0	48.0	48.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag		Lead		Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?		Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)						7.0	7.0		7.0	7.0
Flash Dont Walk (s)						11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)						0	0		0	0
Act Effct Green (s)	14.1	10.9	14.1	32.4	10.9	32.5	32.5	32.4	54.0	54.0
Actuated g/C Ratio	0.14	0.11	0.14	0.32	0.11	0.32	0.32	0.32	0.54	0.54
v/c Ratio	0.71	0.69	0.75	0.87	0.45	0.68	0.58	0.39	0.45	0.30
Control Delay	49.4	20.8	51.6	38.0	46.5	22.2	4.2	20.1	20.0	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	20.8	51.6	38.0	46.5	22.2	4.2	20.1	20.0	9.1
LOS	D	C	D	D	D	C	A	C	C	A
Approach Delay						19.6			18.0	
Approach LOS						B			B	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 31 (31%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 26.4 Intersection LOS: C

Intersection Capacity Utilization Err% ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 1: Route 13 & Ramps

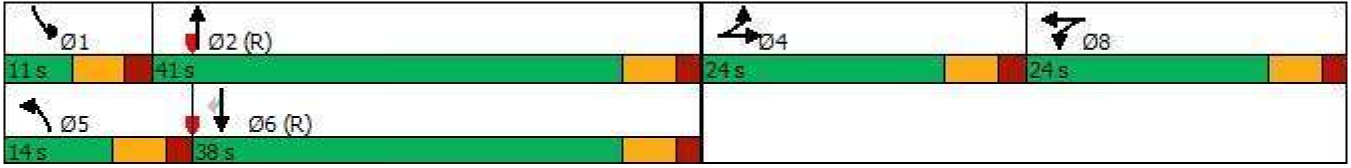
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	320	11	158	79	26	42	131	1191	21	42	1108	184
Future Volume (vph)	320	11	158	79	26	42	131	1191	21	42	1108	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	75		0	200		0	250		300
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.860			0.907			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1602	0	1770	1690	0	1770	3529	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1602	0	1770	1690	0	1770	3529	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		172			46			2				200
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		400			405			427			431	
Travel Time (s)		9.1			9.2			6.5			6.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	12	172	86	28	46	142	1295	23	46	1204	200
Shared Lane Traffic (%)												
Lane Group Flow (vph)	348	184	0	86	74	0	142	1318	0	46	1204	200
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		11.0	24.0	24.0
Total Split (s)	24.0	24.0		24.0	24.0		14.0	41.0		11.0	38.0	38.0
Total Split (%)	24.0%	24.0%		24.0%	24.0%		14.0%	41.0%		11.0%	38.0%	38.0%
Maximum Green (s)	18.0	18.0		18.0	18.0		8.0	35.0		5.0	32.0	32.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	15.4	15.4		10.2	10.2		14.1	47.4		7.8	38.8	38.8
Actuated g/C Ratio	0.15	0.15		0.10	0.10		0.14	0.47		0.08	0.39	0.39
v/c Ratio	0.66	0.47		0.48	0.35		0.57	0.79		0.34	0.88	0.27
Control Delay	45.7	11.1		50.4	23.6		50.7	30.6		49.4	30.2	5.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	45.7	11.1		50.4	23.6		50.7	30.6		49.4	30.2	5.0
LOS	D	B		D	C		D	C		D	C	A
Approach Delay		33.8			38.0			32.6			27.4	
Approach LOS		C			D			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 13 (13%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 30.9 Intersection LOS: C
Intersection Capacity Utilization 72.6% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 9: Route 13 & Walmart



	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↱			↑↱	
Traffic Volume (vph)	0	0	132	0	0	132	0	1498	55	0	1202	143
Future Volume (vph)	0	0	132	0	0	132	0	1498	55	0	1202	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865			0.865		0.995			0.984	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	3522	0	0	3483	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	3522	0	0	3483	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		162			266			431			613	
Travel Time (s)		3.7			6.0			6.5			9.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	143	0	0	143	0	1628	60	0	1307	155
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	143	0	0	143	0	1688	0	0	1462	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 58.0% ICU Level of Service B

Analysis Period (min) 15

Lanes, Volumes, Timings
19: Route 13 & Norton

06/20/2022

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑	↱	↰↰	↑↑↑	↱	↰↰	↑↑↑	↱
Traffic Volume (vph)	115	70	295	335	120	140	335	1335	465	125	835	60
Future Volume (vph)	115	70	295	335	120	140	335	1335	465	125	835	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	300		50	300		450	300		200
Storage Lanes	1		0	2		1	2		1	2		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt		0.879				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3111	0	3433	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3111	0	3433	1863	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		235				229			505			229
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		401			728			938			1092	
Travel Time (s)		9.1			16.5			14.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	76	321	364	130	152	364	1451	505	136	908	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	397	0	364	130	152	364	1451	505	136	908	65
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6

Lanes, Volumes, Timings
19: Route 13 & Norton

06/20/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	24.0		11.0	24.0	24.0	11.0	24.0	24.0	11.0	24.0	24.0
Total Split (s)	19.0	24.0		21.0	26.0	26.0	22.0	43.0	43.0	12.0	33.0	33.0
Total Split (%)	19.0%	24.0%		21.0%	26.0%	26.0%	22.0%	43.0%	43.0%	12.0%	33.0%	33.0%
Maximum Green (s)	13.0	18.0		15.0	20.0	20.0	16.0	37.0	37.0	6.0	27.0	27.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	11.3	11.1		14.1	14.0	14.0	15.2	42.3	42.3	8.4	35.6	35.6
Actuated g/C Ratio	0.11	0.11		0.14	0.14	0.14	0.15	0.42	0.42	0.08	0.36	0.36
v/c Ratio	0.63	0.72		0.75	0.50	0.36	0.70	0.67	0.53	0.47	0.50	0.09
Control Delay	56.3	24.3		51.6	45.8	3.2	42.9	23.7	4.5	49.3	27.8	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	24.3		51.6	45.8	3.2	42.9	23.7	4.5	49.3	27.8	0.2
LOS	E	C		D	D	A	D	C	A	D	C	A
Approach Delay		32.0			39.1			22.5			28.9	
Approach LOS		C			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 68 (68%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 27.5 Intersection LOS: C

Intersection Capacity Utilization 71.0% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 19: Route 13 & Norton

Lanes, Volumes, Timings
1: Route 13 & WB Ramps

06/20/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱↱	↰↰	↑↑			↑↑↑↑	↱
Traffic Volume (vph)	0	0	0	515	0	600	130	845	0	0	2035	325
Future Volume (vph)	0	0	0	515	0	600	130	845	0	0	2035	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	400		250
Storage Lanes	0		0	2		2	2		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	0.88	0.97	0.95	1.00	1.00	0.86	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	0	2787	3433	3539	0	0	6408	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	0	2787	3433	3539	0	0	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						245						353
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		617			589			523			1671	
Travel Time (s)		14.0			13.4			7.9			25.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	560	0	652	141	918	0	0	2212	353
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	560	0	652	141	918	0	0	2212	353
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Prot		Prot	Prot	NA			NA	Perm
Protected Phases				3		8	5	2			6	
Permitted Phases						8						6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				3		8	5	2			6	6
Switch Phase												
Minimum Initial (s)				5.0		5.0	5.0	5.0			5.0	5.0
Minimum Split (s)				11.0		24.0	11.0	24.0			24.0	24.0
Total Split (s)				27.0		27.0	11.0	53.0			42.0	42.0
Total Split (%)				33.8%		33.8%	13.8%	66.3%			52.5%	52.5%
Maximum Green (s)				21.0		21.0	5.0	47.0			36.0	36.0
Yellow Time (s)				4.0		4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0		2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0		6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0		3.0	3.0	3.0			3.0	3.0
Recall Mode				None		None	None	C-Max			C-Max	C-Max
Walk Time (s)						7.0		7.0			7.0	7.0
Flash Dont Walk (s)						11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)						0		0			0	0
Act Effct Green (s)				18.0		18.0	6.4	50.0			37.6	37.6
Actuated g/C Ratio				0.22		0.22	0.08	0.62			0.47	0.47
v/c Ratio				0.73		0.80	0.51	0.42			0.73	0.38
Control Delay				34.3		25.8	31.6	17.5			16.1	1.9
Queue Delay				0.0		0.0	0.0	0.0			0.0	0.0
Total Delay				34.3		25.8	31.6	17.5			16.1	1.9
LOS				C		C	C	B			B	A
Approach Delay					29.7			19.4			14.1	
Approach LOS					C			B			B	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 56 (70%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 19.2 Intersection LOS: B
Intersection Capacity Utilization 83.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 1: Route 13 & WB Ramps

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	165	11	28	33	22	27	88	988	55	44	1991	186
Future Volume (vph)	165	11	28	33	22	27	88	988	55	44	1991	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	75		0	150		0	150		200
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.893			0.918			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1663	0	1770	1710	0	1770	3511	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1663	0	1770	1710	0	1770	3511	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			29			6				127
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		498			484			463			472	
Travel Time (s)		11.3			11.0			7.0			7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	12	30	36	24	29	96	1074	60	48	2164	202
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	42	0	36	53	0	96	1134	0	48	2164	202
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	24.0	24.0		24.0	24.0		11.4	24.4		11.4	24.4	24.4
Total Split (s)	24.0	24.0		24.0	24.0		12.0	62.1		14.9	65.0	65.0
Total Split (%)	19.2%	19.2%		19.2%	19.2%		9.6%	49.7%		11.9%	52.0%	52.0%
Maximum Green (s)	18.2	18.2		18.2	18.2		6.1	56.2		9.0	59.1	59.1
Yellow Time (s)	3.7	3.7		3.7	3.7		4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	2.1	2.1		2.1	2.1		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		5.8	5.8		5.9	5.9		5.9	5.9	5.9
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	10.8	10.8		7.7	7.7		6.1	60.5		7.7	59.5	59.5
Actuated g/C Ratio	0.10	0.10		0.07	0.07		0.06	0.58		0.07	0.57	0.57
v/c Ratio	0.51	0.21		0.28	0.35		0.93	0.56		0.37	1.08	0.21
Control Delay	50.6	23.7		53.4	33.4		124.3	17.7		56.6	70.2	5.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	5.5	0.0
Total Delay	50.6	23.7		53.4	33.4		124.3	17.7		56.6	75.7	5.8
LOS	D	C		D	C		F	B		E	E	A
Approach Delay		45.5			41.5			26.0			69.5	
Approach LOS		D			D			C			E	

Intersection Summary

Area Type: Other

Cycle Length: 125

Actuated Cycle Length: 105

Natural Cycle: 145

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 54.0 Intersection LOS: D

Intersection Capacity Utilization 86.0% ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 6: Route 13

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Configurations			↱			↱		↑↱			↑↱	
Traffic Volume (vph)	0	0	58	0	0	12	0	1053	127	0	2163	67
Future Volume (vph)	0	0	58	0	0	12	0	1053	127	0	2163	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865			0.865		0.984			0.995	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	3483	0	0	3522	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	3483	0	0	3522	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		250			328			472			331	
Travel Time (s)		5.7			7.5			7.2			5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	63	0	0	13	0	1145	138	0	2351	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	63	0	0	13	0	1283	0	0	2424	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 72.2% ICU Level of Service C

Analysis Period (min) 15

Lanes, Volumes, Timings
13: Route 13 & EB Ramps

06/20/2022

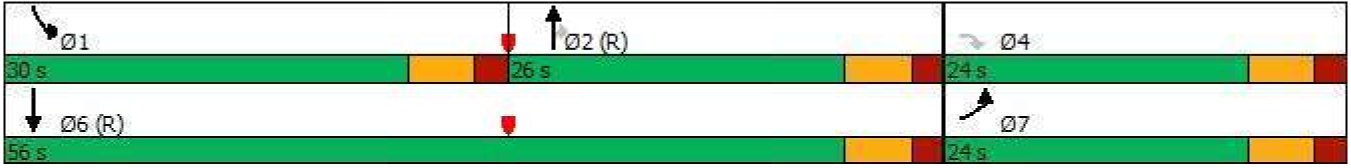
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱					↑↑↑	↱	↰↰	↑↑	
Traffic Volume (vph)	330	0	350	0	0	0	0	645	420	670	1880	0
Future Volume (vph)	330	0	350	0	0	0	0	645	420	670	1880	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3433	0	1583	0	0	0	0	5085	1583	3433	3539	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3433	0	1583	0	0	0	0	5085	1583	3433	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123						457			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		650			687			331			523	
Travel Time (s)		14.8			15.6			5.0			7.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	359	0	380	0	0	0	0	701	457	728	2043	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	359	0	380	0	0	0	0	701	457	728	2043	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					2	1	1	2	
Detector Template	Left		Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20		20					100	20	20	100	
Trailing Detector (ft)	0		0					0	0	0	0	
Detector 1 Position(ft)	0		0					0	0	0	0	
Detector 1 Size(ft)	20		20					6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			4						2			
Detector Phase	7		4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0		5.0					5.0	5.0	5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	11.0		24.0					24.0	24.0	11.0	24.0	
Total Split (s)	24.0		24.0					26.0	26.0	30.0	56.0	
Total Split (%)	30.0%		30.0%					32.5%	32.5%	37.5%	70.0%	
Maximum Green (s)	18.0		18.0					20.0	20.0	24.0	50.0	
Yellow Time (s)	4.0		4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Recall Mode	None		None					C-Max	C-Max	None	C-Max	
Walk Time (s)			7.0					7.0	7.0		7.0	
Flash Dont Walk (s)			11.0					11.0	11.0		11.0	
Pedestrian Calls (#/hr)			0					0	0		0	
Act Effct Green (s)	16.6		16.6					24.1	24.1	21.3	51.4	
Actuated g/C Ratio	0.21		0.21					0.30	0.30	0.27	0.64	
v/c Ratio	0.50		0.89					0.46	0.57	0.80	0.90	
Control Delay	30.4		45.6					24.9	6.0	40.5	13.9	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay	30.4		45.6					24.9	6.0	40.5	13.9	
LOS	C		D					C	A	D	B	
Approach Delay		38.2						17.4			20.9	
Approach LOS		D						B			C	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 22.8 Intersection LOS: C
Intersection Capacity Utilization 83.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 13: Route 13 & EB Ramps



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱		↰↰	↑	↱
Traffic Volume (vph)	280	825	340	250	170	70	70	110	335	325	105	50
Future Volume (vph)	280	825	340	250	170	70	70	110	335	325	105	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		450	300		200	100		0	300		50
Storage Lanes	2		0	2		1	2		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	0.95	0.97	1.00	1.00
Frt			0.850			0.850		0.887				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3139	0	3433	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3139	0	3433	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			370			192		364				192
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1671			847			353			374	
Travel Time (s)		25.3			12.8			8.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	897	370	272	185	76	76	120	364	353	114	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	304	897	370	272	185	76	76	484	0	353	114	54
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6						8

Lanes, Volumes, Timings
19: Route 13 & Norton

06/20/2022

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	5	2	2	1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.4	24.4	24.4	11.4	24.4	24.4	11.4	24.4		11.4	24.4	24.4
Total Split (s)	15.4	27.6	27.6	13.0	25.2	25.2	11.4	24.4		15.0	28.0	28.0
Total Split (%)	19.3%	34.5%	34.5%	16.3%	31.5%	31.5%	14.3%	30.5%		18.8%	35.0%	35.0%
Maximum Green (s)	9.7	21.9	21.9	7.3	19.5	19.5	5.7	18.7		9.3	22.3	22.3
Yellow Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3		1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7		5.7	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	11.8	26.7	26.7	11.3	26.2	26.2	5.7	9.9		9.3	15.8	15.8
Actuated g/C Ratio	0.15	0.33	0.33	0.14	0.33	0.33	0.07	0.12		0.12	0.20	0.20
v/c Ratio	0.60	0.76	0.48	0.56	0.16	0.12	0.31	0.68		0.88	0.31	0.12
Control Delay	25.6	31.7	9.1	36.9	21.4	0.4	39.0	13.7		60.4	30.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	25.6	31.7	9.1	36.9	21.4	0.4	39.0	13.7		60.4	30.0	0.5
LOS	C	C	A	D	C	A	D	B		E	C	A
Approach Delay		25.2			26.3			17.2			47.6	
Approach LOS		C			C			B			D	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 18 (23%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

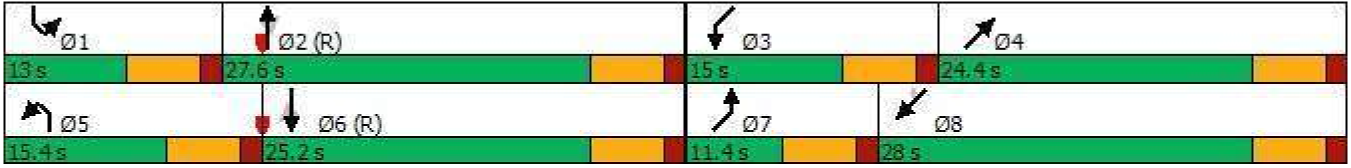
Maximum v/c Ratio: 0.88

Intersection Signal Delay: 27.6 Intersection LOS: C

Intersection Capacity Utilization 72.1% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 19: Route 13 & Norton



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰	↱	↱	↰↰	↑↑			↑↑↑	↱
Traffic Volume (vph)	0	0	0	515	0	600	130	845	0	0	1365	325
Future Volume (vph)	0	0	0	515	0	600	130	845	0	0	1365	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		350
Storage Lanes	0		0	2		1	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	0.95	0.97	0.95	1.00	1.00	0.91	1.00
Frt					0.850	*0.950						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	1504	1681	3433	3539	0	0	5085	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	1504	1681	3433	3539	0	0	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					163							342
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		586			532			506			696	
Travel Time (s)		13.3			8.1			7.7			10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	542	0	632	137	889	0	0	1437	342
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	0	0	542	316	316	137	889	0	0	1437	342
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8	2 8!	5	2!			6	
Permitted Phases												6

3: WB Ramps

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				4	8	2 8	5	2			6	6
Switch Phase												
Minimum Initial (s)				5.0	5.0		5.0	5.0			5.0	5.0
Minimum Split (s)				24.9	24.0		24.9	24.9			24.0	24.0
Total Split (s)				51.0	51.0		27.0	99.0			72.0	72.0
Total Split (%)				34.0%	34.0%		18.0%	66.0%			48.0%	48.0%
Maximum Green (s)				44.1	45.0		20.1	92.1			66.0	66.0
Yellow Time (s)				3.3	4.0		3.3	3.3			4.0	4.0
All-Red Time (s)				3.6	2.0		3.6	3.6			2.0	2.0
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)				6.9	6.0		6.9	6.9			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	3.0
Recall Mode				None	None		Max	C-Max			C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)				11.0	11.0		11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)				0	0		0	0			0	0
Act Effct Green (s)				29.2	30.1	150.0	35.0	107.0			66.0	66.0
Actuated g/C Ratio				0.19	0.20	1.00	0.23	0.71			0.44	0.44
v/c Ratio				0.81	0.73	0.19	0.17	0.35			0.64	0.39
Control Delay				67.6	36.5	0.2	44.6	7.1			34.4	3.7
Queue Delay				0.0	0.0	0.0	0.0	0.3			0.7	0.0
Total Delay				67.6	36.5	0.2	44.6	7.4			35.2	3.7
LOS				E	D	A	D	A			D	A
Approach Delay					41.1			12.4			29.1	
Approach LOS					D			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 124 (83%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 28.3 Intersection LOS: C

Intersection Capacity Utilization 68.7% ICU Level of Service C

Analysis Period (min) 15

* User Entered Value

! Phase conflict between lane groups.

Splits and Phases: 3: WB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑↑	↑↑	↱
Traffic Volume (vph)	0	660	0	945	1700	320
Future Volume (vph)	0	660	0	945	1700	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			300
Storage Lanes	0	1	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	5085	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	5085	3539	1583
Link Speed (mph)	30			45	45	
Link Distance (ft)	343			942	447	
Travel Time (s)	7.8			14.3	6.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	695	0	995	1789	337
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	695	0	995	1789	337
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Free			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 94.5% ICU Level of Service F

Analysis Period (min) 15

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱					↑↑↑↑	↱		↑↑↑	
Traffic Volume (vph)	330	0	350	0	0	0	0	645	420	0	1880	0
Future Volume (vph)	330	0	350	0	0	0	0	645	420	0	1880	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	0		225	0		0
Storage Lanes	2		1	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00	0.91	1.00
Frt			0.850						0.850			
Flt Protected	0.950											
Satd. Flow (prot)	3433	0	1583	0	0	0	0	6408	1583	0	5085	0
Flt Permitted	0.950											
Satd. Flow (perm)	3433	0	1583	0	0	0	0	6408	1583	0	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			28						442			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		611			631			359			506	
Travel Time (s)		13.9			14.3			5.4			7.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	347	0	368	0	0	0	0	679	442	0	1979	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	347	0	368	0	0	0	0	679	442	0	1979	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					2	1		2	
Detector Template	Left		Right					Thru	Right		Thru	
Leading Detector (ft)	20		20					100	20		100	
Trailing Detector (ft)	0		0					0	0		0	
Detector 1 Position(ft)	0		0					0	0		0	
Detector 1 Size(ft)	20		20					6	20		6	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0		0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type	Prot		Prot					NA	Perm		NA	
Protected Phases	4		4					2			6	
Permitted Phases	4		4						2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4		4					2	2		6	
Switch Phase												
Minimum Initial (s)	5.0		5.0					5.0	5.0		5.0	
Minimum Split (s)	24.9		24.9					24.9	24.9		24.0	
Total Split (s)	63.0		63.0					87.0	87.0		87.0	
Total Split (%)	42.0%		42.0%					58.0%	58.0%		58.0%	
Maximum Green (s)	56.1		56.1					80.1	80.1		81.0	
Yellow Time (s)	3.3		3.3					3.3	3.3		4.0	
All-Red Time (s)	3.6		3.6					3.6	3.6		2.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.9		6.9					6.9	6.9		6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0					3.0	3.0		3.0	
Recall Mode	Max		Max					C-Max	C-Max		C-Max	
Walk Time (s)	7.0		7.0					7.0	7.0		7.0	
Flash Dont Walk (s)	11.0		11.0					11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0		0					0	0		0	
Act Effct Green (s)	56.1		56.1					80.1	80.1		81.0	
Actuated g/C Ratio	0.37		0.37					0.53	0.53		0.54	
v/c Ratio	0.27		0.60					0.20	0.42		0.72	
Control Delay	33.4		39.9					15.2	2.3		13.1	
Queue Delay	0.0		0.0					0.0	0.0		1.3	
Total Delay	33.4		39.9					15.2	2.3		14.4	
LOS	C		D					B	A		B	
Approach Delay		36.7						10.1			14.4	
Approach LOS		D						B			B	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 148 (99%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 17.3 Intersection LOS: B
Intersection Capacity Utilization 68.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 11: EB Ramps

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↱			↑↑↱	
Traffic Volume (vph)	0	0	58	0	0	12	0	1053	127	0	2163	67
Future Volume (vph)	0	0	58	0	0	12	0	1053	127	0	2163	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.91	0.91
Frt			0.865			0.865		0.984			0.995	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	3483	0	0	5060	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	3483	0	0	5060	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		315			203			475			359	
Travel Time (s)		7.2			4.6			7.2			5.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	61	0	0	13	0	1108	134	0	2277	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	61	0	0	13	0	1242	0	0	2348	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 53.5% ICU Level of Service A

Analysis Period (min) 15

19: Norton-E

Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations		↱		↑↑	↱		↑↑	↱		
Traffic Volume (vph)	0	120	0	825	620	0	1690	670	0	0
Future Volume (vph)	0	120	0	825	620	0	1690	670	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300	50	300		0	300		0	0	0
Storage Lanes	0	0	0		1	0		1	0	0
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Frt		0.865			0.850			0.850		
Flt Protected										
Satd. Flow (prot)	0	1611	0	3539	1583	0	3539	1583	0	0
Flt Permitted										
Satd. Flow (perm)	0	1611	0	3539	1583	0	3539	1583	0	0
Link Speed (mph)	30			45			45		30	
Link Distance (ft)	728			696			942		213	
Travel Time (s)	16.5			10.5			14.3		4.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	126	0	868	653	0	1779	705	0	0
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	126	0	868	653	0	1779	705	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)	0			0			0		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Sign Control	Free			Free			Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 50.0% ICU Level of Service A

Analysis Period (min) 15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	165	11	28	33	22	27	88	988	55	44	1991	186
Future Volume (vph)	165	11	28	33	22	27	88	988	55	44	1991	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	75		0	250		0	150		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.894			0.918			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1665	0	1770	1710	0	1770	3511	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1665	0	1770	1710	0	1770	3511	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			28			6				109
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		263			255			419			475	
Travel Time (s)		6.0			5.8			6.3			7.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	174	12	29	35	23	28	93	1040	58	46	2096	196
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	41	0	35	51	0	93	1098	0	46	2096	196
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	24.0	24.0		24.0	24.0		11.4	24.4		11.4	24.4	24.4
Total Split (s)	24.0	24.0		24.0	24.0		12.4	88.6		13.4	89.6	89.6
Total Split (%)	16.0%	16.0%		16.0%	16.0%		8.3%	59.1%		8.9%	59.7%	59.7%
Maximum Green (s)	18.2	18.2		18.2	18.2		6.5	82.7		7.5	83.7	83.7
Yellow Time (s)	3.7	3.7		3.7	3.7		4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	2.1	2.1		2.1	2.1		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.8	3.8		3.8	3.8		3.9	3.9		3.9	3.9	3.9
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	14.9	14.4		10.4	9.9		16.2	103.1		11.3	95.8	95.8
Actuated g/C Ratio	0.10	0.10		0.07	0.07		0.11	0.69		0.08	0.64	0.64
v/c Ratio	0.51	0.22		0.29	0.37		0.49	0.45		0.35	0.93	0.19
Control Delay	69.0	29.8		71.4	42.6		71.6	13.4		82.3	19.2	0.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	69.0	29.8		71.4	42.6		71.6	13.4		82.3	19.2	0.9
LOS	E	C		E	D		E	B		F	B	A
Approach Delay		61.5			54.3			18.0			18.9	
Approach LOS		E			D			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 4 (3%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 21.8 Intersection LOS: C

Intersection Capacity Utilization 81.3% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 24:

Lane Group	EBL	EBR2	WBL	WBR2	NBL	NBT	NBR2	SBL	SBT	SBR2
Lane Configurations	↰↰	↱	↰↰	↱↱	↰↰	↑↑↑	↱	↰↰	↑↑	↱
Traffic Volume (vph)	330	350	515	600	130	515	420	670	1365	325
Future Volume (vph)	330	350	515	600	130	515	420	670	1365	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0		350			0		
Storage Lanes	2		2		2			2		
Taper Length (ft)	25		25		25			25		
Lane Util. Factor	0.97	1.00	0.97	0.88	0.97	0.91	1.00	0.97	0.95	1.00
Frt		0.850		0.850			0.850			0.850
Flt Protected	0.950		0.950		0.950			0.950		
Satd. Flow (prot)	3433	1583	3433	2787	3433	5085	1583	3433	3539	1583
Flt Permitted	0.950		0.950		0.950			0.950		
Satd. Flow (perm)	3433	1583	3433	2787	3433	5085	1583	3433	3539	1583
Right Turn on Red		Yes		Yes			Yes			Yes
Satd. Flow (RTOR)		258		158			457			353
Link Speed (mph)						45			45	
Link Distance (ft)						613			938	
Travel Time (s)						9.3			14.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	359	380	560	652	141	560	457	728	1484	353
Shared Lane Traffic (%)										
Lane Group Flow (vph)	359	380	560	652	141	560	457	728	1484	353
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)						48			48	
Link Offset(ft)						0			0	
Crosswalk Width(ft)						16			16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15		9	15		9
Number of Detectors	1	1	1	1	1	2	1	1	2	1
Detector Template	Left	Right	Left	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	20	20	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	20	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)						94			94	
Detector 2 Size(ft)						6			6	
Detector 2 Type						Cl+Ex			Cl+Ex	
Detector 2 Channel										
Detector 2 Extend (s)						0.0			0.0	
Turn Type	Prot	Perm	Prot	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7		3		5	2		1	6	
Permitted Phases		5		1			2			6

Lane Group	EBL	EBR2	WBL	WBR2	NBL	NBT	NBR2	SBL	SBT	SBR2
Detector Phase	7	5	3	1	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	25.0	25.0	12.0	25.0	25.0
Total Split (s)	20.0	16.0	20.0	26.0	16.0	30.0	30.0	26.0	40.0	40.0
Total Split (%)	26.3%	21.1%	26.3%	34.2%	21.1%	39.5%	39.5%	34.2%	52.6%	52.6%
Maximum Green (s)	13.0	9.0	13.0	19.0	9.0	23.0	23.0	19.0	33.0	33.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag		Lead		Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?		Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)						7.0	7.0		7.0	7.0
Flash Dont Walk (s)						11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)						0	0		0	0
Act Effct Green (s)	13.0	9.0	13.0	18.7	9.0	23.3	23.3	18.7	33.0	33.0
Actuated g/C Ratio	0.17	0.12	0.17	0.25	0.12	0.31	0.31	0.25	0.43	0.43
v/c Ratio	0.61	0.92	0.95	0.81	0.35	0.36	0.57	0.86	0.97	0.40
Control Delay	34.2	41.7	60.7	29.7	33.5	21.4	5.4	39.7	38.6	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	41.7	60.7	29.7	33.5	21.4	5.4	39.7	38.6	3.2
LOS	C	D	E	C	C	C	A	D	D	A
Approach Delay						16.6			34.1	
Approach LOS						B			C	

Intersection Summary

Area Type: Other

Cycle Length: 76

Actuated Cycle Length: 76

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 33.1 Intersection LOS: C

Intersection Capacity Utilization Err% ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 1: Route 13 & Ramps

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	165	11	28	33	22	27	88	988	55	44	1991	186
Future Volume (vph)	165	11	28	33	22	27	88	988	55	44	1991	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	75		0	200		0	250		300
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.893			0.918			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1663	0	1770	1710	0	1770	3511	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1663	0	1770	1710	0	1770	3511	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			29			6				142
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		400			405			427			431	
Travel Time (s)		9.1			9.2			6.5			6.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	12	30	36	24	29	96	1074	60	48	2164	202
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	42	0	36	53	0	96	1134	0	48	2164	202
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6

9: Route 13 & Walmart

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	24.0		11.0	24.0	24.0
Total Split (s)	24.0	24.0		24.0	24.0		11.0	53.0		14.0	56.0	56.0
Total Split (%)	20.9%	20.9%		20.9%	20.9%		9.6%	46.1%		12.2%	48.7%	48.7%
Maximum Green (s)	18.0	18.0		18.0	18.0		5.0	47.0		8.0	50.0	50.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	10.3	10.3		7.5	7.5		5.0	53.5		7.2	50.5	50.5
Actuated g/C Ratio	0.11	0.11		0.08	0.08		0.05	0.56		0.08	0.53	0.53
v/c Ratio	0.48	0.20		0.26	0.33		1.02	0.57		0.36	1.15	0.22
Control Delay	45.1	21.6		47.4	29.7		148.8	17.6		51.2	97.5	5.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	45.1	21.6		47.4	29.7		148.8	17.6		51.2	97.5	5.4
LOS	D	C		D	C		F	B		D	F	A
Approach Delay		40.7			36.8			27.9			88.8	
Approach LOS		D			D			C			F	

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 94.7

Natural Cycle: 145

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.15

Intersection Signal Delay: 66.0 Intersection LOS: E

Intersection Capacity Utilization 86.3% ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 9: Route 13 & Walmart

Lanes, Volumes, Timings
13: Route 13

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↱			↑↱	
Traffic Volume (vph)	0	0	58	0	0	12	0	1053	127	0	2163	67
Future Volume (vph)	0	0	58	0	0	12	0	1053	127	0	2163	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865			0.865		0.984			0.995	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	3483	0	0	3522	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	3483	0	0	3522	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		162			266			431			613	
Travel Time (s)		3.7			6.0			6.5			9.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	63	0	0	13	0	1145	138	0	2351	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	63	0	0	13	0	1283	0	0	2424	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 72.2%	ICU Level of Service C
Analysis Period (min) 15	

Lanes, Volumes, Timings
19: Route 13 & Norton

06/20/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑	↱	↰↰	↑↑↑	↱	↰↰	↑↑↑	↱
Traffic Volume (vph)	70	110	335	325	105	50	280	825	340	250	1700	70
Future Volume (vph)	70	110	335	325	105	50	280	825	340	250	1700	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	300		50	300		450	300		200
Storage Lanes	1		0	2		1	2		1	2		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt		0.887				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3139	0	3433	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3139	0	3433	1863	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		198				149			370			149
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		401			728			938			1092	
Travel Time (s)		9.1			16.5			14.2			16.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	120	364	353	114	54	304	897	370	272	1848	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	484	0	353	114	54	304	897	370	272	1848	76
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	24.0		11.0	24.0	24.0	11.0	24.0	24.0	11.0	24.0	24.0
Total Split (s)	16.0	24.0		19.0	27.0	27.0	17.0	47.0	47.0	20.0	50.0	50.0
Total Split (%)	14.5%	21.8%		17.3%	24.5%	24.5%	15.5%	42.7%	42.7%	18.2%	45.5%	45.5%
Maximum Green (s)	10.0	18.0		13.0	21.0	21.0	11.0	41.0	41.0	14.0	44.0	44.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	8.8	15.0		12.9	21.6	21.6	11.0	42.4	42.4	12.7	44.1	44.1
Actuated g/C Ratio	0.08	0.14		0.12	0.20	0.20	0.10	0.40	0.40	0.12	0.41	0.41
v/c Ratio	0.52	0.93dr		0.85	0.30	0.12	0.86	0.45	0.44	0.67	0.88	0.10
Control Delay	60.7	36.2		66.6	40.6	0.6	71.5	25.2	4.2	54.1	35.7	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.7	36.2		66.6	40.6	0.6	71.5	25.2	4.2	54.1	35.7	0.3
LOS	E	D		E	D	A	E	C	A	D	D	A
Approach Delay		39.6			54.0			29.2			36.8	
Approach LOS		D			D			C			D	

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 107

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 36.5 Intersection LOS: D

Intersection Capacity Utilization 84.0% ICU Level of Service E

Analysis Period (min) 15

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 19: Route 13 & Norton

Lanes, Volumes, Timings
1: Route 13 & WB Ramps

06/20/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰		↱↱	↰↰	↑↑			↑↑↑↑	↱
Traffic Volume (vph)	0	0	0	410	0	1135	185	1575	0	0	1630	325
Future Volume (vph)	0	0	0	410	0	1135	185	1575	0	0	1630	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	400		250
Storage Lanes	0		0	2		2	2		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	0.88	0.97	0.95	1.00	1.00	0.86	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	0	2787	3433	3539	0	0	6408	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	0	2787	3433	3539	0	0	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						140						353
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		617			589			523			1671	
Travel Time (s)		14.0			13.4			7.9			25.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	446	0	1234	201	1712	0	0	1772	353
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	446	0	1234	201	1712	0	0	1772	353
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Prot		Prot	Prot	NA			NA	Perm
Protected Phases				3		8	5	2			6	
Permitted Phases						8						6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				3		8	5	2			6	6
Switch Phase												
Minimum Initial (s)				5.0		5.0	5.0	5.0			5.0	5.0
Minimum Split (s)				11.0		24.0	11.0	24.0			24.0	24.0
Total Split (s)				31.0		31.0	11.0	39.0			28.0	28.0
Total Split (%)				44.3%		44.3%	15.7%	55.7%			40.0%	40.0%
Maximum Green (s)				25.0		25.0	5.0	33.0			22.0	22.0
Yellow Time (s)				4.0		4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0		2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0		6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0		3.0	3.0	3.0			3.0	3.0
Recall Mode				None		None	None	C-Max			C-Max	C-Max
Walk Time (s)						7.0		7.0			7.0	7.0
Flash Dont Walk (s)						11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)						0		0			0	0
Act Effct Green (s)				25.0		25.0	5.0	33.0			22.0	22.0
Actuated g/C Ratio				0.36		0.36	0.07	0.47			0.31	0.31
v/c Ratio				0.36		1.14	0.82	1.03			0.88	0.48
Control Delay				17.7		95.6	36.6	41.4			29.3	4.8
Queue Delay				0.0		0.0	0.0	0.0			0.0	0.0
Total Delay				17.7		95.6	36.6	41.4			29.3	4.8
LOS				B		F	D	D			C	A
Approach Delay					74.9			40.9			25.2	
Approach LOS					E			D			C	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 34 (49%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 45.1 Intersection LOS: D

Intersection Capacity Utilization 93.2% ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1: Route 13 & WB Ramps

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	336	11	165	83	28	44	138	1395	22	44	1409	193
Future Volume (vph)	336	11	165	83	28	44	138	1395	22	44	1409	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	75		0	150		0	150		200
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.859			0.908			0.998				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1600	0	1770	1691	0	1770	3532	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1600	0	1770	1691	0	1770	3532	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		179			48			2				127
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		498			484			463			472	
Travel Time (s)		11.3			11.0			7.0			7.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	365	12	179	90	30	48	150	1516	24	48	1532	210
Shared Lane Traffic (%)												
Lane Group Flow (vph)	365	191	0	90	78	0	150	1540	0	48	1532	210
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6

Lanes, Volumes, Timings
6: Route 13

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	24.0	24.0		24.0	24.0		11.4	24.4		11.4	24.4	24.4
Total Split (s)	24.0	24.0		24.0	24.0		17.0	65.4		11.6	60.0	60.0
Total Split (%)	19.2%	19.2%		19.2%	19.2%		13.6%	52.3%		9.3%	48.0%	48.0%
Maximum Green (s)	18.2	18.2		18.2	18.2		11.1	59.5		5.7	54.1	54.1
Yellow Time (s)	3.7	3.7		3.7	3.7		4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	2.1	2.1		2.1	2.1		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		5.8	5.8		5.9	5.9		5.9	5.9	5.9
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	16.5	16.5		11.2	11.2		11.1	62.1		5.7	54.2	54.2
Actuated g/C Ratio	0.14	0.14		0.10	0.10		0.10	0.53		0.05	0.47	0.47
v/c Ratio	0.75	0.50		0.53	0.38		0.89	0.82		0.56	0.93	0.26
Control Delay	58.9	13.2		61.9	28.2		98.7	28.8		79.9	41.3	9.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	58.9	13.2		61.9	28.2		98.7	28.8		79.9	41.3	9.1
LOS	E	B		E	C		F	C		E	D	A
Approach Delay		43.2			46.2			35.0			38.6	
Approach LOS		D			D			C			D	

Intersection Summary

Area Type: Other

Cycle Length: 125

Actuated Cycle Length: 116.5

Natural Cycle: 125

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 38.1 Intersection LOS: D

Intersection Capacity Utilization 81.5% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: Route 13

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↱			↑↱	
Traffic Volume (vph)	0	0	164	0	0	164	0	1706	69	0	1482	178
Future Volume (vph)	0	0	164	0	0	164	0	1706	69	0	1482	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.865			0.865		0.994			0.984	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	3518	0	0	3483	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	3518	0	0	3483	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		250			328			472			331	
Travel Time (s)		5.7			7.5			7.2			5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	178	0	0	178	0	1854	75	0	1611	193
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	178	0	0	178	0	1929	0	0	1804	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 66.2% ICU Level of Service C

Analysis Period (min) 15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱					↑↑↑	↱	↰↰	↑↑	
Traffic Volume (vph)	430	0	260	0	0	0	0	1330	540	640	1400	0
Future Volume (vph)	430	0	260	0	0	0	0	1330	540	640	1400	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3433	0	1583	0	0	0	0	5085	1583	3433	3539	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3433	0	1583	0	0	0	0	5085	1583	3433	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			140						587			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		650			687			331			523	
Travel Time (s)		14.8			15.6			5.0			7.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	467	0	283	0	0	0	0	1446	587	696	1522	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	467	0	283	0	0	0	0	1446	587	696	1522	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					2	1	1	2	
Detector Template	Left		Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20		20					100	20	20	100	
Trailing Detector (ft)	0		0					0	0	0	0	
Detector 1 Position(ft)	0		0					0	0	0	0	
Detector 1 Size(ft)	20		20					6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type	Prot		Perm					NA	Perm	Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			4						2			
Detector Phase	7		4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0		5.0					5.0	5.0	5.0	5.0	

Lanes, Volumes, Timings
13: Route 13 & EB Ramps

06/20/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	11.0		24.0					24.0	24.0	11.0	24.0	
Total Split (s)	24.0		24.0					26.0	26.0	20.0	46.0	
Total Split (%)	34.3%		34.3%					37.1%	37.1%	28.6%	65.7%	
Maximum Green (s)	18.0		18.0					20.0	20.0	14.0	40.0	
Yellow Time (s)	4.0		4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Recall Mode	None		None					C-Max	C-Max	None	C-Max	
Walk Time (s)			7.0					7.0	7.0		7.0	
Flash Dont Walk (s)			11.0					11.0	11.0		11.0	
Pedestrian Calls (#/hr)			0					0	0		0	
Act Effct Green (s)	14.5		14.5					20.3	20.3	17.2	43.5	
Actuated g/C Ratio	0.21		0.21					0.29	0.29	0.25	0.62	
v/c Ratio	0.66		0.64					0.98	0.67	0.83	0.69	
Control Delay	29.8		19.6					46.1	6.4	21.0	8.3	
Queue Delay	0.4		0.0					0.0	0.0	0.0	0.3	
Total Delay	30.1		19.6					46.1	6.4	21.0	8.6	
LOS	C		B					D	A	C	A	
Approach Delay		26.2						34.7			12.5	
Approach LOS		C						C			B	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 23.6 Intersection LOS: C

Intersection Capacity Utilization 93.2% ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 13: Route 13 & EB Ramps

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰↰	↑↱		↰↰	↑	↱
Traffic Volume (vph)	420	1750	540	160	1200	80	140	85	365	390	145	180
Future Volume (vph)	420	1750	540	160	1200	80	140	85	365	390	145	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		450	300		200	100		0	300		50
Storage Lanes	2		0	2		1	2		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	0.95	0.97	1.00	1.00
Frt			0.850			0.850		0.878				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3107	0	3433	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3107	0	3433	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			340			185		217				144
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1671			847			353			374	
Travel Time (s)		25.3			12.8			8.0			8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	457	1902	587	174	1304	87	152	92	397	424	158	196
Shared Lane Traffic (%)												
Lane Group Flow (vph)	457	1902	587	174	1304	87	152	489	0	424	158	196
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6						8

Lanes, Volumes, Timings
19: Norton & Route 13

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	5	2	2	1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.4	24.4	24.4	11.4	24.4	24.4	11.4	24.4		11.4	24.4	24.4
Total Split (s)	29.4	87.3	87.3	14.0	71.9	71.9	17.4	24.4		24.3	31.3	31.3
Total Split (%)	19.6%	58.2%	58.2%	9.3%	47.9%	47.9%	11.6%	16.3%		16.2%	20.9%	20.9%
Maximum Green (s)	23.7	81.6	81.6	8.3	66.2	66.2	11.7	18.7		18.6	25.6	25.6
Yellow Time (s)	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3		1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7		5.7	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Max	Max	None	Max	Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	22.6	81.6	81.6	8.3	67.3	67.3	10.8	17.1		18.6	24.9	24.9
Actuated g/C Ratio	0.15	0.55	0.55	0.06	0.45	0.45	0.07	0.12		0.13	0.17	0.17
v/c Ratio	0.87	0.98	0.57	0.91	0.81	0.11	0.61	1.06dr		0.99	0.51	0.51
Control Delay	79.5	48.4	10.8	113.7	40.7	0.3	77.8	54.7		104.3	62.7	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	79.5	48.4	10.8	113.7	40.7	0.3	77.8	54.7		104.3	62.7	21.6
LOS	E	D	B	F	D	A	E	D		F	E	C
Approach Delay		45.8			46.6			60.2			75.0	
Approach LOS		D			D			E			E	

