Greater Dalton MPO

201 South Hamilton Street, Dalton, GA 30720
(706) 876-2592

Public Hearing: December 7, 2023 – Joint Committee Meeting Minutes

Location: 1999 Riverbend Drive, Dalton, Georgia

Call to Order: 10:04 A.M.

Adjournment: 11:05 A.M.

I. Presentations

Presenter: GDOT District 6 – Office of Planning

Discussion:

- **Roundabout for SR 3 @ Five Springs Road and Old Dixie Highway**

  The group discussed the proposed roundabout at the intersection and what alternatives were considered. The MPO was invited to be part of the concept meeting, and voice concerns to the project design team.
  GDOT encouraged any comments regarding the proposed project be submitted before the concept meeting, so the design team would have time to review those concerns.

  The traffic report and concept are attached at the end.

Presenter: City of Dalton

Discussion:

- **Market Street Corridor**:

  Design for Phase II in progress.

  Right-of-Way for Phase I still in negotiation.

Presenter: Whitfield County Engineering Department

Discussion:

- The Whitfield County Board of Commissioners voted to construct a roundabout at the intersection of Houston Valley Road and Mt. Vernon Road. The project is in design phase.
- The realignment of Dawnville Beaverdale Road and Beaverdale Road Intersection was completed by the Public Works Department. The New section is now open to the

public. A new signalized intersection, to the north, is in design phase.

Presenter: Greater Dalton Metropolitan Planning Organization

Discussion:

- **Consideration to accept agreement with Chattanooga-Hamilton County**

  The MPO must renew the MOU with Chattanooga-Hamilton County to maintain current planning boundaries. The new agreement will reflect data from the 2020 Census.

- **FY 2024-2027 Transportation Improvement Program**

  Two draft amendments will be brought before the Policy Committee to reflect updated funding amounts and codes for GDOT projects in the TIP.

II. New Business

1) Action Item: Consideration to accept agreement with Chattanooga-Hamilton County
   Approved: Mayor Kenny Gowin made a motion to accept the continued agreement. Mayor Tom Dickson seconded the motion. The agreement passed on a 7-0 vote.

2) Action Item: Amendments to the FY 2024-2027 Transportation Improvement Program
   Approved: Mayor Tom Dickson made a motion to approve the draft amendments. Mayor Kenny Gowin seconded the motion. The amendments passed on a 7-0 vote.

III. Adjournment

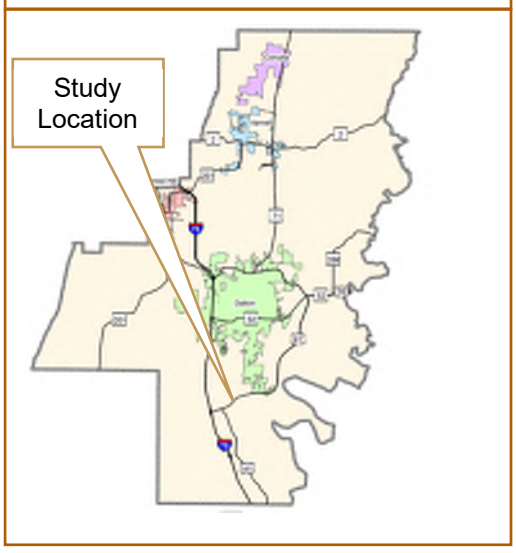
Kent Benson adjourned the meeting at 11:05 A.M.

Minutes submitted by: Jacob Bearden

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

TRAFFIC ENGINEERING STUDY

October 2021



PRIMARY ROUTE: SR 3

SECONDARY ROUTE: S DALTON BYPASS

MILEPOINT: N/A

GDOT DISTRICT: 6

CONGRESSIONAL DISTRICT: 14

COUNTY: WHITFIELD

CITY: DALTON

PREPARED BY: ARCADIS

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STUDY REQUEST

Georgia Department of Transportation (GDOT) District 6 requested for a Traffic Engineering (TE) study at the intersection of State Route (SR) 3 and Old Dixie Highway/Five Springs Road due to the frequency of fatal and severe injury crashes observed at the intersection.

PROJECT LOCATION

The project is located in the city of Dalton (Whitfield County) at the intersection of SR 3 and Old Dixie Hwy/Five Springs Rd. SR 3 is a four-lane rural major arterial that runs in the east-west direction with a posted speed limit of 55 MPH. Traffic in opposing direction along SR 3 is separated by paved median. Old Dixie Hwy is a two-lane rural major collector that connects traffic from the south to the intersection. The posted speed limit along Old Dixie Hwy is 50 MPH. Five Spring Rd is a two-lane rural local road that connects traffic from the north to the intersection. The posted speed limit along Five Springs Rd is 40 MPH. The intersection is stop controlled on the side streets (Five Springs Rd/Old Dixie Hwy). Land use within the vicinity of the intersection consists primarily of forest. The area view of the study location is shown in **Figure 1**.

PROJECT JUSTIFICATION STATEMENT

The intersection at SR 3 and Old Dixie Hwy/Five Springs Rd was identified by GDOT District 6 Traffic Operations having observed fatal and severe injury collisions in recent years. For the 6-year crash analysis period (2015-2020), the intersection recorded a total of 46 crashes, comprising of 1 fatal, 19 injury, and 26 property-damage only (PDO) collisions. The fatal crash was an angle collision between a NB passenger car (Veh #1) and an EB passenger car (Veh #2) on a clear day with dry road surface condition around 5 PM. Veh #1 was attempting to cross SR 3 from the stop-controlled approach but failed to yield to Veh #2 which had the right-of-way. Driver of Veh #1 sustained fatal injury having been struck on the driver's front side by Veh #2. Angle crashes at intersection represented approximately 37% (17 crashes) of the total crashes while rear-end crashes accounted for 39% (18 crashes) of the total crashes. The angle crashes occurred primarily due to at fault drivers' failure to yield to vehicles with the right-of-way as noted from the crash reports. Out of the 17 angle crashes, 8 were right-angle collisions involving two vehicles traveling perpendicular to each other and 9 were left-turn crashes involving left-turn vehicles and vehicles proceeding through the intersection. Left turn crashes were more prevalent on the SB approach compared to other approaches. Rear-end collisions were predominant on the NB channelized right turn approach. From the crash history reports, "following too closely" was cited as a major concern for rear-end collisions.