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 148.4

Natural Cycle: 150

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 51.4 Intersection LOS: D

Intersection Capacity Utilization 97.2% ICU Level of Service F

Analysis Period (min) 15

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 19: Norton & Route 13

Lanes, Volumes, Timings
3: Route 13 & WB Ramsp

06/20/2022

Lane Group	WBL2	WBR2	SBT	SBR2	NEL2	NET
Lane Configurations	↰	↱↱	↑↑	↱		↰↑
Traffic Volume (vph)	410	1135	1630	325	185	1575
Future Volume (vph)	410	1135	1630	325	185	1575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.88	0.95	1.00	0.95	0.95
Frt		0.850		0.850		
Flt Protected	0.950					0.995
Satd. Flow (prot)	1770	2787	3539	1583	0	3522
Flt Permitted	0.950					0.995
Satd. Flow (perm)	1770	2787	3539	1583	0	3522
Right Turn on Red	Yes	Yes		Yes	Yes	
Satd. Flow (RTOR)	29	29		188		29
Link Speed (mph)			45			30
Link Distance (ft)			162			113
Travel Time (s)			2.5			2.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	446	1234	1772	353	201	1712
Shared Lane Traffic (%)						
Lane Group Flow (vph)	446	1234	1772	353	0	1913
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)			0			0
Link Offset(ft)			0			0
Crosswalk Width(ft)			16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (ft)	20	20	100	20	20	100
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	6	20	20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Prot	NA	Prot	Split	NA
Protected Phases	2	4	4	4	2	2
Permitted Phases						
Detector Phase	2	4	4	4	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0

Lane Group	WBL2	WBR2	SBT	SBR2	NEL2	NET
Minimum Split (s)	24.9	24.9	24.9	24.9	24.9	24.9
Total Split (s)	73.0	73.0	73.0	73.0	73.0	73.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	66.1	66.1	66.1	66.1	66.1	66.1
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.6	3.6	3.6	3.6	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.9	6.9	6.9	6.9		6.9
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	C-Max	C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	66.1	66.1	66.1	66.1		66.1
Actuated g/C Ratio	0.45	0.45	0.45	0.45		0.45
v/c Ratio	0.55	0.97	1.11	0.43		1.19
Control Delay	30.0	56.3	83.2	10.5		104.2
Queue Delay	0.0	0.2	0.4	0.0		0.9
Total Delay	30.0	56.5	83.6	10.5		105.1
LOS	C	E	F	B		F
Approach Delay			71.5			105.1
Approach LOS			E			F

Intersection Summary

Area Type: Other

Cycle Length: 146

Actuated Cycle Length: 146

Offset: 14 (10%), Referenced to phase 4:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

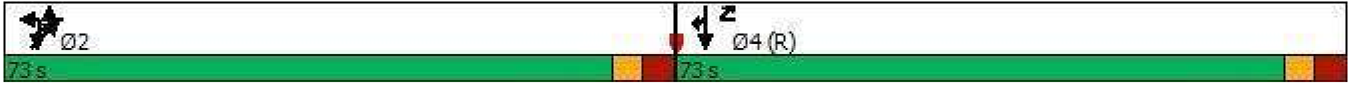
Maximum v/c Ratio: 1.19

Intersection Signal Delay: 76.3 Intersection LOS: E

Intersection Capacity Utilization Err% ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 3: Route 13 & WB Ramsp



	↰	↑	↓	↙	↗	↷
Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑↑		↱↱		
Traffic Volume (vph)	0	2710	0	1955	0	0
Future Volume (vph)	0	2710	0	1955	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	0.88	1.00	1.00
Frt				0.850		
Flt Protected						
Satd. Flow (prot)	0	3539	0	2787	0	0
Flt Permitted						
Satd. Flow (perm)	0	3539	0	2787	0	0
Link Speed (mph)		30	30		45	
Link Distance (ft)		114	450		101	
Travel Time (s)		2.6	10.2		1.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2946	0	2125	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2946	0	2125	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		24	24		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 78.2% ICU Level of Service D

Analysis Period (min) 15

	↗	↘	↑	↗	↙	↙
Lane Group	EBL2	EBR2	NBT	NBR2	SWL2	SWT
Lane Configurations	↰	↱	↑↑	↱		↰↑
Traffic Volume (vph)	430	260	1330	540	640	1400
Future Volume (vph)	430	260	1330	540	640	1400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Lane Util. Factor	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850		0.850		
Flt Protected	0.950					0.985
Satd. Flow (prot)	1770	1583	3539	1583	0	3486
Flt Permitted	0.950					0.985
Satd. Flow (perm)	1770	1583	3539	1583	0	3486
Right Turn on Red	Yes	Yes		Yes	Yes	
Satd. Flow (RTOR)	29	29		203		80
Link Speed (mph)			30			45
Link Distance (ft)			140			161
Travel Time (s)			3.2			2.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	467	283	1446	587	696	1522
Shared Lane Traffic (%)						
Lane Group Flow (vph)	467	283	1446	587	0	2218
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)			0			0
Link Offset(ft)			0			0
Crosswalk Width(ft)			16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (ft)	20	20	100	20	20	100
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	6	20	20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Prot	NA	custom	Perm	NA
Protected Phases	4	2	2	2		4
Permitted Phases	4	2		2	4	

Lane Group	EBL2	EBR2	NBT	NBR2	SWL2	SWT
Detector Phase	4	2	2	2	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.9	24.9	24.9	24.9	24.9	24.9
Total Split (s)	86.0	60.0	60.0	60.0	86.0	86.0
Total Split (%)	58.9%	41.1%	41.1%	41.1%	58.9%	58.9%
Maximum Green (s)	79.1	53.1	53.1	53.1	79.1	79.1
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.6	3.6	3.6	3.6	3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.9	6.9	6.9	6.9		6.9
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	None	None	None	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	79.1	53.1	53.1	53.1		79.1
Actuated g/C Ratio	0.54	0.36	0.36	0.36		0.54
v/c Ratio	0.48	0.48	1.12	0.83		1.15
Control Delay	21.3	35.0	99.4	31.1		87.4
Queue Delay	0.0	0.0	0.8	0.0		0.1
Total Delay	21.3	35.0	100.2	31.1		87.5
LOS	C	D	F	C		F
Approach Delay			80.2			87.5
Approach LOS			F			F

Intersection Summary

Area Type: Other

Cycle Length: 146

Actuated Cycle Length: 146

Offset: 2 (1%), Referenced to phase 4:EBSW, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.15

Intersection Signal Delay: 75.4 Intersection LOS: E

Intersection Capacity Utilization 132.7% ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 11: Route 13 & EB Ramps

	↘	↰	↱	↗	↓	↙
Lane Group	EBR	WBR2	NBR	NBR2	SBT	SBR
Lane Configurations	↱	↱	↱↱		↑↱	
Traffic Volume (vph)	164	164	1706	69	1482	178
Future Volume (vph)	164	164	1706	69	1482	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.88	1.00	0.95	0.95
Frt	0.865	0.865	0.850		0.984	
Flt Protected						
Satd. Flow (prot)	1611	1611	2787	0	3483	0
Flt Permitted						
Satd. Flow (perm)	1611	1611	2787	0	3483	0
Link Speed (mph)					45	
Link Distance (ft)					246	
Travel Time (s)					3.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	178	178	1854	75	1611	193
Shared Lane Traffic (%)						
Lane Group Flow (vph)	178	178	1929	0	1804	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Right	Right	Right	Right	Left	Right
Median Width(ft)					12	
Link Offset(ft)					0	
Crosswalk Width(ft)					16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	9	9	9		9
Sign Control					Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 78.9% ICU Level of Service D

Analysis Period (min) 15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱
Traffic Volume (vph)	140	85	365	390	145	180	420	1750	540	160	1200	80
Future Volume (vph)	140	85	365	390	145	180	420	1750	540	160	1200	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	300		50	300		450	300		200
Storage Lanes	1		0	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		0.878				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3107	0	3433	1863	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.062		
Satd. Flow (perm)	1770	3107	0	3433	1863	1583	3433	3539	1583	224	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		212				152			587			155
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		401			728			450			1312	
Travel Time (s)		9.1			16.5			10.2			29.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	92	397	424	158	196	457	1902	587	174	1304	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	489	0	424	158	196	457	1902	587	174	1304	87
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2	6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.2	24.2		11.2	24.2	24.2	11.4	24.4	24.4	11.4	24.4	24.4
Total Split (s)	22.7	24.2		25.2	26.7	26.7	28.9	85.2	85.2	11.4	67.7	67.7
Total Split (%)	15.5%	16.6%		17.3%	18.3%	18.3%	19.8%	58.4%	58.4%	7.8%	46.4%	46.4%
Maximum Green (s)	16.5	18.0		19.0	20.5	20.5	23.2	79.5	79.5	5.7	62.0	62.0
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.1	2.1		2.1	2.1	2.1	1.3	1.3	1.3	1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2		6.2	6.2	6.2	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	15.5	16.8		19.0	20.3	20.3	22.3	80.2	80.2	70.2	64.0	64.0
Actuated g/C Ratio	0.11	0.12		0.13	0.14	0.14	0.15	0.55	0.55	0.48	0.44	0.44
v/c Ratio	0.81	1.07dr		0.95	0.61	0.56	0.87	0.98	0.52	0.72	0.84	0.11
Control Delay	93.9	55.7		94.3	70.0	22.0	68.2	27.5	0.6	42.0	43.0	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	41.1	0.4	0.0	0.0	0.0
Total Delay	93.9	55.7		94.3	70.0	22.0	68.2	68.6	1.0	42.0	43.0	0.3
LOS	F	E		F	E	C	E	E	A	D	D	A
Approach Delay		64.8			71.2			55.1			40.5	
Approach LOS		E			E			E			D	

Intersection Summary

Area Type: Other

Cycle Length: 146

Actuated Cycle Length: 146

Offset: 106 (73%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 54.4 Intersection LOS: D

Intersection Capacity Utilization 98.1% ICU Level of Service F

Analysis Period (min) 15

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 19: Route 13 & Norton

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	336	11	165	83	28	44	138	1395	22	44	1409	193
Future Volume (vph)	336	11	165	83	28	44	138	1395	22	44	1409	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	175		0	200		0	350		300
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.859			0.908			0.998				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1600	0	1770	1691	0	1770	3532	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1600	0	1770	1691	0	1770	3532	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		179			45			2				156
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		277			275			420			498	
Travel Time (s)		6.3			6.3			6.4			7.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	365	12	179	90	30	48	150	1516	24	48	1532	210
Shared Lane Traffic (%)												
Lane Group Flow (vph)	365	191	0	90	78	0	150	1540	0	48	1532	210
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6

24: Route 13 & Walmart

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	24.0	24.0		24.0	24.0		24.4	24.4		11.4	24.4	24.4
Total Split (s)	24.0	24.0		24.0	24.0		24.4	85.2		12.8	73.6	73.6
Total Split (%)	16.4%	16.4%		16.4%	16.4%		16.7%	58.4%		8.8%	50.4%	50.4%
Maximum Green (s)	18.2	18.2		18.2	18.2		18.5	79.3		6.9	67.7	67.7
Yellow Time (s)	3.7	3.7		3.7	3.7		4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	2.1	2.1		2.1	2.1		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		5.8	5.8		5.9	5.9		5.9	5.9	5.9
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	17.8	14.1		12.7	9.1		17.2	89.1		9.0	78.5	78.5
Actuated g/C Ratio	0.12	0.10		0.09	0.06		0.12	0.61		0.06	0.54	0.54
v/c Ratio	0.87	0.60		0.58	0.53		0.72	0.71		0.44	0.81	0.23
Control Delay	84.2	18.7		78.6	44.0		80.7	23.6		89.5	19.3	1.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	1.5	0.0
Total Delay	84.2	18.7		78.6	44.0		80.7	23.6		89.5	20.9	1.4
LOS	F	B		E	D		F	C		F	C	A
Approach Delay		61.7			62.5			28.7			20.4	
Approach LOS		E			E			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 146

Actuated Cycle Length: 146

Offset: 37 (25%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 30.9 Intersection LOS: C

Intersection Capacity Utilization 81.5% ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 24: Route 13 & Walmart

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰	↱	↱	↰↰	↑↑			↑↑↑	↱
Traffic Volume (vph)	0	0	0	410	0	1135	185	1575	0	0	990	325
Future Volume (vph)	0	0	0	410	0	1135	185	1575	0	0	990	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		350
Storage Lanes	0		0	2		1	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	0.95	0.97	0.95	1.00	1.00	0.91	1.00
Frt					0.850	*0.950						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	1504	1681	3433	3539	0	0	5085	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	1504	1681	3433	3539	0	0	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					102							342
Link Speed (mph)		30			45			45			45	
Link Distance (ft)		586			532			506			696	
Travel Time (s)		13.3			8.1			7.7			10.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	432	0	1195	195	1658	0	0	1042	342
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	0	0	432	598	597	195	1658	0	0	1042	342
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8	2 8!	5	2!			6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				4	8	2 8	5	2			6	6
Switch Phase												
Minimum Initial (s)				5.0	5.0		5.0	5.0			5.0	5.0
Minimum Split (s)				24.9	24.0		24.9	24.9			24.0	24.0
Total Split (s)				49.0	49.0		24.9	66.0			41.1	41.1
Total Split (%)				42.6%	42.6%		21.7%	57.4%			35.7%	35.7%
Maximum Green (s)				42.1	43.0		18.0	59.1			35.1	35.1
Yellow Time (s)				3.3	4.0		3.3	3.3			4.0	4.0
All-Red Time (s)				3.6	2.0		3.6	3.6			2.0	2.0
Lost Time Adjust (s)				0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)				6.9	6.0		6.9	6.9			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?							Yes				Yes	Yes
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	3.0
Recall Mode				None	None		Max	C-Max			C-Max	C-Max
Walk Time (s)				7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)				11.0	11.0		11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)				0	0		0	0			0	0
Act Effct Green (s)				41.4	42.3	115.0	18.7	59.8			35.1	35.1
Actuated g/C Ratio				0.36	0.37	1.00	0.16	0.52			0.31	0.31
v/c Ratio				0.35	0.97	0.36	0.35	0.90			0.67	0.47
Control Delay				27.7	59.4	0.6	52.8	29.2			37.5	5.6
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				27.7	59.4	0.6	52.8	29.2			37.5	5.6
LOS				C	E	A	D	C			D	A
Approach Delay					29.4			31.7			29.6	
Approach LOS					C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 1 (1%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 30.3 Intersection LOS: C

Intersection Capacity Utilization 101.9% ICU Level of Service G

Analysis Period (min) 15

* User Entered Value

! Phase conflict between lane groups.

Splits and Phases: 3: WB Ramps

	↗	↘	↖	↑	↓	↙
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑↑	↑↑	↱
Traffic Volume (vph)	0	755	0	2070	1200	240
Future Volume (vph)	0	755	0	2070	1200	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0			300
Storage Lanes	0	1	0			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1611	0	5085	3539	1583
Flt Permitted						
Satd. Flow (perm)	0	1611	0	5085	3539	1583
Link Speed (mph)	30			45	45	
Link Distance (ft)	343			942	447	
Travel Time (s)	7.8			14.3	6.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	795	0	2179	1263	253
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	795	0	2179	1263	253
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Free			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 86.6% ICU Level of Service E

Analysis Period (min) 15

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱					↑↑↑↑	↱		↑↑↑	
Traffic Volume (vph)	430	0	260	0	0	0	0	1330	540	0	1400	0
Future Volume (vph)	430	0	260	0	0	0	0	1330	540	0	1400	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	0		225	0		0
Storage Lanes	2		1	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00	0.91	1.00
Frt			0.850						0.850			
Flt Protected	0.950											
Satd. Flow (prot)	3433	0	1583	0	0	0	0	6408	1583	0	5085	0
Flt Permitted	0.950											
Satd. Flow (perm)	3433	0	1583	0	0	0	0	6408	1583	0	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			37						568			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		611			631			359			506	
Travel Time (s)		13.9			14.3			5.4			7.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	453	0	274	0	0	0	0	1400	568	0	1474	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	453	0	274	0	0	0	0	1400	568	0	1474	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					2	1		2	
Detector Template	Left		Right					Thru	Right		Thru	
Leading Detector (ft)	20		20					100	20		100	
Trailing Detector (ft)	0		0					0	0		0	
Detector 1 Position(ft)	0		0					0	0		0	
Detector 1 Size(ft)	20		20					6	20		6	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0		0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0		0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0		0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type	Prot		Prot					NA	Perm		NA	
Protected Phases	4		4					2			6	
Permitted Phases	4		4						2			

11: EB Ramps

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4		4					2	2		6	
Switch Phase												
Minimum Initial (s)	5.0		5.0					5.0	5.0		5.0	
Minimum Split (s)	24.9		24.9					24.9	24.9		24.0	
Total Split (s)	46.0		46.0					69.0	69.0		69.0	
Total Split (%)	40.0%		40.0%					60.0%	60.0%		60.0%	
Maximum Green (s)	39.1		39.1					62.1	62.1		63.0	
Yellow Time (s)	3.3		3.3					3.3	3.3		4.0	
All-Red Time (s)	3.6		3.6					3.6	3.6		2.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0		0.0	
Total Lost Time (s)	6.9		6.9					6.9	6.9		6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0		3.0					3.0	3.0		3.0	
Recall Mode	Max		Max					C-Max	C-Max		C-Max	
Walk Time (s)	7.0		7.0					7.0	7.0		7.0	
Flash Dont Walk (s)	11.0		11.0					11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0		0					0	0		0	
Act Effct Green (s)	39.1		39.1					62.1	62.1		63.0	
Actuated g/C Ratio	0.34		0.34					0.54	0.54		0.55	
v/c Ratio	0.39		0.49					0.40	0.51		0.53	
Control Delay	30.1		29.2					12.1	2.4		3.5	
Queue Delay	0.1		0.0					0.0	0.0		0.3	
Total Delay	30.2		29.2					12.1	2.4		3.8	
LOS	C		C					B	A		A	
Approach Delay		29.8						9.3			3.8	
Approach LOS		C						A			A	

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 1 (1%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 10.9 Intersection LOS: B

Intersection Capacity Utilization 101.9% ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 11: EB Ramps

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↱			↑↑↱	
Traffic Volume (vph)	0	0	164	0	0	164	0	1706	69	0	1482	178
Future Volume (vph)	0	0	164	0	0	164	0	1706	69	0	1482	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.91	0.91
Frt			0.865			0.865		0.994			0.984	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	3518	0	0	5004	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	3518	0	0	5004	0
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		315			203			475			359	
Travel Time (s)		7.2			4.6			7.2			5.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	173	0	0	173	0	1796	73	0	1560	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	173	0	0	173	0	1869	0	0	1747	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 66.2% ICU Level of Service C

Analysis Period (min) 15

Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations		↱		↑↑	↱		↑↑	↱		
Traffic Volume (vph)	0	320	0	1750	960	0	1315	640	0	0
Future Volume (vph)	0	320	0	1750	960	0	1315	640	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300	50	300		0	300		0	0	0
Storage Lanes	0	0	0		1	0		1	0	0
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Frt		0.865			0.850			0.850		
Flt Protected										
Satd. Flow (prot)	0	1611	0	3539	1583	0	3539	1583	0	0
Flt Permitted										
Satd. Flow (perm)	0	1611	0	3539	1583	0	3539	1583	0	0
Link Speed (mph)	30			45			45		30	
Link Distance (ft)	728			696			942		213	
Travel Time (s)	16.5			10.5			14.3		4.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	337	0	1842	1011	0	1384	674	0	0
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	337	0	1842	1011	0	1384	674	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)	0			0			0		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Sign Control	Free			Free			Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 74.9% ICU Level of Service D

Analysis Period (min) 15

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↱		↰	↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (vph)	336	11	165	83	28	44	138	1395	22	44	1409	193
Future Volume (vph)	336	11	165	83	28	44	138	1395	22	44	1409	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	75		0	250		0	150		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.860			0.908			0.998				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1602	0	1770	1691	0	1770	3532	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1602	0	1770	1691	0	1770	3532	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		174			46			2				156
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		263			255			419			475	
Travel Time (s)		6.0			5.8			6.3			7.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	354	12	174	87	29	46	145	1468	23	46	1483	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	354	186	0	87	75	0	145	1491	0	46	1483	203
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	24.0	24.0		24.0	24.0		11.4	24.4		11.4	24.4	24.4
Total Split (s)	24.0	24.0		24.0	24.0		14.2	55.5		11.5	52.8	52.8
Total Split (%)	20.9%	20.9%		20.9%	20.9%		12.3%	48.3%		10.0%	45.9%	45.9%
Maximum Green (s)	18.2	18.2		18.2	18.2		8.3	49.6		5.6	46.9	46.9
Yellow Time (s)	3.7	3.7		3.7	3.7		4.4	4.4		4.4	4.4	4.4
All-Red Time (s)	2.1	2.1		2.1	2.1		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.8	3.8		3.8	3.8		3.9	3.9		3.9	3.9	3.9
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	18.2	15.4		13.0	9.9		17.1	65.6		10.4	56.6	56.6
Actuated g/C Ratio	0.16	0.13		0.11	0.09		0.15	0.57		0.09	0.49	0.49
v/c Ratio	0.65	0.51		0.44	0.40		0.55	0.74		0.29	0.85	0.24
Control Delay	51.2	13.4		53.7	29.1		53.7	24.5		52.4	23.9	4.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	51.2	13.4		53.7	29.1		53.7	24.5		52.4	23.9	4.0
LOS	D	B		D	C		D	C		D	C	A
Approach Delay		38.2			42.3			27.1			22.3	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 27.1 Intersection LOS: C
Intersection Capacity Utilization 75.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 24:

APPENDIX D – HIGHWAY SAFETY MANUAL REPORTS

I-44/Route 13 Crash History by Intersection and Segment

Location		INTERSECTIONS				ROADWAY SEGMENTS							TOTAL	Percentage
		I-44 EB at Route 13	I-44 WB at Route 13	Route 13 at Norton Road	Route 13 at Farm Road 94	I-44 from Melville Road to Route 13	I-44 from Route 13 to Grant Avenue	Route 13 from Norton Road to Farm Road 94	I-44 at Route 13 EB Off-Ramp	I-44 at Route 13 EB On-Ramp	I-44 at Route 13 WB Off-Ramp	I-44 at Route 13 WB On-Ramp		
Passing	**PDO**	7	4	2	3	8	7	4	0	2	0	0	**37**	**13.3%**
	MI	0	0	1	0	0	1	0	0	0	0	0	**2**	
	DI	0	0	0	0	0	0	0	0	0	0	0	**0**	
	F	0	0	0	0	0	0	0	0	0	0	0	**0**	
Rear End	**PDO**	12	5	10	2	4	17	13	0	0	11	0	**74**	**39.2%**
	MI	1	5	4	2	3	18	2	0	1	4	0	**40**	
	DI	0	0	0	0	0	1	0	0	0	0	0	**1**	
	F	0	0	0	0	0	0	0	0	0	0	0	**0**	
Head On	**PDO**	0	2	0	0	0	0	0	0	0	0	0	**2**	**1.4%**
	MI	1	0	0	0	0	1	0	0	0	0	0	**2**	
	DI	0	0	0	0	0	0	0	0	0	0	0	**0**	
	F	0	0	0	0	0	0	0	0	0	0	0	**0**	
Left Turn / Right Angle Collision	**PDO**	3	4	5	5	0	0	0	0	0	0	0	**17**	**10.9%**
	MI	0	1	8	2	0	0	0	0	0	0	0	**11**	
	DI	0	0	1	2	0	0	0	0	0	0	0	**3**	
	F	0	0	0	1	0	0	0	0	0	0	0	**1**	
Out of Control	**PDO**	3	4	5	1	17	12	10	0	0	2	0	**54**	**22.2%**
	MI	2	0	0	0	1	2	2	1	0	0	0	**8**	
	DI	0	0	1	0	1	0	0	0	0	0	0	**2**	
	F	0	0	0	0	0	0	1	0	0	0	0	**1**	
Other / Unknown	**PDO**	2	6	0	3	7	1	9	0	0	1	0	**29**	**13.0%**
	MI	0	0	1	1	3	1	1	0	0	0	0	**7**	
	DI	0	0	0	0	0	0	0	0	0	0	0	**0**	
	F	0	0	1	0	1	0	0	0	0	0	0	**2**	
Total		**31**	**31**	**39**	**22**	**45**	**61**	**42**	**1**	**3**	**18**	**0**	**293**	**100%**

PDO = Property Damage

MI = Minor Injury

DI = Disabling Injury

F = Fatal

I-44/Route 13 Crash Types

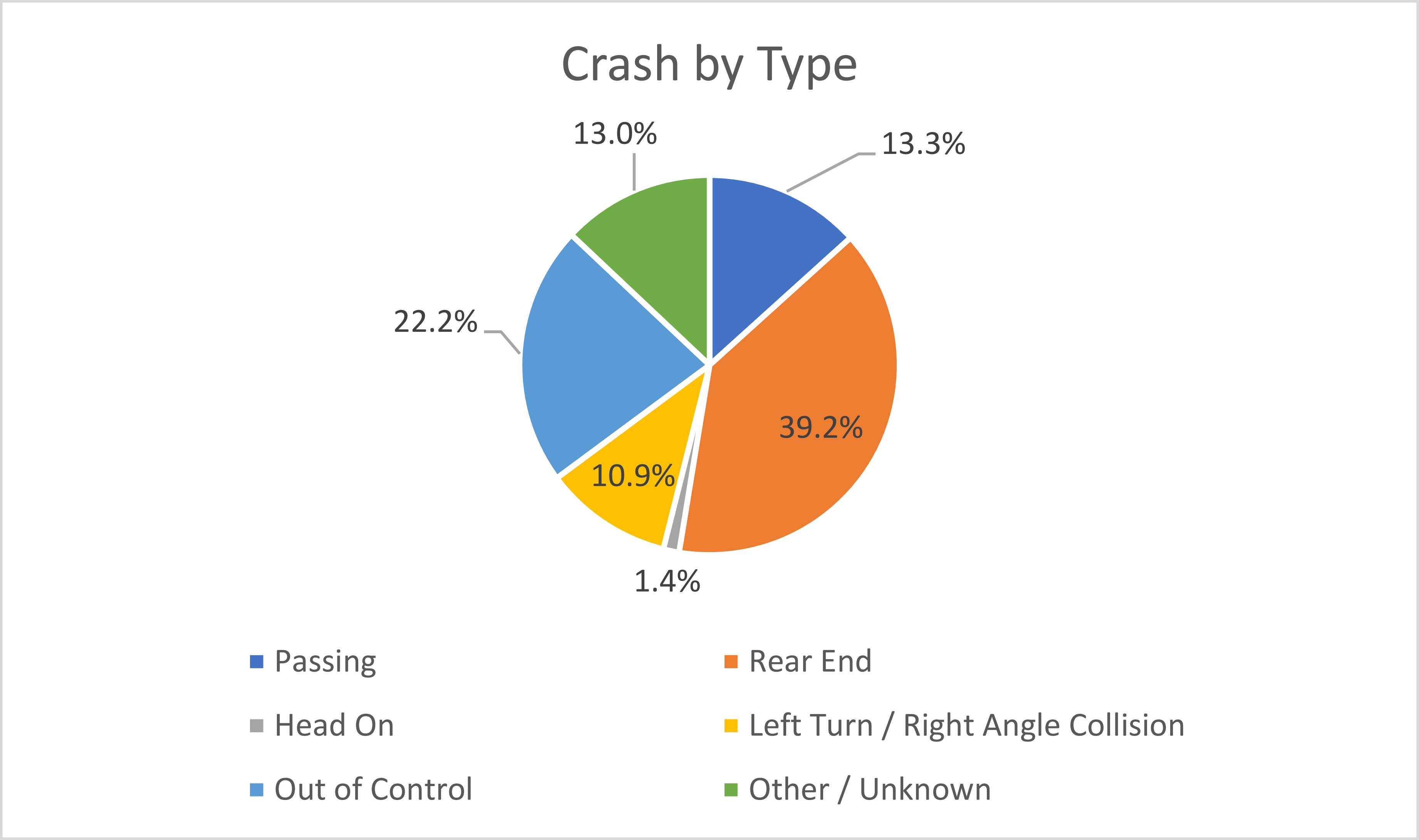


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Table ES1 Freeway Interchange Calibration Values

Freeway Interchange Facility	**Calibration Value**	
	FI	**PDO**
Ramp Terminals		
Rural Stop-Controlled D4 Diamond Interchange Terminal	0.843	2.251
Urban Stop-Controlled D4 Diamond Interchange Terminal	1.226	2.025
Signalized D4 Diamond Interchange with Two Lane Crossroads Terminal	1.087	2.360
Signalized D4 Diamond Interchange with Four Lane Crossroads Terminal	0.853	1.830
Signalized D4 Diamond Interchange with Six Lane Crossroads Terminal	0.874	2.150
Rural Stop-Controlled A2 Partial Cloverleaf Interchange Terminal	0.290	1.504
Urban Stop-Controlled A2 Partial Cloverleaf Interchange Terminal	1.035	1.594
Signalized Partial A2 Cloverleaf Interchange Terminal	0.535	1.172
Speed-Chang Lanes		
Rural Entrance Speed-Change Lane	0.714	1.152
Rural Exit Speed-Change Lane	0.811	1.162
Urban Four-Lane Entrance Speed-Change Lane	0.598	1.314
Urban Four-Lane Exit Speed-Change Lane	0.455	0.519
Urban Six-Lane Entrance Speed-Change Lane	0.431	0.739
Urban Six-Lane Exit Speed-Change Lane	0.443	0.482
Ramps		
Rural Entrance Ramp for Single Vehicle Crashes	1.000*	0.769
Rural Entrance Ramp for Multiple Vehicle Crashes	1.000*	2.489
Rural Exit Ramp for Single Vehicle Crashes	0.356	1.531
Rural Exit Ramp for Multiple Vehicle Crashes	1.000*	1.000*
Urban Entrance Ramp for Single Vehicle Crashes	0.913	1.121
Urban Entrance Ramp for Multiple Vehicle Crashes	2.681	6.360
Urban Exit Ramp for Single Vehicle Crashes	0.840	1.266
Urban Exit Ramp for Multiple Vehicle Crashes	2.354	5.252

*A value of 1.000 (i.e., national data) was used because Missouri data contained too few ramp crashes.

CMF / CRF Details

CMF ID: 206

Conversion of stop-controlled intersection into single-lane roundabout

Description:

Prior Condition: ***No Prior Condition(s)***

Category: Intersection geometry

Study: ***Observational Before-After Study of the Safety Effect of U.S. Roundabout Conversions Using the Empirical Bayes Method*, Persaud et al., 2001**

Star Quality Rating:	4 Stars

Crash Modification Factor (CMF)	
Value:	0.28
Adjusted Standard Error:	0.11
Unadjusted Standard Error:	0.06

Crash Reduction Factor (CRF)	
Value:	72 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	11
Unadjusted Standard Error:	6

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Number of Lanes:	
Road Division Type:	
Speed Limit:	
Area Type:	Urban
Traffic Volume:	
Time of Day:	
If countermeasure is intersection-based	
Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	Not specified
Traffic Control:	Stop-controlled
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	
Municipality:	
State:	
Country:	
Type of Methodology Used:	2

Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Dec-01-2009
Comments:	

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CMF / CRF Details

CMF ID: 5555

Install J-Turn intersection

Description: Install J-Turn intersection

Prior Condition: Two way stop controlled intersection

Category: Intersection geometry

Study: *Evaluation of J-turn Intersection Design Performance in Missouri*, Edara et al., 2013

Star Quality Rating:	8 Stars [View score details]

Crash Modification Factor (CMF)	
Value:	0.652
Adjusted Standard Error:	
Unadjusted Standard Error:	

Crash Reduction Factor (CRF)	
Value:	34.8 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	
Unadjusted Standard Error:	

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Principal Arterial Other Freeways and Expressways
Number of Lanes:	
Road Division Type:	Divided by Median
Speed Limit:	65-70
Area Type:	Rural
Traffic Volume:	
Time of Day:	All
If countermeasure is intersection-based	
Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	3-leg,4-leg
Traffic Control:	Other
Major Road Traffic Volume:	10326 to 26470 Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	434 to 1389 Annual Average Daily Traffic (AADT)

Development Details

Date Range of Data Used:	2004 to 2013
Municipality:	
State:	MO
Country:	USA
Type of Methodology Used:	2

Sample Size Used:	
Before Sample Size Used:	86
After Sample Size Used:	27

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Aug-12-2014
Comments:	

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CMF / CRF Details

CMF ID: 10761

Convert diamond interchange to Diverging Diamond Interchange (DDI) or Double Crossover Diamond (DCD)

Description: Convert a diamond interchange to a Diverging Diamond Interchange (DDI) or a Double Crossover Diamond (DCD)

Prior Condition: *No Prior Condition(s)*

Category: Interchange design

Study: *Systematic Safety Evaluation of Diverging Diamond Interchanges Based on Nationwide Implementation Data*, Abdelrahman et al., 2021

Star Quality Rating:	4 Stars

Crash Modification Factor (CMF)	
Value:	0.858
Adjusted Standard Error:	
Unadjusted Standard Error:	

Crash Reduction Factor (CRF)	
Value:	14.2 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	
Unadjusted Standard Error:	

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Number of Lanes:	
Road Division Type:	Divided by Median
Speed Limit:	
Area Type:	Urban and suburban
Traffic Volume:	1295 to 76100 *Annual Average Daily Traffic (AADT)*
Time of Day:	All
If countermeasure is intersection-based	
Intersection Type:	
Intersection Geometry:	
Traffic Control:	
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Development Details

Date Range of Data Used:	
Municipality:	
State:	CO, FL, GA, ID, IN, IA, KS, KY, MI, MN, MO, NV, NM, NY, NC, OH, OR, PA, TN, TX, UT, VA, WI, WY
Country:	

Type of Methodology Used:	2
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Jul-01-2021
Comments:	The AADT values mentioned are for the Arterials.

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CMF / CRF Details

CMF ID: 9821

Install right-in-right-out (RIRO) operations at stop-controlled intersections

Description:

Prior Condition: *No Prior Condition(s)*

Category: Access management

Study: *Safety Effects of Turning Movement Restrictions at Stop-Controlled Intersections*, Le et al., 2018

Star Quality Rating:	3 Stars [View score details]

Crash Modification Factor (CMF)	
Value:	0.55
Adjusted Standard Error:	
Unadjusted Standard Error:	0.09

Crash Reduction Factor (CRF)	
Value:	45 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	
Unadjusted Standard Error:	9

Applicability

Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Number of Lanes:	4 and 6
Road Division Type:	Divided by Median
Speed Limit:	
Area Type:	Urban
Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	3-leg
Traffic Control:	Stop-controlled
Major Road Traffic Volume:	13433 to 75000 Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	51 to 2600 Annual Average Daily Traffic (AADT)

Development Details

Date Range of Data Used:	
Municipality:	
State:	CA
Country:	USA
Type of Methodology Used:	7

Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	Oct-27-2018
Comments:	This CMF compares urban, three-legged, stop-controlled intersections with RIRO operation to full movement. This CMF looks at Total crashes. Total crashes are defined as all crashes within 100 ft of intersection (all types and severities combined)

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Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	I-44 to Norton Road
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.13
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	21,001
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	20
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	62
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	23
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	0.99	0.91	1.00	0.98

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.430	1.000	0.430	0.98	0.91	0.382
Fatal and Injury (FI)	-12.76	1.28	1.31	0.127	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.280	0.120	0.98	0.91	0.107
Property Damage Only (PDO)	-12.81	1.38	1.34	0.328	$(5)_{TOTAL}-(5)_{FI}$ 0.720	0.309	0.98	0.91	0.275

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	Norton Road to RP 59.902
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.2
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	20,811
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	40
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	55
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.05	0.97	1.00	1.00	1.02

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.653	1.000	0.653	1.02	0.91	0.606
Fatal and Injury (FI)	-12.76	1.28	1.31	0.194	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.280	0.183	1.02	0.91	0.170
Property Damage Only (PDO)	-12.81	1.38	1.34	0.498	$(5)_{TOTAL}-(5)_{FI}$ 0.720	0.470	1.02	0.91	0.436

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Focus Workforce Mgmt West Ent. To Start TWLTL
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data	Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)	--	2U
Length of segment, L (mi)	--	0.11
AADT (veh/day) $AADT_{MAX}$ = 32,600 (veh/day)	--	2,302
Type of on-street parking (none/parallel/angle)	None	None
Proportion of curb length with on-street parking	--	0
Median width (ft) - for divided only	15	Not Present
Lighting (present / not present)	Not Present	Not Present
Auto speed enforcement (present / not present)	Not Present	Not Present
Major commercial driveways (number)	--	0
Minor commercial driveways (number)	--	1
Major industrial / institutional driveways (number)	--	0
Minor industrial / institutional driveways (number)	--	0
Major residential driveways (number)	--	0
Minor residential driveways (number)	--	0
Other driveways (number)	--	0
Speed Category	--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)	0	100
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]	30	30
Calibration Factor, Cr	1.00	1.48

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.20	1.00	1.00	1.00	1.20

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-15.22	1.68	0.84	0.012	1.000	0.012	1.20	1.48	0.021
Fatal and Injury (FI)	-16.22	1.66	0.65	0.004	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.303	0.004	1.20	1.48	0.006
Property Damage Only (PDO)	-15.62	1.69	0.87	0.009	$(5)_{TOTAL}-(5)_{FI}$ 0.697	0.008	1.20	1.48	0.015

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Start TWLTL To Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data	Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)	--	3T
Length of segment, L (mi)	--	0.12
AADT (veh/day) AADT$_{MAX}$ = 32,900 (veh/day)	--	2,302
Type of on-street parking (none/parallel/angle)	None	None
Proportion of curb length with on-street parking	--	0
Median width (ft) - for divided only	15	Not Present
Lighting (present / not present)	Not Present	Present
Auto speed enforcement (present / not present)	Not Present	Not Present
Major commercial driveways (number)	--	2
Minor commercial driveways (number)	--	0
Major industrial / institutional driveways (number)	--	0
Minor industrial / institutional driveways (number)	--	0
Major residential driveways (number)	--	0
Minor residential driveways (number)	--	0
Other driveways (number)	--	0
Speed Category	--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)	0	25
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]	30	28
Calibration Factor, Cr	1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.01	1.00	0.93	1.00	0.94

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.40	1.41	0.66	0.027	1.000	0.027	0.94	0.91	0.023
Fatal and Injury (FI)	-16.45	1.69	0.59	0.004	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.153	0.004	0.94	0.91	0.004
Property Damage Only (PDO)	-11.95	1.33	0.59	0.023	$(5)_{TOTAL}-(5)_{FI}$ 0.847	0.023	0.94	0.91	0.020

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Old MO 13 to 1717 W Smith Dr
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.18
AADT (veh/day)	$AADT_{MAX}$ = 32,900 (veh/day)	--	2,584
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	11
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	14
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.00	1.00	0.93	1.00	0.93

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.40	1.41	0.66	0.048	1.000	0.048	0.93	0.91	0.041
Fatal and Injury (FI)	-16.45	1.69	0.59	0.008	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.158	0.008	0.93	0.91	0.006
Property Damage Only (PDO)	-11.95	1.33	0.59	0.040	$(5)_{TOTAL}-(5)_{FI}$ 0.842	0.040	0.93	0.91	0.034

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Farm Road 143 to Dickerson Branch crossing
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.15
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	6,655
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	2
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	47
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	15
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	1.00	1.00	1.00	1.08

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	0.162	1.000	0.162	1.08	0.91	0.159
Fatal and Injury (FI)	-12.08	1.25	0.99	0.051	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.333	0.054	1.08	0.91	0.053
Property Damage Only (PDO)	-12.53	1.38	1.08	0.102	$(5)_{TOTAL}-(5)_{FI}$ 0.667	0.108	1.08	0.91	0.106

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 67,700 (veh/day)	--	4,136
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 33,400 (veh/day)	--	2,584
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	5.21
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Permissive
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Permissive
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	3
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF* $_{COMB}$
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.98	0.92	1.00	0.91	1.00	0.54

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at MO 13
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 67,700 (veh/day)	--	21,001
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 33,400 (veh/day)	--	6,199
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	5.21
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4
Type of left-turn signal phasing for Leg #1		Permissive	Protected
Type of left-turn signal phasing for Leg #2		--	Protected
Type of left-turn signal phasing for Leg #3		--	Protected
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	6
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF* $_{COMB}$
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.78	0.92	1.00	0.91	1.00	0.43

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections			
General Information		**Location Information**	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Farm Road 143
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		**Base Conditions**	**Site Conditions**
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 45,700 (veh/day)	--	6,655
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 9,300 (veh/day)	--	2,764
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.28
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	0
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF* $_{COMB}$
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	1.00	1.00	0.91	1.00	0.91

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Multiple-vehicle nondriveway							
Segment 1	0.382	0.107	0.275	2.25	1.320	0.665	1.008
Segment 2	0.606	0.170	0.436	0.25	1.320	0.556	0.448
Segment 3	0.021	0.006	0.015	0.25	0.840	0.982	0.025
Segment 4	0.023	0.004	0.020	0.25	0.660	0.985	0.027
Segment 5	0.041	0.006	0.034	0.25	0.660	0.974	0.046
Segment 6	0.159	0.053	0.106	0.25	1.010	0.861	0.172
Single-vehicle							
Segment 1	0.080	0.014	0.066	0	0.860	0.936	0.075
Segment 2	0.127	0.022	0.106	0.5	0.860	0.901	0.164
Segment 3	0.063	0.022	0.041	0.25	0.810	0.952	0.072
Segment 4	0.022	0.007	0.015	0.5	1.370	0.971	0.035
Segment 5	0.034	0.011	0.024	0.00	1.370	0.955	0.033
Segment 6	0.062	0.018	0.044	0.75	0.860	0.949	0.097
						1.000	0.000
Multiple-vehicle driveway-related							
Segment 1	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 2	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 3	0.014	0.004	0.009	0	0.810	0.989	0.013
Segment 4	0.027	0.006	0.020	0.25	1.100	0.971	0.033
Segment 5	0.020	0.005	0.015	0.25	1.100	0.979	0.024
Segment 6	0.113	0.039	0.074	0.5	0.810	0.916	0.146
INTERSECTIONS							
Multiple-vehicle							
Intersection 1	2.154	0.603	1.551	1	0.390	0.543	1.399
Intersection 2	11.938	3.955	7.983	5	0.390	0.177	6.433
Intersection 3	0.829	0.285	0.544	2	0.800	0.601	1.097
Intersection 4						1.000	0.000
Single-vehicle							
Intersection 1	0.250	0.094	0.156	0	0.360	0.917	0.250
Intersection 2	0.762	0.198	0.563	1	0.360	0.785	0.813
Intersection 3	0.299	0.097	0.202	0	1.140	0.746	0.223
Intersection 4						1.000	0.000
COMBINED (sum of column)	18.026	5.726	12.300	15	--	--	12.633

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1) **Site Type**	(2) **N_{ped}**	(3) **N_{bike}**
ROADWAY SEGMENTS		
Segment 1	0.008	0.002
Segment 2	0.013	0.003
Segment 3	0.001	0.001
Segment 4	0.001	0.000
Segment 5	0.001	0.001
Segment 6	0.003	0.001
INTERSECTIONS		
Intersection 1	0.113	0.188
Intersection 2	0.065	0.993
Intersection 3	0.030	0.023
Intersection 4		
COMBINED (sum of column)	0.230	1.210

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1) **Crash severity level**	(2) **$N_{predicted}$**	(3) **N_{ped}**	(4) **N_{bike}**	(5) $N_{expected (VEHICLE)}$	(6) $N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	18.0	0.2	1.2	12.6	14.1
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	5.7	0.2	1.2	4.0	5.5
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	12.3	0.0	0.0	8.6	8.6

Worksheet 1A -- General Information and Input Data for Rural Multilane Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	RP 59.902 to RP 61.538 NB
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (divided / undivided)		Undivided	Divided
Length of segment, L (mi)		--	1.59
AADT (veh/day)	AADT$_{MAX}$ = 89,300 (veh/day)	--	20,811
Lane width (ft)		12	12
Shoulder width (ft) - right shoulder width for divided [if differ for directions of travel, use average width]		8	9
Shoulder type - right shoulder type for divided		Paved	Paved
Median width (ft) - for divided only		30	60
Side Slopes - for undivided only		1:7 or flatter	Not Applicable
Lighting (present/not present)		Not Present	Not Present
Auto speed enforcement (present/not present)		Not Present	Not Present
Calibration Factor, Cr		1.00	0.74

Worksheet 1B (a) -- Crash Modification Factors for Rural Multilane Divided Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for Lane Width	CMF for Right Shoulder Width	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1rd	*CMF 2rd*	*CMF 3rd*	*CMF 4rd*	*CMF 5rd*	*CMF comb*
from Equation 11-16	from Table 11-17	from Table 11-18	from Equation 11-17	from Section 11.7.2	(1)*(2)*(3)*(4)*(5)
1.00	1.00	0.96	1.00	1.00	0.96

Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-5			**N spf rd**	**Overdispersion Parameter, k**	**Combined CMFs** (6) from Worksheet 1B (a)	**Calibration Factor, Cr**	**Predicted average crash frequency, $N_{predicted\ rs(d)}$**
	a	b	c	from Equation 11-9	from Equation 11-10			(3)*(5)*(6)
Total	-9.025	1.049	1.549	6.483	0.134	0.96	0.74	4.606
Fatal and Injury (FI)	-8.837	0.958	1.687	3.166	0.116	0.96	0.74	2.249
Fatal and Injury^{a} (FI^{a})	-8.505	0.874	1.740	1.914	0.110	0.96	0.74	1.360
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL} - (7)_{FI}$ 2.357

NOTE: ^{a} Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 1A -- General Information and Input Data for Rural Multilane Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (divided / undivided)		Undivided	Divided
Length of segment, L (mi)		--	0.01
AADT (veh/day)	AADT$_{MAX}$ = 89,300 (veh/day)	--	1
Lane width (ft)		12	12
Shoulder width (ft) - right shoulder width for divided [if differ for directions of travel, use average width]		8	9
Shoulder type - right shoulder type for divided		Paved	Paved
Median width (ft) - for divided only		30	60
Side Slopes - for undivided only		1:7 or flatter	Not Applicable
Lighting (present/not present)		Not Present	Not Present
Auto speed enforcement (present/not present)		Not Present	Not Present
Calibration Factor, Cr		1.00	0.74

Worksheet 1B (a) -- Crash Modification Factors for Rural Multilane Divided Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for Lane Width	CMF for Right Shoulder Width	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1rd	*CMF 2rd*	*CMF 3rd*	*CMF 4rd*	*CMF 5rd*	*CMF comb*
from Equation 11-16	from Table 11-17	from Table 11-18	from Equation 11-17	from Section 11.7.2	(1)*(2)*(3)*(4)*(5)
1.00	1.00	0.96	1.00	1.00	0.96

Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-5			**N spf rd**	**Overdispersion Parameter, k**	**Combined CMFs** (6) from Worksheet 1B (a)	**Calibration Factor, Cr**	**Predicted average crash frequency, $N_{predicted\ rs(d)}$**
	a	b	c	from Equation 11-9	from Equation 11-10			(3)*(5)*(6)
Total	-9.025	1.049	1.549	0.000	21.246	0.96	0.74	0.000
Fatal and Injury (FI)	-8.837	0.958	1.687	0.000	18.507	0.96	0.74	0.000
Fatal and Injury^{a} (FI^{a})	-8.505	0.874	1.740	0.000	17.552	0.96	0.74	0.000
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL}$ - $(7)_{FI}$ 0.000

NOTE: ^{a} Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 2A -- General Information and Input Data for Rural Multilane Highway Intersections

General Information		Location Information	
Analyst	GTB	Roadway	MO Hwy 13
Agency or Company	CMT	Intersection	MO 13 at Farm Road 94
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 4ST, 4SG)		--	4ST
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 78,300 (veh/day)	--	25,673
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 7,400 (veh/day)	--	966
Intersection skew angle (degrees)		0	16
Number of non-STOP-controlled approaches with left-turn lanes (0, 1, 2)		0	2
Number of non-STOP-controlled approaches with right-turn lanes (0, 1, 2, 3, or 4)		0	0
Intersection lighting (present/not present)		Not Present	Not Present
Calibration Factor, C_i		1.00	0.65

Worksheet 2B -- Crash Modification Factors for Rural Multilane Highway Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Crash Severity Level	CMF for Intersection Skew Angle (CMF_{1i}) from Equations 11-18 or 11-20 and 11-19 or 11-21	CMF for Left-Turn Lanes (CMF_{2i}) from Table 11-22	CMF for Right-Turn Lanes (CMF_{3i}) from Table 11-23	CMF for Lighting (CMF_{4i}) from Equation 11-22	Combined CMF (CMF_{COMB}) (2)*(3)*(4)*(5)
Total	1.09	0.52	1.00	1.00	0.56
Fatal and Injury (FI)	1.09	0.42	1.00	1.00	0.46

Note: The 4-leg Signalized Intersection (4SG) models do not have base conditions and so can only be used for estimation purposes. As a result, there are not CMFs provided for the 4SG condition.

Worksheet 2C -- Intersection Crashes for Rural Multilane Highway Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-7 or 11-8			**$N_{spf\ int}$**	**Overdispersion Parameter, k**	**Combined CMFs** from (6) of Worksheet 2B	**Calibration Factor, C_i**	**Predicted average crash frequency, $N_{predicted\ int}$**
	a	b	c or d (4SG)	from Equation 11-11 or 11-12	from Table 11-7 or 11-8			(3)*(5)*(6)
Total	-10.008	0.848	0.448	5.371	0.494	0.56	0.65	1.971
Fatal and Injury (FI)	-11.554	0.888	0.525	2.917	0.742	0.46	0.65	0.869
Fatal and Injury^a (FI^a)	-10.734	0.828	0.412	1.656	0.655	0.46	0.65	0.494
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL} - (7)_{FI}$ 1.102

NOTE: ^{a} Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 3A -- Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes, $N_{observed}$** (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Segment 1 (Divided)	4.606	2.249	2.357	8.5	0.134	0.619	6.089
Segment 2 (Undivided)	0.000	0.000	0.000		21.246	1.000	0.000
Segment 3						1.000	0.000
Segment 4						1.000	0.000
Segment 5						1.000	0.000
Segment 6						1.000	0.000
Segment 7						1.000	0.000
Segment 8						1.000	0.000
INTERSECTIONS							
Intersection 1	1.971	0.869	1.102	4.5	0.494	0.507	3.219
Intersection 2						1.000	0.000
Intersection 3						1.000	0.000
Intersection 4						1.000	0.000
Intersection 5						1.000	0.000
Intersection 6						1.000	0.000
Intersection 7						1.000	0.000
Intersection 8						1.000	0.000
COMBINED (sum of column)	6.576	3.118	3.459	13	--	--	9.308

Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	6.6	9.3
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	3.1	4.4

Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL}$ * $(2)_{PDO}$ / $(2)_{TOTAL}$
	3.5	4.9

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	I-44 to Norton Road
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.13
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	22,473
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	20
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	62
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	23
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	0.99	0.91	1.00	0.98

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.471	1.000	0.471	0.98	0.91	0.419
Fatal and Injury (FI)	-12.76	1.28	1.31	0.139	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.278	0.131	0.98	0.91	0.117
Property Damage Only (PDO)	-12.81	1.38	1.34	0.360	$(5)_{TOTAL}-(5)_{FI}$ 0.722	0.340	0.98	0.91	0.302

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	Norton Road to RP 59.902
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.2
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	22,270
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	40
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	55
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.05	0.97	1.00	1.00	1.02

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.716	1.000	0.716	1.02	0.91	0.664
Fatal and Injury (FI)	-12.76	1.28	1.31	0.211	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.279	0.199	1.02	0.91	0.185
Property Damage Only (PDO)	-12.81	1.38	1.34	0.546	$(5)_{TOTAL}-(5)_{FI}$ 0.721	0.516	1.02	0.91	0.479

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Focus Workforce Mgmt West Ent. To Start TWLTL
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	2U
Length of segment, L (mi)		--	0.11
AADT (veh/day)	$AADT_{MAX}$ = 32,600 (veh/day)	--	2,464
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	100
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	1.48

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.20	1.00	1.00	1.00	1.20

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-15.22	1.68	0.84	0.013	1.000	0.013	1.20	1.48	0.024
Fatal and Injury (FI)	-16.22	1.66	0.65	0.004	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.303	0.004	1.20	1.48	0.007
Property Damage Only (PDO)	-15.62	1.69	0.87	0.010	$(5)_{TOTAL}-(5)_{FI}$ 0.697	0.009	1.20	1.48	0.017

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Start TWLTL To Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.12
AADT (veh/day)	AADT$_{MAX}$ = 32,900 (veh/day)	--	2,464
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	2
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	25
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	28
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.01	1.00	0.93	1.00	0.94

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.40	1.41	0.66	0.030	1.000	0.030	0.94	0.91	0.026
Fatal and Injury (FI)	-16.45	1.69	0.59	0.005	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.156	0.005	0.94	0.91	0.004
Property Damage Only (PDO)	-11.95	1.33	0.59	0.025	$(5)_{TOTAL}-(5)_{FI}$ 0.844	0.025	0.94	0.91	0.022

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Old MO 13 to 1717 W Smith Dr
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.18
AADT (veh/day)	AADT$_{MAX}$ = 32,900 (veh/day)	--	2,766
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	11
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	14
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.00	1.00	0.93	1.00	0.93

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.40	1.41	0.66	0.053	1.000	0.053	0.93	0.91	0.045
Fatal and Injury (FI)	-16.45	1.69	0.59	0.008	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.162	0.009	0.93	0.91	0.007
Property Damage Only (PDO)	-11.95	1.33	0.59	0.044	$(5)_{TOTAL}-(5)_{FI}$ 0.838	0.044	0.93	0.91	0.038

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Farm Road 143 to Dickerson Branch crossing
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.15
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	7,122
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	2
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	47
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	15
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	1.00	1.00	1.00	1.08

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	0.178	1.000	0.178	1.08	0.91	0.175
Fatal and Injury (FI)	-12.08	1.25	0.99	0.056	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.331	0.059	1.08	0.91	0.058
Property Damage Only (PDO)	-12.53	1.38	1.08	0.112	$(5)_{TOTAL}-(5)_{FI}$ 0.669	0.119	1.08	0.91	0.117

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 67,700 (veh/day)	--	4,426
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 33,400 (veh/day)	--	2,766
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	5.21
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Permissive
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Permissive
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	3
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF* $_{COMB}$
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.98	0.92	1.00	0.91	1.00	0.54

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at MO 13
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT $_{major}$ (veh/day)	AADT $_{MAX}$ = 67,700 (veh/day)	--	22,473
AADT $_{minor}$ (veh/day)	AADT $_{MAX}$ = 33,400 (veh/day)	--	6,633
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	5.21
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4
Type of left-turn signal phasing for Leg #1		Permissive	Protected
Type of left-turn signal phasing for Leg #2		--	Protected
Type of left-turn signal phasing for Leg #3		--	Protected
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	6
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF* $_{COMB}$
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.78	0.92	1.00	0.91	1.00	0.43

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Farm Road 143
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 45,700 (veh/day)	--	7,122
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 9,300 (veh/day)	--	2,958
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.28
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	0
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF* $_{COMB}$
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	1.00	1.00	0.91	1.00	0.91

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Multiple-vehicle nondriveway							
Segment 1	0.419	0.117	0.302	2.25	1.320	0.644	1.071
Segment 2	0.664	0.185	0.479	0.25	1.320	0.533	0.471
Segment 3	0.024	0.007	0.017	0.25	0.840	0.980	0.028
Segment 4	0.026	0.004	0.022	0.25	0.660	0.983	0.029
Segment 5	0.045	0.007	0.038	0.25	0.660	0.971	0.051
Segment 6	0.175	0.058	0.117	0.25	1.010	0.850	0.186
Single-vehicle							
Segment 1	0.082	0.014	0.068	0	0.860	0.934	0.077
Segment 2	0.131	0.023	0.109	0.5	0.860	0.898	0.169
Segment 3	0.065	0.022	0.043	0.25	0.810	0.950	0.075
Segment 4	0.022	0.007	0.015	0.5	1.370	0.970	0.037
Segment 5	0.036	0.011	0.024	0.00	1.370	0.954	0.034
Segment 6	0.066	0.019	0.047	0.75	0.860	0.946	0.103
						1.000	0.000
Multiple-vehicle driveway-related							
Segment 1	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 2	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 3	0.015	0.005	0.010	0	0.810	0.988	0.014
Segment 4	0.029	0.007	0.022	0.25	1.100	0.969	0.035
Segment 5	0.021	0.005	0.016	0.25	1.100	0.977	0.026
Segment 6	0.122	0.042	0.081	0.5	0.810	0.910	0.156
INTERSECTIONS							
Multiple-vehicle							
Intersection 1	2.353	0.663	1.689	1	0.390	0.522	1.466
Intersection 2	13.037	4.347	8.690	5	0.390	0.164	6.530
Intersection 3	0.919	0.313	0.607	2	0.800	0.576	1.165
Intersection 4						1.000	0.000
Single-vehicle							
Intersection 1	0.267	0.099	0.168	0	0.360	0.912	0.265
Intersection 2	0.812	0.208	0.604	1	0.360	0.774	0.855
Intersection 3	0.313	0.101	0.212	0	1.140	0.737	0.231
Intersection 4						1.000	0.000
COMBINED (sum of column)	19.642	6.263	13.379	15	--	--	13.073

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1) Site Type	(2) N_{ped}	(3) N_{bike}
ROADWAY SEGMENTS		
Segment 1	0.009	0.002
Segment 2	0.014	0.004
Segment 3	0.001	0.001
Segment 4	0.001	0.000
Segment 5	0.001	0.001
Segment 6	0.003	0.001
INTERSECTIONS		
Intersection 1	0.116	0.205
Intersection 2	0.067	1.082
Intersection 3	0.033	0.025
Intersection 4		
COMBINED (sum of column)	0.239	1.319

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)
Crash severity level	$N_{predicted}$	N_{ped}	N_{bike}	$N_{expected (VEHICLE)}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	19.6	0.2	1.3	13.1	14.6
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	6.3	0.2	1.3	4.2	5.7
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	13.4	0.0	0.0	8.9	8.9

Worksheet 1A -- General Information and Input Data for Rural Multilane Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	RP 59.902 to RP 61.538 NB
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Roadway type (divided / undivided)		Undivided	Divided
Length of segment, L (mi)		--	1.59
AADT (veh/day)	$AADT_{MAX}$ = 89,300 (veh/day)	--	22,270
Lane width (ft)		12	12
Shoulder width (ft) - right shoulder width for divided [if differ for directions of travel, use average width]		8	9
Shoulder type - right shoulder type for divided		Paved	Paved
Median width (ft) - for divided only		30	60
Side Slopes - for undivided only		1:7 or flatter	Not Applicable
Lighting (present/not present)		Not Present	Not Present
Auto speed enforcement (present/not present)		Not Present	Not Present
Calibration Factor, Cr		1.00	0.74

Worksheet 1B (a) -- Crash Modification Factors for Rural Multilane Divided Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for Lane Width	CMF for Right Shoulder Width	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1rd	*CMF 2rd*	*CMF 3rd*	*CMF 4rd*	*CMF 5rd*	*CMF comb*
from Equation 11-16	from Table 11-17	from Table 11-18	from Equation 11-17	from Section 11.7.2	(1)*(2)*(3)*(4)*(5)
1.00	1.00	0.96	1.00	1.00	0.96

Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-5			**N spf rd**	**Overdispersion Parameter, k**	**Combined CMFs** (6) from Worksheet 1B (a)	**Calibration Factor, Cr**	**Predicted average crash frequency, $N_{predicted\ rs(d)}$**
	a	b	c	from Equation 11-9	from Equation 11-10			(3)*(5)*(6)
Total	-9.025	1.049	1.549	6.961	0.134	0.96	0.74	4.945
Fatal and Injury (FI)	-8.837	0.958	1.687	3.378	0.116	0.96	0.74	2.400
Fatal and Injury[a] (FI[a])	-8.505	0.874	1.740	2.031	0.110	0.96	0.74	1.443
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL}$ - $(7)_{FI}$ 2.545

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 2A -- General Information and Input Data for Rural Multilane Highway Intersections

General Information		Location Information	
Analyst	GTB	Roadway	MO Hwy 13
Agency or Company	CMT	Intersection	MO 13 at Farm Road 94
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 4ST, 4SG)		--	4ST
AADT$_{major}$ (veh/day)	AADT$_{MAX}$ = 78,300 (veh/day)	--	27,471
AADT$_{minor}$ (veh/day)	AADT$_{MAX}$ = 7,400 (veh/day)	--	1,034
Intersection skew angle (degrees)		0	16
Number of non-STOP-controlled approaches with left-turn lanes (0, 1, 2)		0	2
Number of non-STOP-controlled approaches with right-turn lanes (0, 1, 2, 3, or 4)		0	0
Intersection lighting (present/not present)		Not Present	Not Present
Calibration Factor, C_i		1.00	0.65

Worksheet 2B -- Crash Modification Factors for Rural Multilane Highway Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Crash Severity Level	CMF for Intersection Skew Angle (CMF $_{1i}$) from Equations 11-18 or 11-20 and 11-19 or 11-21	CMF for Left-Turn Lanes (CMF $_{2i}$) from Table 11-22	CMF for Right-Turn Lanes (CMF $_{3i}$) from Table 11-23	CMF for Lighting (CMF $_{4i}$) from Equation 11-22	Combined CMF (CMF $_{COMB}$) (2)*(3)*(4)*(5)
Total	1.09	0.52	1.00	1.00	0.56
Fatal and Injury (FI)	1.09	0.42	1.00	1.00	0.46

Note: The 4-leg Signalized Intersection (4SG) models do not have base conditions and so can only be used for estimation purposes. As a result, there are not CMFs provided for the 4SG condition.

Worksheet 2C -- Intersection Crashes for Rural Multilane Highway Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-7 or 11-8			**N** $_{spf\ int}$	**Overdispersion Parameter, k**	**Combined CMFs** from (6) of Worksheet 2B	**Calibration Factor, C_i**	**Predicted average crash frequency, N** $_{predicted\ int}$
	a	b	c or d (4SG)	from Equation 11-11 or 11-12	from Table 11-7 or 11-8			(3)*(5)*(6)
Total	-10.008	0.848	0.448	5.865	0.494	0.56	0.65	2.152
Fatal and Injury (FI)	-11.554	0.888	0.525	3.210	0.742	0.46	0.65	0.956
Fatal and Injury[a] (FI[a])	-10.734	0.828	0.412	1.802	0.655	0.46	0.65	0.537
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL}$ - $(7)_{FI}$ 1.195

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 3A -- Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Segment 1 (Divided)	4.945	2.400	2.545	8.5	0.134	0.602	6.359
Segment 2 (Undivided)	0.000	0.000	0.000		21.246	1.000	0.000
Segment 3						1.000	0.000
Segment 4						1.000	0.000
Segment 5						1.000	0.000
Segment 6						1.000	0.000
Segment 7						1.000	0.000
Segment 8						1.000	0.000
INTERSECTIONS							
Intersection 1	2.152	0.956	1.195	4.5	0.494	0.485	3.362
Intersection 2						1.000	0.000
Intersection 3						1.000	0.000
Intersection 4						1.000	0.000
Intersection 5						1.000	0.000
Intersection 6						1.000	0.000
Intersection 7						1.000	0.000
COMBINED (sum of column)	7.097	3.356	3.741	13	--	--	9.721

Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	7.1	9.7
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	3.4	4.6
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	3.7	5.1

Output Summary

General Information

Project description:	I-44 INFRA Grant BCA - MO360/James River Freeway to US 65				
Analyst:	LKW	Date:	4/18/2022	Area type:	Urban
First year of analysis:	2018				
Last year of analysis:	2041				

Crash Data Description

Freeway segments	Segment crash data available?	Yes	First year of crash data:	2018
	Project-level crash data available?	No	Last year of crash data:	2021
Ramp segments	Segment crash data available?	Yes	First year of crash data:	2018
	Project-level crash data available?	No	Last year of crash data:	2021
Ramp terminals	Segment crash data available?	Yes	First year of crash data:	2018
	Project-level crash data available?	No	Last year of crash data:	2021

Estimated Crash Statistics

Crashes for Entire Facility	**Total**	**K**	**A**	**B**	**C**	**PDO**
Estimated number of crashes during Study Period, crashes:	1673.4	7.6	22.8	126.3	288.0	1228.8
Estimated average crash freq. during Study Period, crashes/yr:	69.7	0.3	0.9	5.3	12.0	51.2

Crashes by Facility Component	**Nbr. Sites**	**Total**	**K**	**A**	**B**	**C**	**PDO**
Freeway segments, crashes:	20	1411.2	7.0	18.5	102.4	199.6	1083.7
Ramp segments, crashes:	13	84.1	0.5	1.4	6.5	9.4	66.4
Crossroad ramp terminals, crashes:	4	178.2	0.1	2.9	17.4	79.0	78.7

Crashes for Entire Facility by Year	**Year**	**Total**	**K**	**A**	**B**	**C**	**PDO**
Estimated number of crashes during the Study Period, crashes:	2018	62.8	0.3	0.9	4.8	10.9	45.9
	2019	62.8	0.3	0.9	4.8	10.9	45.9
	2020	62.8	0.3	0.9	4.8	10.9	45.9
	2021	62.8	0.3	0.9	4.8	10.9	45.9
	2022	63.5	0.3	0.9	4.9	11.0	46.5
	2023	64.3	0.3	0.9	4.9	11.2	47.1
	2024	65.1	0.3	0.9	5.0	11.3	47.7
	2025	65.9	0.3	0.9	5.0	11.4	48.3
	2026	66.7	0.3	0.9	5.1	11.5	48.9
	2027	67.5	0.3	0.9	5.1	11.7	49.5
	2028	68.3	0.3	0.9	5.2	11.8	50.1
	2029	69.1	0.3	0.9	5.2	11.9	50.7
	2030	69.9	0.3	1.0	5.3	12.0	51.3
	2031	70.7	0.3	1.0	5.3	12.1	51.9
	2032	71.5	0.3	1.0	5.4	12.3	52.5
	2033	72.3	0.3	1.0	5.4	12.4	53.1
	2034	73.1	0.3	1.0	5.5	12.5	53.8
	2035	73.9	0.3	1.0	5.5	12.6	54.4
	2036	74.7	0.3	1.0	5.6	12.8	55.0
	2037	75.6	0.3	1.0	5.6	12.9	55.6
	2038	76.4	0.3	1.0	5.7	13.0	56.3
	2039	77.2	0.3	1.0	5.8	13.2	56.9
	2040	78.0	0.3	1.0	5.8	13.3	57.6
	2041	78.9	0.4	1.1	5.9	13.4	58.2

Distribution of Crashes for Entire Facility

Crash Type	**Crash Type Category**	**Estimated Number of Crashes During the Study Period**					
		Total	**K**	**A**	**B**	**C**	**PDO**
Multiple vehicle	Head-on crashes:	5.0	0.0	0.1	0.7	1.9	2.2
	Right-angle crashes:	61.0	0.2	1.1	6.4	24.2	29.1
	Rear-end crashes:	734.6	3.5	10.9	61.2	148.4	510.6
	Sideswipe crashes:	240.5	0.8	2.3	13.1	27.6	196.6
	Other multiple-vehicle crashes:	28.9	0.1	0.4	2.3	4.8	21.1
	Total multiple-vehicle crashes:	1069.8	4.7	14.9	83.7	206.9	759.6
Single vehicle	Crashes with animal:	10.2	0.0	0.0	0.1	0.2	9.8
	Crashes with fixed object:	435.7	2.1	5.7	30.6	57.9	339.5
	Crashes with other object:	69.2	0.1	0.4	2.1	3.9	62.6
	Crashes with parked vehicle:	9.1	0.0	0.1	0.6	1.1	7.3
	Other single-vehicle crashes	79.4	0.6	1.7	9.2	17.8	50.0
	Total single-vehicle crashes:	603.6	2.9	7.9	42.6	81.0	469.2
	Total crashes:	1673.4	7.6	22.8	126.3	288.0	1228.8

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	I-44 to Norton Road
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.13
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	18,473
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	20
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	62
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	23
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	0.99	0.91	1.00	0.98

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.361	1.000	0.361	0.98	0.91	0.321
Fatal and Injury (FI)	-12.76	1.28	1.31	0.108	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.282	0.102	0.98	0.91	0.091
Property Damage Only (PDO)	-12.81	1.38	1.34	0.274	$(5)_{TOTAL}-(5)_{FI}$ 0.718	0.259	0.98	0.91	0.230

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	Norton Road to RP 59.862
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.16
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	22,851
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	40
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	69
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.07	0.97	1.00	1.00	1.04

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.593	1.000	0.593	1.04	0.91	0.562
Fatal and Injury (FI)	-12.76	1.28	1.31	0.175	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.278	0.165	1.04	0.91	0.156
Property Damage Only (PDO)	-12.81	1.38	1.34	0.453	$(5)_{TOTAL}-(5)_{FI}$ 0.722	0.428	1.04	0.91	0.406

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Focus Workforce Mgmt West Ent. To Start TWLTL
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	2U
Length of segment, L (mi)		--	0.11
AADT (veh/day)	$AADT_{MAX}$ = 32,600 (veh/day)	--	2,464
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	100
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	1.48

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.20	1.00	0.93	1.00	1.12

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-15.22	1.68	0.84	0.013	1.000	0.013	1.12	1.48	0.022
Fatal and Injury (FI)	-16.22	1.66	0.65	0.004	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.303	0.004	1.12	1.48	0.007
Property Damage Only (PDO)	-15.62	1.69	0.87	0.010	$(5)_{TOTAL}-(5)_{FI}$ 0.697	0.009	1.12	1.48	0.016

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Start TWLTL To Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.12
AADT (veh/day)	$AADT_{MAX}$ = 32,900 (veh/day)	--	8,257
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	2
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	25
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	28
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.01	1.00	0.93	1.00	0.94

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.40	1.41	0.66	0.165	1.000	0.165	0.94	0.91	0.141
Fatal and Injury (FI)	-16.45	1.69	0.59	0.036	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.222	0.037	0.94	0.91	0.031
Property Damage Only (PDO)	-11.95	1.33	0.59	0.126	$(5)_{TOTAL}-(5)_{FI}$ 0.778	0.128	0.94	0.91	0.109

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Old MO 13 to 1717 W Smith Dr
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.18
AADT (veh/day)	AADT$_{MAX}$ = 32,900 (veh/day)	--	6,309
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	11
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	14
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.00	1.00	0.93	1.00	0.93

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N$_{brmv}$**	**Proportion of Total Crashes**	**Adjusted N$_{brmv}$**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N$_{brmv}$**
	from Table 12-3		from Table 12-3	from Equation 12-10		(4)$_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.40	1.41	0.66	0.169	1.000	0.169	0.93	0.91	0.144
Fatal and Injury (FI)	-16.45	1.69	0.59	0.034	(4)$_{FI}$/((4)$_{FI}$+(4)$_{PDO}$) 0.206	0.035	0.93	0.91	0.030
Property Damage Only (PDO)	-11.95	1.33	0.59	0.132	(5)$_{TOTAL}$-(5)$_{FI}$ 0.794	0.134	0.93	0.91	0.114

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Farm Road 143 to Dickerson Branch crossing
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.15
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	3,140
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	2
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	47
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	15
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	1.00	1.00	1.00	1.08

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	0.060	1.000	0.060	1.08	0.91	0.059
Fatal and Injury (FI)	-12.08	1.25	0.99	0.020	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.355	0.021	1.08	0.91	0.021
Property Damage Only (PDO)	-12.53	1.38	1.08	0.036	$(5)_{TOTAL}-(5)_{FI}$ 0.645	0.039	1.08	0.91	0.038

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	New Segment Between Roundabouts (underpass of MO 13)
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	2U
Length of segment, L (mi)		--	0.19
AADT (veh/day)	$AADT_{MAX}$ = 32,600 (veh/day)	--	5,793
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	5
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.00	1.00	0.93	1.00	0.93

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-15.22	1.68	0.84	0.098	1.000	0.098	0.93	0.91	0.083
Fatal and Injury (FI)	-16.22	1.66	0.65	0.030	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.297	0.029	0.93	0.91	0.025
Property Damage Only (PDO)	-15.62	1.69	0.87	0.072	$(5)_{TOTAL}-(5)_{FI}$ 0.703	0.069	0.93	0.91	0.058

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 67,700 (veh/day)	--	8,257
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 33,400 (veh/day)	--	2,576
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	5.21
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Permissive
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Permissive
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	3
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF* $_{COMB}$
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.98	0.92	1.00	0.91	1.00	0.54

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at MO 13
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 45,700 (veh/day)	--	22,851
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 9,300 (veh/day)	--	3,140
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.28
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	1
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4
Type of left-turn signal phasing for Leg #1		Permissive	Protected
Type of left-turn signal phasing for Leg #2		--	Protected
Type of left-turn signal phasing for Leg #3		--	Protected
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	0
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	CMF for 3-Leg Stop Control to RIRO
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF 7i*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	CMF 9821
0.67	1.00	0.86	1.00	0.91	1.00	0.55

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Farm Road 143
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 45,700 (veh/day)	--	3,140
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 9,300 (veh/day)	--	2,958
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.28
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	1
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	0
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF_{COMB}*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	0.86	1.00	0.91	1.00	0.78

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	West Norton Road at Norton Underpass
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ = 45,700 (veh/day)	--	8,257
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ = 9,300 (veh/day)	--	5,793
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.28
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	1
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	2
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	CMF for 3-Leg Stop Control to SLR
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF 7i*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	CMF 206
1.00	1.00	0.86	1.00	0.91	1.00	0.28

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	East Norton Road at Norton Underpass
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 45,700 (veh/day)	--	7,122
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 9,300 (veh/day)	--	5,793
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.28
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	1
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	2
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	CMF for 3-Leg Stop Control to SLR
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF 7i*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	CMF 206
1.00	1.00	0.86	1.00	0.91	1.00	0.28

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	MO 13 Connector Road at MO 13
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 45,700 (veh/day)	--	22,851
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 9,300 (veh/day)	--	3,543
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.28
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	1
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4
Type of left-turn signal phasing for Leg #1		Permissive	Protected
Type of left-turn signal phasing for Leg #2		--	Protected
Type of left-turn signal phasing for Leg #3		--	Protected
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	0
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	CMF for 3-Leg Stop Control to RIRO
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF 7i*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	CMF 9821
0.67	1.00	0.86	1.00	0.91	1.00	0.55

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Smith Road
Agency or Company	CMT	Intersection	Smith Road at MO 13 Connector
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST
AADT_{major} (veh/day)	AADT_{MAX} = 45,700 (veh/day)	--	6,309
AADT_{minor} (veh/day)	AADT_{MAX} = 9,300 (veh/day)	--	994
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.28
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	1
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	0
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	CMF_{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	0.86	1.00	0.91	1.00	0.78

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes, $N_{observed}$** (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Multiple-vehicle nondriveway							
Segment 1	0.321	0.091	0.230	2.25	1.320	0.703	0.895
Segment 2	0.562	0.156	0.406	0.25	1.320	0.574	0.429
Segment 3	0.022	0.007	0.016	0.25	0.840	0.982	0.027
Segment 4	0.141	0.031	0.109	0.25	0.660	0.915	0.150
Segment 5	0.144	0.030	0.114	0.25	0.660	0.913	0.153
Segment 6	0.059	0.021	0.038	0.25	1.010	0.944	0.069
Segment 7	0.083	0.025	0.058		0.840	0.935	0.078
Single-vehicle							
Segment 1	0.075	0.013	0.062	0	0.860	0.939	0.070
Segment 2	0.109	0.019	0.090	0.5	0.860	0.914	0.142
Segment 3	0.061	0.021	0.040	0.25	0.810	0.953	0.070
Segment 4	0.043	0.012	0.030	0.5	1.370	0.944	0.068
Segment 5	0.055	0.016	0.039	0.00	1.370	0.929	0.052
Segment 6	0.034	0.011	0.023	0.75	0.910	0.970	0.055
Segment 7	0.087	0.023	0.064		0.810	0.934	0.081
Multiple-vehicle driveway-related							
Segment 1	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 2	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 3	0.014	0.004	0.009	0	0.810	0.989	0.013
Segment 4	0.096	0.023	0.073	0.25	1.100	0.905	0.111
Segment 5	0.048	0.012	0.036	0.25	1.100	0.950	0.058
Segment 6	0.047	0.016	0.031	0.50	0.810	0.963	0.063
Segment 7	0.000	0.000	0.000		0.810	1.000	0.000
INTERSECTIONS							
Multiple-vehicle							
Intersection 1	4.510	1.366	3.145	1	0.390	0.362	1.954
Intersection 2	1.089	0.356	0.733	5	0.800	0.534	3.026
Intersection 3	0.318	0.111	0.208	2	0.800	0.797	0.558
Intersection 4	0.344	0.106	0.238		0.800	0.784	0.269
Intersection 5	0.292	0.090	0.201		0.800	0.811	0.236
Intersection 6	1.144	0.368	0.776		0.800	0.522	0.597
Intersection 7	0.442	0.174	0.268		0.800	0.739	0.326
Single-vehicle							
Intersection 1	0.400	0.128	0.272	0	0.360	0.874	0.381
Intersection 2	0.123	0.037	0.086	1	1.140	0.877	0.231
Intersection 3	0.236	0.080	0.156	0	1.140	0.788	0.186
Intersection 4	0.109	0.034	0.074		1.140	0.890	0.097
Intersection 5	0.106	0.034	0.072		1.140	0.892	0.095
Intersection 6	0.131	0.039	0.092		1.140	0.870	0.114
Intersection 7	0.151	0.051	0.101		1.140	0.853	0.129
COMBINED (sum of column)	11.005	3.380	7.625	15	--	--	10.447

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1) Site Type	(2) N_{ped}	(3) N_{bike}
ROADWAY SEGMENTS		
Segment 1	0.007	0.002
Segment 2	0.012	0.003
Segment 3	0.001	0.001
Segment 4	0.003	0.002
Segment 5	0.003	0.002
Segment 6	0.001	0.000
Segment 7	0.001	0.001
INTERSECTIONS		
Intersection 1	0.114	0.384
Intersection 2	0.033	0.025
Intersection 3	0.015	0.011
Intersection 4	0.012	0.009
Intersection 5	0.011	0.008
Intersection 6	0.034	0.026
COMBINED (sum of column)	0.196	0.436

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1) **Crash severity level**	(2) $N_{predicted}$	(3) N_{ped}	(4) N_{bike}	(5) $N_{expected\ (VEHICLE)}$	(6) $N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	11.0	0.2	0.4	10.4	11.1
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	3.4	0.2	0.4	3.2	3.8
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	7.6	0.0	0.0	7.2	7.2

Worksheet 1A -- General Information and Input Data for Rural Multilane Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	RP 59.902 to RP 61.538 NB
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Roadway type (divided / undivided)		Undivided	Divided
Length of segment, L (mi)		--	1.59
AADT (veh/day)	$AADT_{MAX}$ = 89,300 (veh/day)	--	22,270
Lane width (ft)		12	12
Shoulder width (ft) - right shoulder width for divided [if differ for directions of travel, use average width]		8	9
Shoulder type - right shoulder type for divided		Paved	Paved
Median width (ft) - for divided only		30	60
Side Slopes - for undivided only		1:7 or flatter	Not Applicable
Lighting (present/not present)		Not Present	Not Present
Auto speed enforcement (present/not present)		Not Present	Not Present
Calibration Factor, Cr		1.00	0.74

Worksheet 1B (a) -- Crash Modification Factors for Rural Multilane Divided Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for Lane Width	CMF for Right Shoulder Width	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1rd	*CMF 2rd*	*CMF 3rd*	*CMF 4rd*	*CMF 5rd*	*CMF comb*
from Equation 11-16	from Table 11-17	from Table 11-18	from Equation 11-17	from Section 11.7.2	(1)*(2)*(3)*(4)*(5)
1.00	1.00	0.96	1.00	1.00	0.96

Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-5			**N spf rd**	**Overdispersion Parameter, k**	**Combined CMFs** (6) from Worksheet 1B (a)	**Calibration Factor, Cr**	**Predicted average crash frequency, $N_{predicted\ rs(d)}$**
	a	b	c	from Equation 11-9	from Equation 11-10			(3)*(5)*(6)
Total	-9.025	1.049	1.549	6.961	0.134	0.96	0.74	4.945
Fatal and Injury (FI)	-8.837	0.958	1.687	3.378	0.116	0.96	0.74	2.400
Fatal and Injury[a] (FI[a])	-8.505	0.874	1.740	2.031	0.110	0.96	0.74	1.443
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL}$ - $(7)_{FI}$ 2.545

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 2A -- General Information and Input Data for Rural Multilane Highway Intersections

General Information		Location Information	
Analyst	GTB	Roadway	MO Hwy 13
Agency or Company	CMT	Intersection	MO 13 at Farm Road 94
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 4ST, 4SG)		--	4ST
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 78,300 (veh/day)	--	27,471
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 7,400 (veh/day)	--	1,034
Intersection skew angle (degrees)		0	16
Number of non-STOP-controlled approaches with left-turn lanes (0, 1, 2)		0	2
Number of non-STOP-controlled approaches with right-turn lanes (0, 1, 2, 3, or 4)		0	0
Intersection lighting (present/not present)		Not Present	Not Present
Calibration Factor, C_i		1.00	0.65

Worksheet 2B -- Crash Modification Factors for Rural Multilane Highway Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Crash Severity Level	CMF for Intersection Skew Angle (CMF_{1i}) from Equations 11-18 or 11-20 and 11-19 or 11-21	CMF for Left-Turn Lanes (CMF_{2i}) from Table 11-22	CMF for Right-Turn Lanes (CMF_{3i}) from Table 11-23	CMF for Lighting (CMF_{4i}) from Equation 11-22	CMF for J-Turn (CMF_{5i}) CMF ID 5555
Total	1.09	0.52	1.00	1.00	0.65
Fatal and Injury (FI)	1.09	0.42	1.00	1.00	0.65

Note: The 4-leg Signalized Intersection (4SG) models do not have base conditions and so can only be used for estimation purposes. As a result, there are not CMFs provided for the 4SG condition.

Worksheet 2C -- Intersection Crashes for Rural Multilane Highway Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-7 or 11-8			**$N_{spf\ int}$**	**Overdispersion Parameter, k**	**Combined CMFs** from (6) of Worksheet 2B	**Calibration Factor, C_i**	**Predicted average crash frequency, $N_{predicted\ int}$**
	a	b	c or d (4SG)	from Equation 11-11 or 11-12	from Table 11-7 or 11-8			(3)*(5)*(6)
Total	-10.008	0.848	0.448	5.865	0.494	0.37	0.65	1.403
Fatal and Injury (FI)	-11.554	0.888	0.525	3.210	0.742	0.30	0.65	0.624
Fatal and Injury[a] (FI^a)	-10.734	0.828	0.412	1.802	0.655	0.30	0.65	0.350
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL}$ - $(7)_{FI}$ 0.779

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Multilane Highway Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Collision Type	**Proportion of Collision Type$_{(TOTAL)}$**	**$N_{predicted\ int\ (TOTAL)}$ (crashes/year)**	**Proportion of Collision Type$_{(FI)}$**	**$N_{predicted\ int\ (FI)}$ (crashes/year)**	**Proportion of Collision Type (FI^a)**	**N *predicted int* (FI^a) (crashes/year)**	**Proportion of Collision Type (PDO)**	**$N_{predicted\ int\ (PDO)}$ (crashes/year)**
	from Table 11-9	$(7)_{TOTAL}$ from Worksheet 2C	from Table 11-9	$(7)_{FI}$ from Worksheet 2C	from Table 11-9	$(7)_{FI}^{a}$ from Worksheet 2C	from Table 11-9	$(7)_{PDO}$ from Worksheet 2C

Worksheet 3A -- Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Segment 1 (Divided)	4.945	2.400	2.545	8.5	0.134	0.602	6.359
Segment 2 (Undivided)	0.000	0.000	0.000		21.246	1.000	0.000
Segment 3						1.000	0.000
Segment 4						1.000	0.000
Segment 5						1.000	0.000
Segment 6						1.000	0.000
Segment 7						1.000	0.000
Segment 8						1.000	0.000
INTERSECTIONS							
Intersection 1	1.403	0.624	0.779	4.5	0.494	0.591	2.671
Intersection 2						1.000	0.000
Intersection 3						1.000	0.000
Intersection 4						1.000	0.000
Intersection 5						1.000	0.000
Intersection 6						1.000	0.000
Intersection 7						1.000	0.000
Intersection 8						1.000	0.000
COMBINED (sum of column)	6.348	3.023	3.325	13	--	--	9.030

Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	6.3	9.0
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	3.0	4.3
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$

Rural Multilane Site Total	3.3	4.7

Output Summary

General Information

Project description:	I-44 at MO 13 Interchange Modifications				
Analyst:	GTB	Date:	4/18/2022	Area type:	Urban
First year of analysis:	2018				
Last year of analysis:	2041				

Crash Data Description

Freeway segments	Segment crash data available?	Yes	First year of crash data:	2018
	Project-level crash data available?	No	Last year of crash data:	2021
Ramp segments	Segment crash data available?	Yes	First year of crash data:	2018
	Project-level crash data available?	No	Last year of crash data:	2021
Ramp terminals	Segment crash data available?	Yes	First year of crash data:	2018
	Project-level crash data available?	No	Last year of crash data:	2021

Estimated Crash Statistics

Crashes for Entire Facility	**Total**	**K**	**A**	**B**	**C**	**PDO**
Estimated number of crashes during Study Period, crashes:	1711.8	7.9	22.4	124.1	278.8	1278.6
Estimated average crash freq. during Study Period, crashes/yr:	71.3	0.3	0.9	5.2	11.6	53.3

Crashes by Facility Component	**Nbr. Sites**	**Total**	**K**	**A**	**B**	**C**	**PDO**
Freeway segments, crashes:	20	1470.9	7.2	19.0	104.9	204.5	1135.3
Ramp segments, crashes:	16	97.1	0.6	1.7	8.2	13.4	73.2
Crossroad ramp terminals, crashes:	4	143.8	0.1	1.7	11.1	60.9	70.1

Crashes for Entire Facility by Year	**Year**	**Total**	**K**	**A**	**B**	**C**	**PDO**
Estimated number of crashes during the Study Period, crashes:	2018	64.2	0.3	0.9	4.7	10.6	47.8
	2019	64.2	0.3	0.9	4.7	10.6	47.8
	2020	64.2	0.3	0.9	4.7	10.6	47.8
	2021	64.2	0.3	0.9	4.7	10.6	47.8
	2022	65.0	0.3	0.9	4.8	10.7	48.4
	2023	65.8	0.3	0.9	4.8	10.8	49.0
	2024	66.6	0.3	0.9	4.9	10.9	49.6
	2025	67.4	0.3	0.9	4.9	11.0	50.2
	2026	68.2	0.3	0.9	5.0	11.2	50.8
	2027	69.0	0.3	0.9	5.0	11.3	51.5
	2028	69.8	0.3	0.9	5.1	11.4	52.1
	2029	70.6	0.3	0.9	5.1	11.5	52.7
	2030	71.5	0.3	0.9	5.2	11.6	53.4
	2031	72.3	0.3	0.9	5.2	11.8	54.0
	2032	73.1	0.3	1.0	5.3	11.9	54.6
	2033	73.9	0.3	1.0	5.3	12.0	55.3
	2034	74.8	0.3	1.0	5.4	12.1	55.9
	2035	75.6	0.3	1.0	5.4	12.2	56.6
	2036	76.5	0.3	1.0	5.5	12.4	57.2
	2037	77.3	0.4	1.0	5.5	12.5	57.9
	2038	78.1	0.4	1.0	5.6	12.6	58.6
	2039	79.0	0.4	1.0	5.7	12.7	59.2
	2040	79.9	0.4	1.0	5.7	12.9	59.9
	2041	80.7	0.4	1.0	5.8	13.0	60.6

Distribution of Crashes for Entire Facility

Crash Type	**Crash Type Category**	**Estimated Number of Crashes During the Study Period**					
		Total	**K**	**A**	**B**	**C**	**PDO**
Multiple vehicle	Head-on crashes:	4.8	0.0	0.1	0.7	1.8	2.2
	Right-angle crashes:	53.3	0.2	0.8	4.9	19.7	27.7
	Rear-end crashes:	742.9	3.7	10.7	60.1	142.8	525.6
	Sideswipe crashes:	248.4	0.9	2.4	13.4	28.1	203.7
	Other multiple-vehicle crashes:	30.1	0.2	0.5	2.5	5.2	21.9
	Total multiple-vehicle crashes:	1079.5	4.9	14.5	81.5	197.5	781.1
Single vehicle	Crashes with animal:	10.8	0.0	0.0	0.1	0.3	10.3
	Crashes with fixed object:	456.7	2.1	5.7	30.6	58.2	360.1
	Crashes with other object:	72.6	0.1	0.4	2.1	3.9	66.1
	Crashes with parked vehicle:	9.6	0.0	0.1	0.6	1.1	7.7
	Other single-vehicle crashes	82.6	0.6	1.7	9.2	17.8	53.2
	Total single-vehicle crashes:	632.3	2.9	7.9	42.6	81.3	497.5
	Total crashes:	1711.8	7.9	22.4	124.1	278.8	1278.6

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	I-44 to Norton Road
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.13
AADT (veh/day)	AADT$_{MAX}$ = 66,000 (veh/day)	--	9,807
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	20
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	62
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	23
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	0.99	0.91	1.00	0.98

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N$_{brmv}$**	**Proportion of Total Crashes**	**Adjusted N$_{brmv}$**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N$_{brmv}$**
	from Table 12-3		from Table 12-3	from Equation 12-10		(4)$_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.152	1.000	0.152	0.98	0.91	0.136
Fatal and Injury (FI)	-12.76	1.28	1.31	0.048	(4)$_{FI}$/((4)$_{FI}$+(4)$_{PDO}$) 0.295	0.045	0.98	0.91	0.040
Property Damage Only (PDO)	-12.81	1.38	1.34	0.115	(5)$_{TOTAL}$-(5)$_{FI}$ 0.705	0.107	0.98	0.91	0.096

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	Norton Road to RP 59.902
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.2
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	9,604
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	40
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	55
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.05	0.97	1.00	1.00	1.02

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.228	1.000	0.228	1.02	0.91	0.212
Fatal and Injury (FI)	-12.76	1.28	1.31	0.072	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.296	0.067	1.02	0.91	0.063
Property Damage Only (PDO)	-12.81	1.38	1.34	0.171	$(5)_{TOTAL}-(5)_{FI}$ 0.704	0.161	1.02	0.91	0.149

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Focus Workforce Mgmt West Ent. To Start TWLTL
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	2U
Length of segment, L (mi)		--	0.11
AADT (veh/day)	AADT$_{MAX}$ = 32,600 (veh/day)	--	2,464
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	100
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	1.48

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.20	1.00	1.00	1.00	1.20

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-15.22	1.68	0.84	0.013	1.000	0.013	1.20	1.48	0.024
Fatal and Injury (FI)	-16.22	1.66	0.65	0.004	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.303	0.004	1.20	1.48	0.007
Property Damage Only (PDO)	-15.62	1.69	0.87	0.010	$(5)_{TOTAL}-(5)_{FI}$ 0.697	0.009	1.20	1.48	0.017

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Start TWLTL To Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.12
AADT (veh/day)	$AADT_{MAX}$ = 32,900 (veh/day)	--	2,464
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	2
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	25
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	28
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.01	1.00	0.93	1.00	0.94

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.40	1.41	0.66	0.030	1.000	0.030	0.94	0.91	0.026
Fatal and Injury (FI)	-16.45	1.69	0.59	0.005	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.156	0.005	0.94	0.91	0.004
Property Damage Only (PDO)	-11.95	1.33	0.59	0.025	$(5)_{TOTAL}-(5)_{FI}$ 0.844	0.025	0.94	0.91	0.022

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Old MO 13 to 1717 W Smith Dr
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.18
AADT (veh/day)	$AADT_{MAX}$ = 32,900 (veh/day)	--	2,766
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	11
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	14
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.00	1.00	0.93	1.00	0.93

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.40	1.41	0.66	0.053	1.000	0.053	0.93	0.91	0.045
Fatal and Injury (FI)	-16.45	1.69	0.59	0.008	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.162	0.009	0.93	0.91	0.007
Property Damage Only (PDO)	-11.95	1.33	0.59	0.044	$(5)_{TOTAL}-(5)_{FI}$ 0.838	0.044	0.93	0.91	0.038

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Farm Road 143 to Dickerson Branch crossing
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.15
AADT (veh/day)	AADT$_{MAX}$ = 40,100 (veh/day)	--	7,122
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	2
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	47
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	15
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	1.00	1.00	1.00	1.08

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	0.178	1.000	0.178	1.08	0.91	0.175
Fatal and Injury (FI)	-12.08	1.25	0.99	0.056	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.331	0.059	1.08	0.91	0.058
Property Damage Only (PDO)	-12.53	1.38	1.08	0.112	$(5)_{TOTAL}-(5)_{FI}$ 0.669	0.119	1.08	0.91	0.117

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT $_{major}$ (veh/day)	AADT $_{MAX}$ = 67,700 (veh/day)	--	4,426
AADT $_{minor}$ (veh/day)	AADT $_{MAX}$ = 33,400 (veh/day)	--	2,766
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	5.21
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Permissive
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Permissive
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	3
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combin
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*
0.66	0.98	0.92	1.00	0.91	1.00	0.