This current study seeks to investigate the safety concerns and propose safety countermeasures that are intended to reduce the high crash frequency and severity at the intersection. The study will provide an evidence-based comparison of intersection alternatives to justify the preferred intersection traffic control for mitigating the crash problems. The crash data is included in **Appendix A.**

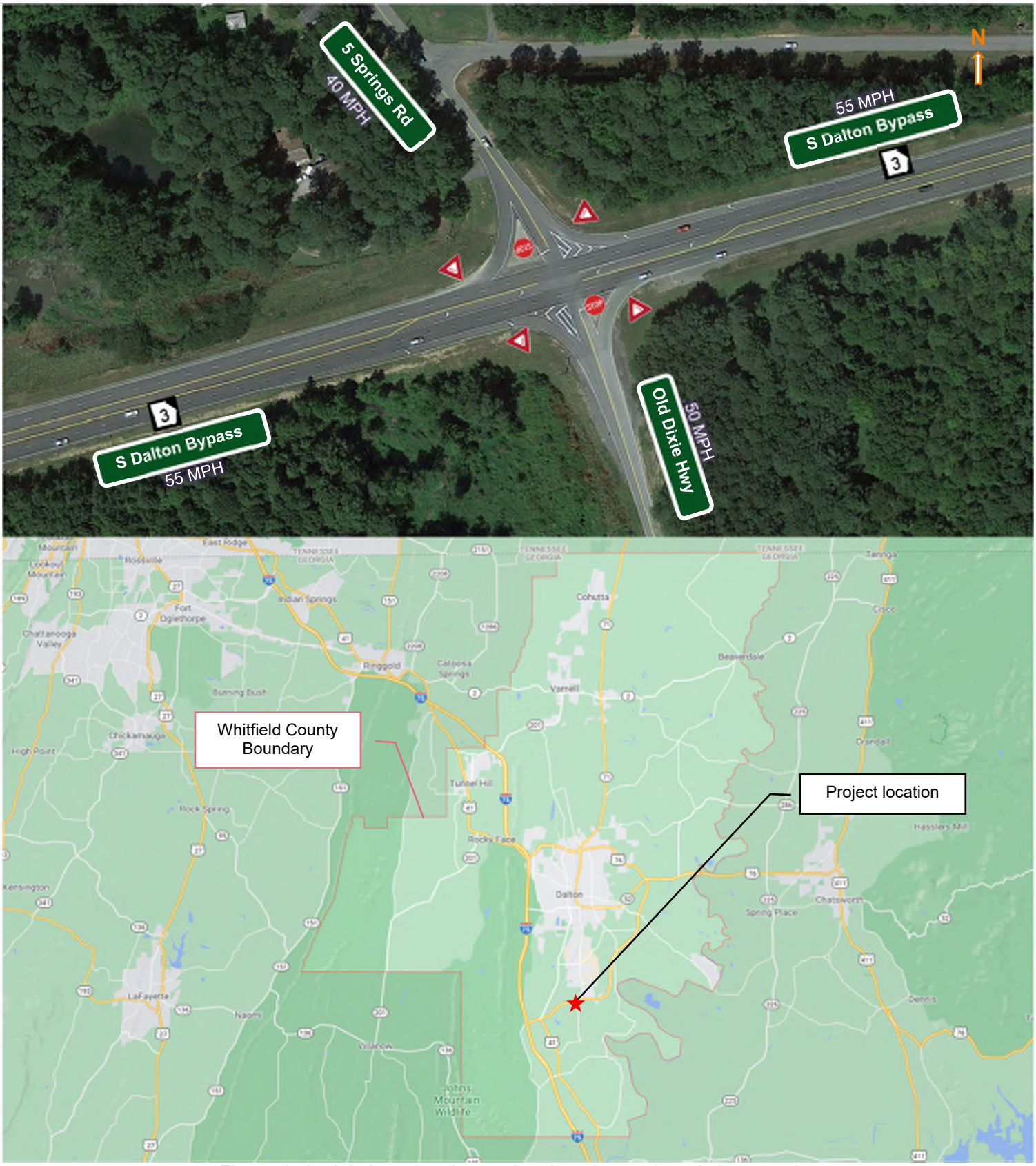


Figure 1: Aerial view showing project location and study intersection

FIELD VISIT

A field visit was completed on Friday, April 30, 2021, to observe, identify and document existing site and traffic conditions. The field visit observations included:

A. Intersection Control and Geometry:
The four-leg intersection is unsignalized. The mainline, SR 3, is free flow, while the side streets, 5 Springs Rd/Old Dixie Hwy, are stop controlled. The mainline has 2 through lanes, one left turn lane, and channelized right turn lanes (striped islands) on each approach. The sides streets have single lane with a slip right turn lane channelized with raised concrete island on each approach.

B. Horizontal/Vertical Grades: The intersection is relatively on a level ground with little or no vertical curves. There is a horizontal curve approximately 400 ft from the intersection on the northbound approach.

C. Intersection Delay / Queuing: During the field visit, no traffic queues were observed within the intersection. Traffic was free flowing along the mainline with minimal stop delays observed for vehicles on the side street. Travel speed on the mainline appear to be higher than posted speed limit, making it difficult for side street traffic to accept gaps to cross or make a left turn.

D. Sight Distance / Obstruction Concerns: No sight distance obstructions were observed within the intersections. Sight distances are adequate on all intersection approaches. Although not measured on the field, sight distances are adequate on all intersection approaches as noted in previous GDOT TE study.

E. Adjacent Signalized Intersection: The closest signalized intersection along SR 3 corridor west of the study location is at SR 3 and S Dixie Rd/US 41 (approximately 1.6 miles). To the east of the study intersection, approximately 1750 ft is the signalized intersection of SR 3 and Abutment Rd

F. Pavement/Signs/Striping Conditions: The pavement markings at intersection appeared adequate with minor wears. Field observations showed that the road signs are adequately maintained and highly visible. All right-turn maneuvers at the intersection are controlled with “YIELD” signs (R1-2). Through and left turn movements from the side streets are controlled by standard “STOP” signs (R1-1). from the EB and WB approaches are channelized and controlled with yield signs (R1-2).

G. Pedestrian Accommodations: There are no sidewalks and pedestrian crosswalks within the intersection.

H. Lighting: There are no overhead street lightings at the intersection.

I. Parking: There are no on-street parking accommodations at or near the intersection.

J. Potential Environmental Impacts: Based on field observations, several environmental concerns or impact of the project to existing utilities were noted. The impacts are further discussed in the environmental section of this report.

K. Other Modes of Transportation: There are no bus stops along the corridors.

CRASH ANALYSIS

Six-years crash data (2015-2020) for the area of influence were obtained from Georgia Electronic Accident Reporting System (GEARS). Crash analysis was performed to quantify the frequency and severity of crashes within the project limit. The goal of the crash analysis was to understand the crash trends/patterns and identify improvements that have the greatest potential to address the safety concerns. Results from the crash analysis are highlighted below. Crash diagrams are included in **Appendix B**.