7)
ed CMF
COMB
(4)*(5)*(6)
54

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at MO 13
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT $_{major}$ (veh/day)	AADT $_{MAX}$ = 67,700 (veh/day)	--	9,807
AADT $_{minor}$ (veh/day)	AADT $_{MAX}$ = 33,400 (veh/day)	--	6,633
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	5.21
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4
Type of left-turn signal phasing for Leg #1		Permissive	Protected
Type of left-turn signal phasing for Leg #2		--	Protected
Type of left-turn signal phasing for Leg #3		--	Protected
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	6
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combin
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*
0.66	0.78	0.92	1.00	0.91	1.00	0.

7) ed CMF
COMB
(4)*(5)*(6)
43

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Farm Road 143
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST
AADT $_{major}$ (veh/day)	AADT $_{MAX}$ = 45,700 (veh/day)	--	7,122
AADT $_{minor}$ (veh/day)	AADT $_{MAX}$ = 9,300 (veh/day)	--	2,958
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.28
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	0
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combin
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*
1.00	1.00	1.00	1.00	0.91	1.00	0.

7)
ed CMF
COMB
'(4)*(5)*(6)
91

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	Predicted average crash frequency (crashes/year)			Observed crashes, $N_{observed}$ (crashes/year)	Overdispersion Parameter, k	Weighted adjustment, w	Expected average crash frequency,
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Multiple-vehicle nondriveway							
Segment 1	0.136	0.040	0.096	2.25	1.320	0.848	0.457
Segment 2	0.212	0.063	0.149	0.25	1.320	0.782	0.220
Segment 3	0.024	0.007	0.017	0.25	0.840	0.980	0.028
Segment 4	0.026	0.004	0.022	0.25	0.660	0.983	0.029
Segment 5	0.045	0.007	0.038	0.25	0.660	0.971	0.051
Segment 6	0.175	0.058	0.117	0.25	1.010	0.850	0.186
Single-vehicle							
Segment 1	0.056	0.008	0.047	0	0.860	0.954	0.053
Segment 2	0.089	0.013	0.075	0.5	0.860	0.929	0.118
Segment 3	0.065	0.022	0.043	0.25	0.810	0.950	0.075
Segment 4	0.022	0.007	0.015	0.5	1.370	0.970	0.037
Segment 5	0.036	0.011	0.024	0.00	1.370	0.954	0.034
Segment 6	0.066	0.019	0.047	0.75	0.860	0.946	0.103
						1.000	0.000
Multiple-vehicle driveway-related							
Segment 1	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 2	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 3	0.015	0.005	0.010	0	0.810	0.988	0.014
Segment 4	0.029	0.007	0.022	0.25	1.100	0.969	0.035
Segment 5	0.021	0.005	0.016	0.25	1.100	0.977	0.026
Segment 6	0.122	0.042	0.081	0.5	0.810	0.910	0.156
INTERSECTIONS							
Multiple-vehicle							
Intersection 1	2.353	0.663	1.689	1	0.390	0.522	1.466
Intersection 2	5.368	1.635	3.733	5	0.390	0.323	5.288
Intersection 3	0.919	0.313	0.607	2	0.800	0.576	1.165
Intersection 4						1.000	0.000
Single-vehicle							
Intersection 1	0.267	0.099	0.168	0	0.360	0.912	0.265
Intersection 2	0.462	0.146	0.316	1	0.360	0.857	0.539
Intersection 3	0.313	0.101	0.212	0	1.140	0.737	0.231
Intersection 4						1.000	0.000
COMBINED (sum of column)	10.818	3.275	7.543	15	--	--	10.576

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1)	(2)	(3)
Site Type	**N_{ped}**	**N_{bike}**
ROADWAY SEGMENTS		
Segment 1	0.003	0.001
Segment 2	0.005	0.001
Segment 3	0.001	0.001
Segment 4	0.001	0.000
Segment 5	0.001	0.001
Segment 6	0.003	0.001
INTERSECTIONS		
Intersection 1	0.116	0.205
Intersection 2	0.066	0.456
Intersection 3	0.033	0.025
Intersection 4		
COMBINED (sum of column)	0.225	0.689

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6
Crash severity level	**$N_{predicted}$**	**N_{ped}**	**N_{bike}**	$N_{expected\ (VEHICLE)}$	N_{exp}
Total	(2)$_{COMB}$ from Worksheet 3A	(2)$_{COMB}$ from Worksheet 3B	(3)$_{COMB}$ from Worksheet 3B	(8)$_{COMB}$ Worksheet 3A	(3)+(4
	10.8	0.2	0.7	10.6	11
Fatal and injury (FI)	(3)$_{COMB}$ from Worksheet 3A	(2)$_{COMB}$ from Worksheet 3B	(3)$_{COMB}$ from Worksheet 3B	(5)$_{TOTAL}$ * (2)$_{FI}$ / (2)$_{TOTAL}$	(3)+(4
	3.3	0.2	0.7	3.2	4.
Property damage only (PDO)	(4)$_{COMB}$ from Worksheet 3A	--	--	(5)$_{TOTAL}$ * (2)$_{PDO}$ / (2)$_{TOTAL}$	(3)+(4
	7.5	0.0	0.0	7.4	7.

)
ected
)+(5)
.5
)+(5)
.1
)+(5)
.4

Worksheet 1A -- General Information and Input Data for Rural Multilane Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	RP 59.902 to RP 60.435 NB
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data	Base Conditions	Site Conditions
Roadway type (divided / undivided)	Undivided	Divided
Length of segment, L (mi)	--	0.53
AADT (veh/day) AADT_{MAX} = 89,300 (veh/day)	--	9,604
Lane width (ft)	12	12
Shoulder width (ft) - right shoulder width for divided [if differ for directions of travel, use average width]	8	9
Shoulder type - right shoulder type for divided	Paved	Paved
Median width (ft) - for divided only	30	60
Side Slopes - for undivided only	1:7 or flatter	Not Applicable
Lighting (present/not present)	Not Present	Not Present
Auto speed enforcement (present/not present)	Not Present	Not Present
Calibration Factor, Cr	1.00	0.74

Worksheet 1B (a) -- Crash Modification Factors for Rural Multilane Divided Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for Lane Width	CMF for Right Shoulder Width	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1rd	*CMF 2rd*	*CMF 3rd*	*CMF 4rd*	*CMF 5rd*	*CMF comb*
from Equation 11-16	from Table 11-17	from Table 11-18	from Equation 11-17	from Section 11.7.2	(1)*(2)*(3)*(4)*(5)
1.00	1.00	0.96	1.00	1.00	0.96

Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**			**N spf rd**	**Overdispersion Parameter, k**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted average crash frequency, $N_{predicted\ rs(d)}$**
	from Table 11-5					(6) from Worksheet 1B (a)		
	a	b	c	from Equation 11-9	from Equation 11-10			(3)*(5)*(6)
Total	-9.025	1.049	1.549	0.960	0.401	0.96	0.74	0.682
Fatal and Injury (FI)	-8.837	0.958	1.687	0.503	0.349	0.96	0.74	0.357
Fatal and Injury[a] (FI[a])	-8.505	0.874	1.740	0.325	0.331	0.96	0.74	0.231
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL}$ - $(7)_{FI}$ 0.325

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 1A -- General Information and Input Data for Rural Multilane Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	RP 60.703 to RP 61.538 NB
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Roadway type (divided / undivided)		Undivided	Divided
Length of segment, L (mi)		--	0.84
AADT (veh/day)	AADT$_{MAX}$ = 89,300 (veh/day)	--	22,270
Lane width (ft)		12	12
Shoulder width (ft) - right shoulder width for divided [if differ for directions of travel, use average width]		8	9
Shoulder type - right shoulder type for divided		Paved	Paved
Median width (ft) - for divided only		30	60
Side Slopes - for undivided only		1:7 or flatter	Not Applicable
Lighting (present/not present)		Not Present	Not Present
Auto speed enforcement (present/not present)		Not Present	Not Present
Calibration Factor, Cr		1.00	0.74

Worksheet 1B (a) -- Crash Modification Factors for Rural Multilane Divided Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for Lane Width	CMF for Right Shoulder Width	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1rd	*CMF 2rd*	*CMF 3rd*	*CMF 4rd*	*CMF 5rd*	*CMF comb*
from Equation 11-16	from Table 11-17	from Table 11-18	from Equation 11-17	from Section 11.7.2	(1)*(2)*(3)*(4)*(5)
1.00	1.00	0.96	1.00	1.00	0.96

Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**			**N spf rd**	**Overdispersion Parameter, k**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted average crash frequency, N $_{predicted\ rs(d)}$**
	from Table 11-5					(6) from Worksheet 1B (a)		
	a	b	c	from Equation 11-9	from Equation 11-10			(3)*(5)*(6)
Total	-9.025	1.049	1.549	3.677	0.253	0.96	0.74	2.612
Fatal and Injury (FI)	-8.837	0.958	1.687	1.785	0.220	0.96	0.74	1.268
Fatal and Injury^a (FI^a)	-8.505	0.874	1.740	1.073	0.209	0.96	0.74	0.762
Property Damage Only (PDO)	--	--	--	--	--	--	--	(7)$_{TOTAL}$ - (7)$_{FI}$ 1.345

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 2A -- General Information and Input Data for Rural Multilane Highway Intersections

General Information		Location Information	
Analyst	GTB	Roadway	MO Hwy 13
Agency or Company	CMT	Intersection	MO 13 at Farm Road 94
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 4ST, 4SG)		--	4ST
AADT$_{major}$ (veh/day)	AADT$_{MAX}$ = 78,300 (veh/day)	--	1
AADT$_{minor}$ (veh/day)	AADT$_{MAX}$ = 7,400 (veh/day)	--	1
Intersection skew angle (degrees)		0	16
Number of non-STOP-controlled approaches with left-turn lanes (0, 1, 2)		0	2
Number of non-STOP-controlled approaches with right-turn lanes (0, 1, 2, 3, or 4)		0	0
Intersection lighting (present/not present)		Not Present	Not Present
Calibration Factor, C$_i$		1.00	0.65

Worksheet 2B -- Crash Modification Factors for Rural Multilane Highway Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Crash Severity Level	CMF for Intersection Skew Angle (CMF $_{1i}$) from Equations 11-18 or 11-20 and 11-19 or 11-21	CMF for Left-Turn Lanes (CMF $_{2i}$) from Table 11-22	CMF for Right-Turn Lanes (CMF $_{3i}$) from Table 11-23	CMF for Lighting (CMF $_{4i}$) from Equation 11-22	Combined CMF (CMF $_{COMB}$) (2)*(3)*(4)*(5)
Total	1.09	0.52	1.00	1.00	0.56
Fatal and Injury (FI)	1.09	0.42	1.00	1.00	0.46

Note: The 4-leg Signalized Intersection (4SG) models do not have base conditions and so can only be used for estimation purposes. As a result, there are not CMFs provided for the 4SG condition.

Worksheet 2C -- Intersection Crashes for Rural Multilane Highway Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**			**N $_{spf\ int}$**	**Overdispersion Parameter, k**	**Combined CMFs**	**Calibration Factor, C$_i$**	**Predicted average crash frequency, N $_{predicted\ int}$**
	from Table 11-7 or 11-8					from (6) of Worksheet 2B		
	a	b	c or d (4SG)	from Equation 11-11 or 11-12	from Table 11-7 or 11-8			(3)*(5)*(6)
Total	-10.008	0.848	0.448	0.000	0.494	0.56	0.65	0.000
Fatal and Injury (FI)	-11.554	0.888	0.525	0.000	0.742	0.46	0.65	0.000
Fatal and Injury^a (FI^a)	-10.734	0.828	0.412	0.000	0.655	0.46	0.65	0.000
Property Damage Only (PDO)	--	--	--	--	--	--	--	(7)$_{TOTAL}$ - (7)$_{FI}$
								0.000

NOTE: ^{a} Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Multilane Highway Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Collision Type	**Proportion of Collision Type$_{(TOTAL)}$**	**N $_{predicted\ int}$ $_{(TOTAL)}$ (crashes/year)**	**Proportion of Collision Type$_{(FI)}$**	**N $_{predicted\ int}$ $_{(FI)}$ (crashes/year)**	**Proportion of Collision Type (FI^a)**	**N *predicted int* (FI^a) (crashes/year)**	**Proportion of Collision Type (PDO)**	**N $_{predicted\ int}$ $_{(PDO)}$ (crashes/year)**
	from Table 11-9	(7)$_{TOTAL}$ from Worksheet 2C	from Table 11-9	(7)$_{FI}$ from Worksheet 2C	from Table 11-9	(7) $_{FI}$^{a} from Worksheet 2C	from Table 11-9	(7)$_{PDO}$ from Worksheet 2C

Worksheet 3A -- Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Segment 1 (Divided)	0.682	0.357	0.325	8.5	0.401	0.785	2.361
Segment 2 (Undivided)	2.612	1.268	1.345		0.253	0.602	1.573
Segment 3						1.000	0.000
Segment 4						1.000	0.000
Segment 5						1.000	0.000
Segment 6						1.000	0.000
Segment 7						1.000	0.000
Segment 8						1.000	0.000
INTERSECTIONS							
Intersection 1	0.000	0.000	0.000	4.5	0.494	1.000	0.000
Intersection 2						1.000	0.000
Intersection 3						1.000	0.000
Intersection 4						1.000	0.000
Intersection 5						1.000	0.000
Intersection 6						1.000	0.000
Intersection 7						1.000	0.000
Intersection 8						1.000	0.000
COMBINED (sum of column)	3.295	1.625	1.669	13	--	--	3.934

Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	3.3	3.9
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	1.6	1.9
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$

Rural Multilane Site Total	1.7	2.0

Output Summary

General Information

Project description:	I-44 at MO 13 Interchange Modification				
Analyst:	LKW	Date:	4/22/2022	Area type:	Urban
First year of analysis:	2018				
Last year of analysis:	2041				

Crash Data Description

Freeway segments	Segment crash data available?	Yes	First year of crash data:	2018
	Project-level crash data available?	No	Last year of crash data:	2021
Ramp segments	Segment crash data available?	Yes	First year of crash data:	2018
	Project-level crash data available?	No	Last year of crash data:	2021
Ramp terminals	Segment crash data available?	Yes	First year of crash data:	2018
	Project-level crash data available?	No	Last year of crash data:	2021

Estimated Crash Statistics

Crashes for Entire Facility	**Total**	**K**	**A**	**B**	**C**	**PDO**
Estimated number of crashes during Study Period, crashes:	1743.0	8.7	24.6	138.6	288.4	1282.6
Estimated average crash freq. during Study Period, crashes/yr:	72.6	0.4	1.0	5.8	12.0	53.4

Crashes by Facility Component	**Nbr. Sites**	**Total**	**K**	**A**	**B**	**C**	**PDO**
Freeway segments, crashes:	20	1413.4	7.2	18.9	104.8	201.0	1081.4
Ramp segments, crashes:	24	212.6	1.4	4.4	25.1	39.3	142.5
Crossroad ramp terminals, crashes:	4	117.0	0.1	1.3	8.7	48.1	58.8

Crashes for Entire Facility by Year	**Year**	**Total**	**K**	**A**	**B**	**C**	**PDO**
Estimated number of crashes during the Study Period, crashes:	2018	65.8	0.3	0.9	5.3	11.1	48.1
	2019	65.8	0.3	0.9	5.3	11.1	48.1
	2020	65.8	0.3	0.9	5.3	11.1	48.1
	2021	65.8	0.3	0.9	5.3	11.1	48.1
	2022	66.6	0.3	1.0	5.4	11.2	48.7
	2023	67.3	0.3	1.0	5.4	11.3	49.3
	2024	68.1	0.3	1.0	5.5	11.4	49.9
	2025	68.9	0.3	1.0	5.5	11.5	50.5
	2026	69.6	0.4	1.0	5.6	11.6	51.1
	2027	70.4	0.4	1.0	5.6	11.7	51.7
	2028	71.2	0.4	1.0	5.7	11.8	52.3
	2029	72.0	0.4	1.0	5.7	11.9	52.9
	2030	72.8	0.4	1.0	5.8	12.0	53.5
	2031	73.5	0.4	1.0	5.8	12.1	54.2
	2032	74.3	0.4	1.0	5.9	12.2	54.8
	2033	75.1	0.4	1.1	5.9	12.4	55.4
	2034	75.9	0.4	1.1	6.0	12.5	56.0
	2035	76.7	0.4	1.1	6.1	12.6	56.6
	2036	77.5	0.4	1.1	6.1	12.7	57.3
	2037	78.3	0.4	1.1	6.2	12.8	57.9
	2038	79.1	0.4	1.1	6.2	12.9	58.5
	2039	79.9	0.4	1.1	6.3	13.0	59.2
	2040	80.8	0.4	1.1	6.3	13.1	59.8
	2041	81.6	0.4	1.1	6.4	13.2	60.5

Distribution of Crashes for Entire Facility

Crash Type	**Crash Type Category**	**Estimated Number of Crashes During the Study Period**					
		Total	**K**	**A**	**B**	**C**	**PDO**
Multiple vehicle	Head-on crashes:	5.1	0.0	0.1	0.7	1.7	2.4
	Right-angle crashes:	45.9	0.1	0.7	4.2	16.3	24.6
	Rear-end crashes:	724.0	3.8	10.8	61.7	138.2	509.5
	Sideswipe crashes:	247.8	0.9	2.4	13.7	27.9	202.8
	Other multiple-vehicle crashes:	35.1	0.2	0.6	3.4	6.5	24.3
	Total multiple-vehicle crashes:	1057.9	5.1	14.7	83.8	190.6	763.7
Single vehicle	Crashes with animal:	10.8	0.0	0.0	0.2	0.3	10.3
	Crashes with fixed object:	498.4	2.6	7.1	39.4	70.1	379.2
	Crashes with other object:	72.8	0.2	0.4	2.4	4.3	65.5
	Crashes with parked vehicle:	10.1	0.0	0.1	0.7	1.3	7.9
	Other single-vehicle crashes	92.9	0.8	2.2	12.2	21.7	56.0
	Total single-vehicle crashes:	685.1	3.7	9.9	54.8	97.7	519.0
	Total crashes:	1743.0	8.7	24.6	138.6	288.4	1282.6

Worksheet 1A -- General Information and Input Data for Rural Multilane Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	RP 59.902 to RP 61.538 NB
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Roadway type (divided / undivided)		Undivided	Divided
Length of segment, L (mi)		--	1.59
AADT (veh/day)	$AADT_{MAX}$ = 89,300 (veh/day)	--	22,270
Lane width (ft)		12	12
Shoulder width (ft) - right shoulder width for divided [if differ for directions of travel, use average width]		8	9
Shoulder type - right shoulder type for divided		Paved	Paved
Median width (ft) - for divided only		30	60
Side Slopes - for undivided only		1:7 or flatter	Not Applicable
Lighting (present/not present)		Not Present	Not Present
Auto speed enforcement (present/not present)		Not Present	Not Present
Calibration Factor, Cr		1.00	0.74

Worksheet 1B (a) -- Crash Modification Factors for Rural Multilane Divided Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for Lane Width	CMF for Right Shoulder Width	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1rd	*CMF 2rd*	*CMF 3rd*	*CMF 4rd*	*CMF 5rd*	*CMF comb*
from Equation 11-16	from Table 11-17	from Table 11-18	from Equation 11-17	from Section 11.7.2	(1)*(2)*(3)*(4)*(5)
1.00	1.00	0.96	1.00	1.00	0.96

Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-5			**N spf rd**	**Overdispersion Parameter, k**	**Combined CMFs** (6) from Worksheet 1B (a)	**Calibration Factor, Cr**	**Predicted average crash frequency, $N_{predicted\ rs(d)}$**
	a	b	c	from Equation 11-9	from Equation 11-10			(3)*(5)*(6)
Total	-9.025	1.049	1.549	6.961	0.134	0.96	0.74	4.945
Fatal and Injury (FI)	-8.837	0.958	1.687	3.378	0.116	0.96	0.74	2.400
Fatal and Injury[a] (FI[a])	-8.505	0.874	1.740	2.031	0.110	0.96	0.74	1.443
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL}$ - $(7)_{FI}$ 2.545

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 1A -- General Information and Input Data for Rural Multilane Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (divided / undivided)		Undivided	Divided
Length of segment, L (mi)		--	0.01
AADT (veh/day)	$AADT_{MAX}$ = 89,300 (veh/day)	--	1
Lane width (ft)		12	12
Shoulder width (ft) - right shoulder width for divided [if differ for directions of travel, use average width]		8	9
Shoulder type - right shoulder type for divided		Paved	Paved
Median width (ft) - for divided only		30	60
Side Slopes - for undivided only		1:7 or flatter	Not Applicable
Lighting (present/not present)		Not Present	Not Present
Auto speed enforcement (present/not present)		Not Present	Not Present
Calibration Factor, Cr		1.00	0.74

Worksheet 1B (a) -- Crash Modification Factors for Rural Multilane Divided Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for Lane Width	CMF for Right Shoulder Width	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1rd	*CMF 2rd*	*CMF 3rd*	*CMF 4rd*	*CMF 5rd*	*CMF comb*
from Equation 11-16	from Table 11-17	from Table 11-18	from Equation 11-17	from Section 11.7.2	(1)*(2)*(3)*(4)*(5)
1.00	1.00	0.96	1.00	1.00	0.96

Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-5			**N spf rd**	**Overdispersion Parameter, k**	**Combined CMFs** (6) from Worksheet 1B (a)	**Calibration Factor, Cr**	**Predicted average crash frequency, $N_{predicted\ rs(d)}$**
	a	b	c	from Equation 11-9	from Equation 11-10			(3)*(5)*(6)
Total	-9.025	1.049	1.549	0.000	21.246	0.96	0.74	0.000
Fatal and Injury (FI)	-8.837	0.958	1.687	0.000	18.507	0.96	0.74	0.000
Fatal and Injury^a (FI^a)	-8.505	0.874	1.740	0.000	17.552	0.96	0.74	0.000
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL}$ - $(7)_{FI}$ 0.000

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 2A -- General Information and Input Data for Rural Multilane Highway Intersections

General Information		Location Information	
Analyst	GTB	Roadway	MO Hwy 13
Agency or Company	CMT	Intersection	MO 13 at Farm Road 94
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2030

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 4ST, 4SG)		--	4ST
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 78,300 (veh/day)	--	27,471
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 7,400 (veh/day)	--	1,034
Intersection skew angle (degrees)		0	16
Number of non-STOP-controlled approaches with left-turn lanes (0, 1, 2)		0	2
Number of non-STOP-controlled approaches with right-turn lanes (0, 1, 2, 3, or 4)		0	0
Intersection lighting (present/not present)		Not Present	Not Present
Calibration Factor, C_i		1.00	0.65

Worksheet 2B -- Crash Modification Factors for Rural Multilane Highway Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Crash Severity Level	CMF for Intersection Skew Angle (CMF $_{1i}$) from Equations 11-18 or 11-20 and 11-19 or 11-21	CMF for Left-Turn Lanes (CMF $_{2i}$) from Table 11-22	CMF for Right-Turn Lanes (CMF $_{3i}$) from Table 11-23	CMF for Lighting (CMF $_{4i}$) from Equation 11-22	CMF for RIRO (CMF $_{5i}$) CMF ID 9821
Total	1.09	0.52	1.00	1.00	0.55
Fatal and Injury (FI)	1.09	0.42	1.00	1.00	0.55

Note: The 4-leg Signalized Intersection (4SG) models do not have base conditions and so can only be used for estimation purposes. As a result, there are not CMFs provided for the 4SG condition.

Worksheet 2C -- Intersection Crashes for Rural Multilane Highway Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-7 or 11-8			**N** $_{spf\ int}$	**Overdispersion Parameter, k**	**Combined CMFs** from (6) of Worksheet 2B	**Calibration Factor, C_i**	**Predicted average crash frequency, N** $_{predicted\ int}$
	a	b	c or d (4SG)	from Equation 11-11 or 11-12	from Table 11-7 or 11-8			(3)*(5)*(6)
Total	-10.008	0.848	0.448	5.865	0.494	0.31	0.65	1.184
Fatal and Injury (FI)	-11.554	0.888	0.525	3.210	0.742	0.25	0.65	0.526
Fatal and Injury^a (FI^a)	-10.734	0.828	0.412	1.802	0.655	0.25	0.65	0.295
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL}$ - $(7)_{FI}$ 0.658

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Multilane Highway Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Collision Type	**Proportion of Collision Type$_{(TOTAL)}$**	**N** $_{predicted\ int\ (TOTAL)}$ **(crashes/year)**	**Proportion of Collision Type$_{(FI)}$**	**N** $_{predicted\ int\ (FI)}$ **(crashes/year)**	**Proportion of Collision Type (FI^a)**	**N predicted int (FI^a) (crashes/year)**	**Proportion of Collision Type (PDO)**	**N** $_{predicted\ int\ (PDO)}$ **(crashes/year)**
	from Table 11-9	$(7)_{TOTAL}$ from Worksheet 2C	from Table 11-9	$(7)_{FI}$ from Worksheet 2C	from Table 11-9	(7) $_{FI}$ ^{a} from Worksheet 2C	from Table 11-9	$(7)_{PDO}$ from Worksheet 2C
Total	1.000	1.184	1.000	0.526	1.000	0.295	1.000	0.658
		(2)*$(3)_{TOTAL}$		(4)x$(5)_{FI}$		(6)*(7) $_{FI}$ ^{a}		(8)*(9) $_{PDO}$

Rural Multilane Site Total

2030 Rural Multilane
Build FR 94 RIRO

Worksheet 3A -- Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Segment 1 (Divided)	4.945	2.400	2.545	8.5	0.134	0.602	6.359
Segment 2 (Undivided)	0.000	0.000	0.000		21.246	1.000	0.000
Segment 3						1.000	0.000
Segment 4						1.000	0.000
Segment 5						1.000	0.000
Segment 6						1.000	0.000
Segment 7						1.000	0.000
Segment 8						1.000	0.000
INTERSECTIONS							
Intersection 1	1.184	0.526	0.658	4.5	0.494	0.631	2.407
Intersection 2						1.000	0.000
Intersection 3						1.000	0.000
Intersection 4						1.000	0.000
Intersection 5						1.000	0.000
Intersection 6						1.000	0.000
Intersection 7						1.000	0.000
Intersection 8						1.000	0.000
COMBINED (sum of column)	6.128	2.926	3.203	13	--	--	8.766

Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	6.1	8.8
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	2.9	4.2

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Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL}$ * $(2)_{PDO}$ / $(2)_{TOTAL}$
	3.2	4.6

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		**Location Information**	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	I-44 to Norton Road
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		**Base Conditions**	**Site Conditions**
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.13
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	26,618
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	20
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	62
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	23
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	0.99	0.91	1.00	0.98

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.593	1.000	0.593	0.98	0.91	0.527
Fatal and Injury (FI)	-12.76	1.28	1.31	0.172	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.275	0.163	0.98	0.91	0.145
Property Damage Only (PDO)	-12.81	1.38	1.34	0.454	$(5)_{TOTAL}-(5)_{FI}$ 0.725	0.430	0.98	0.91	0.382

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	Norton Road to RP 59.902
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.2
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	26,377
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	40
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	55
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.05	0.97	1.00	1.00	1.02

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.901	1.000	0.901	1.02	0.91	0.836
Fatal and Injury (FI)	-12.76	1.28	1.31	0.262	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.275	0.248	1.02	0.91	0.230
Property Damage Only (PDO)	-12.81	1.38	1.34	0.690	$(5)_{TOTAL}-(5)_{FI}$ 0.725	0.653	1.02	0.91	0.606

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Focus Workforce Mgmt West Ent. To Start TWLTL
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	2U
Length of segment, L (mi)		--	0.11
AADT (veh/day)	$AADT_{MAX}$ = 32,600 (veh/day)	--	2,918
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	100
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	1.48

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.20	1.00	1.00	1.00	1.20

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-15.22	1.68	0.84	0.018	1.000	0.018	1.20	1.48	0.032
Fatal and Injury (FI)	-16.22	1.66	0.65	0.006	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.302	0.005	1.20	1.48	0.010
Property Damage Only (PDO)	-15.62	1.69	0.87	0.013	$(5)_{TOTAL}-(5)_{FI}$ 0.698	0.012	1.20	1.48	0.022

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Start TWLTL To Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.12
AADT (veh/day)	$AADT_{MAX}$ = 32,900 (veh/day)	--	2,918
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	2
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	25
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	28
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.01	1.00	0.93	1.00	0.94

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.40	1.41	0.66	0.038	1.000	0.038	0.94	0.91	0.032
Fatal and Injury (FI)	-16.45	1.69	0.59	0.006	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.164	0.006	0.94	0.91	0.005
Property Damage Only (PDO)	-11.95	1.33	0.59	0.031	$(5)_{TOTAL}-(5)_{FI}$ 0.836	0.032	0.94	0.91	0.027

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Old MO 13 to 1717 W Smith Dr
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.18
AADT (veh/day)	$AADT_{MAX}$ = 32,900 (veh/day)	--	3,276
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	11
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	14
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.00	1.00	0.93	1.00	0.93

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.40	1.41	0.66	0.067	1.000	0.067	0.93	0.91	0.057
Fatal and Injury (FI)	-16.45	1.69	0.59	0.011	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.170	0.011	0.93	0.91	0.010
Property Damage Only (PDO)	-11.95	1.33	0.59	0.055	$(5)_{TOTAL}-(5)_{FI}$ 0.830	0.056	0.93	0.91	0.047

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Farm Road 143 to Dickerson Branch crossing
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.15
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	8,346
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	2
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	47
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	15
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	1.00	1.00	1.00	1.08

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	0.219	1.000	0.219	1.08	0.91	0.216
Fatal and Injury (FI)	-12.08	1.25	0.99	0.068	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.327	0.072	1.08	0.91	0.070
Property Damage Only (PDO)	-12.53	1.38	1.08	0.140	$(5)_{TOTAL}-(5)_{FI}$ 0.673	0.148	1.08	0.91	0.145

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 67,700 (veh/day)	--	5,243
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 33,400 (veh/day)	--	3,276
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	5.21
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Permissive
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Permissive
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	3
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersectior		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.98	0.92	1.00	0.91	1.00	0.54

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at MO 13
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 67,700 (veh/day)	--	26,618
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 33,400 (veh/day)	--	7,857
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	5.21
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4
Type of left-turn signal phasing for Leg #1		Permissive	Protected
Type of left-turn signal phasing for Leg #2		--	Protected
Type of left-turn signal phasing for Leg #3		--	Protected
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	6
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersectior		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.78	0.92	1.00	0.91	1.00	0.43

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Farm Road 143
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 45,700 (veh/day)	--	8,436
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 9,300 (veh/day)	--	3,503
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.28
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	0
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersectior		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	1.00	1.00	0.91	1.00	0.91

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Multiple-vehicle nondriveway							
Segment 1	0.527	0.145	0.382	2.25	1.320	0.590	1.234
Segment 2	0.836	0.230	0.606	0.25	1.320	0.475	0.529
Segment 3	0.032	0.010	0.022	0.25	0.840	0.974	0.038
Segment 4	0.032	0.005	0.027	0.25	0.660	0.979	0.037
Segment 5	0.057	0.010	0.047	0.25	0.660	0.964	0.064
Segment 6	0.216	0.070	0.145	0.25	1.010	0.821	0.222
Single-vehicle							
Segment 1	0.089	0.016	0.073	0	0.860	0.929	0.083
Segment 2	0.142	0.025	0.117	0.5	0.860	0.891	0.181
Segment 3	0.072	0.023	0.048	0.25	0.810	0.945	0.082
Segment 4	0.024	0.008	0.017	0.5	1.370	0.968	0.040
Segment 5	0.039	0.012	0.027	0.00	1.370	0.949	0.037
Segment 6	0.075	0.021	0.054	0.75	0.860	0.939	0.116
						1.000	0.000
Multiple-vehicle driveway-related							
Segment 1	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 2	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 3	0.017	0.006	0.012	0	0.810	0.986	0.017
Segment 4	0.034	0.008	0.026	0.25	1.100	0.964	0.042
Segment 5	0.025	0.006	0.019	0.25	1.100	0.973	0.031
Segment 6	0.147	0.050	0.097	0.5	0.810	0.893	0.185
INTERSECTIONS							
Multiple-vehicle							
Intersection 1	2.932	0.841	2.091	1	0.390	0.467	1.635
Intersection 2	16.247	5.503	10.744	5	0.390	0.136	6.749
Intersection 3	1.189	0.393	0.796	2	0.800	0.513	1.340
Intersection 4						1.000	0.000
Single-vehicle							
Intersection 1	0.313	0.112	0.201	0	0.360	0.899	0.307
Intersection 2	0.954	0.235	0.719	1	0.360	0.744	0.966
Intersection 3	0.350	0.112	0.239	0	1.140	0.715	0.250
Intersection 4						1.000	0.000
COMBINED (sum of column)	24.350	7.841	16.509	15	--	--	14.183

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1) Site Type	(2) N_{ped}	(3) N_{bike}
ROADWAY SEGMENTS		
Segment 1	0.011	0.003
Segment 2	0.017	0.004
Segment 3	0.001	0.001
Segment 4	0.001	0.001
Segment 5	0.001	0.001
Segment 6	0.004	0.001
INTERSECTIONS		
Intersection 1	0.124	0.254
Intersection 2	0.071	1.344
Intersection 3	0.041	0.032
Intersection 4		
COMBINED (sum of column)	0.266	1.638

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1) **Crash severity level**	(2) **$N_{predicted}$**	(3) **N_{ped}**	(4) **N_{bike}**	(5) $N_{expected (VEHICLE)}$	(6) $N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	24.4	0.3	1.6	14.2	16.1
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	7.8	0.3	1.6	4.6	6.5
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	16.5	0.0	0.0	9.6	9.6

Worksheet 1A -- General Information and Input Data for Rural Multilane Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	RP 59.902 to RP 61.538 NB
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (divided / undivided)		Undivided	Divided
Length of segment, L (mi)		--	1.59
AADT (veh/day)	AADT$_{MAX}$ = 89,300 (veh/day)	--	26,377
Lane width (ft)		12	12
Shoulder width (ft) - right shoulder width for divided [if differ for directions of travel, use average width]		8	9
Shoulder type - right shoulder type for divided		Paved	Paved
Median width (ft) - for divided only		30	60
Side Slopes - for undivided only		1:7 or flatter	Not Applicable
Lighting (present/not present)		Not Present	Not Present
Auto speed enforcement (present/not present)		Not Present	Not Present
Calibration Factor, Cr		1.00	0.74

Worksheet 1B (a) -- Crash Modification Factors for Rural Multilane Divided Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for Lane Width	CMF for Right Shoulder Width	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1rd	*CMF 2rd*	*CMF 3rd*	*CMF 4rd*	*CMF 5rd*	*CMF comb*
from Equation 11-16	from Table 11-17	from Table 11-18	from Equation 11-17	from Section 11.7.2	(1)*(2)*(3)*(4)*(5)
1.00	1.00	0.96	1.00	1.00	0.96

Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-5			**N spf rd**	**Overdispersion Parameter, k**	**Combined CMFs** (6) from Worksheet 1B (a)	**Calibration Factor, Cr**	**Predicted average crash frequency, N $_{predicted\ rs(d)}$**
	a	b	c	from Equation 11-9	from Equation 11-10			(3)*(5)*(6)
Total	-9.025	1.049	1.549	8.313	0.134	0.96	0.74	5.906
Fatal and Injury (FI)	-8.837	0.958	1.687	3.973	0.116	0.96	0.74	2.822
Fatal and Injury^{a} (FI^{a})	-8.505	0.874	1.740	2.354	0.110	0.96	0.74	1.673
Property Damage Only (PDO)	--	--	--	--	--	--	--	(7)$_{TOTAL}$ - (7)$_{FI}$ 3.083

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 2A -- General Information and Input Data for Rural Multilane Highway Intersections

General Information		Location Information	
Analyst	GTB	Roadway	MO Hwy 13
Agency or Company	CMT	Intersection	MO 13 at Farm Road 94
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 4ST, 4SG)		--	4ST
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 78,300 (veh/day)	--	32,539
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 7,400 (veh/day)	--	1,225
Intersection skew angle (degrees)		0	16
Number of non-STOP-controlled approaches with left-turn lanes (0, 1, 2)		0	2
Number of non-STOP-controlled approaches with right-turn lanes (0, 1, 2, 3, or 4)		0	0
Intersection lighting (present/not present)		Not Present	Not Present
Calibration Factor, C_i		1.00	0.65

Worksheet 2B -- Crash Modification Factors for Rural Multilane Highway Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Crash Severity Level	CMF for Intersection Skew Angle (CMF_{1i}) from Equations 11-18 or 11-20 and 11-19 or 11-21	CMF for Left-Turn Lanes (CMF_{2i}) from Table 11-22	CMF for Right-Turn Lanes (CMF_{3i}) from Table 11-23	CMF for Lighting (CMF_{4i}) from Equation 11-22	Combined CMF (CMF_{COMB}) (2)*(3)*(4)*(5)
Total	1.09	0.52	1.00	1.00	0.56
Fatal and Injury (FI)	1.09	0.42	1.00	1.00	0.46

Note: The 4-leg Signalized Intersection (4SG) models do not have base conditions and so can only be used for estimation purposes. As a result, there are not CMFs provided for the 4SG condition.

Worksheet 2C -- Intersection Crashes for Rural Multilane Highway Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-7 or 11-8			**N** $_{spf\ int}$	**Overdispersion Parameter, k**	**Combined CMFs** from (6) of Worksheet 2B	**Calibration Factor, C_i**	**Predicted average crash frequency, N** $_{predicted\ int}$
	a	b	c or d (4SG)	from Equation 11-11 or 11-12	from Table 11-7 or 11-8			(3)*(5)*(6)
Total	-10.008	0.848	0.448	7.304	0.494	0.56	0.65	2.680
Fatal and Injury (FI)	-11.554	0.888	0.525	4.078	0.742	0.46	0.65	1.215
Fatal and Injury^a (FI^a)	-10.734	0.828	0.412	2.223	0.655	0.46	0.65	0.662
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL}$ - $(7)_{FI}$ 1.465

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 3A -- Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Segment 1 (Divided)	5.906	2.822	3.083	8.5	0.134	0.559	7.050
Segment 2 (Undivided)	0.000	0.000	0.000		21.246	1.000	0.000
Segment 3						1.000	0.000
Segment 4						1.000	0.000
Segment 5						1.000	0.000
Segment 6						1.000	0.000
Segment 7						1.000	0.000
Segment 8						1.000	0.000
INTERSECTIONS							
Intersection 1	2.680	1.215	1.465	4.5	0.494	0.430	3.717
Intersection 2						1.000	0.000
Intersection 3						1.000	0.000
Intersection 4						1.000	0.000
Intersection 5						1.000	0.000
Intersection 6						1.000	0.000
Intersection 7						1.000	0.000
COMBINED (sum of column)	8.586	4.037	4.548	13	--	--	10.767

Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	8.6	10.8
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	4.0	5.1
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	4.5	5.7

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	I-44 to Norton Road
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.13
AADT (veh/day)	AADT$_{MAX}$ = 66,000 (veh/day)	--	20,778
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	20
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	62
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	23
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	0.99	0.91	1.00	0.98

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	Norton Road to RP 59.862
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.16
AADT (veh/day)	AADT$_{MAX}$ = 66,000 (veh/day)	--	25,798
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	40
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	69
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.07	0.97	1.00	1.00	1.04

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Focus Workforce Mgmt West Ent. To Start TWLTL
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	2U
Length of segment, L (mi)		--	0.11
AADT (veh/day)	$AADT_{MAX}$ = 32,600 (veh/day)	--	2,798
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	100
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	1.48

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.20	1.00	0.93	1.00	1.12

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Start TWLTL To Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.12
AADT (veh/day)	$AADT_{MAX}$ = 32,900 (veh/day)	--	9,660
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	2
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	25
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	28
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.01	1.00	0.93	1.00	0.94

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Old MO 13 to 1717 W Smith Dr
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.18
AADT (veh/day)	$AADT_{MAX}$ = 32,900 (veh/day)	--	7,161
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	11
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	14
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.00	1.00	0.93	1.00	0.93

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Farm Road 143 to Dickerson Branch crossing
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.15
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	3,392
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	2
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	47
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	15
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	1.00	1.00	1.00	1.08

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	New Segment Between Roundabouts (underpass of MO 13)
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	2U
Length of segment, L (mi)		--	0.19
AADT (veh/day)	$AADT_{MAX}$ = 32,600 (veh/day)	--	6,862
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	5
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.00	1.00	0.93	1.00	0.93

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		**Location Information**	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2050

Input Data		**Base Conditions**	**Site Conditions**	
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG	
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 67,700 (veh/day)	--	9,660	AADT OK
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 33,400 (veh/day)	--	2,835	AADT OK
Intersection lighting (present/not present)		Not Present	Present	
Calibration factor, C_i		1.00	5.21	
Data for unsignalized intersections only:		--	--	
Number of major-road approaches with left-turn lanes (0,1,2)		0	1	
Number of major-road approaches with right-turn lanes (0,1,2)		0	0	
Data for signalized intersections only:		--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2	
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive	
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive	
Type of left-turn signal phasing for Leg #3		--	Permissive	
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Permissive	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0	
Intersection red light cameras (present/not present)		Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10	
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	3	
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2	
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.98	0.92	1.00	0.91	1.00	0.54

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at MO 13
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions	
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST	Unsignalized three-leg inte
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 45,700 (veh/day)	--	25,798	AADT OK
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 9,300 (veh/day)	--	3,392	AADT OK
Intersection lighting (present/not present)		Not Present	Present	
Calibration factor, C_i		1.00	1.28	
Data for unsignalized intersections only:		--	--	
Number of major-road approaches with left-turn lanes (0,1,2)		0	1	
Number of major-road approaches with right-turn lanes (0,1,2)		0	1	
Data for signalized intersections only:		--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4	
Type of left-turn signal phasing for Leg #1		Permissive	Protected	
Type of left-turn signal phasing for Leg #2		--	Protected	
Type of left-turn signal phasing for Leg #3		--	Protected	
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0	
Intersection red light cameras (present/not present)		Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1	
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	0	
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2	
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersectior		0	2	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	CMF for 3-Leg Stop Control to RIRO	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF 7i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	CMF 9821	(1)*(2)*(3)*(4)*(5)*(6)*(7)
0.67	1.00	0.86	1.00	0.91	1.00	0.55	0.29

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Farm Road 143
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions	
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST	
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 45,700 (veh/day)	--	3,392	AADT OK
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 9,300 (veh/day)	--	3,357	AADT OK
Intersection lighting (present/not present)		Not Present	Present	
Calibration factor, C_i		1.00	1.28	
Data for unsignalized intersections only:		--	--	
Number of major-road approaches with left-turn lanes (0,1,2)		0	0	
Number of major-road approaches with right-turn lanes (0,1,2)		0	1	
Data for signalized intersections only:		--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2	
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive	
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive	
Type of left-turn signal phasing for Leg #3		--	Not Applicable	
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0	
Intersection red light cameras (present/not present)		Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1	
Maximum number of lanes crossed by a pedestrian (n_{anesx})		--	0	
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2	
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF* $_{COMB}$
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	0.86	1.00	0.91	1.00	0.78

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	West Norton Road at Norton Underpass
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions	
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST	Unsignalized three-leg inte
AADT $_{major}$ (veh/day)	AADT $_{MAX}$ = 45,700 (veh/day)	--	9,660	AADT OK
AADT $_{minor}$ (veh/day)	AADT $_{MAX}$ = 9,300 (veh/day)	--	6,862	AADT OK
Intersection lighting (present/not present)		Not Present	Present	
Calibration factor, C_i		1.00	1.28	
Data for unsignalized intersections only:		--	--	
Number of major-road approaches with left-turn lanes (0,1,2)		0	0	
Number of major-road approaches with right-turn lanes (0,1,2)		0	1	
Data for signalized intersections only:		--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2	
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive	
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive	
Type of left-turn signal phasing for Leg #3		--	Not Applicable	
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0	
Intersection red light cameras (present/not present)		Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10	
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	2	
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2	
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersectior		0	2	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1) CMF for Left-Turn Lanes	(2) CMF for Left-Turn Signal Phasing	(3) CMF for Right-Turn Lanes	(4) CMF for Right Turn on Red	(5) CMF for Lighting	(6) CMF for Red Light Cameras	(7) CMF for 3-Leg Stop Control to SLR	(8) Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF 7i*	*CMF* $_{COMB}$
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	CMF 206	(1)*(2)*(3)*(4)*(5)*(6)*(7)
1.00	1.00	0.86	1.00	0.91	1.00	0.28	0.22

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	East Norton Road at Norton Underpass
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions	
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST	Unsignalized three-leg inte
AADT $_{major}$ (veh/day)	AADT_{MAX} = 45,700 (veh/day)	--	8,087	AADT OK
AADT $_{minor}$ (veh/day)	AADT_{MAX} = 9,300 (veh/day)	--	6,862	AADT OK
Intersection lighting (present/not present)		Not Present	Present	
Calibration factor, C_i		1.00	1.28	
Data for unsignalized intersections only:		--	--	
Number of major-road approaches with left-turn lanes (0,1,2)		0	0	
Number of major-road approaches with right-turn lanes (0,1,2)		0	1	
Data for signalized intersections only:		--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2	
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive	
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive	
Type of left-turn signal phasing for Leg #3		--	Not Applicable	
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0	
Intersection red light cameras (present/not present)		Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10	
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	2	
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2	
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersectior		0	2	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	CMF for 3-Leg Stop Control to SLR	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF 7i*	*CMF* $_{COMB}$
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	CMF 206	(1)*(2)*(3)*(4)*(5)*(6)*(7)
1.00	1.00	0.86	1.00	0.91	1.00	0.28	0.22

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	MO 13 Connector Road at MO 13
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions	
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST	Unsignalized three-leg inte
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 45,700 (veh/day)	--	25,798	AADT OK
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 9,300 (veh/day)	--	4,021	AADT OK
Intersection lighting (present/not present)		Not Present	Present	
Calibration factor, C_i		1.00	1.28	
Data for unsignalized intersections only:		--	--	
Number of major-road approaches with left-turn lanes (0,1,2)		0	1	
Number of major-road approaches with right-turn lanes (0,1,2)		0	1	
Data for signalized intersections only:		--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4	
Type of left-turn signal phasing for Leg #1		Permissive	Protected	
Type of left-turn signal phasing for Leg #2		--	Protected	
Type of left-turn signal phasing for Leg #3		--	Protected	
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0	
Intersection red light cameras (present/not present)		Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1	
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	0	
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2	
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersectior		0	2	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	CMF for 3-Leg Stop Control to RIRO	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF 7i*	*CMF* $_{COMB}$
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	CMF 9821	(1)*(2)*(3)*(4)*(5)*(6)*(7)
0.67	1.00	0.86	1.00	0.91	1.00	0.55	0.29

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Smith Road
Agency or Company	CMT	Intersection	Smith Road at MO 13 Connector
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2050

Input Data		Base Conditions	Site Conditions	
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST	
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 45,700 (veh/day)	--	7,161	AADT OK
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 9,300 (veh/day)	--	1,128	AADT OK
Intersection lighting (present/not present)		Not Present	Present	
Calibration factor, C_i		1.00	1.28	
Data for unsignalized intersections only:		--	--	
Number of major-road approaches with left-turn lanes (0,1,2)		0	0	
Number of major-road approaches with right-turn lanes (0,1,2)		0	1	
Data for signalized intersections only:		--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2	
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive	
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive	
Type of left-turn signal phasing for Leg #3		--	Not Applicable	
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0	
Intersection red light cameras (present/not present)		Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1	
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	0	
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2	
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	2	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	0.86	1.00	0.91	1.00	0.78

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Multiple-vehicle nondriveway							
Segment 1	0.376	0.105	0.271	2.25	1.320	0.668	0.998
Segment 2	0.663	0.183	0.480	0.25	1.320	0.533	0.470
Segment 3	0.028	0.008	0.019	0.25	0.840	0.977	0.033
Segment 4	0.176	0.041	0.135	0.25	0.660	0.896	0.183
Segment 5	0.172	0.037	0.135	0.25	0.660	0.898	0.180
Segment 6	0.065	0.023	0.042	0.25	1.010	0.938	0.076
Segment 7	0.110	0.033	0.078		0.840	0.915	0.101
Single-vehicle							
Segment 1	0.079	0.014	0.066	0	0.860	0.936	0.074
Segment 2	0.115	0.020	0.095	0.5	0.860	0.910	0.150
Segment 3	0.065	0.022	0.044	0.25	0.810	0.950	0.075
Segment 4	0.047	0.013	0.033	0.5	1.370	0.940	0.074
Segment 5	0.059	0.017	0.042	0.00	1.370	0.925	0.055
Segment 6	0.036	0.012	0.024	0.75	0.910	0.968	0.059
Segment 7	0.095	0.024	0.071		0.810	0.928	0.089
Multiple-vehicle driveway-related							
Segment 1	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 2	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 3	0.015	0.005	0.010	0	0.810	0.988	0.015
Segment 4	0.112	0.027	0.085	0.25	1.100	0.890	0.127
Segment 5	0.054	0.013	0.041	0.25	1.100	0.944	0.065
Segment 6	0.051	0.018	0.034	0.50	0.810	0.960	0.069
Segment 7	0.000	0.000	0.000		0.810	1.000	0.000
INTERSECTIONS							
Multiple-vehicle							
Intersection 1	5.454	1.678	3.776	1	0.390	0.320	2.084
Intersection 2	1.286	0.414	0.871	5	0.800	0.493	3.296
Intersection 3	0.365	0.125	0.241	2	0.800	0.774	0.622
Intersection 4	0.438	0.131	0.307		0.800	0.740	0.325
Intersection 5	0.360	0.108	0.252		0.800	0.776	0.279
Intersection 6	1.379	0.434	0.945		0.800	0.476	0.656
Intersection 7	0.536	0.207	0.328		0.800	0.700	0.375
Single-vehicle							
Intersection 1	0.456	0.141	0.315	0	0.360	0.859	0.427
Intersection 2	0.131	0.039	0.092	1	1.140	0.870	0.243
Intersection 3	0.255	0.086	0.169	0	1.140	0.775	0.197
Intersection 4	0.121	0.038	0.084		1.140	0.878	0.107
Intersection 5	0.118	0.037	0.081		1.140	0.881	0.104
Intersection 6	0.142	0.042	0.100		1.140	0.860	0.123
Intersection 7	0.165	0.055	0.110		1.140	0.842	0.139
COMBINED (sum of column)	13.101	4.015	9.085	15	--	--	11.505

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1)	(2)	(3)
Site Type	N_{ped}	N_{bike}
ROADWAY SEGMENTS		
Segment 1	0.008	0.002
Segment 2	0.013	0.004
Segment 3	0.001	0.001
Segment 4	0.004	0.002
Segment 5	0.003	0.002
Segment 6	0.001	0.000
Segment 7	0.001	0.001
INTERSECTIONS		
Intersection 1	0.118	0.462
Intersection 2	0.038	0.029
Intersection 3	0.017	0.013
Intersection 4	0.015	0.011
Intersection 5	0.013	0.010
Intersection 6	0.041	0.031
COMBINED (sum of column)	0.214	0.523

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)
Crash severity level	$N_{predicted}$	N_{ped}	N_{bike}	$N_{expected\ (VEHICLE)}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	13.1	0.2	0.5	11.5	12.2
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	4.0	0.2	0.5	3.5	4.3
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	9.1	0.0	0.0	8.0	8.0

Worksheet 1A -- General Information and Input Data for Rural Multilane Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	RP 59.902 to RP 61.538 NB
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (divided / undivided)		Undivided	Divided
Length of segment, L (mi)		--	1.59
AADT (veh/day)	AADT_{MAX} = 89,300 (veh/day)	--	26,377
Lane width (ft)		12	12
Shoulder width (ft) - right shoulder width for divided [if differ for directions of travel, use average width]		8	9
Shoulder type - right shoulder type for divided		Paved	Paved
Median width (ft) - for divided only		30	60
Side Slopes - for undivided only		1:7 or flatter	Not Applicable
Lighting (present/not present)		Not Present	Not Present
Auto speed enforcement (present/not present)		Not Present	Not Present
Calibration Factor, Cr		1.00	0.74

Worksheet 1B (a) -- Crash Modification Factors for Rural Multilane Divided Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for Lane Width	CMF for Right Shoulder Width	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1rd	*CMF 2rd*	*CMF 3rd*	*CMF 4rd*	*CMF 5rd*	*CMF comb*
from Equation 11-16	from Table 11-17	from Table 11-18	from Equation 11-17	from Section 11.7.2	(1)*(2)*(3)*(4)*(5)
1.00	1.00	0.96	1.00	1.00	0.96

Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-5			**N spf rd**	**Overdispersion Parameter, k**	**Combined CMFs** (6) from Worksheet 1B (a)	**Calibration Factor, Cr**	**Predicted average crash frequency, $N_{\text{predicted rs(d)}}$**
	a	b	c	from Equation 11-9	from Equation 11-10			(3)*(5)*(6)
Total	-9.025	1.049	1.549	8.313	0.134	0.96	0.74	5.906
Fatal and Injury (FI)	-8.837	0.958	1.687	3.973	0.116	0.96	0.74	2.822
Fatal and Injury[a] (FI[a])	-8.505	0.874	1.740	2.354	0.110	0.96	0.74	1.673
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{\text{TOTAL}} - (7)_{\text{FI}}$ 3.083

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 2A -- General Information and Input Data for Rural Multilane Highway Intersections

General Information		Location Information	
Analyst	GTB	Roadway	MO Hwy 13
Agency or Company	CMT	Intersection	MO 13 at Farm Road 94
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 4ST, 4SG)		--	4ST
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 78,300 (veh/day)	--	32,539
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 7,400 (veh/day)	--	1,225
Intersection skew angle (degrees)		0	16
Number of non-STOP-controlled approaches with left-turn lanes (0, 1, 2)		0	2
Number of non-STOP-controlled approaches with right-turn lanes (0, 1, 2, 3, or 4)		0	0
Intersection lighting (present/not present)		Not Present	Not Present
Calibration Factor, C_i		1.00	0.65

Worksheet 2B -- Crash Modification Factors for Rural Multilane Highway Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Crash Severity Level	CMF for Intersection Skew Angle (CMF_{1i}) from Equations 11-18 or 11-20 and 11-19 or 11-21	CMF for Left-Turn Lanes (CMF_{2i}) from Table 11-22	CMF for Right-Turn Lanes (CMF_{3i}) from Table 11-23	CMF for Lighting (CMF_{4i}) from Equation 11-22	CMF for J-Turn (CMF_{5i}) CMF ID 5555
Total	1.09	0.52	1.00	1.00	0.65
Fatal and Injury (FI)	1.09	0.42	1.00	1.00	0.65

Note: The 4-leg Signalized Intersection (4SG) models do not have base conditions and so can only be used for estimation purposes. As a result, there are not CMFs provided for the 4SG condition.

Worksheet 2C -- Intersection Crashes for Rural Multilane Highway Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-7 or 11-8			**$N_{spf\ int}$**	**Overdispersion Parameter, k**	**Combined CMFs** from (6) of Worksheet 2B	**Calibration Factor, C_i**	**Predicted average crash frequency, $N_{predicted\ int}$**
	a	b	c or d (4SG)	from Equation 11-11 or 11-12	from Table 11-7 or 11-8			(3)*(5)*(6)
Total	-10.008	0.848	0.448	7.304	0.494	0.37	0.65	1.747
Fatal and Injury (FI)	-11.554	0.888	0.525	4.078	0.742	0.30	0.65	0.792
Fatal and Injury^{a} (FI^{a})	-10.734	0.828	0.412	2.223	0.655	0.30	0.65	0.432
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL} - (7)_{FI}$ 0.955

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 3A -- Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Segment 1 (Divided)	5.906	2.822	3.083	8.5	0.134	0.559	7.050
Segment 2 (Undivided)	0.000	0.000	0.000		21.246	1.000	0.000
Segment 3						1.000	0.000
Segment 4						1.000	0.000
Segment 5						1.000	0.000
Segment 6						1.000	0.000
Segment 7						1.000	0.000
INTERSECTIONS							
Intersection 1	1.747	0.792	0.955	4.5	0.494	0.537	3.023
Intersection 2						1.000	0.000
Intersection 3						1.000	0.000
Intersection 4						1.000	0.000
Intersection 5						1.000	0.000
Intersection 6						1.000	0.000
Intersection 7						1.000	0.000
Intersection 8						1.000	0.000
COMBINED (sum of column)	7.653	3.614	4.039	13	--	--	10.073

Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	7.7	10.1
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	3.6	4.8
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	4.0	5.3

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	I-44 to Norton Road
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.13
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	11,618
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	20
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	62
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	23
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	0.99	0.91	1.00	0.98

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.192	1.000	0.192	0.98	0.91	0.171
Fatal and Injury (FI)	-12.76	1.28	1.31	0.060	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.292	0.056	0.98	0.91	0.050
Property Damage Only (PDO)	-12.81	1.38	1.34	0.145	$(5)_{TOTAL}-(5)_{FI}$ 0.708	0.136	0.98	0.91	0.121

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	Norton Road to RP 59.902
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.2
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	11,377
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	40
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	55
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.05	0.97	1.00	1.00	1.02

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.287	1.000	0.287	1.02	0.91	0.266
Fatal and Injury (FI)	-12.76	1.28	1.31	0.089	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.292	0.084	1.02	0.91	0.078
Property Damage Only (PDO)	-12.81	1.38	1.34	0.216	$(5)_{TOTAL}-(5)_{FI}$ 0.708	0.203	1.02	0.91	0.189

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Focus Workforce Mgmt West Ent. To Start TWLTL
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	2U
Length of segment, L (mi)		--	0.11
AADT (veh/day)	$AADT_{MAX}$ = 32,600 (veh/day)	--	2,918
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	100
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	30
Calibration Factor, Cr		1.00	1.48

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.20	1.00	1.00	1.00	1.20

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-15.22	1.68	0.84	0.018	1.000	0.018	1.20	1.48	0.032
Fatal and Injury (FI)	-16.22	1.66	0.65	0.006	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.302	0.005	1.20	1.48	0.010
Property Damage Only (PDO)	-15.62	1.69	0.87	0.013	$(5)_{TOTAL}-(5)_{FI}$ 0.698	0.012	1.20	1.48	0.022

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Start TWLTL To Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.12
AADT (veh/day)	AADT$_{MAX}$ = 32,900 (veh/day)	--	2,918
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	2
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	25
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	28
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.01	1.00	0.93	1.00	0.94

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.40	1.41	0.66	0.038	1.000	0.038	0.94	0.91	0.032
Fatal and Injury (FI)	-16.45	1.69	0.59	0.006	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.164	0.006	0.94	0.91	0.005
Property Damage Only (PDO)	-11.95	1.33	0.59	0.031	$(5)_{TOTAL}-(5)_{FI}$ 0.836	0.032	0.94	0.91	0.027

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Old MO 13 to 1717 W Smith Dr
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	3T
Length of segment, L (mi)		--	0.18
AADT (veh/day)	$AADT_{MAX}$ = 32,900 (veh/day)	--	3,276
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	11
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	14
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.00	1.00	0.93	1.00	0.93

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.40	1.41	0.66	0.067	1.000	0.067	0.93	0.91	0.057
Fatal and Injury (FI)	-16.45	1.69	0.59	0.011	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.170	0.011	0.93	0.91	0.010
Property Damage Only (PDO)	-11.95	1.33	0.59	0.055	$(5)_{TOTAL}-(5)_{FI}$ 0.830	0.056	0.93	0.91	0.047

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Roadway Section	Farm Road 143 to Dickerson Branch crossing
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.15
AADT (veh/day)	AADT$_{MAX}$ = 40,100 (veh/day)	--	8,346
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	2
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	47
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	15
Calibration Factor, Cr		1.00	0.91

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.08	1.00	1.00	1.00	1.08

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N$_{brmv}$**	**Proportion of Total Crashes**	**Adjusted N$_{brmv}$**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N$_{brmv}$**
	from Table 12-3		from Table 12-3	from Equation 12-10		(4)$_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	0.219	1.000	0.219	1.08	0.91	0.216
Fatal and Injury (FI)	-12.08	1.25	0.99	0.068	(4)$_{FI}$/((4)$_{FI}$+(4)$_{PDO}$) 0.327	0.072	1.08	0.91	0.070
Property Damage Only (PDO)	-12.53	1.38	1.08	0.140	(5)$_{TOTAL}$-(5)$_{FI}$ 0.673	0.148	1.08	0.91	0.145

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Old MO 13
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ = 67,700 (veh/day)	--	5,243
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ = 33,400 (veh/day)	--	3,276
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	5.21
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Permissive
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Permissive
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	3
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersectior		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	CMF_{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.98	0.92	1.00	0.91	1.00	0.54

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at MO 13
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ = 67,700 (veh/day)	--	11,618
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ = 33,400 (veh/day)	--	7,857
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	5.21
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4
Type of left-turn signal phasing for Leg #1		Permissive	Protected
Type of left-turn signal phasing for Leg #2		--	Protected
Type of left-turn signal phasing for Leg #3		--	Protected
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	6
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersectior		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF* $_{COMB}$
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.78	0.92	1.00	0.91	1.00	0.43

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	GTB	Roadway	Norton Road
Agency or Company	CMT	Intersection	Norton Road at Farm Road 143
Date Performed	02/11/22	Jurisdiction	Springfield, MO
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST
AADT $_{major}$ (veh/day)	AADT$_{MAX}$ = 45,700 (veh/day)	--	8,436
AADT $_{minor}$ (veh/day)	AADT$_{MAX}$ = 9,300 (veh/day)	--	3,503
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.28
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			1
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	0
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersectior		0	2

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	1.00	1.00	0.91	1.00	0.91

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Multiple-vehicle nondriveway							
Segment 1	0.171	0.050	0.121	2.25	1.320	0.816	0.553
Segment 2	0.266	0.078	0.189	0.25	1.320	0.740	0.262
Segment 3	0.032	0.010	0.022	0.25	0.840	0.974	0.038
Segment 4	0.032	0.005	0.027	0.25	0.660	0.979	0.037
Segment 5	0.057	0.010	0.047	0.25	0.660	0.964	0.064
Segment 6	0.216	0.070	0.145	0.25	1.010	0.821	0.222
Single-vehicle							
Segment 1	0.060	0.009	0.051	0	0.860	0.951	0.057
Segment 2	0.096	0.015	0.081	0.5	0.860	0.924	0.127
Segment 3	0.072	0.023	0.048	0.25	0.810	0.945	0.082
Segment 4	0.024	0.008	0.017	0.5	1.370	0.968	0.040
Segment 5	0.039	0.012	0.027	0.00	1.370	0.949	0.037
Segment 6	0.075	0.021	0.054	0.75	0.860	0.939	0.116
						1.000	0.000
Multiple-vehicle driveway-related							
Segment 1	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 2	0.000	0.000	0.000	0	1.390	1.000	0.000
Segment 3	0.017	0.006	0.012	0	0.810	0.986	0.017
Segment 4	0.034	0.008	0.026	0.25	1.100	0.964	0.042
Segment 5	0.025	0.006	0.019	0.25	1.100	0.973	0.031
Segment 6	0.147	0.050	0.097	0.5	0.810	0.893	0.185
INTERSECTIONS							
Multiple-vehicle							
Intersection 1	2.932	0.841	2.091	1	0.390	0.467	1.635
Intersection 2	6.691	2.072	4.619	5	0.390	0.277	5.649
Intersection 3	1.189	0.393	0.796	2	0.800	0.513	1.340
Intersection 4						1.000	0.000
Single-vehicle							
Intersection 1	0.313	0.112	0.201	0	0.360	0.899	0.307
Intersection 2	0.543	0.165	0.378	1	0.360	0.837	0.618
Intersection 3	0.350	0.112	0.239	0	1.140	0.715	0.250
Intersection 4						1.000	0.000
COMBINED (sum of column)	13.382	4.075	9.307	15	--	--	11.708

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1)	(2)	(3)
Site Type	**N_{ped}**	**N_{bike}**
ROADWAY SEGMENTS		
Segment 1	0.004	0.001
Segment 2	0.006	0.002
Segment 3	0.001	0.001
Segment 4	0.001	0.001
Segment 5	0.001	0.001
Segment 6	0.004	0.001
INTERSECTIONS		
Intersection 1	0.124	0.254
Intersection 2	0.070	0.565
Intersection 3	0.041	0.032
Intersection 4		
COMBINED (sum of column)	0.248	0.854

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)
Crash severity level	**$N_{predicted}$**	**N_{ped}**	**N_{bike}**	$N_{expected (VEHICLE)}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	13.4	0.2	0.9	11.7	12.8
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	4.1	0.2	0.9	3.6	4.7
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	9.3	0.0	0.0	8.1	8.1

Worksheet 1A -- General Information and Input Data for Rural Multilane Roadway Segments

General Information		Location Information	
Analyst	GTB	Roadway	Missouri Hwy 13
Agency or Company	CMT	Roadway Section	RP 59.902 to RP 61.538 NB
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Roadway type (divided / undivided)		Undivided	Divided
Length of segment, L (mi)		--	1.59
AADT (veh/day)	AADT$_{MAX}$ = 89,300 (veh/day)	--	26,377
Lane width (ft)		12	12
Shoulder width (ft) - right shoulder width for divided [if differ for directions of travel, use average width]		8	9
Shoulder type - right shoulder type for divided		Paved	Paved
Median width (ft) - for divided only		30	60
Side Slopes - for undivided only		1:7 or flatter	Not Applicable
Lighting (present/not present)		Not Present	Not Present
Auto speed enforcement (present/not present)		Not Present	Not Present
Calibration Factor, Cr		1.00	0.74

Worksheet 1B (a) -- Crash Modification Factors for Rural Multilane Divided Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for Lane Width	CMF for Right Shoulder Width	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1rd	*CMF 2rd*	*CMF 3rd*	*CMF 4rd*	*CMF 5rd*	*CMF comb*
from Equation 11-16	from Table 11-17	from Table 11-18	from Equation 11-17	from Section 11.7.2	(1)*(2)*(3)*(4)*(5)
1.00	1.00	0.96	1.00	1.00	0.96

Worksheet 1C (a) -- Roadway Segment Crashes for Rural Multilane Divided Roadway Segments

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-5			**N spf rd**	**Overdispersion Parameter, k**	**Combined CMFs** (6) from Worksheet 1B (a)	**Calibration Factor, Cr**	**Predicted average crash frequency, N $_{predicted\ rs(d)}$**
	a	b	c	from Equation 11-9	from Equation 11-10			(3)*(5)*(6)
Total	-9.025	1.049	1.549	8.313	0.134	0.96	0.74	5.906
Fatal and Injury (FI)	-8.837	0.958	1.687	3.973	0.116	0.96	0.74	2.822
Fatal and Injury^a (FI^a)	-8.505	0.874	1.740	2.354	0.110	0.96	0.74	1.673
Property Damage Only (PDO)	--	--	--	--	--	--	--	(7)$_{TOTAL}$ - (7)$_{FI}$ 3.083

NOTE: ^{a} Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 2A -- General Information and Input Data for Rural Multilane Highway Intersections

General Information		Location Information	
Analyst	GTB	Roadway	MO Hwy 13
Agency or Company	CMT	Intersection	MO 13 at Farm Road 94
Date Performed	02/11/22	Jurisdiction	MoDOT
		Analysis Year	2022

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 4ST, 4SG)		--	4ST
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 78,300 (veh/day)	--	32,539
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 7,400 (veh/day)	--	1,225
Intersection skew angle (degrees)		0	16
Number of non-STOP-controlled approaches with left-turn lanes (0, 1, 2)		0	2
Number of non-STOP-controlled approaches with right-turn lanes (0, 1, 2, 3, or 4)		0	0
Intersection lighting (present/not present)		Not Present	Not Present
Calibration Factor, C_i		1.00	0.65

Worksheet 2B -- Crash Modification Factors for Rural Multilane Highway Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Crash Severity Level	CMF for Intersection Skew Angle (CMF_{1i}) from Equations 11-18 or 11-20 and 11-19 or 11-21	CMF for Left-Turn Lanes (CMF_{2i}) from Table 11-22	CMF for Right-Turn Lanes (CMF_{3i}) from Table 11-23	CMF for Lighting (CMF_{4i}) from Equation 11-22	CMF for RIRO (CMF_{5i}) CMF ID 9821
Total	1.09	0.52	1.00	1.00	0.55
Fatal and Injury (FI)	1.09	0.42	1.00	1.00	0.55

Note: The 4-leg Signalized Intersection (4SG) models do not have base conditions and so can only be used for estimation purposes. As a result, there are not CMFs provided for the 4SG condition.

Worksheet 2C -- Intersection Crashes for Rural Multilane Highway Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients** from Table 11-7 or 11-8			**$N_{spf\ int}$**	**Overdispersion Parameter, k**	**Combined CMFs** from (6) of Worksheet 2B	**Calibration Factor, C_i**	**Predicted average crash frequency, $N_{predicted\ int}$**
	a	b	c or d (4SG)	from Equation 11-11 or 11-12	from Table 11-7 or 11-8			(3)*(5)*(6)
Total	-10.008	0.848	0.448	7.304	0.494	0.31	0.65	1.474
Fatal and Injury (FI)	-11.554	0.888	0.525	4.078	0.742	0.25	0.65	0.668
Fatal and Injury[a] (FI^a)	-10.734	0.828	0.412	2.223	0.655	0.25	0.65	0.364
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL} - (7)_{FI}$ 0.806

NOTE: [a] Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Worksheet 2D -- Crashes by Severity Level and Collision Type for Rural Multilane Highway Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Collision Type	**Proportion of Collision $Type_{(TOTAL)}$**	**$N_{predicted\ int\ (TOTAL)}$ (crashes/year)**	**Proportion of Collision $Type_{(FI)}$**	**$N_{predicted\ int\ (FI)}$ (crashes/year)**	**Proportion of Collision Type (FI^a)**	**N *predicted int* (FI^a) (crashes/year)**	**Proportion of Collision Type (PDO)**	**$N_{predicted\ int\ (PDO)}$ (crashes/year)**
	from Table 11-9	$(7)_{TOTAL}$ from Worksheet 2C	from Table 11-9	$(7)_{FI}$ from Worksheet 2C	from Table 11-9	$(7)_{FI}{}^a$ from Worksheet 2C	from Table 11-9	$(7)_{PDO}$ from Worksheet 2C
Total	1.000	1.474	1.000	0.668	1.000	0.364	1.000	0.806
		$(2)*(3)_{TOTAL}$		$(4)x(5)_{FI}$		$(6)*(7)_{FI}{}^a$		$(8)*(9)_{PDO}$
Head-on collision	0.016	0.024	0.018	0.012	0.023	0.008	0.015	0.012
Sideswipe collision	0.107	0.158	0.042	0.028	0.040	0.015	0.156	0.126
Rear-end collision	0.228	0.336	0.213	0.142	0.108	0.039	0.240	0.193
Angle collision	0.395	0.582	0.534	0.357	0.571	0.208	0.292	0.235
Single-vehicle collision	0.202	0.298	0.148	0.099	0.199	0.072	0.243	0.196
Other collision	0.052	0.077	0.045	0.030	0.059	0.021	0.054	0.044

Worksheet 3A -- Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Segment 1 (Divided)	5.906	2.822	3.083	8.5	0.134	0.559	7.050
Segment 2 (Undivided)	0.000	0.000	0.000		21.246	1.000	0.000
Segment 3						1.000	0.000
Segment 4						1.000	0.000
Segment 5						1.000	0.000
Segment 6						1.000	0.000
Segment 7						1.000	0.000
Segment 8						1.000	0.000
INTERSECTIONS							
Intersection 1	1.474	0.668	0.806	4.5	0.494	0.579	2.749
Intersection 2						1.000	0.000
Intersection 3						1.000	0.000
Intersection 4						1.000	0.000
Intersection 5						1.000	0.000
Intersection 6						1.000	0.000
Intersection 7						1.000	0.000
COMBINED (sum of column)	7.380	3.490	3.889	13	--	--	9.799

Worksheet 3B -- Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	$N_{predicted}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(8)_{COMB}$ from Worksheet 3A
	7.4	9.8
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	3.5	4.6
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	3.9	5.2

HSM Crash Predictions

Alternative	No. Fatal/Injury Predicted Crashes	No. PDO Predicted Crashes	Total Annual Crashes	Difference from No Build
2022 Existing Conditions	23.40	55.50	78.90	
2030 No Build	25.60	61.90	87.50	
2030 SB-EB Flyover	22.30	58.00	80.30	
2030 Park Street Interchange	22.50	57.30	79.80	
2050 No Build	31.40	77.80	109.20	
2050 SB-EB Flyover	27.00	72.50	99.50	-8.9%
2050 Park Street Interchange	27.10	71.80	98.90	-9.4%

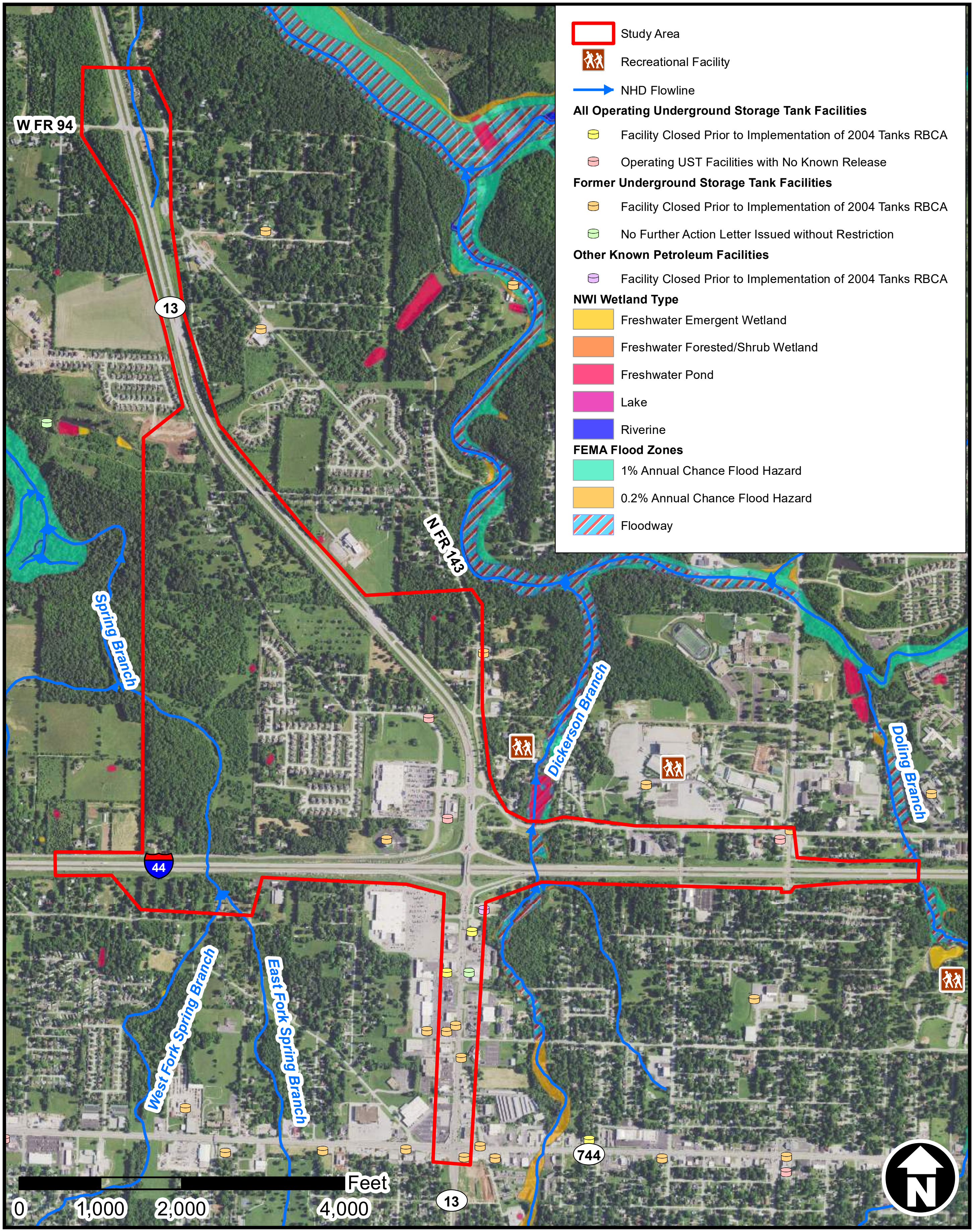
FR 94

Alternative	No. Fatal/Injury Predicted Crashes	No. PDO Predicted Crashes	Total Annual Crashes	Difference from No Build
2021 Existing Conditions	0.80	1.10	1.90	
2030 No Build	1.00	1.20	2.20	
2030 J-Turn	0.60	0.80	1.40	
2030 RIRO	0.60	0.70	1.30	
2050 No Build	1.20	1.50	2.70	
2050 J-Turn	0.80	1.00	1.80	-33.3%
2050 RIRO	0.60	0.80	1.40	-48.1%

Alternative	ISATe		Urban/Suburban		Rural Arterial	
	F/IC	PDO	F/IC	PDO	F/IC	PDO
2022 Existing Conditions	15.40	41.00	5.70	12.20	2.30	2.30
2030 No Build	16.90	45.90	6.30	13.40	2.40	2.60
2030 SB-EB Flyover	16.50	47.80	3.40	7.60	2.40	2.60
2030 Park Street Interchange	17.60	48.10	3.30	7.50	1.60	1.70
2050 No Build	20.80	58.20	7.80	16.50	2.80	3.10
2050 SB-EB Flyover	20.20	60.30	4.00	9.10	2.80	3.10
2050 Park Street Interchange	21.10	60.50	4.10	9.30	1.90	2.00

Alternative	ISATe		Urban/Suburban		Rural Arterial	
	F/IC	PDO	F/IC	PDO	F/IC	PDO
2021 Existing Conditions					0.80	1.10
2030 No Build					1.00	1.20
2030 J-Turn					0.60	0.80
2030 RIRO					0.60	0.70
2050 No Build					1.20	1.50
2050 J-Turn					0.80	1.00
2050 RIRO					0.60	0.80

APPENDIX E – ENVIRONMENTAL MAPPING EXHIBIT & CONCEPTUAL RES



Route 13 & I-44 Project - Greene Co., MO

Environmental Resources Map

CMT
Crawford, Murphy & Tilly

This RES has been completed, only administrators may edit this document now, they will contact you if any information changes.

Date Completed: 06/13/2022
Completed By: Charlotte Drinkard

Request for Environmental Services Form#:2022-05-01026

☐ Alternative Project Delivery Method (such as Design/Build)

Project Information

Stage:	Location/Conceptual	Previous RES(s):	No RES Selected
Job Number (w/o 'J'):	SU0079 District: Southwest	County:	GREENE
TIP Number:		Rte/Street:	MO 13
Letting Date:	05/01/2026	PS&E Due Date:	02/23/2026
Location:	Interchange improvements at I-44 in Springfield.		
TMS Project Description - termini (no stations):	Interchange improvements at I-44 in Springfield.		
Describe RES project improvements in full detail:	Construct new Route 13 & I-44 interchange including reconfiguration of existing ramps, new SB-EB flyover, and replacement of existing structure over I-44. Additionally, remove the existing Norton signalized intersection and replace the west leg of Norton with a right-in right-out intersection 750 feet north of the existing west leg. The east leg of the Norton intersection will remain in the same location but will be a right-in right-out intersection.		

These users will receive a notification when Environmental Services completes the current stage, the person who created this form as well as the person who submits it will also receive notification.

Project Manager:	Kristi Bachman - 417-829-8040	TP Designer:	None selected
District Contact:	None selected	District Contact:	None selected
Contact:	None selected		
Date Desired:	06/18/2022	Submit Date:	05/20/2022
Desired A-Date:	09/01/2023		
Created By:	Alexandra Zelles - (5/19/2022 4:20:42 PM) - 630-907-7072	Submitted By:	Alexandra Zelles - (5/20/2022 12:00:00 AM) - 630-907-7072

Program Year:

Preliminary Engineering:	N/A	Right of Way:	N/A
Construction:	N/A		
Has the district documented that the project has: 1. Independent utility, 2. Logical termini, and 3. Does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements?:	● Yes ○ No		
Changes to project since last RES submittal? If yes, explain:	No ☐ Design/Build ☐ Alternate Technical Concepts		

☐ Project breakout from previous or larger project? *If checked explain:*

Acres - From all sources (e.g. donated from public or private entities):

Additional R/W (acres): 4.2

Temp Easement (acres): 3.5

Permanent Easement (acres): 0.0

ROW may be needed, but, not yet determined? Yes

Acres of Tree Clearing: 4.4 acres

DO NOT CLEAR TREES W/O MODOT'S PRIOR WRITTEN APPROVAL.

Is ANY Federally-owned land impacted by the project? ○ Yes ● No

Land Disturbance / Stormwater:

Will project involve 1 acre of land disturbance:

● Yes
○ No
○ Unknown

Projects with one acre or greater land disturbance activities must comply with the Land Disturbance Permit requirements.

Define project type (see definitions below):

○ New Development
● Redevelopment
○ Maintenance

New Development - Projects (with land disturbance greater than or equal to 1 acre) that are constructed where there was previously no transportation facility.
Redevelopment - Non-maintenance work performed to or on an existing public transportation facility which provides for an increased number of thru lanes of travel unless the work can be accomodated without increasing the width of the existing pavement. Widening of an existing road that does not result in an additional thru lane does not constitute redevelopment. Widening to add shoulders does not constitute a thru lane unless the total widening is greater than or equal to 10 feet.
Maintenance - Projects that do not meet the criteria of redevelopment or new development.

Was coordination with adjacent MS4 communities conducted? ○ Yes ● No

If yes, please provide a short description of the coordination:

Number of Displacements(do not include partial takes that do not displace):

Residential: ○ Yes ● No

Commercial: ○ Yes ● No

No. of People:

Residences:

No. of Employees:

Businesses:

Any Public Involvement planned or completed:

Two (2) public meetings have been held with the public to gain feedback on the proposed project location and the proposed improvements. Once the project receives funding for design, an additional public hearing or meeting will be held with the public.

Average Daily Traffic:

ADT Construction Year: 36,000

ADT Design Year: 46,700

Traffic Impacts:

Road Closure Planned: ○ Yes ● No

Bridge Closure Planned: ○ Yes ● No

Days/Months Closed:

Detour > 25 mi rural (including local roads) ○ Yes ● No

Detour > 5 mi urban (including local roads, census defined urban) ○ Yes ● No

Detour Info (including use of local roads):

Bicycle / Pedestrian Consideration

Pedestrian facilities considered: Yes

Bicycle facilities considered: No

National Flood Insurance Program (NFIP) and Hydraulic Design Data:

☑ Project is in a FEMA-identified zone "subject to 100-year flooding":

If so, what zone?:

Zone AE (1% and 0.2% annual chance flood hazard)

Project is in a FEMA-defined "floodway" Yes ▾

If Yes, will work be done at or below the base flood elevation At Base Elevation ▾

☐ Project involves land purchased through FEMA Hazard Mitigation Grant Program (Flood buyout property)

If checked, give details:

☑ Is highway improvement located within 4 miles of an existing airport?

Please note that **the District** is responsible for obtaining the necessary permits for the project. See the following Airport Link

---

Known Concerns: Provide information you have about these resources that you have observed in the area.

Parkland: Three recreational facilities are located near the project study area. Dickerson Park Zoo is located in the northeast quadrant of the I-44 and Route 13 interchange. The Ozark Empire Fairgrounds are located along the north side of I-44, east of Route 13. Doling Park is located south of I-44 east of the project study area.

Wetland/404 Permit: The National Wetland Inventory and National Hydrography Dataset indicate Dickerson Branch and one freshwater pond within the project study area.

Land Disturbance / Stormwater:

Farmland: Portions of the project study area are located outside the U.S. Census urban area of Springfield, MO.

Threatened & Endangered Species: Unknown. Tree removal is anticipated; future RES submittals will provide updates.

Migratory Birds: Are there birds nesting on the structure? Unknown,

Hazardous Waste: According to MoDNR ESTART database, multiple existing and former underground storage tank sites are located within the project study area, which the majority of them concentrated along Route 13, south of I-44.

Cultural Resources: No National Register of Historic Places sites are located within or adjacent to the project study area.