Summary of Intersection Crashes

Table 1 summarizes the crash data by crash severity and manner of collisions at the intersection. For the 6-year period (2015-2020), the intersection experienced a total of 46 crashes including 1 fatal, 19 injury and 26 PDO crashes. Rear-end crashes were the most prevalent crash type at the intersection, followed by angle collisions. As shown in **Table 1**, angle crashes represented approximately 37% (17 crashes) of the total crashes while rear-end crashes accounted for 39% (18 crashes) of the total crashes. The fatal collision was a right-angle crash between a NB through vehicle (Veh #1) and an EB through vehicle (Veh #2). Veh #1 was attempting to cross SR 3 from the stop-controlled approach but failed to yield to Veh #2 which had the right-of-way. Driver of Veh #1 sustained fatal injury having been t-boned by Veh #2. From the crash reports, the angle crashes within the intersection occurred primarily due to at fault drivers' failure to yield to vehicles that had the right-of-way. Out of the 17 angle crashes, 8 were right-angle collisions involving two vehicles traveling perpendicular to each other and 9 were left-turn crashes involving left-turn vehicles and vehicles proceeding through the intersection. From the breakdown of angle collisions (**Table 2)**, left turn crashes appear to be more prevalent for the SB left turn maneuver compared to other intersection left turn movements. Rear-end collision is most predominant on the NB channelized right lane accounting for 83% (15 out 18) of all rear-end collisions at the intersection. According to police reports, "following too closely" was cited as the major contributory factor for the rear-end collisions. Using the Highway Safety Manual (HSM) methodology, intersections with similar characteristics typically experience 2.8 crashes per year. The crash rate at this intersection is considerably higher (7.7 crashes per year) compared to the rates observed at other intersections with similar geometry and traffic characteristics, hence the need for safety improvements at this location.

Table 1: Intersection Crash Summary (2015-2020)

Manner of Collision	Crash Severity	Year						Total	Percent Total
		2015	2016	2017	2018	2019	2020		
Angle		3	1	1	4	7	1	**17**	37%
	K					1		1	
	A				1	1		2	
	B	2			3	1		6	
	C	1				1		2	
	O		1	1		3	1	6	
Not A Collision with Motor Vehicle		2	1	1	1	3	2	**10**	22%
	B		1			1	1	3	
	C	1		1		1		3	
	O	1			1	1	1	4	
Rear End		2		3	2	7	4	**18**	39%
	C				1	1	1	3	
	O	2		3	1	6	3	15	
Sideswipe-Same Direction		1						**1**	2%
	O	1						1	
Total		**8**	**2**	**5**	**7**	**17**	**7**	**46**	**100%**
Total Fatal Crashes	K					1		1	2%
Total Injury Crashes	ABC	4	1	1	5	6	2	19	41%
Total PDO Crashes	O	4	1	4	2	10	5	26	57%
Average Crashes (per year)								7.7	
HSM Predicted Crashes (per year)								2.8	
Average Daily Traffic (ADT)		19,530	19,620	18,210	19,150	20,870	20,870		
Crash Rate (per 100 MEV)		11.2	2.8	7.5	10.0	22.3	9.2		
Injury Rate (per 100 MEV)		5.6	1.4	1.5	7.2	7.9	2.6		
Fatality Rate (per 100 MEV)		0.0	0.0	0.0	0.0	1.3	0.0		

ADT = average daily traffic; MEV = million entering vehicles
K=fatal injury; A=Incapacitating injury; B=Non-incapacitating injury; C=Possible injury; O=No injury

Table 2: Distribution of Angle Crashes by Maneuver and Crash Severity

Maneuver (Vehicle #1)	Injury Severity	Maneuver (Vehicle #2)				
		EBT	EBL	NBT	SBT	WBT
EBT	B			1		
WBT	A				1	
WBL	A	1				
	O	1				
NBT	K	1				
	B	2				
	C					1
	O	1				1
NBL	B	1			1	
	O		1			
SBL	B			1		
	C			1		
	O			2		

Time of the Day Analysis

Figure 2 displays the crashes by time of the day in relation to hourly traffic volumes and the lighting conditions within the study limit. As shown in **Figure 2**, the crashes were fairly distributed across the 24-hr period with peak crash frequencies observed at the morning (6 AM) and evening (5 PM) hours. The data shows a strong correlation between the crash frequencies and traffic volumes. Moreover, majority of the crashes (65%) occurred during the daylight hours, with noticeable proportions (about 28% of total crashes) occurring during the "dark not lighted" hours.