District Comments:

Project Attachments:

****NOTE: If making updates to an attachment, please use a different filename than the original.***
****The combined size of attachments in one upload must be less than 100MB***

Attachments:

✖FIRMETTE maps.pdf

✖Environmental Limits_Conceptual.kmz

✖Aerial.pdf

✖County Location Map.pdf

Required Information to be attached for each RES stage:

- ***Loc/Concp.:*** *Location map (county map) & topographic map or aerial photo showing project limits – pre-plan sheets or other preliminary maps showing alternatives, if available*
- ***Prel. Plan:*** *Prel. Plan sheets*
- ***R/W:*** *R/W Plan sheets*
- ***Final Design:*** *Final Plans [Location map (county map) & topographic map or aerial photo showing project limits if this is first RES submittal*

RES Environmental Screenings

›Farmland Impact

Status Information: Status Changed By: Brandon Baumhoer ○ N/A ● Pending ○ Cleared Clearance Date:

Environmental Response: The northern end of the project area is located outside of city limits. If no new right of way is needed outside of city limits, FPPA will not apply. If ROW is needed outside of city limits, a farmland impact rating form (AD-1006) will need to be completed at the ROW stage.

Environmental Action: Complete AD-1006 form at ROW stage if necessary.

District Action: Notify environmental if any new ROW will be needed outside of city limits.

Attachments:

☑ Farmland Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Brandon Baumhoer - 5/23/2022 10:08:35 AM

›Floodplain/Regulatory Floodway

Status Information: Status Changed By: Brandon Baumhoer ○ N/A ● Pending ○ Cleared Clearance Date:

Environmental Response: According to the firmette provided by the district, the project area contains 1% floodplain and regulatory floodway. The district also stated the work will be completed at base flood elevation. A floodplain permit and no rise certification from SEMA will be required for this work.

Environmental Action: None

District Action: None

Attachments:

☑ Floodplain/Regulatory Floodway Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Brandon Baumhoer - 5/23/2022 10:03:53 AM

Land Disturbance / Stormwater

Status Information: Status Changed By: Caleb Knerr ○ N/A ● Pending ○ Cleared Clearance Date:

Environmental Response: According to a 6/10/2022 review of ArcGIS, the project is inside the TS4 area (drains to Springfield MS4) and is considered redevelopment. The District must consider, where feasible and appropriate, the design and implementation of permanent stormwater BMPs to detain and/or treat new stormwater from the project, under MoDOT's definition of redevelopment, to the maximum extent practicable.

Environmental Action: Obtain details regarding permanent BMPs including plan sheets, location, type of BMP, how the BMP will function with regards to quantity or quality treatments. Once details are obtained, the BMPs are entered into TMS.

District Action: Provide details regarding permanent BMPs including plan sheets, location, type of BMP, how the BMP will function with regards to quantity or quality treatments. Once details are obtained, the BMPs are entered into TMS.

TS4 Area: ● Yes ○ No ○ Partial Is the project in a TMDL watershed? ○ Yes ● No

Attachments:

☑ Land Disturbance / Stormwater Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Caleb Knerr - 6/10/2022 11:03:15 AM

FEMA/SEMA Buyout

Status Information: Status Changed By: Brandon Baumhoer ● N/A ○ Pending ○ Cleared Clearance Date:

Environmental Response: TMS Buyout layer indicates no FEMA/SEMA Buyout properties in the project limits.

Environmental Action: None

District Action: None

Attachments:

☑ FEMA/SEMA Buyout Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Brandon Baumhoer - 5/23/2022 10:10:17 AM

Socioeconomic Impact

Status Information: Status Changed By: Caitie Wiechman ○ N/A ● Pending ○ Cleared Comment Date:

Environmental Response: The project does not require commercial or residential displacements, but does require new right of way and temporary easements that are subject to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Road closures and detours will not be necessary during project construction. Two (2) public meetings have been held with the public to gain feedback on the proposed project location and the proposed improvements. Once the project receives funding for design, an additional public hearing or meeting will be held with the public. Additional information on the results of the first two meetings, as well as the final meeting, will be needed to continue to assess socioeconomic impacts.

Environmental Action: Continue to assess impacts when more information is known about the previous public meetings and the future meeting.

District Action: Please provide more information on the following for both (and the next) of the public meetings: - Dates - How the public was notified of the meetings (flyers, news, online, etc.) - Number of attendees - Comments received - Any major concerns expressed by the public and if those concerns were addressed by the district.

Attachments:

☑ Socioeconomic Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Caitlin Wiechman - 5/23/2022 10:48:33 AM

Threatened & Endangered Species

Status Information: Status Changed By: Caleb Knerr ○ No Effect ● Pending ○ Cleared Clearance Date:

Environmental Response: Consultation Code: 2022-0052815, June 10, 2022 Endangered Species Act Species List: Gray, Indiana, and Northern Long-eared bats; Niangua Darter and Ozark Cavefish; Monarch Butterfly Findings below are based on a review of the Mo Natural Heritage Database (NHD) (March 2022), and MO Speleological Survey (MSS) Database (February 2022) using ArcMap, and Google Earth. Gray bats are cave obligate species which congregate in maternity or bachelor colonies in the summer utilizing dome cave and mine habitat, and during winter hibernation in vertical or pit-type caves and mines, utilizing mainly stream corridors for foraging spring through fall. Review of the MDC Heritage Database (updated March 2022) and MSS Cave Database (updated February 2022) shows there are records for gray bats within 3 miles of the project location at Ritter Spring Cave. This project will require 4.4 acres of tree clearing. There will be bridge and culvert work required for the project. There will be no impacts to caves. A habitat assessment and bridge/culvert check required before making determination on this project for gray bats. Indiana and northern long-eared bats hibernate in caves during winter, and spend summers in forested habitat where they may use trees with suitable characteristics (cracks, crevices, peeling bark) for roosting. Review of the MDC Heritage Database (updated March 2022) and MSS Cave Database (updated February 2022) shows there are records for gray bats within 6 miles of the project location at Sequoita Cave. This project will require 4.4 acres of tree clearing. There will be bridge and culvert work required for the project. There will be no impacts to caves. A habitat assessment and bridge/culvert check required before making determination on this project for Indiana and northern long-eared bats. If there is suitable habitat in the clearing area, this project would require mitigation under the FHWA programmatic formal (LAA) consultation for IN/NLEB. Niangua darter can be found in clear, silt-free Ozark creeks and small rivers with a gravel or rock substrate. The project does not cross any streams with known records of this species. There will be no impacts to suitable habitat. This project will have no effect on Niangua dater. Ozark cavefish are found in cave streams and springs, and are affected by inputs to groundwater. This project does not cross any mapped Ozark cavefish recharge areas and there will be no impacts to suitable habitat. The closest record of this species is over 3.5 miles away. This project will have no effect on Ozark cavefish. Monarch butterflies are candidate species for USFWS federal listing. Healthy and abundant milkweed is needed for oviposition and larval consumption. Sufficient quality and quantity of nectar from flowers is needed for adult feeding throughout the breeding and migration seasons. Habitat that provides a specific roosting microclimate for overwintering: protection from the elements (e.g., rain, wind, hail, excessive radiation) and moderate temperatures that are warm enough to prevent freezing yet cool enough to prevent lipid depletion. Nectar and clean water sources located near roosting sites. Nectar and milkweed resources along the migration route when butterflies are present; the size and spatial arrangement of habitat patches are generally thought to be important aspects, but currently unknown. Roosting sites may also be important for monarchs along their fall migration route. Per guidance received from USFWS on 1/5/2021, conferencing for monarchs is not required unless MoDOT is receiving funding from the USFWS. Since that is not the case with this project, MoDOT has not made an effects determination for this species.

Environmental Action: Habitat assessment and bridge check.

District Action: Please provide the acreage of tree clearing between 0-100' from roadway surfaces, 100-300' from roadway surfaces, and any clearing over 300' from roadway surfaces.

Attachments: ✖ Official_Species_List_SU0079.pdf

☑ Threatened & Endangered Species Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Caleb Knerr - 6/10/2022 11:48:39 AM

Migratory Birds

Status Information: Status Changed By: Caleb Knerr ○ N/A ● Pending ○ Cleared Clearance Date:

Environmental Response: According to a 6/10/2022 review of TMS bridge data layer on ArcGIS, there are structures in the project area that could have nesting migratory birds. A field check is required before determining whether or not there will be impacts to nesting migratory birds from this project.

Environmental Action: Field check

District Action: Nothing for now

Attachments:

☑ Migratory Birds Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Caleb Knerr - 6/10/2022 11:53:30 AM

Hazardous Waste Impact

Status Information: Status Changed By: Ethan Musick ○ N/A ○ Pending ● Cleared Clearance Date: 05/27/2022

Environmental Response: The site location was reviewed utilizing the MDNR Interactive E-Start Map. The map contains information about the following types of sites: Superfund sites, Federal Facilities sites, Resource Conservation and Recovery Act Corrective Action sites, Brownfields/Voluntary Cleanup Program sites, Brownfield Assessments, and Petroleum and Hazardous Substance Storage Tank Facilities. Multiple UST sites were identified with in the project area. no evidence of a release was found at any of the sites. The potential to encounter wastes from sites unknown to MoDOT should always be a consideration. Any previously unknown sites that are found during project construction will be handled in accordance with Federal and State Laws and Regulations.

Environmental Action: None

District Action: If regulated solid or hazardous wastes are found during construction activities, the MoDOT construction inspector will direct the contractor to cease work at the suspect site. The construction inspector will contact the appropriate environmental specialist to discuss options for remediation. The environmental specialist, the construction office and the contractor will develop a plan for sampling, remediation and continuation of project construction. Independent consulting, analytical and remediation services will be contracted if necessary. The Missouri Department of Natural Resources and U.S. Environmental Protection Agency will be contacted for coordination and approval of required activities.

Attachments:

☑ Hazardous Waste Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Ethan Musick - 5/27/2022 12:02:49 PM

Wetland Impact (Section 404/401)

Status Information: Status Changed By: Caleb Knerr ○ N/A ● Pending ○ Cleared Clearance Date:

Environmental Response: On 6/13/2022 MoDOT Environmental staff reviewed ArcGIS USFWS NWI maps, Google Earth aerial imagery and Streetview, and USGS 24K topographic maps. According to a review of these resources, there are jurisdictional streams in the project area. There is one mapped open water wetlands in the project area in the northeast quadrant. According to project description, there may be fill in streams from this project (culvert extensions). Based on the scope of the work and the description of the work provided, this project streams. A Section 404 permit required (likely NWP 14 No PCN). A field check is needed to determine if wetlands exist in the project area.

Environmental Action: field check

District Action: Please provide the type, size (CY and acreage), and location of fill in the stream. District shall ensure that contractor abides by all conditions in the NWP including the General Conditions and Section 401 Conditions in MoDOT's MOU with DNR, found in the General Provisions. District shall ensure that contractor abides by the attached JSP. Please send confirmation email.

Wetland Permit Information:

404 Permit Number Likely NWP 14 No PCN	Permit Submitted	Permit Received
Permit Expiration	Compliance Certification Sent	Compliance Certification Received

Attachments: ✖Clean Water Act Sec 404 Requirements JSP.doc

☑ Wetland Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Caleb Knerr - 6/13/2022 5:57:45 AM

Noise Impact

Status Information: Status Changed By: Matt Burcham ○ N/A ● Pending ○ Cleared Clearance Date:

Environmental Response: With the addition of a flyover ramp and reconfiguration of additional ramps and Norton intersection, this project's improvements do meet the criteria of a Type I project, therefore a noise analysis is required.

Environmental Action: Assist with hiring an on-call consultant to do noise study.

District Action: Assist with hiring.

Attachments:

☑ Noise Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Matthew Burcham - 5/24/2022 12:24:36 PM

Cultural Resources Impact (Section 106/Historic 4f)

Status Information: ● Pending ○ Cleared ○ ROW Cleared

Status Changed By: Travis Tesreau

Clearance Date:

A Date Cleared:

Environmental Action: Based on the information provided, this project will require an architectural and archaeological survey and subsequent SHPO submittal. Please let the Historic Preservation Section know as soon as landowner permission has been attained.

District Action:

Attachments:

☐ Adverse Effect or Conditional No Adverse Effect

☐ Based on the review of the project location and description noted above, there are no identified historic 4(f) resources affected that would preclude the setting of an A-date.

Checked by: on de minimis ▾ Approved on:

☑ Cultural Resources Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Travis Tesreau - 5/23/2022 7:06:37 AM

Public Land Impact (Section 4f/6f)

Status Information: Status Changed By: Caitie Wiechman ○ N/A ● Pending ○ Cleared Clearance Date:

Environmental Response: According to Google Earth imagery, the only park located adjacent to the project area is the Dickerson Park Zoo, which is located at the intersection of W Norton Road and N Farm Road 143 and is both a Section 4(f) and Section 6(f) resource. This resources is managed by the Springfield-Greene County Park board and is accredited by the Associated of Zoos and Aquariums. Visitation for this resource is granted through either a zoo membership, or for a small entry fee and the hours are from 9 AM to 5 PM. Additional information on if new right of way or easements will be require from park property will be needed to continue to assess public land impacts.

Environmental Action: Please provide information on if new right of way or easements will be required from park property.

District Action: Please provide additional details on if any new right of way/easements will be needed from the Dickerson Park Zoo property. If so, additional time will be required to complete Section 4(f) documentation and to coordinate with Missouri State Parks (for Section 6(f) requirements).

Attachments:

☑ Based on the review of the project location and description noted above, there are no identified 4(f) or 6(f) resources affected that would preclude the setting of an A-date.

Checked by: Caitie Wiechman on 05/23/2022

☑ Public Land Impact Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Caitlin Wiechman - 5/23/2022 10:43:13 AM

Other

Status Information: ○ N/A ○ Pending ● Cleared

Clearance Date: 05/23/2022

Environmental Response: The project is within 4 miles of Springfield-Branson National Airport an existing public use facility.

District Action: Access FAA's Notice Criteria Tool at: https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp?action=showNoNoticeRequiredToolForm. After entering improvement information into the FAA tool, filing information will be determined with one of two outcomes: (1) the improvement will need to be filed with the FAA, or (2) the improvement does not meet the FAA's filing requirement and no further action is required. Ensure documentation is uploaded to e-Projects.

Attachments:

☑ Other Screening Submitted - *Mark submitted when this review is ready to be sent to district staff.*

Last Updated: Charlotte Drinkard - 5/23/2022 2:43:23 PM

NEPA Classification

NEPA Right-Of-Way Permission: Pending

as determined or approved by:

NEPA Approval/Proceed to A-date Request:

Re-evaluation Date:

Final Design Complete:

NEPA Classification:

This project qualifies for the programmatic categorical exclusion under Item#:

All Environmental Issues Cleared:

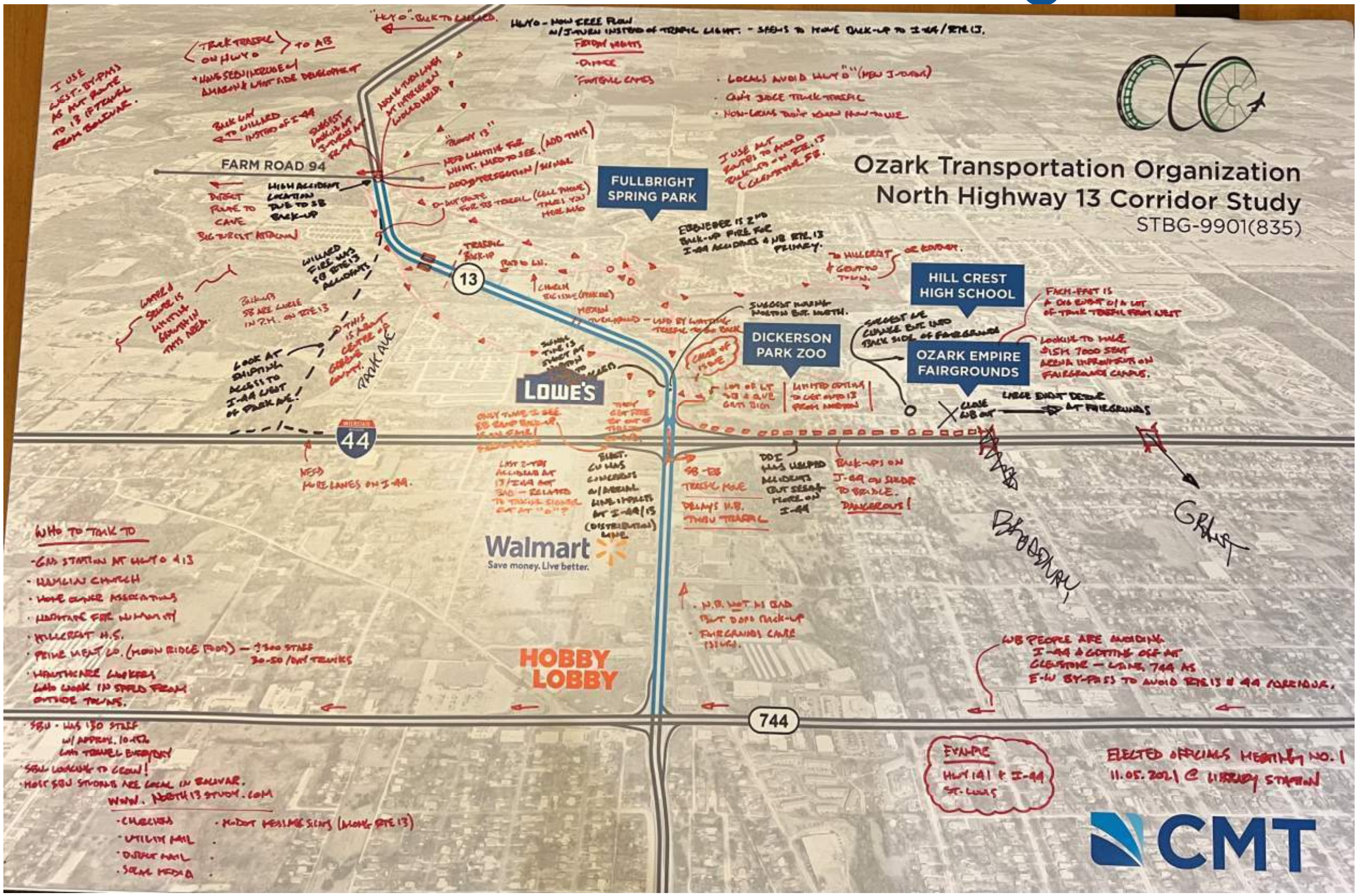
Commitments and/or Comments to District: A Programmatic Categorical Exclusion (PCE) NEPA classification is anticipated for this proposed project. The NEPA approval date will be given once Cultural Resources, Threatened & Endangered Species, and Public Lands sections are cleared.

Attachments:

Last Submitted: 06/13/2022 by Charlotte Drinkard

APPENDIX F – PUBLIC INVOLVEMENT FEEDBACK

Elected Official & Public Meeting No. 1



GIVE US YOUR INPUT

Name: Aaron Owen Please Keep Me Informed: ☐ Yes

Contact: 417-830-6252

Community/Organization: Ozark Empire Fairgrounds

COMMENT

We would like to see a bypass go west before the traffic makes it to the intersection of Hwy 13 and Norton

---

GIVE US YOUR INPUT

Name: Becky Volz Please Keep Me Informed: ☒ Yes

Contact: woodlandhna@gmail.com

Community/Organization: WOODLAND HEIGHTS N'HOOD ASSOC.

COMMENT

I'm glad to see this study happening.
1) consider a by-pass from 94 → I44
2) install lighting @ 94
3) widen and/or lengthen turn lanes @ 94 northbound

GIVE US YOUR INPUT

Name: RiTA Silic Please Keep Me Informed: ☐ Yes

Contact: rjsilic@aTT.neT 417.619.4322

Community/Organization: NorTh Springfield BeTTerment Association (NSBA)

COMMENT

Find Kansas Expwy ~~so~~ busy, busy, & avoid iT frequently - opting for Talmage or NorTon Rd. for shopping or leaving Town. /
Traffic backup aT NorTon makes iT difficult to cross KS Expy difficult and access 13 NorTh because traffic going wesT backup blocking ThaT shorT access.
Have more buT will commenT laTer

GIVE US YOUR INPUT

Name: Gail Noggle. Please Keep Me Informed: ☐ Yes

Contact:

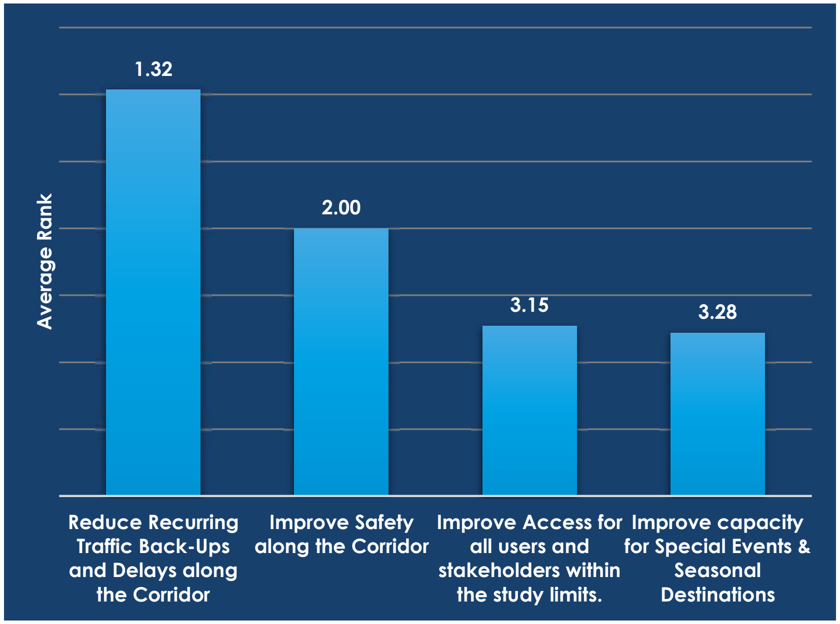
Community/Organization:

COMMENT

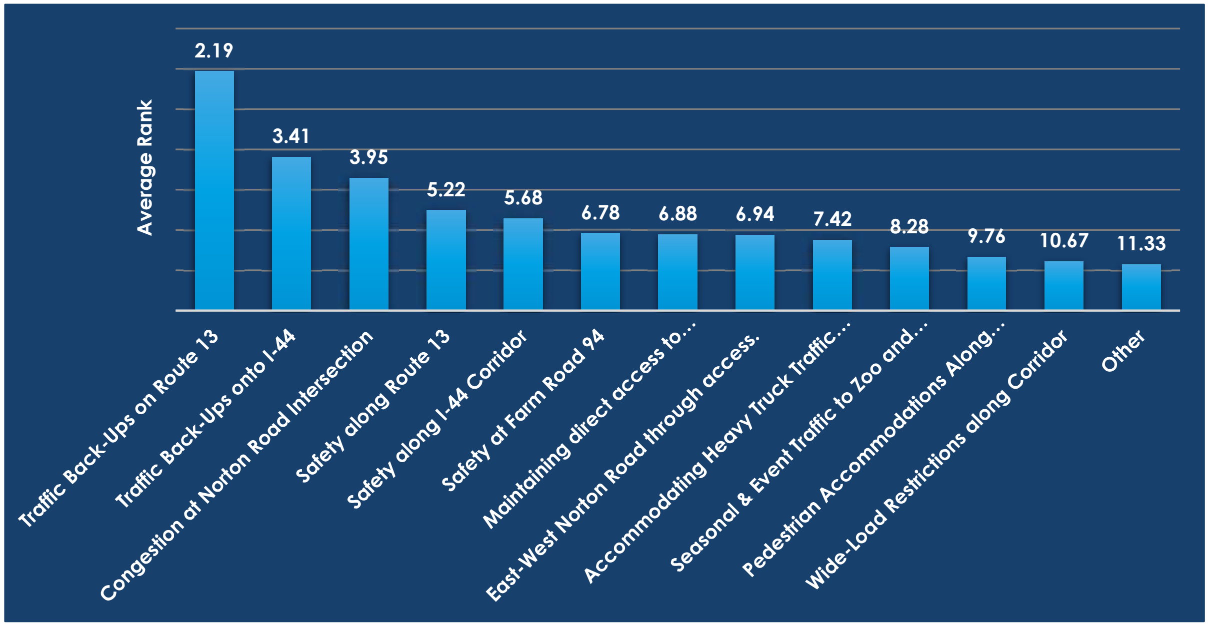
Tracker - 41 trucks - new (in/out)
Tracker @ Smith 15×2 new trucks - pontoon
Breaktime - new travel center
Impressive Acres - residential
misc residential
Ind/Bus Park - state certified

Project Goals have been identified based on the feedback we received during our initial public meetings in November 2022. Please rank the importance of each of these goals from most important to least important.

- The highest ranked goal was to reduce traffic back-ups and delays
- Improve capacity for special events and seasonal destinations rated lowest in importance.



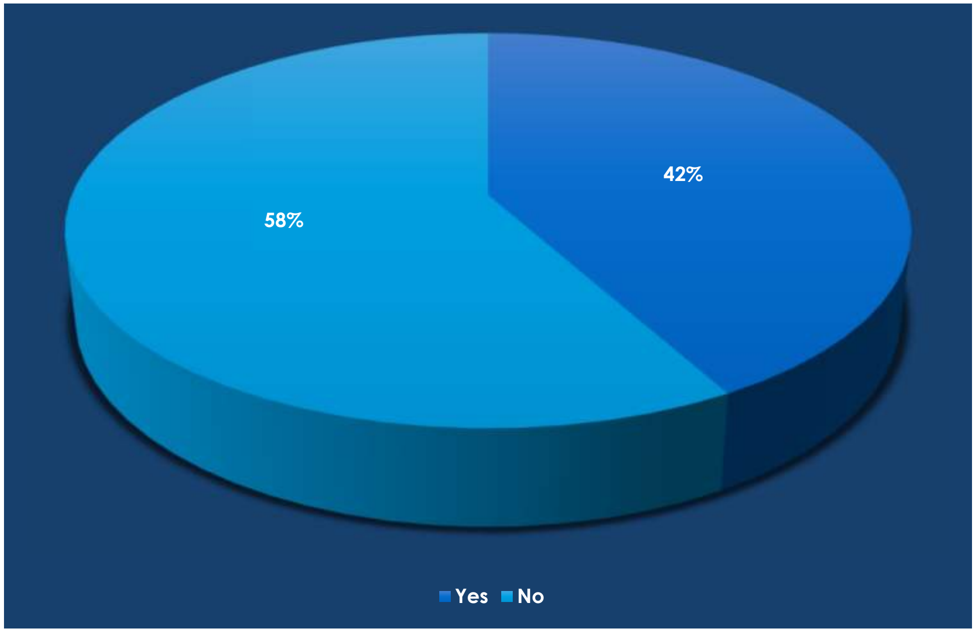
Twelve traffic-related challenges were highlighted by the public during our initial public meetings in November 2022. Please prioritize these twelve challenges from most important to solve to least important.



- The highest ranked challenge by far was traffic back-ups on Route 13
- Other challenges mentioned were noise reduction and accounting for commercial growth in the area

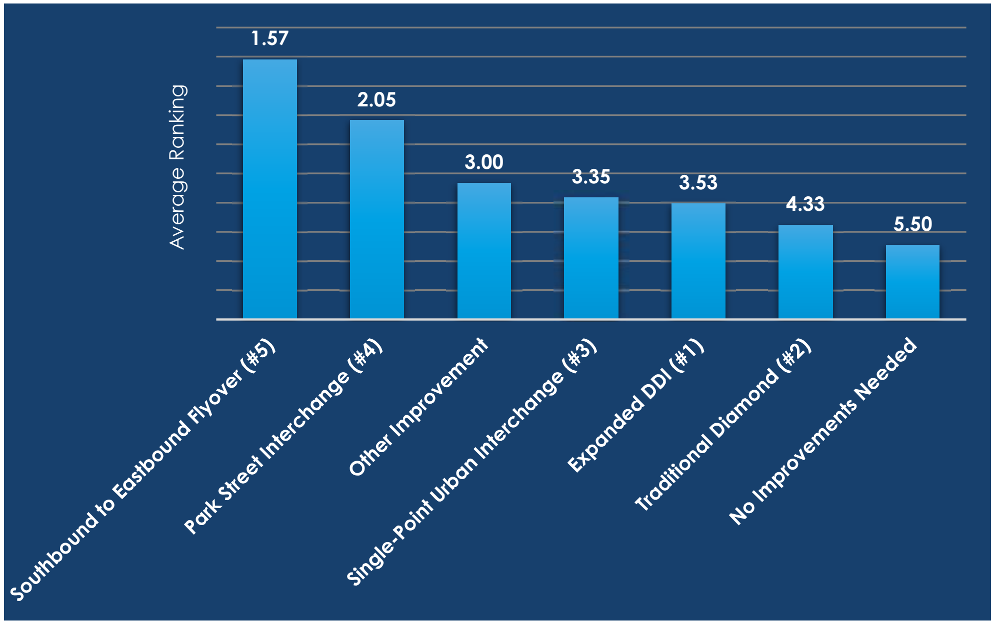
Many people indicated that they have avoided travel within the study limit due to traffic delays and safety concerns. Do you currently avoid travel within the corridor and use a different route.

- 42% (13 of 31) of responders avoid travel within the study limit.
- 100% (12 of 12) of responders would return if improvements were made.

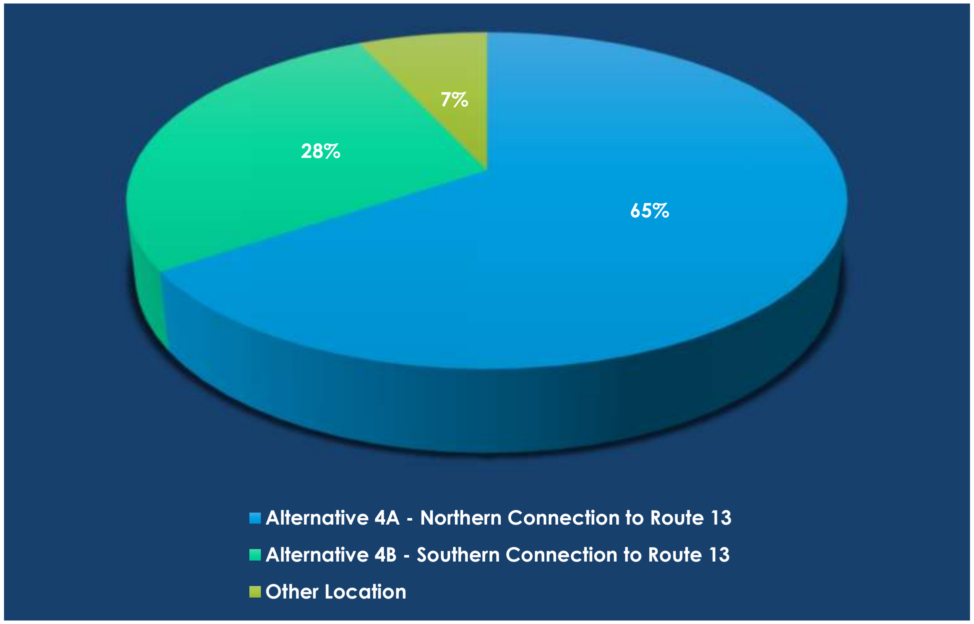


Please rank how well you think the alternatives will address the issues at the I-44 and MO 13 interchange, from best addresses the issues to doesn’t address the issues.

- Alternative #5 (SB-EB Flyover) was the highest ranked followed by #4 (Park Street Interchange).

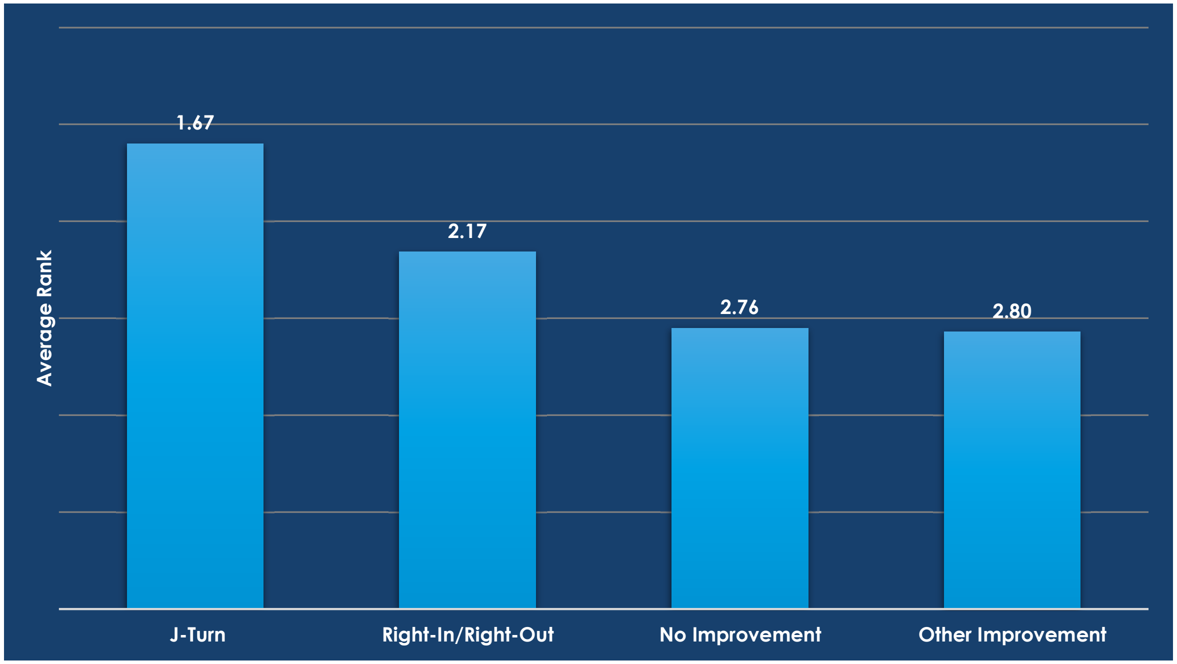


Alternative #4 (Park Street) presents multiple alignment configurations in the north. Please select your preferred alignment alternative for connecting the new road to Hwy 13.



- 19 people out of 39 preferred alternative 4A.

For the proposed Farm Road 94 improvements, please rank which design alternatives would best address the existing safety and accessibility concerns, from best addresses to does not address.



- J-Turn improvement was ranked highest among the options.

Summary of Public Comments

North HWY 13 Study – Public Meeting Number 2

HWY 13/Norton/Kansas is to congested. Need a loop running from HWY 160 to Greene County line to HWY 65 to easy the traffic flow from the current dangerous/backed up intersection.

Start a Southbound flyover before the Hwy 13 curve just North of the Norton/Hwy 13 intersection. Wipe out the North Kum & Go, there's two there. Position flyover support structure East of current D interchange. Flyover enters Eastbound I44 one half mile east. Add another Westbound one-half mile exit lane on I44 to create two Northbound Hwy 13 lane merges. Add one additional one-fourth mile Westbound exit lane to the other proposed new exit lane dedicated to a one lane right 'C' turn to Norton Road, 400 feet East of current Norton connection. Dedicate current Norton Connection to widening Hwy 13 to three lanes Northbound merging to two lanes one-half mile North on Hwy 13. Design Norton Westbound/Hwy 13 intersection to five lanes, two Eastbound on Norton, one Westbound crossing Hwy 13, two Northbound on Hwy 13, all controlled by intersection lights and yield signs.

I live north of Springfield in the Ebenezer area. Highway 13 is the main route that I take when going into Springfield for appointments and household purchases, I find the extreme back up especially on Fridays and Saturdays to be a major problem. But as for safety concerns I find the new J turns to be hard to navigate especially for Willard students who live East of 13 Highway. The J turn to get across 13, and on to O highway is so much more difficult than the stop light originally there I do realize that this transition across a major fast-moving highway is always a safety problem.

My family lives on WW and we have to use one of the J turns to access 13 south. It's often hard to merge into oncoming traffic, then cross another lane of traffic to make it to the turn lane in time. Has been especially hard for our sixteen-year-old daughter just learning to drive. Have had several near accidents with all three drivers in our family due to the J turn.

44 needs to be 3 lanes from 160 to 65 to allow for better traffic flow.

I travel highway 13 on a regular basis from Bolivar to Springfield the main problem I see is the congestion from the "Branson " traffic during the tourist season, many times we will avoid this by taking Hwy 32 to Hwy 65 and south into the Springfield area, I have seen traffic backed up for miles on Hwy 13, also the so-called "J" turns along Hwy 13 are a tragedy waiting to happen, every time I go to Springfield I see or encounter people trying to cross 3 lanes of traffic to complete their J turn, today was no exception, I saw 3 incidents, one was a truck pulling a 24' trailer, he barely made it across.

Make more Lanes and a flyover.

I use the corridor to turn onto 44 to connect to 65, head to highway EE to then connect to 13 going south to continue on my way to Kimberling city. I travel this at least three-four times a month. Taking Hwy 13 through town to continue down to Kimberling City often leads to multiple delays.

Summary of Public Comments

North HWY 13 Study

Add a lane on I 44 from Kansas to Glenstone.

This intersection has served us well until the last couple of years. I live off of Highway O near Cardin Cardin Circus. Sometimes it is better to go the back way on Fm Rd 129 to Kearney to miss the tie-up that occurs in the afternoons on weekends .Also, the traffic lights need to be re-timed so cars don't get tied up between Norton Road and the Interstate Highway. By-the-way, I don't like the new intersections on 13. Please give us our traffic light back on 13 and O.

Hwy 13 and I-44 NEED flyovers like 65 & I-44. That would solve all the congestion issues. Get rid of some of those lights. Make a longer right lane turn in to Lowes. Give a left lane to Norton road with no stoplight. Flyovers onto I-44.....please.

This design does not work for I-44 & 13 highway. To much traffic back ups. Accidents on I-44 & 13 highway south bound. I pick up my grandson & take him work 2-3 times a week. We must use 13 highway because he works on 13 just south of I-44.

It would help if there could be a road/drive to connect the stores so that you did not have to get out on Kansas Ex. The drive on the west of Kansas connects Walmart with the library and is a wonderful way to access that area. If I am on Kearney and want to go to Lowes I go farther west and take Fulbright St. north and come in from the west.

One of the biggest problems I see on a regular basis is confusion with the intersections. There are signs telling traffic that the intersection with I-44 is coming up and to get in the left lane for I-44 east as you approach town from the north, so many drivers pull into the left turn lane to Norton. Also, many pedestrians are crossing Kansas Expressway between the Walmart light and Kearney light and waiting in the turn lane to finish crossing the road, some with small children. Could a pedestrian bridge at Talmage help?

If the city would let Hwy13/Kansas Expwy. southbound flow up to Kearney. There wouldn't be any issues for traffic jams. Make a 1/2mile outer road before Norton Rd to get to Walmart and other businesses. Old 13 can be used as an outer road as well. Make 13 highway flow all the way till division st! There's enough land, and space to make it work. I've seen other cities with highways flowing smoothly with outer roads to get into businesses.

I believe that massive flyovers from 44 to 13 would greatly help as well as a new exit off 44 only for the zoo and fairgrounds.

I was born and raised five miles north and I live about four miles north now near Fantastic Caverns. 58 years of dealing with Highway 13. This problem is inarguably the worst in Springfield. I've thought a lot about it over a very long time and I have a solution which would help significantly. Norton Road needs to be extended to the north on old Highway 13 at least a half mile. You would probably have to take out some houses on both sides of 13. Curve Norton back to the north and build an outer road on the west side for Lowes and the Kum And Go stores, which would just merge into Norton on that side. Lowes would probably fight you, but that intersection is the root of the problem. You need to put space between stop lights. There really isn't another solution. You can't widen the road, it isn't feasible. The intersection at Norton and 13 is the bulk of the problem. I can't stress this enough. Take that stop light a half mile north and a tremendous burden will be lifted.

Open up West Evergreen St. That parallels I44 and west Norton to take pressure off of Norton Rd.

Summary of Public Comments

North HWY 13 Study

Build a bypass between highway 13 and the junction of I44 and highway 65. No doubt a very expensive project but provides a long-term solution. A measure of the highway 13 south bound traffic arriving at that junction might prove the value of such a bypass.

I think the biggest help for traffic between I-44 and Kearney would be to provide an alternate route for local traffic driving to businesses along N. Kansas Expressway. I also think local traffic attempting to turn left from northbound Kansas/Hwy 13 into businesses causes a problem. If there was an alternate route for local traffic and left turns were eliminated along Kansas Expressway between Kearney and I-44 this would greatly help keep traffic moving, especially northbound traffic.

Adding a third lane each direction of the interchange should drastically reduce traffic. Mimic the south national or south Kansas diamond.

It seems as if the lights aren't synced. I'll go through one light only to be stopped by the next one because it's red. That's when the traffic starts to back up and you just do this sort of bunny hop all the way from Kearney until you get past Norton road. If you could just hit every light green, it would speed things up. Then turn them red, allow cross traffic turning, etc.

As a civil designer and architect, I have several observations. First there needs to 'Fly Overs' between the main highways. One flyover from I-44 to northbound 13, and one fly over from hwy 13 to Hwy 1-44 southbound that branches to east and west bound I-44, The trick is to make the existing ramps not conflict. with the fly overs. Once this is done the cross over should be able to handle the local traffic. The Fly Overs should be placed far away from the exit ramps so they will not conflict. I know it will be hard to do but only one lane each way can be elevated and made to work.

There needs to be an artery that connects James River Expressway to Hwy 13. The artery needs to fork off at Sunshine/Hwy 60 and connect several miles north of 44. There is absolutely no easy way to get from the south side of town to the north side from Nixa and other areas in that geographic area. Also, there needs to be an artery from which 13 to 65. Both of these arteries would reduce the congestion at Kansas and 44. Reduce traffic in Kansas as a majority of this traffic is just traveling through Springfield to southern destinations.

I travel through this area 4 times a day on a trip from Bolivar to the south side of Springfield. The main issue is the excess traffic lights at Norton Road and at the Walmart exit. No other divergent diamond interchange has so many traffic lights so close. The entrance to Norton Road needs moved further north by a few miles (the main backup on SB 13 is to Norton Road). The Walmart stoplight needs removed fully (the main backup on NB 13 is between Kearney and I-44). Widening the road is the Walmart area would allow traffic to easily enter the southbound lanes with no right turn allowed. Without removing or changing something about the intersections mentioned, any solution will fall to make enough of an impact. The issue is not the diamond, it's the intersections surrounding it.

Summary of Public Comments

North HWY 13 Study

I suggest a hwy 13 loop. a new road from radio lane that heads southwest behind most of the houses near Lowes and empty's onto i-44. basically, take the James river and 44 interchange and flip it over. Would have to be labeled hwy 13 north, no local access. this way, most of the sb 13 traffic would take the loop to get to i-44 either east or west. This would be about a mile, as a guess, west of the present 13/44 interchange. If you are sb on 13 and want to continue in a southerly direction, you stay on existing 13. If heading to 44, you take the loop. Similarly, if wb on 44, you take the loop to avoid local traffic and continue till you meet up with existing 13 around radio road. Flyover for nb 13 loop near radio road/lane and only nb access to 13. So, in a nutshell, near radio lane would be an exit to i-44 for sb traffic and nb traffic from the loop would join existing 13 in a flyover near radio lane."

This is one of the worst intersections in and around Springfield. I have been backed up northbound and southbound emergency vehicles sometimes have to get in the northbound lane meeting oncoming traffic to get through that intersection. Something needs to be done before somebody really gets hurt. I have seen interstate 44 back up to Glenstone and past. Trying to get off on 13 northbound have seen several accidents on interstate 44 there on that account It has nothing on a weekend to see traffic backed up to the sock River bridge on 13

We have a farm along hwy. 13 and have to pick up trash on a daily basis to keep our cattle from eating and getting sick and in some cases dying from ingesting plastic .The City of Springfield mandates a percentage of there trash be sent to the landfill but say they're not responsible for trash along the hwy? Trash not only comes from the people hauling to the landfill but trucks returning from the landfill with plastic and paper left in the trailers when these trucks get up to speed these materials blow out. All travelers coming to our area from the north see this and it is a real eye sore.

This 13 / 44 corridor is an eyesore and inconvenience. It creates a bad impression of Springfield for visitors and may deter others from coming to Springfield at all.

How about an overhead bridge for people going straight on 13? People turning could still do that, getting onto the highway, getting onto Norton Road, etc, but people going straight up 13 toward Bolivar or straight toward Kearney could just go on this bridge....or maybe a rotary before 44 heading South with exits for 44, Norton Road and 13 North and South. I don't know if those are outlandish or not, but they might be an option.

Seems to me that we need more interchanges along that northern corridor. Probably need to open up Grant and National.