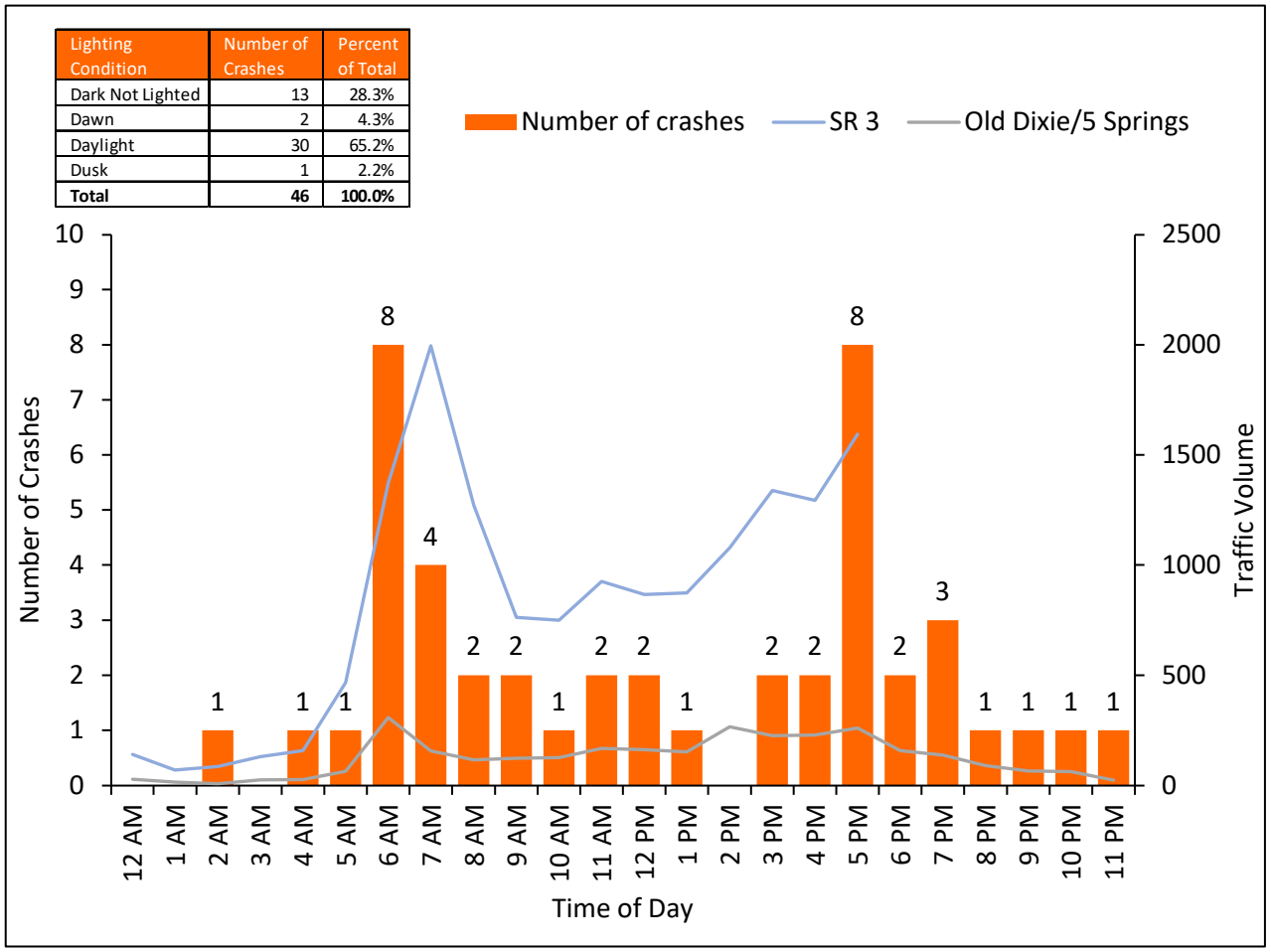


Figure 2: Summary of Crashes by Time of Day, Lighting Condition and Hourly Vehicular Volume

Seasonal Analysis

The number of crashes occurring each day of the week as well as the month of the year were analyzed to identify high crash frequency days and months. As shown in **Table 3,** the crashes were distributed fairly across the weekdays and across the months. The crash frequencies appear to be high in the Summers, especially in August, compared to the other months or seasons.

Table 3: Distribution of Crashes by Day of Week and Month of Year

SEASON/ Month	DAY OF WEEK							Total	Percent of Total
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday		
WINTER	**3**	**1**	**1**	**3**	**1**	**0**	**1**	**10**	**22%**
December	1	1	1	1			1	5	**11%**
January	1			2				3	**7%**
February	1				1			2	**4%**
SPRING	**3**	**1**	**2**	**1**	**2**	**1**	**1**	**11**	**24%**
March	3		1		1			5	**11%**
April			1		1		1	3	**7%**
May		1		1		1		3	**7%**
SUMMER	**1**	**4**	**1**	**2**	**2**	**2**	**2**	**14**	**30%**
June	1	1	1	2				5	**11%**
July		3						3	**7%**
August					2	2	2	6	**13%**
FALL	**1**	**2**	**4**	**0**	**2**	**1**	**1**	**11**	**24%**
September		1	1			1		3	**7%**
October	1	1			1		1	4	**9%**
November			3		1			4	**9%**
Total	**8**	**8**	**8**	**6**	**7**	**4**	**5**	**46**	**100%**
Percent of Total	17%	17%	17%	13%	15%	9%	11%		

OPERATIONAL ANALYSIS

Traffic Volume Counts

Twelve-hour (12-hr) intersection turning movement counts were collected at the intersection of SR 3 and 5 Springs Rd/old Dixie Hwy on Wednesday, October 9, 2019 from 6:00 AM to 6:00 PM. The counts included all cars, trucks or other motorized vehicles passing through the intersections. The traffic volume counts for the intersection is included in **Appendix C**.

Existing Operations

A Synchro analysis was completed for the existing traffic and No Build conditions at the intersection. Results of the analysis are included in **Appendix D** and summarized below. **Table 4** shows the results of the existing and No Build traffic operations at intersection.

Table 4: Existing & No Build AM / PM Peak Hour Intersection Operations

Approach	Existing (2019)				No Build (2024)				No Build (2044)			
	AM		PM		AM		PM		AM		PM	
	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS
Old Dixie Hwy (NB)	24.9	C	6.1	A	265.5	F	7.4	A	3488.5	F	1188.2	F
5 Springs Rd (SB)	36.3	E	9.8	B	46.6	E	15.9	C	2310.8	F	1615.1	F
SR 3 (EB)*	4.0	-	3.0	-	4.4	-	3.2	-	24.9	-	4.0	-
SR 3 (WB)*	4.6	-	3.9	-	4.8	-	4.4	-	76.4	-	9.8	-
Intersection	**6.4**	**-**	**4.1**	**-**	**23.4**	**-**	**4.8**	**-**	**105.7**	**-**	**85.4**	**-**

**Free flow approach. Non-zero delay include delay for left and u-turns*

As shown in **Table 4**, traffic operations on the side streets for the existing and No Build (2024) conditions appear to be stable in the PM peak hours compared to the AM peak hours, however, in the design year (2044), traffic operations deteriorate, with the side streets operating at LOS F.

Warrant Analysis

The Manual of Uniform Traffic Control Devices 2009 Edition (MUTCD) is the established source for evaluating warrants for installing a traffic signal. The MUTCD establishes nine traffic signal warrants that define minimum conditions under which signal installations may be justified. A signal warrant analysis was performed based on existing 12-hour turning movement counts at the intersections. The full warrant report is included in **Appendix E. Table 5** shows the signal warrant analysis for the intersection. Based on the signal warrant analyses, the intersection does not meet any of the signal warrants at 100% volume threshold. Therefore, a signal is not warranted at this intersection.

Table 5: Summary of Current Conditions Signal Warrant Analysis

Volume Threshold Analysis	Warrant 1a	Warrant 1b	Warrant 2	Warrant 3	Warrant 4	Warrant 5	Warrant 6	Warrant 7	Warrant 8	Warrant 9
100% Volume Threshold	No	No	No	No	N/A	N/A	N/A	No	N/A	N/A

N/A = not applicable

INTERSECTION CONTROL EVALUATION (ICE)

Georgia Department of Transportation's Intersection Control Evaluation (ICE) policies were developed to further leverage safety advancements as part of intersection improvements for the study intersection. The ICE process consists of two distinct stages. Stage 1 identifies potential intersection control types that may provide safety benefits based on the existing conditions. Stage 2 further evaluates those alternatives inclusive of safety, operations, cost, environmental impacts, and project support. The following alternatives were evaluated in Stage 2 for the intersection. The ICE results are included in **Appendix F** and the operational analyses for each alternative are also included in **Appendix G**. Two intersection alternatives were evaluated including a multi-lane roundabout, and an RCUT.

Multi-lane Roundabout

A multi-lane roundabout was evaluated for this intersection because it would provide fewer conflict points than the existing configuration. This alternative would also decrease the crash frequency and severity while increasing operational efficiency and reducing speeds for vehicles entering the intersection. The multi-lane roundabout would help mitigate the 9 left-turn and 8 right-angle crashes by removing opposing conflict points since drivers are expected to travel in the same direction through the circulatory roadway. Based on Federal Highway Administration (FHWA) crash modification factors, the installation of a multi-lane roundabout at this location is anticipated to reduce the occurrence of fatal/injury and PDO collisions by 87% and 71%, respectively, for all crash types. The annual safety benefit cost for this alternative is 13.2. This alternative ranked first in the ICE Stage 2 analysis with a score of 6.4. The total cost for the multi-lane roundabout is estimated to be $2,405,000.

Restricted Crossing U-turn (RCUT)-Stop Control

An unsignalized Restricted Crossing U-turn (RCUT-stop control) would reduce the 32 conflict points at existing intersection to 9 points and would provide substantial safety benefits with moderate increase in delay for the side street traffic. This alternative would restrict left-turn and through movements from the side streets (5 Springs Rd/Old Dixie Hwy), potentially mitigating the 14 angle collisions that occurred between the side street vehicles and vehicles on the mainline (SR 3). Based on Federal Highway Administration (FHWA) crash modification factors, the installation of an RCUT is anticipated to reduce the occurrence of fatal/injury and PDO collisions by 54% and 43%, respectively, for all crash types. The estimated construction cost for this alternative is $1,100,000. The annual safety benefit cost for this alternative is 16.3. The RCUT ranked second in the stage 2 analysis of the ICE with a score of 5.6.

Intersection Crash Reduction Factors

The Crash Reduction Factors (CRF) used in the ICE Stage 2 analysis were determined from the FHWA's Crash Modification Factors Clearinghouse website (http://www.cmfclearinghouse.org/) and are provided in **Table 4** below.

Table 6: Intersection Crash Reduction Factors

Alternative	PDO	Fatal/Injury
Multi-lane Roundabout	71% (CMF ID: 229)	87% (CMF ID: 230)
RCUT	43% (CMF ID: 5556)	54% (CMF ID: 5557)

EXPECTED OPERATIONAL RESULTS

The intersection delay and LOS results for the design year (2044) for all alternatives considered in the ICE Stage 2 analysis are summarized in **Table 5**. The analysis reports are also provided in **Appendix G**.

As shown in **Table 5**, the RCUT alternative would provide higher intersection operational benefits compared to the multi-lane roundabout, however, the delay for the left-turn vehicles on the minor streets would increase significantly. Operationally, the RCUT would require through and left turn vehicles to first turn right at the main intersection and then execute left turns by making U-turns at the median opening downstream of the intersection. Once the drivers make U-turns, they then must turn right or proceed through the intersection when they reach the cross street, hence, increasing the travel time for left and through vehicles from the side street. Although the multi-lane roundabout will increase delay for mainline through vehicles compared to the RCUT alternative, it will minimize the delay for left turn and side street through vehicles.

Table 7: Operational Results for Alternatives (Design Year 2044)

Approach	NO BUILD				Alternative 1: Single-lane Roundabout				Alternative 2: RCUT			
	AM		PM		AM		PM		AM		PM	
	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS
Old Dixie Hwy (NB)	3488.5	F	1188.2	F	43.9	E	14.7	B	13.8	B	3.6	A
5 Springs Rd (SB)	2310.8	F	1615.1	F	11.3	B	11.9	B	1.5	A	3.6	A
SR 3 (EB)*	24.9	-	4.0	-	11.4	B	8.1	A	2.8	-	1.4	-
SR 3 (WB)*	76.4	-	9.8	-	11.4	B	8.0	A	4.0	-	2.9	-
Intersection	**105.7**	**-**	**85.4**	**-**	**14.2**	**B**	**8.8**	**A**	**4.3**	**-**	**2.5**	**-**

NBL Delay AM/PM: Roundabout (43.9s / 11.3s) RCUT (73.9s / 51.6s)
SBL Delay AM/PM: Roundabout (14.7s / 11.9s) RCUT (63.4s / 52.4s)
**Free flow approach. Non-zero delay include delay for left and u-turns*

SAFETY BENEFIT-COST ANALYSIS

A summary of the safety benefit cost (B/C) ratios for the alternatives considered is presented in **Table 6**. Construction cost estimates for the preferred alternative is also included in **Appendix H**. Details of the B/C ratio calculations are included in **Appendix I**.

Table 8: Intersection Safety Countermeasures Benefit/Cost Ratios

Safety Countermeasure	Estimated Construction Costs	B/C Ratio
Multi-lane Roundabout	$ 2,405,000	13.2
RCUT	$ 1,100,000	16.3

PROJECT RISK ANALYSIS

This section identifies potential risks that could delay recommended improvements at the intersection. These risks include environmental impacts, utility conflicts, and other corridor issues. The goal of identifying these potential risks as part of this traffic study is to prevent project delays once improvements have been selected for delivery.

Environmental Screening

To assist GDOT in understanding the potential environmental constraints within the corridor, Arcadis staff conducted a desktop survey using National Wetland Inventory (NWI) maps, Georgia's Natural, Archaeological, and Historic Geographic Information System (GNAHRGIS), the U.S. Environmental Protection Agency's (USEPA) EnviroMapper, and the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for identifying environmental resources that may be afforded protection under the National Environmental Policy Act (NEPA). The environmental screening report is included in **Appendix J.** The screening findings are summarized below:

- Five historic properties that may be afforded protection under Section 4(f) were identified within and adjacent to the project limits. Coordination and a Historic Resources Survey Report by a certified historian would be necessary to confirm the full extent of historic resources and their eligibility for listing in the National Register of Historic Places (NRHP)
    - 3092 Five Springs Rd, 1961
    - 3072 Five Springs Rd, 1961
    - 3051 Five Springs Rd, 1961 (GNAHRGIS data point)
    - 3067 Five Springs Rd, 1961
    - 3073 Five Springs Rd, 1961
- The proposed project is adjacent to forested areas within the range of the Gray Bat. The impact of the project on the protected species and their habitat may be need.
- Portion of the study corridor contains a flood zone or flood hazard area. Coordination with project engineers and designers is necessary to confirm the location of the floodplain and any impacts resulting from the proposed project's design

A utility cost estimate with GDOT was not completed in this study. However, based on field observations, it was determined that project would likely impact electrical, gas and water distribution lines as shown in the pictures below taken from site visit.