What is the long-term goal of highway 13? As the primary route to go from SGF to KC, what additional steps will be taken as populations grow and even more traffic arises many decades from now? It is a weird situation where an interstate intersects with a road with many stoplights that has the traffic of a highway.

Why can't the zoo/lowes stop light be moved further north?

Summary of Public Comments

North HWY 13 Study

I am anxious to see what solutions are reached. However, with continued growth both in the city of Springfield and north and south of the city in metropolitan areas, a unique and innovative solution will be required in order to result in a viable long-term solution. Looking at transportation in Springfield overall, one of the major issues that Springfield uniquely faces is the very large area that Springfield covers with no limited-access freeways going through the city. All freeways are located on the perimeter of the city. Traveling to/through the heart of the city takes a very long time or a very long detour. A limited-access freeway could solve many more big problems than the North Hwy 13 study is focusing on. While this is certainly a radical idea, big problems require big solutions. This would be a real long-term solution rather than a short-term band-aid in which we have to come back in 10-15 years and figure out where to put another band-aid. Obviously, funding is the big concern, but I've had the opportunity to be involved with the IBTTA (Int'l Bridge, Tunnel and Turnpike Assoc.). I think a turnpike would be an innovative solution that has worked very well in other parts of the country. I believe most people would pay a few bucks to be able to get to downtown Springfield 15 minutes sooner than they normally would. Or perhaps a few more bucks to get from North Springfield to South Springfield without hitting a single stoplight or detouring over to Hwy 65. Again, definitely an aggressive solution. I would encourage you to take a look at this project from Florida (https://www.selmonextension.com/). A very similar problem in which they built a turnpike that allowed through traffic to bypass all the congestion and stoplights. In a brilliant move, they also funded an ad campaign to increase local support for the project and encourage people to shop locally along the route that was going to be bypassed. Sorry for being long-winded, but please reach out if I can provide additional insight or information. (ahostettler@greatriv.com)

I'm not sure I was able to indicate on the survey that we usually avoid the hwy 13/I-44 intersection whenever possible. We live right off FR 141 near O Hwy. To get on I-44 we take FR141 south to Norton Road. (As you know, this is a bad intersection too.) To go into Springfield we often take FR141 south then east on FR 84 & FR145 & FR 86 to Grant south. We reverse these routes to return home. If we are coming north on Kansas Exp we often use Fantastic Caverns Rd to get to FR 141. We are looking forward to Hwy improvements and appreciate that you are trying to get input. I hope this helps.

I have lived west of 13 on FR 60 for about 14 years. The DD has been very good and works ok most of the time. Some of my observations regarding problem times 1. southbound backs up typically on Friday afternoons, prior to holidays, more in the summer, when there are big events at the Fairgrounds, worst when these are extreme or combined. Minor backups occur with morning rush and of course wrecks near the DD cause significant backups. 2. The left lane backs up the most because people are mostly lining up in the left lane to make left onto 44, I assume to go to Glenstone or 65 to go into Spr or south to Branson, etc. Going south into Springfield in the right lane of 13 is typically not as bad of a wait. 3. The fairground problem is nearly everyone comes out making a left to go either south or back to the east on 44, filling up the stack into the SB DD, preventing SB from 13 from making progression properly. Lots of semis, trash trucks, other large slow vehicles hurt the efficiency also with large gaps in front of them during green time. 4. Timing of the DD lights usually work until it starts to backup, then it seems like a little more SB and less NB time would help, but it doesn't seem like the timing is adjusted to help ease the Fri afternoon backups. 5. Additional difficulty is the afternoon rush to the north, requiring a long green in that direction to avoid gridlock between Kearney and 44. Of course that long NB green for the afternoon rush worsens the SB backups on Friday afternoon. That's my observance and it seems to be gradually worsening, particularly post pandemic as travel is getting heavier and as building in central and north Greene county has picked up in recent years. During these typical backup times I usually check google and if it's backing up more than 1/4 to 1/2 mile I will either take WW over to H/Glenstone or take O or FR94 over to 160/West Bypass, depending on where my destination is. Obviously, increased SB to EB is the main overloaded movement, although others are also stressed at times. Possible solutions in my view: 1. add a left lane to SB 13 and flyover to EB 44 would seem to be the best but probably a lot of ROW and expensive. 2. adding another lane to the DD in both directions but that would require a new bridge so very expensive and terrible congestion during construction. 3. A new loop around the north side of town between 13 and Glenstone, but this would likely require years of ROW acquisition and be astronomically expensive. 4. Perhaps a way to get people out of the fairgrounds and onto 44 without going to 13 would help a little. 5. If MoDOT could make some adjustments on the fly to the NB/SB DD lights that could ease congestion during the height of backups. Sometimes it looks like just a 5 sec shift would not hurt NB movement and could really help SB, particularly when done over several consecutive cycles. NOTE: opening up more free flowing traffic onto 44 will probably worsen the need for another right lane on EB 44 from 13 to Glenstone and then also on over to 65. Probably a need for additional lane on the WB too. So I can fully appreciate the problems and complexity of this overall situation! And I'm sure there's other considerations I'm not even think of! Thank you for listening! TW

Summary of Public Comments

North HWY 13 Study

Christian County Transportation Update - Ozark, MO. The asphalt portion of the Downtown Square project will be completed by Friday, 12/10. The Jackson St. project is about 98% complete. We have some minor striping to complete, street signage and handrail to install along the pedestrian pathways. The notice to proceed on three of our Trail / Multi-Modal projects is December 13th. Those projects will wrap up by the end of March. Regarding the area around the Ozark Mill and the Mill pond bridge improvements, the consultant is finishing up the plans for what appears to be a January bid letting. Other than that, we are in full on preparation for next year's paving bid package and finalizing our five-year paving plan that will be utilized to encourage our voters to renew the Transportation Sales Tax in April of 2022.

I don't drive that way now, so I didn't complete the survey. But I remember part of the purpose of the new interchange was to eliminate the long backup of southbound Hwy 13 traffic into Springfield. And it was very good until they built the Lowes Norton Road stop light system which backs up traffic in both directions. But I doubt if that can be fixed unless there was some way to move the Norton Road intersection farther north, but people wishing to travel east on Norton Road would need a way to drive around the zoo.

I travel hwy 13 to Springfield then east on I44 for work. I get to Springfield about 3:45 am and almost always have a red light at the diverging diamond with no traffic headed north. It also doesn't seem to be in sink with the Norton road light, which would help traffic flow instead of backing up. On weekends or evenings, the south-bound can back up over 1/2 mile. Sometimes I can avoid it by using 143, but sometimes it's backed up when not peak times then stuck for several minutes. I also travel to Bolivar and Brighton regularly, and dislike the J turns. It is hard to get out and then over during heavy traffic. Also, it is a pain to go 1/2 mile out of my way to make a left turn.

I think J turns are very dangerous, I'm hoping the project will not use them on North 13 interchange.

Why can't we add more lanes and move the Norton road stop light? There needs to be a turn lane on 13 for traffic that is going west on 44. Or maybe flyovers for both east and west bound traffic trying to get on 44. It's hard to say what could change because 13 is a very busy highway.

Ramps to 44 on Grant Avenue would remove traffic and Fairgrounds and zoo traffic from the 13-44 intersection. Moving the intersection of 44-13 to the west would remove the thru traffic from 13 to 44, which is a very large amount of that traffic. Moving the Norton Road intersection to the North would help too, along with ramped outer roads for the commercial businesses, both current and future.

Take out the diverging diamond and put in a sweep like Sunshine and 65. That will move the backups to Kansas (mo-13) and Kearney. Then put a flyover for north and south bound on Kansas so they move along without stopping for cross traffic on Kearney. The only other solution is to create more bridges across I-44 and diffuse traffic before it gets to I-44.The 20% more traffic that is supposed to be handled by the diverging diamond is not enough capacity for the number of vehicles traveling through that corridor.

Summary of Public Comments

North HWY 13 Study

At a minimum, the bridge over I-44 needs to be 3 lanes north and south with dual lefts and rights for each off ramp like National/James River.

I used to travel 13 almost every weekend from before it was improved (2006-2011), and it is vastly greater than when I started in 2006. And the Diamond was a blessing. It really sped up the crossing over 44. When husband did reverse trip, coming home on Fridays, 44 used to back up for more than a mile. The diamond eliminated that backup. That area needs wider roads as you go north, from Kearney to 44.

Exits onto 44 need to be like the ones on James River. Would make it easier to get on and off.

I am retired and use the intersection of 13 and 44 varying times of the day. I live about 5 miles north of the intersection of Hwy 13 & Hwy 44. I use Hwy 13 about 60% of the time and the backroads about 40% of time. I use Google maps to determine the amount of traffic at this intersection, if needed. I am alert on Fri-Sun and sometimes during rush hour for traffic back ups on 13. I have seen traffic backed up on 13 for miles but this was improved when the diverging diamond was built. Traffic can still back up though and crawl at a frustrating pace even with the diverging diamond. I have also seen traffic backed up on West bound 44 on the off ramp and onto the highway attempting to use the 13 and 44 intersection even after the diamond was installed. Extending the length of the off ramps on Hwy 44 was extremely helpful. My alternate route is either to go south on 129, l on 92, r on 129, r on 129, r on 94, l on 127 (W Melville Road) or to go farther west to Hwy 160 and south to West Bypass. The fastest way to the south side of Springfield is to access East 44, R on Hwy 65 and R on James River Freeway and this requires us to travel through the intersection of 13 and 44. Two of the major issues of this intersection is access to and from the Ozark Empire Fairgrounds and of course, rush hour traffic. I thank you for your time and attention to this matter.

I believe the diverging diamond interchange at HWY 13 (Kansas Ave) and I-44 needs to be widened to three (3) lanes in each direction as soon as possible. Traffic has increased in that area, and it seems like Southbound traffic is most always stacked up North of the interchange for several light cycles. It would seem that a three-lane overpass like that on South National at James River would allow more traffic thru the intersection.

Summary of Public Comments

North HWY 13 Study

Thank you for giving the public the opportunity to make comments for your study. I have lived on the north side of Springfield for 43 years and fight the traffic on north Highway 13 corridor on a daily basis. My recommendations are as follows: A flyover from southbound traffic on Hwy 13 to east I-44 . (99% truck traffic.) A flyover from westbound traffic on I-44 to north Hwy 13. Expand Hwy 13 & diverging diamond bridge to 6 lanes. Lengthen the right turn lane for west I-44 traffic. Keep the loop to Norton Road from I-44 west. Norton Road & Farm Road 143 is a nightmare during high traffic hours and Fairground activities. Too many business entrances from Kearney to I-44. Accident prone area.

This intersection needs a flyover. It's very important to me that the visibility of the courageous church on i44 is not impeded.

Honestly, even though most are not confused by the diverging diamond anymore, they traverse it like they are. It is a good idea for a lower volume interchange but the car count that gets through it is low, particularly with truck traffic, for the given amount of time it moves in either direction. I think a wider bridge with straight well marked dedicated direction lanes and traffic lights would handle the same volume of traffic but more quickly with proper signal timing…again with well marked lanes and overhead signs well before the interchange. A wider bridge with added dedicated lanes would be helpful in this endeavor as well. The flow onto and off of I44 with the extra lanes proposed for the I44 improvements will be helpful as well. The west bound off ramp onto Kansas should get an extra lane to coordinate with the bridge/interchange improvements as well.

I live on N National and go across Norton Rd to go to Lowes. SB 13 is always backed up around the corner. In my opinion, Norton should be right only onto 13, no traffic light, then a bridge to the north extending Smith St. to FR 143. Thanks

My husband and I regularly use the 13/44 Kansas Expressway corridor. My husband drives it daily to work and I drive it almost every day. Depending on the time of day the congestion gets awful. On Friday afternoon until Sunday afternoon, we check the cameras to see if the traffic is backed up. When traffic is backed up we take the exit leading to Fantastic Caverns and take the road that runs behind Lowe's to get to town. It takes us out of our way to get to Springfield. Any help to get rid of the traffic pattern and ease the backup and congestion would be wonderful and so very helpful.

The off ramp from I-44 west onto Hwy 13 N needs at least 2 lanes going north onto 13. The traffic that backs up onto I-44 at peak times is a safety hazard.

"It would be helpful if the option photos were where you could enlarge/open them to see the key and detail of the various options online.That being said, the Park Street interchange drawing appears to be an option that takes traffic going directly to and from Hwy 13 and I-44 and bypasses the diverging diamond toward the west. If this could be done in a throughput manner with no lights and stops for that traffic, I feel it would relieve the bulk of the congestion on Kansas Expressway. Redesigning Norton into Kansas Expressway by adding roundabouts (especially if multi-lane since people don't really get how to drive them) and a large number turnouts with directional signs one on top of the next will just add more confusion, frustration and congestion to the area. People attending the fair, Farm Fest, Lawn & Garden show, DPZ's Teddy Bear Picnic, etc, don't drive the area often and need simple roads and directional signage plus we northsiders still need easy access to Lowe's and Walmart from NE of the area. I'd hate for this area to require constant redesign like Glenstone at James River. Thank you."

Summary of Public Comments

North HWY 13 Study

I would just like to vote for the roundabout option to alleviate congestion at the North Road/Highway 13 intersection. It is an awkward intersection right now. I use the Norton Road heading west to Highway 13 heading north route.

Why not buy properties behind Walmart and the shopping center on Kansas exp and bring traffic in thru there from hwy 44

I believe the Park street interchange is a great idea. It gives alternative for freight traffic to go both east and west. It would lessen the congestion of south bound 13 traffic significantly. With the airport and Amazon, Convoy of Hope, Fed Ex, to the west, I think traffic to the west would benefit more with the Park interchange than the flyover to the east. Fairgrounds traffic would be lessened with less activity at the current interchange and perhaps I-44 off ramp could be lengthened to help with congestion. From a safety point moving the total number of vehicles at any intersection always lessens accidents. There will still be significant traffic at 13 and Norton interchange due to the local commerce and north side growth but eliminating the 53 foot trailers a half mile to the west would greatly relieve the stress of the signals at this interchange. Thank you for the opportunity to voice my opinion. Ken Scott Fire Chief Willard Fire Protection District.

After watching the virtual meeting, I like the flyover and the J-turn at Farm Rd 94. I believe it would work the best for all involved.

Thank you for the display and request for feedback. I think the best option for traffic flow is the fly over option. The other options appear to only move the problem to another part of 13 or are wildly expensive and disruptive. The fly over allows traffic to move uninterrupted. Thank you.

13 highway at 44 junction would benefit from on Ramps instead of red lights...this would extend the life of the bridge over 44...to make an on ramp from 13 on east bound 44 would probably need an overpass over fair ground entrance. .but west bound is a smaller task also 44 highway needs to be bigger its small slow and dangerous. I hope this helps good luck

The flyover is the best idea to keep traffic moving.

I think proposed alternative #1 would handle the most traffic quicker.

First, option 6 should be implemented regardless of any other changes regarding access to I-44. These have seemed to work well further North, especially at the 13-O intersection. Second, the issue with traffic queuing to access I-44 East lies not with the number of vehicles able to be queued for entry but with the flow of those already queued. Most of the alternatives presented are equivalent to added lanes at a McDonald's drive through - orders are not completed more quickly, rather, more cars are able to be in the lot and waiting to order, which does not address the problem in this case. For congestion at this intersection to be reduced or outright eliminated, traffic from South 13 to East I-44 must be allowed continuous flow; the only option which addresses this issue adequately is option 4. If it were to be voted upon, my vote would be in favor of 4b in order to minimize disruption of housing in the area.

Summary of Public Comments

North HWY 13 Study

THERE NEEDS TO BE A OVERPASS FOR EVERYONE TO GET ONTO INTERSTATE 44 EAST AND WEST. THAT IS THE ONLY WAY YOU ARE EVER GOING TO FIX THIS PROBLEM. I WORKED AT LOWE'S FOR 17 YEARS WHEN IT FIRST OPENED AND I HAVE SEEN HOW THIS HAS GOTTEN WORSE OVER THE YEARS. THE NEW DIAMOND MADE A BIG DIFFERENCE BUT THERE IS STILL BACKUPS.

Facebook comment - Why not obtain a huge sample of traffic data from the two roads, build a model of them in software and of the possible ways to link them, then run simulations of each, for as many million hours as you like (doesn't have to be real time), then report back the statistics associated with each. I don't think asking people which they would prefer is really the best way.

Facebook comment - Make it a flyover to get to I44 from Kansas.

Facebook comment - I just ask for the sake of us local truckers that this time please make us some room. As it is trying to get around that diamond is near impossible. Then we have trucks that have to ride side by side because one needs to go straight and the other needs the interstate. This makes it very difficult to get around and ends up slowing traffic because we have to slow up. And if you need proof of what I'm saying go look at the inside curb that a lot of guys end up having to hit and are ruining their tires. Whatever design you choose to keep us truckers in mind. It seems we are always forgotten about.

Facebook comment - The fewer 'diamonds' interchanges the better.

Facebook comment - I feel like all the diverging diamonds suffer from the same flaws.1. You cramp them in between two outer apposing lights that aren't synced with the lights on the diamonds. Examples being the light at Norton road and light to the road between McDonald's and Casey's. They restrict the flow of the diamonds. You may get a green on the diamond and then fall right into a red light at one of these apposing lights. It seems to be an issue at all the diamonds in town.2. The lights on the diamonds are timed and not motion activated. Timing them just doesn't seem to work right.3. The entry speed into the diamonds have heavy braking causing a domino effect causing stopped traffic at green lights. (Example southbound on 13 and starting on 13 through the diamond. If they had better entry angles to handle the speed limit, I think it would move more volume of vehicles. Kansas City diamonds have the ability to hold speed limit through the diamond safely.4. Signage for the diamond on 13 needs to warn drivers sooner of what lane they need to be in.5. Allowing turning left on red after stopping like you are allowed on a right turn. (National and James River).

Summary of Public Comments

North HWY 13 Study

Facebook comments - There were some good ideas but removing the diverging diamond is good and south to east bound flyover is good but with Norton being the only east/west roadway north of I-44 from Glenstone to Kansas/13 might have some effect on traffic. The round-a-bouts are not needed at this major intersection entrance to Springfield.

Facebook comment - They need to add ramps at Grant and 44. Remove Norton at Kansas(13) heading East. Add bypass 13 down Park Avenue to 44. Move Norton access further north on 13 to existing over pass with added ramps. For some reason they tend to avoid ramps and live intersections.

Facebook comment - Combine 1 and 2, need to expand the DDI and also eliminate the existing intersection at Norton Rd.

Facebook comment - Taking a look at the 5 options the other evening, there were two that seemed more convenient with one exception. On the 5th option, the one with huge roundabouts. From my driving experience through those in Springfield is drivers often tailgate behind cars already starting through, leaving others who had the legal entry denied and forced to lose their ability to rightfully enter. Also, drivers often give no regard to cars already in the roundabout that may be driving in front of the on coming traffic. Very few drivers take into consideration that car does have first right of way that crosses in front of them. Let's give roundabout 4 entry point numbers in counterclockwise order of 1, West, 2 South, 3 East, 4 North, as is typical traffic flow...Say a driver (point 1) is coming from the west and already 1/4 into the roundabout needing to go 3/4 circle to the north, (point 4). Car entering from the east (point 3) often does not wait to see where car from the west is going, rather, enters anyway at their point 3, thus pulling in front of that car trying to complete its (Point 4) north bound drive. If drivers were more courteous it wouldn't a problem, but alas, here we are with having to deal with carelessness and potential injury. This is why I see a need to not have roundabouts. Lights with turn signals are clear and unmistakable .Overall, I can see a huge load off the entering and exiting of 44 and 13, better safety and convenience that hopefully will carry us through the next 20-25 years.

The main proposal with the flyover and roundabouts must be completed as it is the best long-term option. Also, please coordinate with the zoo and fairgrounds to implement/install statues/ sculpture in the roundabout on the way to zoo/fairgrounds to bring placemaking to that area. For instance, in the middle of the roundabout have a tall statue similar to the Stl zoo entrance. (Google STL zoo statues since I cannot upload here for reference).

#5 is the one I like the best. All those semis wanting to head east on 44 could do that with ease. Whatever you all decide just make sure you give tons of room on the off-ramp from 44 to 13. It’s a mass casualty situation waiting to happen. The ramp backs up on to 44. There’s a rise you come over around Grant and the backup is right there. You’re either jamming the brakes or diving into the passing lane. The diamond was cool, but it’s a lot cooler that you all recognize it’s not working in that location. Decide what you want to do and hire local to build it.

Summary of Public Comments

North HWY 13 Study

This interchange is behind the times at best. This is such a busy intersection it needs to be redesigned with fly overs and modernized. The congestion is constant.. the tie ups on 13 both directions and to exit off 1-44 to north bound 13 is ridiculous fix this

The area is already filled with businesses. Remove access to I44 at this point so it's only local and North/South traffic through there. No proposals address congestion on Kansas between I44 and Kearney. Again, separate the local and through traffic lanes here.

Visibility at night is severely lacking. The current road surface makes line impossible to see. Between Springfield and Bolivar is the worst. The white lines are not reflective and there is no way to see it at night or in the rain.

Traffic going between the 2 highways should be able to bypass the intersections with stop lights. This could be Dont with flyover bridges or bridge over 13 that allows the highway traffic to bypass the lights.

Option #4 or #5 seem to be the most long-term and best solution for congestion at this intersection.

Facebook comment: How about an off ramp (west 44) that fly's over traffic going to 13 north and then the flyover option for southbound 13 traffic to east 44? All of 44 needs to be 6 lanes through Springfield. I feel flyovers are the only way to reduce backups albeit they are probably more expensive.

Facebook comment: I-44 is a death trap in the mornings when you're trying to get on 44 and some driver in front of you with a death wish decides to go down the on ramp and try to merge into traffic at 35mph.

Facebook Comment: How about fly over all the N/S Hwy13 thru traffic and dedicate double 44 ramps both eastbound and westbound.

Facebook Comment: In my opinion, the Park Street Interchange looks like the best solution.

Facebook Comment: The dedicated 44 exit onto Norton Rd was a Huge mistake! Only used at its potential during fair! Could have moved traffic so much faster into 13N w/2 lanes!

Facebook Comment: Alternative 5 needs an option from farm road 143 other than 13 North. Right now it looks like it is a forced right turn without any other turn available.

Facebook Comment: Get rid of the redlights at Norton and Walmart. They are the biggest bottleneck.

Summary of Public Comments

North HWY 13 Study

Facebook Comment: I drive a semi truck through there on a regular basis. I don't see any problems with the current configuration that would justify the disruption caused by changing it.

Facebook Comment: We need alternative ways to get to and from the shopping on north Kansas, so that traffic isn't all going to Kansas expressway. Need to add at least one more lane of traffic for both directions from Kearney north to outside of town.

Facebook Comment: I try and avoid it like the on across S National and 60

"Facebook Comment: There may be other safety concerns I'm not aware of but simply separating the through traffic on farm road 94 from the left turns would be might vote for the 13/94 intersection. Alternative 5 is missing an option to turn left to get to the roundabout, leaving no way to get to 13 North or the I44 intersection...you may want to look at that again if this proposal goes through."

Facebook Comment: Try to reroute 12/I44 to west of current location or tied it with West Bypass.

Summary of Public Comments

North HWY 13 Study

Question: For those alternatives you ranked higher, what about these designs makes you think they will address the issues that exist along the Hwy 13 Corridor?

Responses:

All the traffic light stop and go with semis. Less stopping points

Eastbound flyover reminds me of the westbound flyover at I-44 and US 65. Had great results there. Adds a great way for Norton traffic to route around with all right turns.

Flyover for non-stop access from SB 13 to EB 44Norton Rd underpass with roundabouts (please work this and right-in right-out only access from Norton to 13 into any alternative versus the continuous t's)

I think that Alternative #4 (Park Street Interchange) will best resolve the issues that exist along the MO 13 corridor since this design is able to keep highway/through traffic separate from local traffic. It also provides plenty of capacity north of I-44 for SB traffic that wants to head south on 'Business MO 13.' I also like Alternative #4 because if you're traveling south on MO 13 and inadvertently miss the I-44 exit, you can still access I-44 via the existing interchange. The next best option is Alternative #2 (Traditional Diamond) as it provides more capacity for traffic within the corridor.

Keeps all traffic between Hwy-13 and I-44 off Kansas with no slowdowns or stopping moments. Increases safety coming south as the high speed traffic won't need to stop or slowdown. Removing all the traffic to or from I-44 will allow the Kansas to effectively handle the remaining local traffic.The interchange is a critical step toward freeway to Kansas City.

New exit will maintain access to businesses such as Kum and Go and Lowes; will still relieve congestion

More lanes of traffic will help, Alt 1 seems simplest and less cost, Alt 3 also seems to simplify and improve flow

I believe alternative 5 most effeciently accomplishes the needed improvements with a cost effective solution that improves traffic flow and safety. It's one big drawback is the lack of direct access to Hwy 13 south from 141. Fm Rd. 94 is not a safe alternative currently and a J turn will take residents even further out of their way before accessing the highway. The most efficient way to accomplish this seems to be via Radio Road to Fm Rd 139 along to the new proposed Morris Ave connector. The commuting traffic flow could return along the Norton Rd right turn access and Park access via the round abouts and tunnel under 13. Repaving along with slight widening and intersection improvement at Radio and 139 would be a must but these additions make this a very feasible and attractive option as it still gives out of town and local traffic access to amenities. Additional lanes in the northbound approach to the cooridor from Kearney starting further south would help allieviate traffic congestion between Kearney and the cooridor in evening rush hour. Alt 4 is an appealing alternative for rerouting nonlocal traffic but requiring the additional plan puts an awfully expensive price tag on the improvements. I think the combination of 4 & 1 is the most appealing of the possible combinations to most efficiently and safely move traffic as long as the proposed rerouting of Norton includes south bound access to 13. I think that's what I understand from the drawing but not positive. Alt 4 & 2 would get my third vote.

Summary of Public Comments

North HWY 13 Study

Question: For those alternatives you ranked higher, what about these designs makes you think they will address the issues that exist along the Hwy 13 Corridor?

Responses:

It will help move the traffic away from the corridor, making it safer for everyone.

Long range relief

Those designs provide direct access to i44 from 13 without needing to stop at a light

The flyover will keep the large trucks moving to east bound I 44.

The flyover and Norton underpass is the only option that will address long term traffic needs at the intersection.

The first three give a balance between improving the flow of traffic -by expanding the distance between stops and turns-while maintaining access to local businesses and homes- with the possible exception of the flyover design to Lowe's and the gas stations there.

Longer usefulness and reduction in congestion for more years to come

Improved LOS projections. The Park Ave alternative can be constructed with minimal disruption to existing 13 traffic; it also simplifies access to businesses at Norton and 13.

Ultimately, traffic flowing south on 13 needs a nonstop way to turn east onto I44. I just don't want the long term solution to block access from local neighborhoods from connecting to the intersection. Farm road 143 is how I typically get to Kansas/I44 so I don't want that access difficult or impossible. (You may want to look again at alternative #5 intersection with farm road 143. It looks like there is only access to 13 North.)

Alt 5 is the best solution I believe

The under pass for Norton Rd will essentially remove the local traffic from entering the congested area and the flyover will also spread out the traffic.

Eliminates unneeded stop lights

Eliminates construction congestion around 13/44 intersection, adequately solves the on/off traffic from 44 to 13 and 13 to 44

Removing the 13 southbound to I44 eastbound traffic is so helpful. I personally am delayed by my westbound 44 to westbound norton. #5 will deal with my current concerns.

Summary of Public Comments

North HWY 13 Study

Question: For those alternatives you ranked higher, what about these designs makes you think they will address the issues that exist along the Hwy 13 Corridor?

Responses:

With design 5 it will have through traffic for the interchange which seems to be the biggest issue for southbound traffic. It accommodates the larger slower semis as well as East bound traffic.

Separation of through traffic from local traffic

Summary of Public Comments

North HWY 13 Study

Question: For those alternatives you ranked lower, what about these designs makes you think they would not address the issues that exist along the Hwy 13 Corridor?

Responses:

Same reasons. They don’t address enough They are short term

Park St addition adds another way onto I-44 but is needlessly complicated to achieve. Getting right of way/domain to buy the properties in the way might prove impossible. SPUI is cool but leaves a lot of the congestion at Norton. Bigger diverging diamond leaves Norton congestion but adds lanes.

Too many consecutive stoplights along 13; moving access to Norton Road too far north for zoo/fairground visitors; difficulty in accessing businesses along 13 north of 44; isolating homes in area between 44, 13, and proposed Park St corridor

Please do not select Alternative #5 (SB to EB Flyover). It would be helpful for highway/through traffic but, in my opinion, would be a nightmare for any drivers - especially ones not from this area - who need to utilize Norton Road.

Some, most, or all movements still have to stop entering or leaving Springfield.

Traditional diamond was removed in 2009; diverging diamond is not working now - I don't think making it wider will help

I don't see that Alt 2 accomplishes much, seems like we'd be back to the old tie-ups. Alt 4 & 5 both seem great, wish they didn't cost so much.

The SPUI is a very impractical use of the space with no improvements to Norton and a logistical and safety nightmare. OTC and DOT may like these intersections, but most average drivers DO NOT. The regular maintenance required to keep traffic moving safely in the form of restriping is an ongoing cost and regular impediment to traffic.

Left turns takes time for semis traffic will still back up everyone coming from KC WANTS to GO TO BRANSON

Traffic still looks like it is going to be congested, making it still unsafe.

Cost does not outweigh long range volume.

They don’t fix the direct access to 13 from i44 or vise versa meaning you have to stop at a light causing backups

The other options do not address the congestion at the Norton intersection well enough or (to me) will only worsen the problem.

The last two may address some of the issues but ultimately will require further work down the road and more money spent when issues have the opportunity to be fixed now. They also require more change than is necessary to how the interchange works as it has been driven for many years.

Summary of Public Comments

North HWY 13 Study

Question: For those alternatives you ranked lower, what about these designs makes you think they would not address the issues that exist along the Hwy 13 Corridor?

Responses:

Would not keep up with future traffic volume requiring another redesign in a few years

The LOS projections indicate they can't accommodate traffic volume. Also, constriction disruptions would complicate traffic

I think too many places for traffic to stop/back up.... so not a long tern solution.

Park street bridge, I like it as well. I don't like how it will be $61 million, and we will still need more money to fix issues with the Kansas and Norton interchange.

Routing traffic through a residential area would likely increase crashes, negatively effect quality of living for all persons in the vicinity, and lower property values

The park expansion will create more traffic around established neighborhoods.

Restricts current residents in NW/W area of project to directly access 13 south into town

feels like they would just be a cheaper and shorter-term solutions.

Traditional interchanges with stop lights will not improve the queue of traffic that is already horrible

Summary of Public Comments

North HWY 13 Study

Question: What other improvements might be appropriate for the Farm Road 94 intersection?

Responses:

Either J-turn or closing through traffic works for me. My Grandmother-in-law was killed at that intersection in 2017. Had driven through it probably 1000s of times, but traffic is too heavy now to have it straight across. Been in one very close call there myself as far back as 2011.

Eventually an interchange, but that's more long term.

J-turns do not work, nobody seems to know how to use them or when to switch lanes. May not have as many accidents but there are tons of near misses every day and increasing traffic is just going to make it worse

Other safety considerations must be made regardless of the configuration whether it's a yellow caution light or adding signage warning of dangerous intersection. It's also imperative that dedicated right lane approaches are established on the shoulders approaching this intersection from the north and south to allow those turning off the highway to move out of traffic and slow down to safely approach the intersection. The closing of cross access is impractical for an intersection with so much commuter traffic and two major recreational sites on one side. Fantastic Caverns brings in too much tax revenue to put impediments in the way of getting there and the new trail system from Ritter Springs to Fellows Lake will bring in additional recreational traffic, Let's find more ways to allow easy access to these features rather than further limiting the already singular approach.

Extend right turn lane

Not sure. I drive though this intersection many times throughout the year on my way to Iowa for work. Have t noticed a major issue here

Traditional over/underpass to allow for easier access to roads north of I 44 and to create better business opportunity at the intersection. Traffic counts are there!

Traffic signal

Widen the intersection gap.... and add extra median triangles to separate Left Turn vs Through Traffic vs Opposite Left. Then you won't have to worry as much if multiple people go in there at the same time.

I think J turns are the best thing for the area. I like the ones at HWY13 AND HWY O. Only issue with those that I wish we don't have with FR94 and HWY 13. Make the transition to the J turn farther away from FR94. The farther away they are, the easier it is and safer way to merge into traffic. HWY 13 and HWY O you have to almost immediately cut off traffic to merge over to use the J turn.

make an undercut on fm94 or an overpass of 13 so that fm94 traffic can flow freely beneath 13 and all entries/exits from/to 13 will be right lane entries/exits

Plan for a grade separated interchange since MODOT already owns a lot of land at the intersection and the residential 'lots' on the SW corner largely can't be developed under today's zoning and subdivision regulations.

Summary of Public Comments

North HWY 13 Study

Question: Do you have any questions for the design team?

Responses:

What is the time frame to construct any of these? Would some take longer than others?

Please make a left turn available onto Norton from Southbound FR141 I think you underestimate the amount of people doing this maneuver thank you

We live on N Broadway Ave, this street runs into the front of the fairgrounds, what are the plans for detours? There is a lot of traffic on Broadway now of people wanting to miss the diamond. There is an elementary school on W Talmage that has cross walks on Broadway and Grant that few people stop for. Most traffic using Broadway and Grant are traveling at 45 to 50 mph. The current speed limit for this area is 30 mph. Grant has a traffic signal but Broadway does not. It is a clear shot down Broadway from Kearney to Norton Rd.

What new expanded pedestrian accommodations will be implemented in the final design?

Summary of Public Comments

North HWY 13 Study

Question: Is there anything else you want to share with the design team?

Responses:

Please find a way to improve access for commuters to southbound 13 from 141 either through the redesign of the intersection at Norton, via Radio and Morris, or another access point that does not cause one to go further out of the way (ie J turn at 94). Additionally it would be great if more could be done to address traffic approaching from the intersection of Kearney and Kansas. Perhaps starting the lane diversions further south on Kansas before the corridor would help allieviate some of that congestion.And thank you for patiently answering all of my questions at the March Library Station session and showing a real interest in brainstorming alternatives to the limited access to 13 from 141 and Norton.

In my experience driving through this intersection many times throughout the year I've found the biggest problems are getting traffic from i44 to 13 nb and traffic from 13 sb to both i44 east and west bound but mostly east bound. I truly believe the park st interchange will help the most moving commercial traffic away from Kansas Expressway and leaving easy Access to businesses the way the interchange is now.

I think the design team has done a good job explaining the designs and they look very workable.

If park avenue is chosen the section of 13 between Norton and New highway interchange should be looked at to add another intersection for business growth in the area.

Would large around abouts on each side of I44 be an option to keep traffic continuous? Maybe add a pedestrian crossing around Kansas and Livingston

APPENDIX G
ORIGIN – DESTINATION STUDY

CBB TRANSPORTATION ENGINEERS+PLANNERS
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TECHNICAL MEMORANDUM

Date: February 28, 2022

To: Mr. Andy Thomason, AICP, Ozarks Transportation Organization
Mr. Steve Prange, PE, CMT

From: Srinivas Yanamanamanda, P.E., PTOE, PTP
Mirza A. Sharif, Ph.D

CBB Job No: 125-2021

Project: Ozarks Transportation Organization Highway 13 Corridor Study
Springfield, Missouri

The purpose of this technical memorandum is to document the origins and destinations of traffic to and from the northern portion of Highway 13 in the Springfield area. CBB has completed an Origin-Destination (OD) analysis of the study area shown in **Figure 1**. The purpose of this analysis is to provide better insight into the Ozarks Transportation Organization's (OTO) current and future planning activity to address transportation planning, traffic operations, and related planning in the study area.

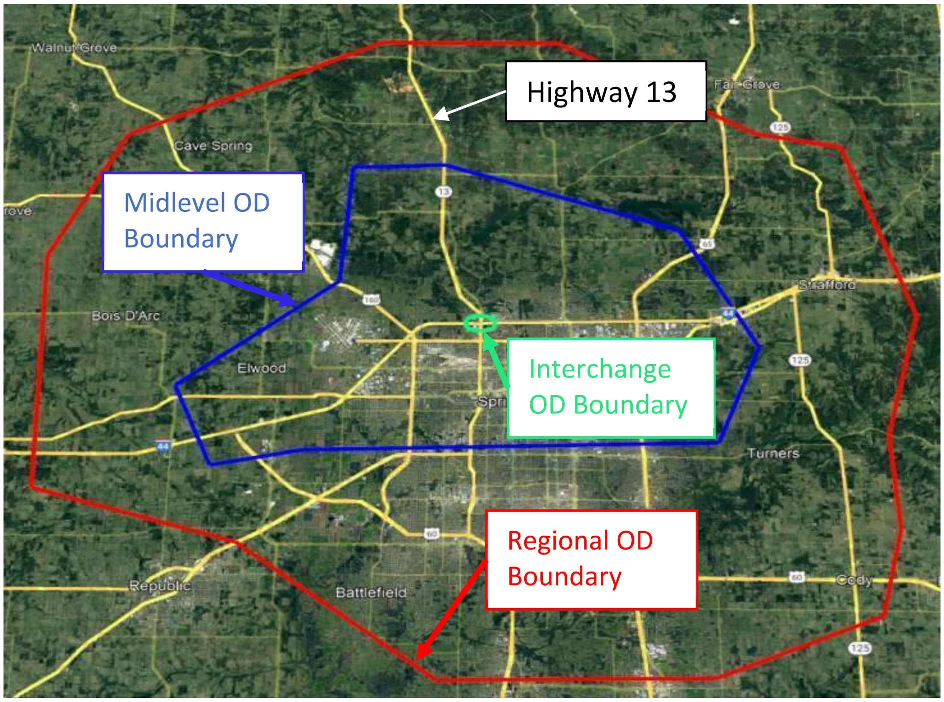


Figure 1: Study Area for OD analysis

Three levels of OD analyses were conducted to understand the travel patterns of traffic using Highway 13 within the Springfield region. The OD analyses completed are:

- Highway 13 and Interstate 44 Interchange OD (OD S1)
- Midlevel OD (OD S2)
- Regional OD (OD S3)

The following sections will discuss data collection, processing, and findings from the OD analyses.

Data Source

The data utilized in this study was collected from StreeLight Data. StreetLight Data is an all-in-one OD data provider. It allows analyzing traffic between assigned geographic zones. StreeLight uses Location-Based Services (LBS) data and Navigation-GPS data to develop their metrics. The LBS data is collected from smartphone apps that use location-based services and Navigation-GPS data is gathered from connected cars, smartphones using GPS navigation, and connected commercial trucks. All these data are processed by Streetlight to generate various metrics using their algorithms.

The locations to be analyzed can be drawn as zones inside the StreetLight Insight which is a web-based tool for data query and analysis. The zones can be set up as an origin point or a destination point. Zones can also be set up as an area of study without defining any specific role, as in Zone analysis or segment analysis. A user has option of using historical data starting from 2016 to the most recent data available for October 2021. Also, the option of day types allows segmentation for the days of data in the analysis. The data can be queried into day parts as well which allows segmentation of parts of the day (in hours).

In this project following criteria were used for all levels of analysis.

- Data Periods: 2019
- Day Types:
    - All Days (Monday-Sunday)
    - Weekday (Tuesday-Thursday)
    - Weekend Day (Saturday-Sunday)
- Day Parts:
    - All Day (12am-12pm)
    - AM Peak Hour (7am-9am)
    - PM Peak Hour (4pm-6pm)

All the zones used in this project were defined as unidirectional and the zones were set up as pass-through traffic. Same zones were used as origin and destination points by reverting their travel direction. For example, the southbound Highway 13 was used as the origin point and the northbound Highway 13 at the same zone was used as the destination point from other origin points.

Interchange Level OD Analysis (OD S1)

The interchange level OD analysis was done around Highway 13 and Interstate 44 interchange to understand the travel pattern in the area. The AADT from 2019 data estimated that approximately 11200 vehicles travel southbound using Highway 13 in the study area daily. **Figure 2** illustrates the percentages of pass-through traffic originating from the southbound Highway 13 and major destination points for that traffic. Approximately 36% of vehicles keep continuing through Highway 13, 41% travels eastbound 44, and 14% travels westbound 44. Ninety-one percent of the vehicles travel outside of the analysis boundary.

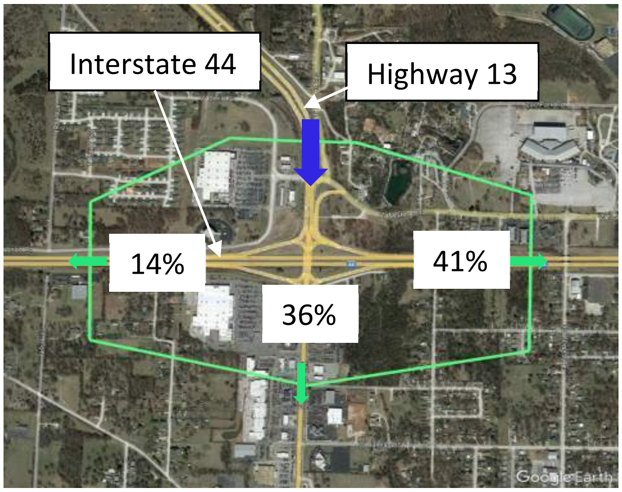


Figure 2: Interchange Level OD Analysis of Southbound Highway 13

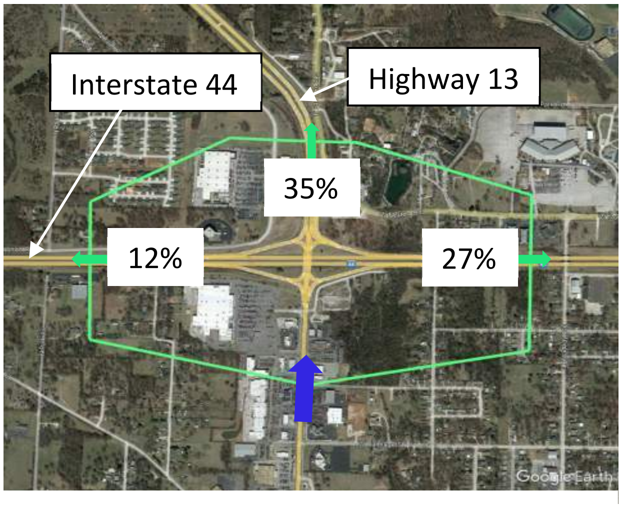


Figure 3: Interchange Level OD Analysis of Northbound Highway 13

Traffic originating south of the analysis area has a similar pattern for westbound 44 and northbound Highway 13, see **Figure 3**. According to the StreetLight estimation, 13,600 vehicles enter the analysis area using northbound Highway 13. Approximately 35% of the traffic continues going north, 12% goes westbound, and 27% travels eastbound on Interstate 44. It was found that almost 26% of traffic finish their travel in the analysis area boundary.

MidLevel OD Analysis (OD S2)

Midlevel Od analysis was completed using similar approaches used in interchange level OD analysis. StreetLight data estimated that 10,500 vehicles enter the analysis area through southbound Highway 13 and travels to various destinations. Approximately 42% of the traffic reach their destinations in the analysis area, see **Figure 4**. Twenty-five percent of vehicles travel south using southbound US 65 and an estimated 15% continue using southbound Highway 13, the two major pass-through destinations for the midlevel OD analysis. Only 2% and 3% of vehicles travel outside the analysis boundary through eastbound and westbound 44.