Electrical lines (SW quadrant of intersection)

Water lines/Hydrant (SE quadrant of intersection)

Gas line (NW quadrant of Intersection)

Gas line (SW quadrant of intersection)

Other Projects

Using GeoPI, two maintenance construction projects were identified along SR 3 corridor.

- PI M005644: Resurfacing of SR 3 from SR 3 Conn to CR 666/Old Dixie Hwy (93.59% construction complete)
- PI M005635: Resurfacing of SR 3 from CR 666/Old Dixie Hwy to SR 52 (90.28% construction complete)

CONCLUSION

Based on crash data from 2015 to 2020, the intersection at SR 3 and 5 Springs Rd/Old Dixie Hwy has recorded a total of 46 crashes including 1 fatal, 19 injury and 26 PDO crashes. Rear-end crashes were the most prevalent crash type at the intersection, followed by angle collisions. From the crash reports, the angle crashes within the intersection occurred primarily due to at fault drivers' failure to yield to vehicles that had the right-of-way. Out of the 17 angle crashes, 8 were right-angle collisions and 9 were left-turn crashes. Left-turn angle crashes appear to be major concern for the NB approach.

As discussed throughout the report, the proposed intersection improvements are expected to provide some of the highest crash mitigation and operational benefits. The preferred alternative (multi-lane roundabout) is anticipated to reduce fatal/injury and PDO crashes by 87% and 71%, respectively. Similarly, a reduction of 54% and 43%, respectively, for fatal/injury and PDO crashes are expected with the RCUT alternative. Although the RCUT alternative showed the lowest overall intersection delay, the delays for left turn movements from the side street were significantly higher compared to the multi-lane roundabout alternative. Besides reducing the speeds of vehicles entering the intersection, the turbo

features of the multi-lane roundabout would help eliminate weaving or changing lanes as drivers are expected to choose the correct lane before entering the roundabout.

Recommendations

Based on the observed crash frequencies and severities, it is recommended that a multi-lane roundabout be programmed to be installed at the intersections of SR 3 and 5 Springs Rd/Old Dixie Hwy. **Table 7** shows the intersection recommended safety improvement for the intersection with its delivery mechanism. The existing condition and proposed layout sketch of the preferred alternative are included in **Appendix K**. The TE study previously completed by GDOT is included in **Appendix L**.

Table 9: Intersection Safety Improvements Delivery Mechanisms

Safety Improvement	Project Costs	B/C ratio	Delivery Method
Multi-lane roundabout	PE: $705,000 UTL: $100,000 ROW: $0 Const: $1,600,000 **Total: $2,405,000**	13.2	MOSD

Appendix A: Crash Data

Crash Data
2015 -2020

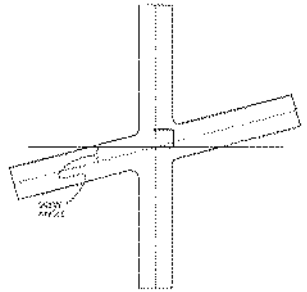
AccidentNo	Date	Time	CrashSeverity	MannerOfCollision	Light	Surface	DriverAge1	DriverAge2	VehType1	VehType2	DirVeh1	DirVeh2	MnvrVeh1	MnvrVeh2	NumberOfVehicles	LatDecimal	LongDecimal
5151884	1/29/2015	7:50:00	O	Rear End	Daylight	Dry	34	16	Passenger Car	Passenger Car	North	North	Turning Right	Stopped	2	34.701915	-84.96663
5245257	4/5/2015	20:59:00	B	Angle	DarkNot Lighted	Dry	73	56	Passenger Car	Sports Utility Vehicle (SUV)	North	South	Turning Left	Straight	2	34.702016	-84.967046
5368438	7/21/2015	6:33:00	B	Angle	Daylight	Dry	39	43	Van	Sports Utility Vehicle (SUV)	South	North	Turning Left	Straight	2	34.70205	-84.966892
5400361	8/22/2015	13:44:00	C	Angle	Daylight	Dry	40	23	Sports Utility Vehicle (SUV)	Sports Utility Vehicle (SUV)	South	North	Turning Left	Straight	2	34.701973	-84.96684
5464216	10/11/2015	2:45:00	C	Not A Collision with Motor Vehicle	DarkNot Lighted	Dry	26	-1	Passenger Car	N/A	North	N/A	Negotiating A Curve	N/A	1	34.70206	-84.96693
5497568	11/4/2015	12:28:00	O	Rear End	Daylight	Dry	26	30	Passenger Car	Pickup Truck	North	North	Turning Right	Stopped	2	34.701953	-84.96674
5506476	11/11/2015	7:21:00	O	Not A Collision with Motor Vehicle	Daylight	Dry	32	-1	Passenger Car	N/A	North	N/A	Straight	N/A	1	34.702056	-84.966934
5531848	10/16/2015	11:01:00	O	Sideswipe-Same Direction	Daylight	Dry	40	0	Passenger Car	Tractor/Trailer	South	South	Changing Lanes	Straight	2	34.702056	-84.966883
5767146	4/1/2016	4:53:00	B	Not A Collision with Motor Vehicle	DarkNot Lighted	Wet	38	-1	Passenger Car	N/A	South	N/A	Straight	N/A	1	34.70214	-84.966564
5917302	9/13/2016	6:40:00	O	Angle	DarkNot Lighted	Dry	60	54	Van	Sports Utility Vehicle (SUV)	South	North	Turning Left	Straight	2	34.701808	-84.966728
6149505	3/13/2017	6:10:00	O	Rear End	DarkNot Lighted	Dry	46	46	Passenger Car	Sports Utility Vehicle (SUV)	North	North	Turning Right	Stopped	2	34.70181	-84.96669
6158410	3/20/2017	16:52:00	O	Rear End	Daylight	Dry	0	50	Pickup Truck	Passenger Car	North	North	Backing	Turning Right	2	34.701736	-84.96741
6272791	6/12/2017	9:27:00	C	Not A Collision with Motor Vehicle	Daylight	Dry	40	-1	Sports Utility Vehicle (SUV)	N/A	East	N/A	Straight	N/A	1	34.702189	-84.967178
6342159	8/5/2017	10:54:00	O	Rear End	Daylight	Dry	26	62	Pickup Truck	Pickup Truck	North	North	Straight	Stopped	2	34.70176	-84.96674
6432561	10/17/2017	16:11:00	O	Angle	Daylight	Dry	26	23	Passenger Car	Sports Utility Vehicle (SUV)	South	North	Turning Left	Straight	2	34.70201	-84.96653
6567813	1/25/2018	5:52:00	A	Angle	DarkNot Lighted	Dry	31	34	Pickup Truck	Sports Utility Vehicle (SUV)	West	East	Turning Left	Straight	2	34.70205	-84.966889
6644288	3/21/2018	6:52:00	B	Angle	DarkNot Lighted	Dry	49	52	Passenger Car	Pickup Truck	East	North	Straight	Straight	2	34.702052	-84.966891
6714617	5/15/2018	7:52:00	O	Rear End	Daylight	Dry	63	45	Pickup Truck	Sports Utility Vehicle (SUV)	North	North	Turning Right	Stopped	2	34.701995	-84.96659
6724009	5/24/2018	17:19:00	C	Rear End	Daylight	Dry	32	25	Sports Utility Vehicle (SUV)	Pickup Truck	North	North	Turning Right	Turning Right	2	34.702087	-84.96691
6749549	6/13/2018	7:05:00	B	Angle	Daylight	Dry	27	30	Passenger Car	Passenger Car	North	East	Turning Left	Straight	3	34.702003	-84.966865
6770840	6/26/2018	17:17:00	B	Angle	Daylight	Dry	62	24	Passenger Car	Passenger Car	North	East	Straight	Straight	2	34.702	-84.96686
6973340	11/23/2018	6:45:00	O	Not A Collision with Motor Vehicle	Dawn	Dry	60	-1	Tractor/Trailer	N/A	East	N/A	Straight	N/A	1	34.701747	-84.96796
7073523	2/1/2019	6:52:00	O	Angle	Daylight	Dry	19	59	Passenger Car	Passenger Car	North	East	Turning Left	Turning Left	2	34.70247	-84.9672
7126771	3/15/2019	8:06:00	O	Angle	Daylight	Wet	24	34	Passenger Car	Passenger Car	West	East	Turning Left	Straight	2	34.701786	-84.96695
7139586	3/25/2019	17:11:00	O	Rear End	Daylight	Wet	31	33	Passenger Car	Sports Utility Vehicle (SUV)	North	North	Straight	Stopped	2	34.701627	-84.966688
7189618	4/24/2019	15:10:00	B	Angle	Daylight	Dry	43	32	Pickup Truck	Pickup Truck	North	East	Straight	Straight	3	34.70211	-84.96693
7213258	5/18/2019	11:10:00	A	Angle	Daylight	Dry	44	41	Passenger Car	Pickup Truck	West	South	Straight	Straight	2	34.702051	-84.966889
7238760	6/6/2019	6:35:00	O	Rear End	Dawn	Dry	27	52	Passenger Car	Pickup Truck	North	North	Straight	Stopped	2	34.70211	-84.96636
7253929	6/13/2019	17:30:00	K	Angle	Daylight	Dry	33	52	Passenger Car	Passenger Car	North	East	Straight	Straight	2	34.702051	-84.966889
7295765	7/23/2019	17:09:00	O	Rear End	Daylight	Dry	40	54	Passenger Car	Sports Utility Vehicle (SUV)	North	North	Turning Right	Turning Right	2	34.70206	-84.96693
7453121	11/20/2019	9:33:00	C	Not A Collision with Motor Vehicle	Daylight	Dry	19	-1	Passenger Car	N/A	West	N/A	Straight	N/A	1	34.701976	-84.96757
7467020	12/5/2019	22:12:00	O	Angle	DarkNot Lighted	Dry	20	22	Passenger Car	Sports Utility Vehicle (SUV)	North	East	Straight	Straight	2	34.702047	-84.966889
7480817	12/11/2019	17:08:00	C	Rear End	Daylight	Dry	23	60	Sports Utility Vehicle (SUV)	Passenger Car	North	North	Turning Right	Stopped	2	34.70207	-84.96655
7481779	12/15/2019	6:45:00	C	Angle	DarkNot Lighted	Dry	55	43	Passenger Car	Passenger Car	North	West	Straight	Straight	2	34.702407	-84.96719
7483962	12/17/2019	19:13:00	B	Not A Collision with Motor Vehicle	DarkNot Lighted	Dry	28	-1	Sports Utility Vehicle (SUV)	N/A	North	N/A	Straight	N/A	1	34.7019	-84.96786
7582535	2/24/2020	17:06:00	O	Rear End	DarkNot Lighted	Wet	24	62	Sports Utility Vehicle (SUV)	Passenger Car	East	East	Turning Right	Stopped	2	34.702076	-84.9674
7585029	1/13/2020	23:07:00	O	Rear End	DarkNot Lighted	Wet	21	21	Pickup Truck	Passenger Car	North	North	Turning Right	Stopped	2	34.7021	-84.96624
7680953	8/16/2019	18:35:00	O	Rear End	Daylight	Dry	24	42	Sports Utility Vehicle (SUV)	Sports Utility Vehicle (SUV)	North	North	Straight	Straight	2	34.70193	-84.966667
7697301	7/14/2020	8:51:00	B	Not A Collision with Motor Vehicle	Daylight	Dry	37	-1	Single Unit Truck	N/A	East	N/A	Negotiating A Curve	N/A	1	34.701726	-84.966726
7722459	8/30/2019	12:13:00	O	Rear End	Daylight	Dry	38	44	Passenger Car	Passenger Car	South	South	Straight	Straight	2	34.702258	-84.967171
7722487	9/7/2019	18:37:00	O	Not A Collision with Motor Vehicle	Daylight	Dry	18	-1	Passenger Car	N/A	North	N/A	Straight	N/A	1	34.702238	-84.966074
7728362	9/25/2019	19:42:00	O	Rear End	Dusk	Dry	22	42	Pickup Truck	Passenger Car	North	North	Turning Right	Stopped	2	34.701969	-84.966644
7737599	8/2/2020	19:00:00	O	Angle	Daylight	Dry	45	40	Pickup Truck	Passenger Car	North	West	Straight	Straight	2	34.70207	-84.96687
7757003	8/30/2020	21:04:00	O	Not A Collision with Motor Vehicle	DarkNot Lighted	Wet	-1	-1	Sports Utility Vehicle (SUV)	N/A	North	N/A	Negotiating A Curve	N/A	1	34.701463	-84.966621
7802796	10/5/2020	17:02:00	O	Rear End	Daylight	Dry	30	52	Pickup Truck	Pickup Truck	South	North	Turning Right	Stopped	2	34.70224	-84.9672
7888215	12/14/2020	15:45:00	C	Rear End	Daylight	Dry	37	26	Passenger Car	Passenger Car	North	North	Turning Right	Stopped	2	34.70188	-84.96681

Appendix B: HSM Crash Prediction

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

General Information		Location Information	
Analyst	KB	Roadway	(enter roadway name)
Agency or Company	Arcadis U.S., Inc.	Intersection	SR 3 @ Old Dixie Hwy/ Five Springs Rd
Date Performed	04/08/21	Jurisdiction	Dalton, Whitfield County
		Analysis Year	2019