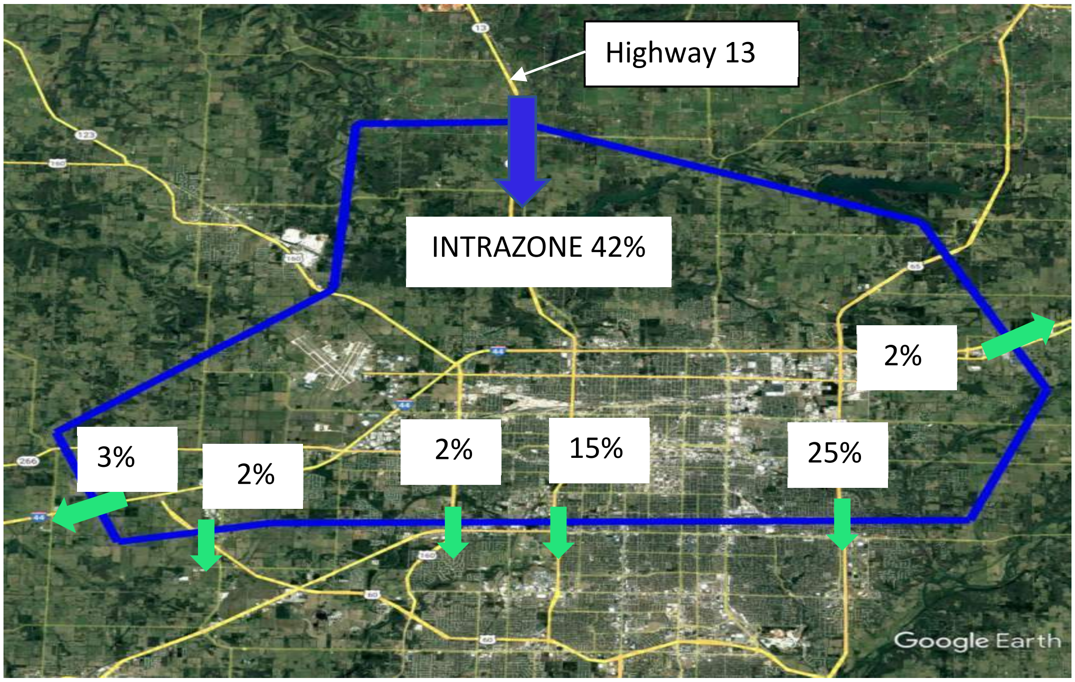


Figure 4: Midlevel OD Analysis of Southbound Highway 13

Regional OD Analysis (OD S3)

CBB has completed an analysis of regional level OD. The goal of this analysis was to understand the regional level travel pattern of the major highways in the analysis area. **Figure 5** shows the boundary of regional level analysis and major destination points for the southbound Highway 13 traffic. Every day 10,400 vehicles enter the region using southbound Highway 13. After analyzing the origin and destination volume of all the major highways in the analysis area, it was found that 75% of traffic entering through southbound Highway 13 complete their travel within the analysis boundary. Approximately, 12% of traffic continues traveling out of the region using US 65, which is the largest destination point within the analysis area. In addition to that, 4% of entering traffic uses US 60 to travel eastbound out of the region. After analyzing the eastbound I-44 data, it was found that 63% of traffic entering through this origin point stays within the analysis boundary and 21% continue traveling eastbound, see **Figure 6**. The second major destination for traffic originating from eastbound I-44 is US 65 which is used by that traffic to travel out of the regional boundary. A similar pattern was observed in westbound I-44 traffic. Approximately, 19,000 vehicles enter the region through eastbound I-44 from the west and 20,000 vehicles enter using westbound I-44.

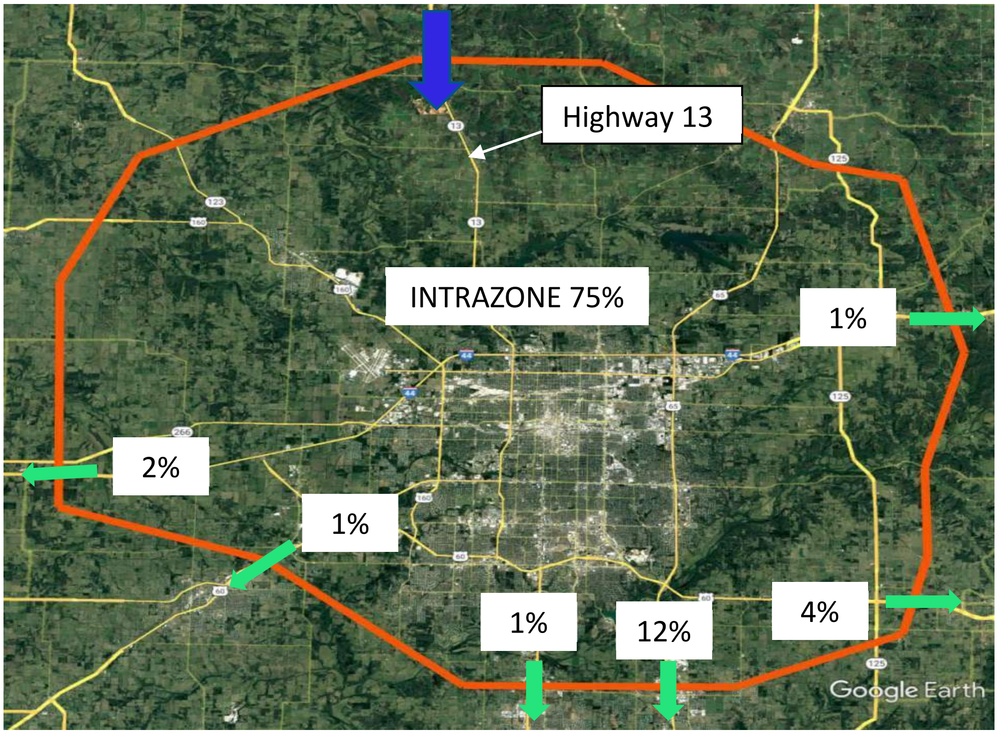


Figure 5: Regional OD Analysis of Southbound Highway 13

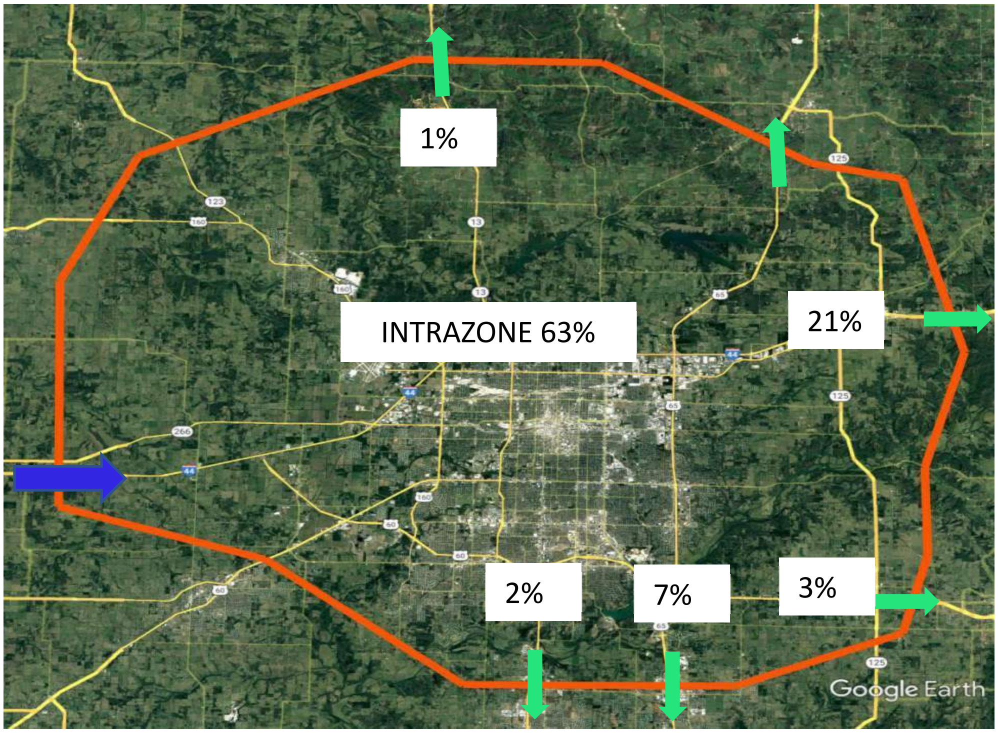
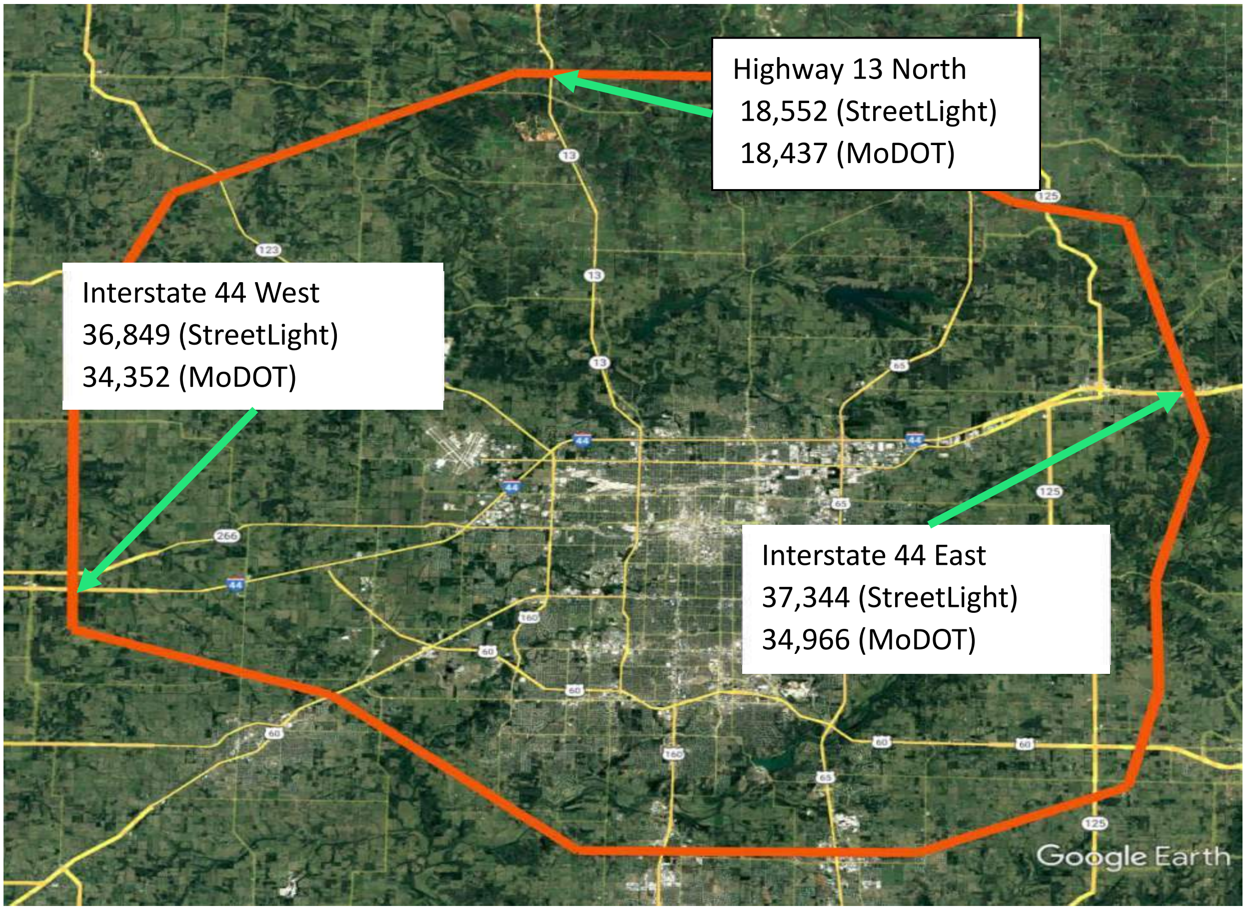


Figure 6: Regional OD Analysis of Eastbound Interstate 44

Data Validation

CBB has validated the data queried from StreetLight with the MoDOT AADT. The AADT was collected from MoDOT for all the major entry points to the region and compared with the daily traffic volume found from Streetlight.

All the analyses were done using data from 2019 StreetLight data which was the most recent data before COVID-19 impacted travel patterns. So, the daily volume from StreetLight was compared with the 2019 AADT from MoDOT. Major highways within the region have a difference of 250 to 5800 vehicles per day between MoDOT and StreetLight. **Figure 7** shows AADT from StreetLight and MoDOT for 2019 at three major entry points to the region.



Highway 13 North
18,552 (StreetLight)
18,437 (MoDOT)

Interstate 44 West
36,849 (StreetLight)
34,352 (MoDOT)

Interstate 44 East
37,344 (StreetLight)
34,966 (MoDOT)

Figure 7: Comparison of MoDOT and StreetLight Data

Analysis data and zone info is attached to this memorandum. We trust this memorandum provides useful information for the overall corridor study. If additional information is desired, please feel free to contact me at 314-449-8240 or syanamanamanda@cbbtraffic.com.

Summary & Findings

- Streetlight Data, derived from background cellular data, was utilized to develop mobility metrics between geographic zones within the OTO region. OD derived data was compared to traffic count data to ensure reasonableness.
- At the Regional OD level, of the total traffic entering southbound on Route 13, approximately 75% stay within the analysis boundary. 12% exit at US 65 south, 4% exit at US 60 east, 2% exit at I-44 west, and 1% exit at I-44 east.
- At the Regional OD level, of the total traffic entering eastbound on I-44, approximately 63% stay within the analysis boundary. 21% exit at I-44 east, 7% exit at US 65 south, and 3% exit at US 60 east.
- At the Regional OD level, of the total traffic entering westbound on I-44, approximately 67% stay within the analysis boundary. 20% exit at I-44 west, 10% exit at US 65 south, and 1% exit at US 60 west.
- Approximately 20% of the traffic entering in both directions along I-44 is through traffic.
- At the I-44/Route 13 interchange, predominant travel patterns include heavy through traffic percentages (approximately 35%) and heavy traffic towards I-44 east (41% of the traffic entering from the north and 27% of the traffic entering from the south). 12% to 14% of traffic entering along Route 13 proceeds towards I-44 west.

APPENDIX

ANALYSIS DATA

Raw data is provided electronically as spreadsheets

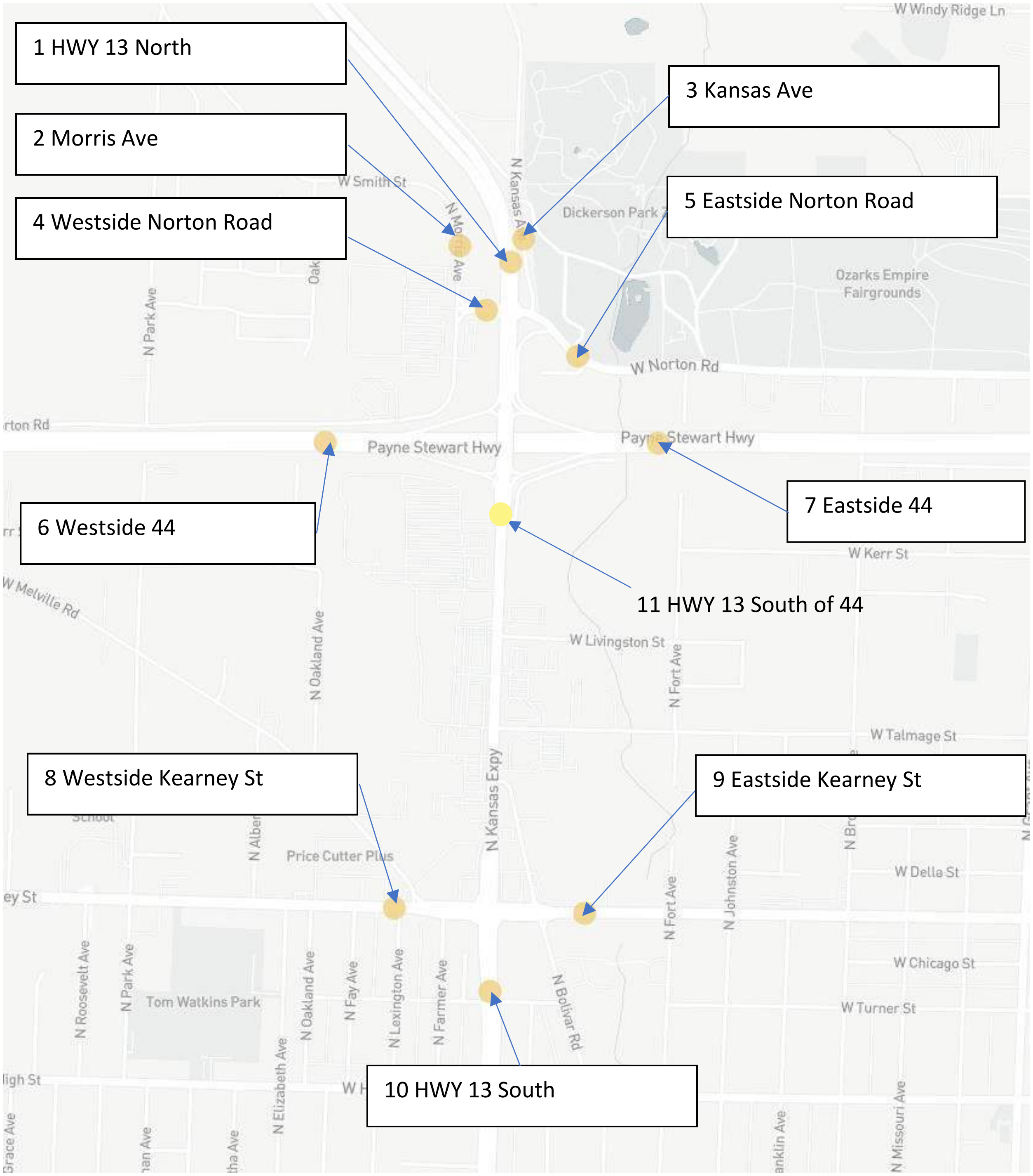
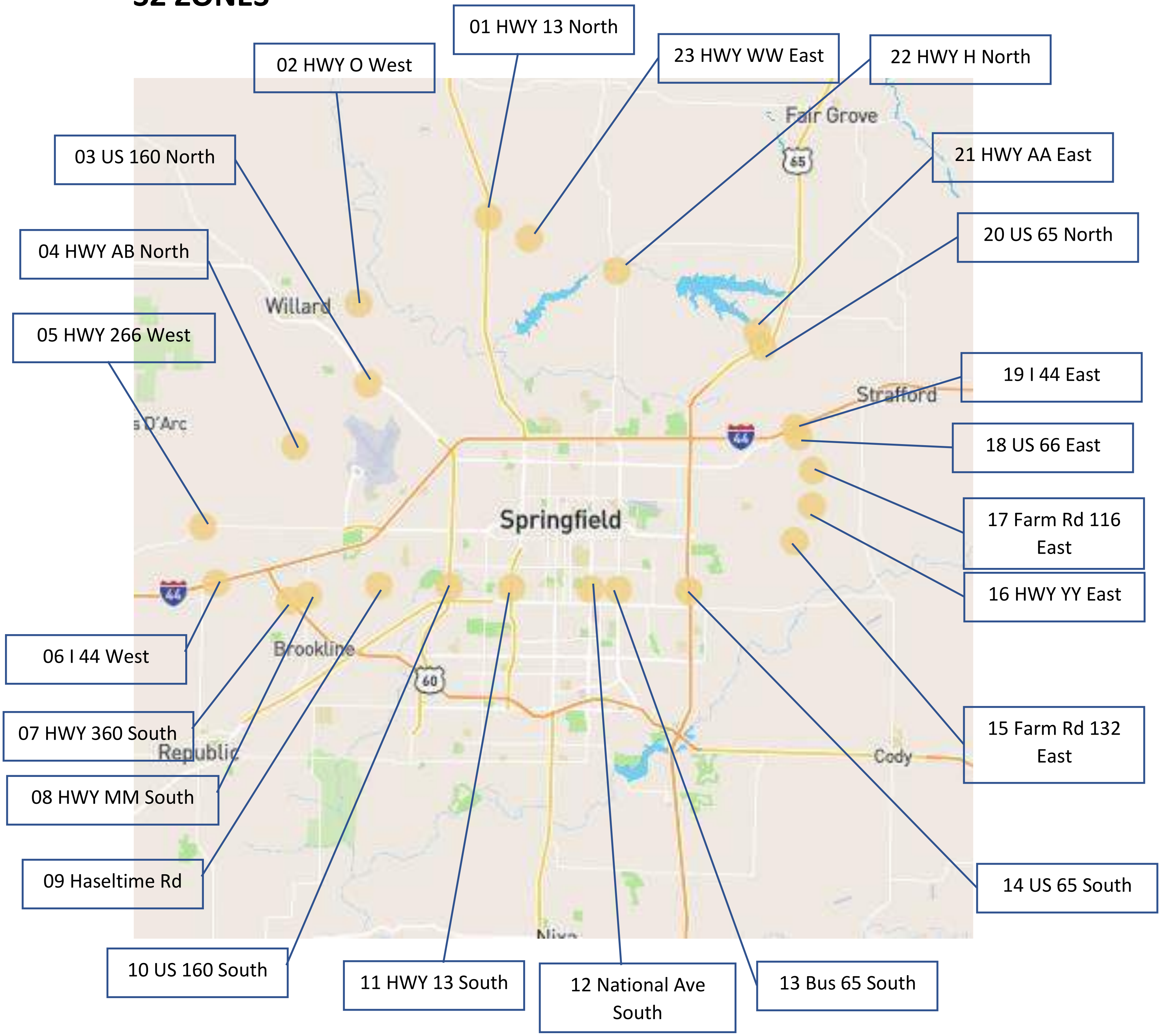


Exhibit: Zones of the OD Matrix S1

OD S1 Daily

Origin/Destination	1 HWY 13 North	2 Morris Ave	3 Kansas Ave	4 Westside Norton Rd	5 Eastside Norton Rd	6 Westside 44	7 Eastside 44	11 HWY 13 South of 44
1 HWY 13 North	0	12	37	291	647	1511	4619	4026
2 Morris Ave	3	0	2	0	96	49	156	361
3 Kansas Ave	19	3	0	72	352	180	188	597
4 Westside Norton Rd	583	11	116	0	743	474	1002	1435
5 Eastside Norton Rd	699	133	419	688	0	668	296	1045
6 Westside 44	1705	51	227	282	798	0	17794	1806
7 Eastside 44	4974	144	224	858	534	16889	0	3262
11 HWY 13 South of 44	4646	377	866	1299	1121	1652	3629	0

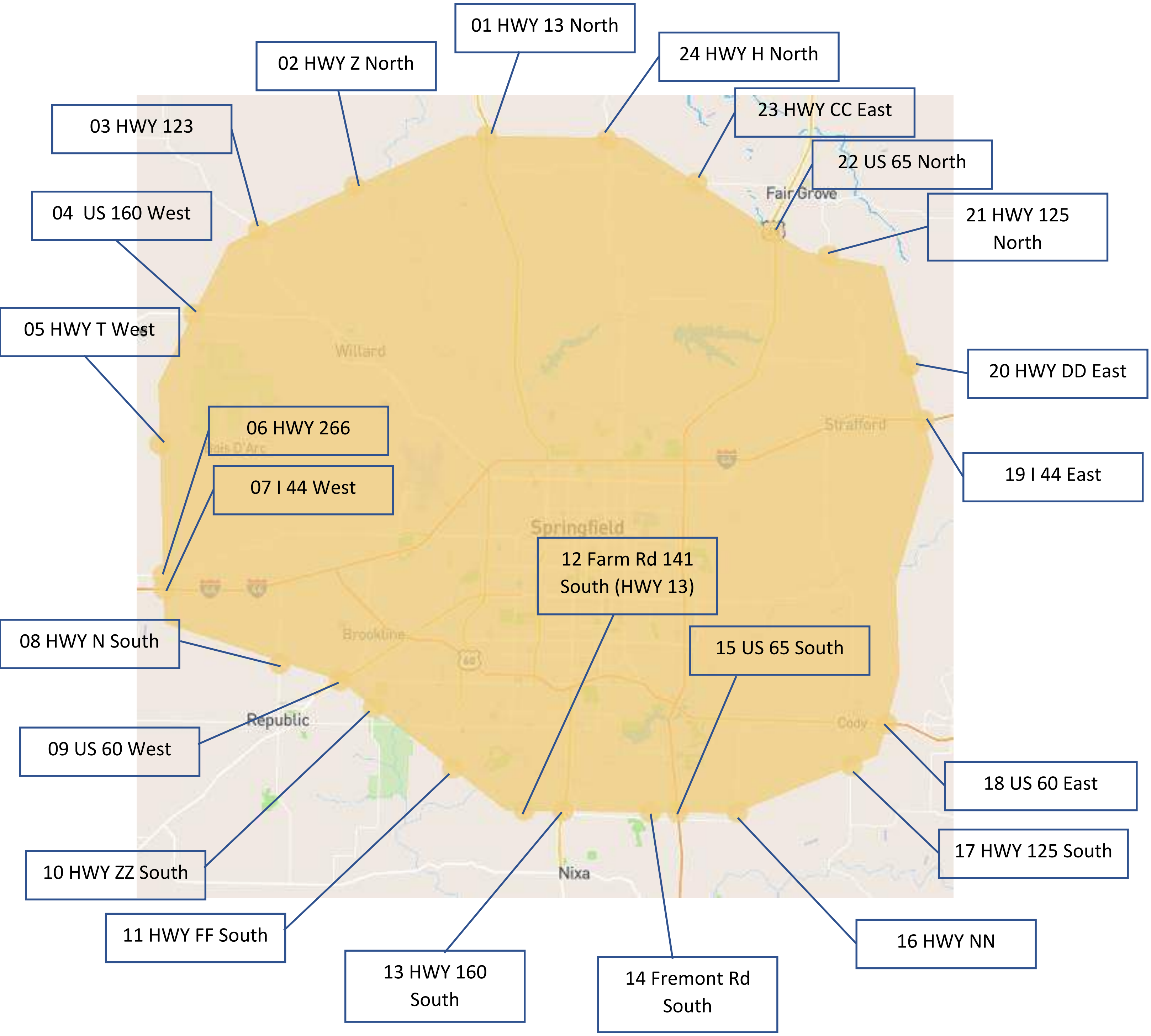
S2 ZONES


01 HWY 13 North
02 HWY O West
23 HWY WW East
22 HWY H North
03 US 160 North
Fair Grove
65
21 HWY AA East
04 HWY AB North
20 US 65 North
Willard
05 HWY 266 West
19 I 44 East
Strafford
s D'Arc
44
18 US 66 East
Springfield
17 Farm Rd 116 East
44
16 HWY YY East
06 I 44 West
Brookline
60
07 HWY 360 South
15 Farm Rd 132 East
Cody
Republic
08 HWY MM South
09 Haseltime Rd
14 US 65 South
Nixa
10 US 160 South
11 HWY 13 South
12 National Ave South
13 Bus 65 South

OD S2 Daily

Origins/Destinations	01 HWY 13 North	02 HWY O West	03 US 160 North	04 HWY AB North	05 HWY 266 West	06 I 44 West	07 HWY 360 South	08 HWY MM South	09 Haseltime Rd	10 US 160 South	11 HWY 13 South	12 National Ave South	13 Bus 65 South	14 US 65 South	15 Farm Rd 132 East	16 HWY YY East	17 Farm Rd 116 East	18 US 66 East	19 I 44 East	20 US 65 North	21 HWY AA East	22 HWY H North	23 HWY WW East
01 HWY 13 North	0	248	15	0	5	337	61	279	29	172	1513	84	230	2665	1	20	0	38	231	9	2	4	191
02 HWY O West	253	0	1	0	0	1	0	0	0	1	8	1	3	14	0	0	0	0	1	1	1	1	109
03 US 160 North	16	1	0	6	2	124	31	79	36	1147	89	30	144	679	1	7	1	22	180	34	1	8	2
04 HWY AB North	1	0	8	0	129	78	3	1176	21	78	8	1	3	4	0	0	0	0	4	1	0	0	0
05 HWY 266 West	3	0	1	153	0	1	1	31	2	33	5	2	2	8	0	1	0	2	10	6	0	1	0
06 I 44 West	335	2	97	73	3	0	7335	103	27	120	78	32	69	312	2	11	0	49	4762	236	1	26	13
07 HWY 360 South	93	0	28	11	2	8143	0	14	1	8	3	1	2	14	0	1	0	2	87	18	0	2	1
08 HWY MM South	269	0	68	1231	37	57	7	0	15	45	16	7	11	49	0	2	1	30	343	125	0	18	15
09 Haseltime Rd	26	0	36	22	4	24	1	17	0	31	6	2	4	9	0	1	0	3	32	13	0	2	1
10 US 160 South	227	3	1195	83	58	106	7	51	32	0	128	44	52	66	1	2	0	14	172	54	0	12	20
11 HWY 13 South	1609	7	135	6	5	62	3	11	6	100	0	156	105	98	2	12	0	11	274	90	2	32	52
12 National Ave South	120	1	37	2	2	30	1	6	2	35	165	0	265	122	6	9	0	11	84	23	1	63	3
13 Bus 65 South	281	2	129	3	4	68	2	11	4	47	138	258	0	218	9	28	3	49	220	79	3	209	2
14 US 65 South	2842	16	595	3	7	331	7	37	9	53	107	123	217	0	50	330	24	506	8170	3142	10	311	8
15 Farm Rd 132 East	2	0	0	0	0	4	0	0	0	0	1	2	6	29	0	2	0	0	1	2	0	1	0
16 HWY YY East	31	0	6	0	0	9	0	2	1	2	3	10	18	340	2	0	0	2	6	12	0	8	0
17 Farm Rd 116 East	0	0	0	0	0	0	0	0	1	0	0	0	1	17	0	0	0	1	1	1	0	0	0
18 US 66 East	33	0	19	1	3	43	1	21	8	11	11	14	49	512	1	2	1	0	49	16	0	6	0
19 I 44 East	240	1	184	2	10	4875	56	316	29	138	274	78	165	7447	0	4	1	57	0	37	1	18	2
20 US 65 North	10	0	38	2	2	268	13	135	13	40	82	23	60	3069	1	11	0	14	43	0	0	5	0
21 HWY AA East	2	0	0	0	0	1	0	1	0	1	1	0	2	11	0	0	0	0	0	0	0	16	0
22 HWY H North	4	0	6	0	0	27	1	21	1	14	47	47	207	310	0	7	1	3	22	3	16	0	1
23 HWY WW East	196	111	1	0	0	16	1	24	1	23	55	1	1	9	0	0	0	0	1	0	0	1	0

S3 ZONES


01 HWY 13 North
02 HWY Z North
24 HWY H North
23 HWY CC East
03 HWY 123
22 US 65 North
Fair Grove
04 US 160 West
21 HWY 125 North
05 HWY T West
Willard
20 HWY DD East
06 HWY 266
Bois D'Arc
Strafford
19 I 44 East
07 I 44 West
Springfield
12 Farm Rd 141 South (HWY 13)
08 HWY N South
Brookline
15 US 65 South
60
Republic
Cody
09 US 60 West
18 US 60 East
17 HWY 125 South
Nixa
10 HWY ZZ South
11 HWY FF South
16 HWY NN
13 HWY 160 South
14 Fremont Rd South

OD S3 Daily

Origins/Destinations	01 HWY 13 North	02 HWY Z North	03 HWY 123 North	04 US 160 West	05 HWY T West	06 HWY 266 West	07 I 44 West	08 HWY N South	09 US 60 West	10 HWY ZZ South	11 HWY FF South	12 Farm Rd 141 South (HWY 13)	13 HWY 160 South	14 Fremont Rd South	15 US 65 South	16 HWY NN	17 HWY 125 South	18 US 60 East	19 I 44 East	20 HWY DD East	21 HWY 125 North	22 US 65 North	23 HWY CC East	24 HWY H North
01 HWY 13 North	0	0	2	35	1	2	241	65	148	33	16	37	93	3	1219	6	12	393	142	1	0	6	93	2
02 HWY Z North	1	0	1	20	0	1	4	2	5	1	0	0	1	0	1	0	0	1	1	0	0	0	1	0
03 HWY 123 North	2	1	0	3	0	0	4	11	14	2	1	0	10	0	23	0	0	7	13	0	0	1	0	0
04 US 160 West	33	22	6	0	2	1	3	10	7	2	1	0	3	0	19	0	1	6	19	1	0	5	1	0
05 HWY T West	0	0	0	1	0	1	1	44	1	0	0	0	1	0	2	0	0	0	1	0	0	0	0	0
06 HWY 266 West	2	1	1	0	1	0	1	30	3	1	1	0	1	0	3	0	0	2	5	0	0	1	0	0
07 I 44 West	234	6	3	2	0	2	0	258	51	19	28	46	334	3	1369	9	17	581	3944	3	1	178	1	5
08 HWY N South	63	3	12	7	60	50	281	0	8	1	0	0	0	0	3	0	0	1	87	0	0	25	0	1
09 US 60 West	148	5	14	6	2	2	46	6	0	118	21	19	129	4	431	9	19	254	200	2	2	64	1	2
10 HWY ZZ South	30	1	3	0	2	1	19	2	142	0	4	5	22	0	83	0	3	33	32	0	0	12	0	0
11 HWY FF South	17	1	1	1	0	0	29	0	11	3	0	2	4	0	4	0	0	8	8	0	0	2	0	0
12 Farm Rd 141 South (HWY 13)	37	0	0	2	0	0	37	0	14	5	4	0	25	0	7	0	0	4	4	0	0	2	0	0
13 HWY 160 South	130	1	14	3	2	1	373	2	115	19	4	26	0	5	57	1	2	116	107	1	0	33	1	3
14 Fremont Rd South	1	0	0	0	0	0	2	0	1	0	0	0	4	0	9	1	0	1	2	0	0	1	0	0
15 US 65 South	1345	1	24	21	3	6	1524	4	425	95	4	7	75	12	0	16	11	838	2080	10	2	475	1	29
16 HWY NN	6	0	1	0	0	0	7	0	8	1	0	0	0	0	10	0	7	483	23	0	0	4	0	0
17 HWY 125 South	12	0	1	0	0	0	19	0	23	2	0	0	0	0	15	9	0	248	43	2	5	11	0	1
18 US 60 East	432	0	5	5	1	8	581	3	241	39	6	4	107	4	792	502	267	0	30	1	8	69	0	4
19 I 44 East	147	1	12	18	1	7	3917	91	171	40	7	5	66	4	1925	9	34	24	0	2	15	21	0	2
20 HWY DD East	0	0	0	0	0	0	5	1	1	1	0	0	0	0	13	1	2	1	1	0	3	1	0	0
21 HWY 125 North	1	0	0	0	0	0	0	0	2	1	0	0	0	0	2	0	2	5	12	3	0	1	0	0
22 US 65 North	5	0	1	8	0	1	199	31	62	16	1	2	21	1	509	2	7	62	23	0	1	0	0	1
23 HWY CC East	90	0	0	1	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	69
24 HWY H North	2	0	0	1	0	0	3	2	3	1	0	0	1	0	26	0	0	3	3	1	0	1	48	0

APPENDIX H
TRAVEL DEMAND MODELING SUMMARY

CBB TRANSPORTATION ENGINEERS+PLANNERS
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TECHNICAL MEMORANDUM

Date: April 29, 2022 (revised May 16, 2022)

To: Mr. Andy Thomason, AICP, Ozarks Transportation Organization
Mr. Steve Prange, PE, CMT

From: Srinivas Yanamanamanda, P.E., PTOE, PTP
Mirza A. Sharif, Ph.D

CBB Job No: 125-2021

Project: Ozarks Transportation Organization Highway 13 Corridor Study
Traffic Forecasts
Springfield, Missouri

The purpose of this technical memorandum is to summarize the traffic forecasts developed for the Interstate 44 and Highway 13 interchange in the Springfield area. CBB has developed traffic forecasts to assist CMT in evaluating interchange alternatives. The Ozarks Transportation Organization's (OTO) existing Travel Demand Model was utilized to develop the traffic forecasts. Additional data sources utilized in traffic forecasts included previously completed work by the Missouri Department of Transportation (MoDOT) and associated traffic volume data, and travel pattern information identified from the Origin Destination analysis completed by us.

The OTO Travel Demand Model is a 4-step travel demand model developed using the VISUM software platform. Travel demand model files previously developed by others for 2018 Existing scenario and 2045 Existing plus Committed scenario were provided for use in this project. It should be noted that while this effort for developing traffic forecasts for the I-44/Highway 13 interchange cursory checks of modeled networks, socio-economic data, and model run procedure sequences; no additional model calibration or validation was completed as part of this effort.

Traffic forecasts were developed for the following scenarios. Base growth projections scenarios below included land use growth assumptions developed by OTO and provided to us as reflected in 2045 Existing Plus Committed travel demand model. The added growth projections scenarios below included additional growth to reflect increased development in the north and southwest areas.

Scenario 1 – base growth projections

This scenario included land use growth assumptions developed by OTO and provided to us as reflected in 2045 Existing Plus Committed travel demand model.

Scenario 1a – base growth projections for high peak periods during Fair

This scenario included land use growth assumptions developed by OTO and provided to us as reflected in 2045 Existing Plus Committed travel demand model. Hourly forecasts developed focused on heavy peak periods to reflect conditions during the occurrence of Fair in the vicinity of the interchange.

Scenario 2 – base growth projections with Park Street interchange

This scenario included land use growth assumptions developed by OTO and provided to us as reflected in 2045 Existing Plus Committed travel demand model. In addition, assumed roadway network included the construction of a full Park Street interchange on I-44 to the west of the Highway 13 interchange.

Scenario 3 – Added growth projections

This scenario was developed to be able to test the interchange improvement alternatives for increased travel demand between the north and the southwest areas relative to this interchange location. This was achieved via increased land use growth accordingly.

Scenario 4 – Added growth projections with Park Street interchange

This scenario was developed to be able to test the interchange improvement alternatives for increased travel demand between the north and the southwest areas relative to this interchange location. This was achieved via increased land use growth accordingly. In addition, assumed roadway network included the construction of a full Park Street interchange on I-44 to the west of the Highway 13 interchange.

The Added Growth Projections scenario assumes the following additional growth beyond the 2045 committed scenario models:

- 1000 additional employees in TAZ 107, coded as increase in WhlsTransUtil attribute
- 300 additional homes in TAZ 122, coded as increase in SFDU
- 300 additional homes in TAZ 241, coded as increase in SFDU

Figure 1 shows the TAZs utilized for the Added Growth Projections scenario.

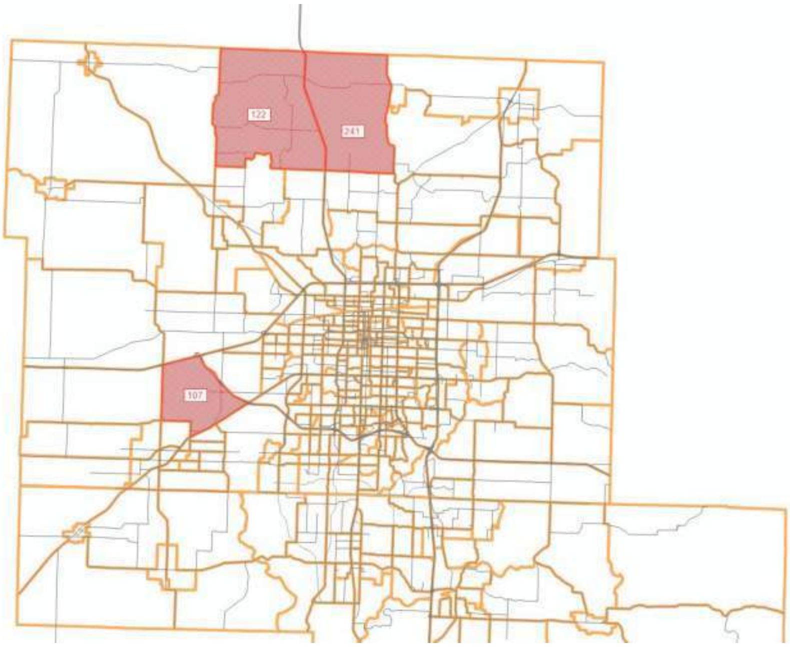

Figure 1: TAZs with Growth Increases for Added Growth Scenario

Traffic forecasts for 2030 and 2050 evaluation years were developed for operational analysis and modeling, and are attached to this technical memorandum. Should there be any questions regarding this technical memorandum, please feel free to contact us at 314-878-6644 or syanamanamanda@cbbtraffic.com.

Traffic Forecasts Scenario 1 - Base growth projections

BASE AM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	200	1140	50	50	80	240	200	590	270	260	80	40
WB Ramps		1390	250				100	660		380		400
EB Ramps	420	1350		220		270		540	310			
Kearney	160	460	250	200	300	100	135	880	185	125	400	250

BASE PM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	110	745	50	100	60	260	300	1200	430	310	110	120
WB Ramps		1065	250				140	1240		300		690
EB Ramps	360	1005		270		200		1110	400			
Kearney	245	870	260	260	515	250	220	670	300	310	385	205

2030 AM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	215	1275	55	60	90	270	225	660	290	280	90	45
WB Ramps		1550	275				110	715		420		460
EB Ramps	465	1505		250		300		575	345			
Kearney	175	495	270	215	325	105	145	950	200	135	430	270

2030 PM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	125	835	60	115	70	295	335	1335	465	335	120	140
WB Ramps		1190	275				155	1345		335		790
EB Ramps	400	1125		315		220		1185	445			
Kearney	265	940	280	285	555	270	235	725	325	335	415	220

2050 AM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	250	1700	70	70	110	335	280	825	340	325	105	50
WB Ramps		2035	325				130	845		515		600
EB Ramps	670	1880		330		350		645	420			
Kearney	200	575	310	250	375	125	170	1100	235	160	500	315

2050 PM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	160	1200	80	140	85	365	420	1750	540	390	145	180
WB Ramps	0	1630	325	0	0	0	185	1575	0	410	0	1135
EB Ramps	640	1400	0	430	0	260	0	1330	540	0	0	0
Kearney	305	1100	325	330	645	310	275	840	380	400	485	260

Traffic Forecasts Scenario 1a - Base growth projections with Fair High Peak

2030 FAIR PM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	250	1010	65	120	75	315	355	1470	695	530	130	250
WB Ramps	0	1565	290	0	0	0	165	1430	0	355	0	1090
EB Ramps	725	1195	0	340	0	235	0	1255	470	0	0	0
Kearney	280	995	295	305	590	285	250	770	345	355	440	235

2050 FAIR PM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	300	1455	85	150	90	395	455	1985	785	620	155	300
WB Ramps	0	2120	350	0	0	0	200	1700	0	445	0	1525
EB Ramps	1040	1525	0	465	0	280	0	1435	585	0	0	0
Kearney	330	1190	350	355	695	335	300	905	410	430	525	280

Traffic Forecasts Scenario 1 - Base growth projections with Park Street Interchange

2050 AM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	250	1000	70	70	110	335	280	400	340	325	105	50
WB Ramps		1535	125				130	620		515		400
EB Ramps	170	1880		105		350		645	420			
Kearney	200	575	310	250	375	125	170	1100	235	160	500	315
Park Int	500		200	225								200

2050 PM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	160	675	80	140	85	365	420	875	540	390	145	180
WB Ramps	0	1330	100	0	0	0	185	1250	0	410	0	585
EB Ramps	340	1400	0	105	0	260	0	1330	540	0	0	0
Kearney	305	1100	325	330	645	310	275	840	380	400	485	260
Park Int	300		225	325								550

Traffic Forecasts Scenario 3 - Added growth projections

2030 AM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	215	1450	55	60	90	270	225	660	290	280	90	45
WB Ramps		1550	450				110	715		420		460
EB Ramps	465	1505		250		300		575	345			
Kearney	175	495	270	215	325	105	145	950	200	135	430	270

2030 PM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	125	835	60	115	70	295	335	1510	465	335	120	140
WB Ramps		1190	275				155	1520		335		790
EB Ramps	400	1125		490		220		1185	445			
Kearney	265	940	280	285	555	270	235	725	325	335	415	220

2050 AM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	250	2000	70	70	110	335	280	825	340	325	105	50
WB Ramps		2035	625				130	845		515		600
EB Ramps	670	1880		330		350		645	420			
Kearney	200	575	310	250	375	125	170	1100	235	160	500	315

2050 PM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	160	1200	80	140	85	365	420	2050	540	390	145	180
WB Ramps	0	1630	325	0	0	0	185	1875	0	410	0	1135
EB Ramps	640	1400	0	730	0	260	0	1330	540	0	0	0
Kearney	305	1100	325	330	645	310	275	840	380	400	485	260

Traffic Forecasts Scenario 4 - Added growth projections with Park Street Interchange

2050 AM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	250	1000	70	70	110	335	280	400	340	325	105	50
WB Ramps		1535	125				130	620		515		400
EB Ramps	170	1880		105		350		645	420			
Kearney	200	575	310	250	375	125	170	1100	235	160	500	315
Park Int	500		500	225								200

2050 PM	SBL	SBT	SBR	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
Norton	160	675	80	140	85	365	420	875	540	390	145	180
WB Ramps	0	1330	100	0	0	0	185	1250	0	410	0	585
EB Ramps	340	1400	0	105	0	260	0	1330	540	0	0	0
Kearney	305	1100	325	330	645	310	275	840	380	400	485	260
Park Int	300		225	625								550