Input Data		Base Conditions	Site Conditions	
Intersection type (3ST, 4ST, 4SG)		--	4ST	Unsignalized four-leg (stop control on minor-road approaches)
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 78,300 (veh/day)	--	16,600	AADT OK
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 7,400 (veh/day)	--	4,270	AADT OK
Intersection skew angle (degrees)		0	0	Skew Intersection:
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	2	
Intersection lighting (present/not present)		Not Present	Not Present	
Calibration Factor, C_i		1.00	1.00	



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	1.00	0.52	0.74	1.00	0.38
Fatal and Injury (FI)	1.00	0.42	0.59	1.00	0.25

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			**$N_{spf\ int}$** from Equation 11-11 or 11-12	**Overdispersion Parameter, k** from Table 11-7 or 11-8	**Combined CMFs** from (6) of Worksheet 2B	**Calibration Factor, C_i**	**Predicted average crash frequency, $N_{predicted\ int}$** (3)*(5)*(6)
	a	b	c or d (4SG)					
Total	-10.008	0.848	0.448	7.222	0.494	0.38	1.00	2.779
Fatal and Injury (FI)	-11.554	0.888	0.525	4.321	0.742	0.25	1.00	1.071
Fatal and Injury[a] (FI[a])	-10.734	0.828	0.412	2.129	0.655	0.25	1.00	0.528
Property Damage Only (PDO)	--	--	--	--	--	--	--	$(7)_{TOTAL}$ - $(7)_{FI}$ 1.708

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	2.779	1.000	1.071	1.000	0.528	1.000	1.708
		(2)*(3)$_{TOTAL}$		(4)x(5)$_{FI}$		(6)*(7)$_{FI}$[a]		(8)*(9)$_{PDO}$
Head-on collision	0.016	0.044	0.018	0.019	0.023	0.012	0.015	0.026
Sideswipe collision	0.107	0.297	0.042	0.045	0.040	0.021	0.156	0.266
Rear-end collision	0.228	0.634	0.213	0.228	0.108	0.057	0.240	0.410
Angle collision	0.395	1.098	0.534	0.572	0.571	0.301	0.292	0.499
Single-vehicle collision	0.202	0.561	0.148	0.158	0.199	0.105	0.243	0.415
Other collision	0.052	0.145	0.045	0.048	0.059	0.031	0.054	0.092

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

Worksheet 2E -- Summary Results for Rural Multilane Highway Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency (crashes / year)**
	(7) from Worksheet 2C
Total	2.8
Fatal and Injury (FI)	1.1
Fatal and Injury[a] (FI[a])	0.5
Property Damage Only (PDO)	1.7

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

Appendix C: Intersection Crash Diagram

Manner of Collision	Crash Severity	Year						Total	Percent Total
		2015	2016	2017	2018	2019	2020		
Angle		3	1	1	4	7	1	**17**	37%
	K					1		1	
	A				1	1		2	
	B	2			3	1		6	
	C	1				1		2	
	O		1	1		3	1	6	
Not A Collision with Motor Vehicle		2	1	1	1	3	2	**10**	22%
	B		1			1	1	3	
	C	1		1		1		3	
	O	1			1	1	1	4	
Rear End		2		3	2	7	4	**18**	39%
	C				1	1	1	3	
	O	2		3	1	6	3	15	
Sideswipe-Same Direction		1						**1**	2%
	O	1						1	
Total		**8**	**2**	**5**	**7**	**17**	**7**	**46**	**100%**
Total Fatal Crashes	K					1		1	2%
Total Injury Crashes	ABC	4	1	1	5	6	2	19	41%

B(1)
O(1)
O(1)
A(1)
C(1)
O(1)
B(1)
C(1)
O(2)
C(1)
C(3)
O(12)
B(1)
O(1)
B(1)
C(1)
O(3)
O(1)
B(1)
A(1)
O(1)
K(1)
B(3)
O(1)
B(1)
C(1)
O(1)

N

MANNER OF COLLISION

- Angle
- Single vehicle
- Head-on
- Rear-end
- Sideswipe-same direction
- Sideswipe-opposite direction

CRASH SEVERITY

- K - Fatal
- A - Serious injury
- B - Minor injury
- C - Possible injury
- O - Property damage only

X Number of crashes

GDOT Georgia Department of Transportation

ARCADIS Design & Consultancy for natural and built assets

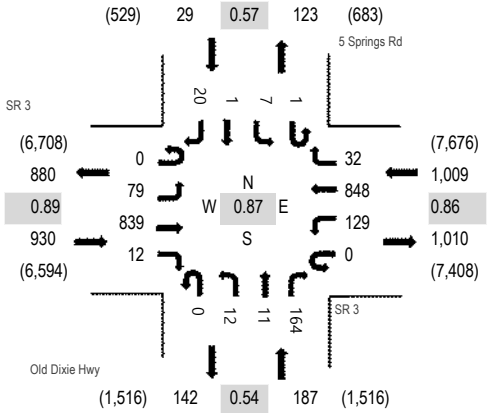
Appendix D: Traffic Data

All Traffic Data Services Inc.

(303) 216-2439
www.alltrafficdata.net

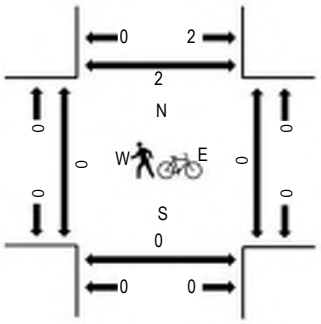
Location: #4 Old Dixie Hwy & SR 3 AM
Date and Start Time: Wednesday, October 9, 2019
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	SR 3 Eastbound				SR 3 Westbound				Old Dixie Hwy Northbound				5 Springs Rd Southbound					Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
6:00 AM	0	7	59	1	0	14	91	2	0	3	6	35	0	1	4	2	225	1,601	0	0	0	0
6:15 AM	0	20	110	6	0	28	139	3	0	1	0	29	0	2	2	1	341	1,874	0	0	0	0
6:30 AM	0	20	164	11	0	47	209	7	0	1	1	38	0	1	0	6	505	1,981	0	0	0	0
6:45 AM	0	30	170	8	0	64	196	7	0	1	2	41	0	1	6	4	530	2,065	0	0	0	0
7:00 AM	0	10	208	3	0	37	163	8	0	5	6	49	0	2	0	7	498	2,155	0	0	0	0
7:15 AM	0	9	171	5	0	31	187	5	0	3	0	29	0	2	1	5	448	2,130	0	0	0	0
7:30 AM	0	26	223	3	0	29	247	7	0	3	2	43	0	1	0	5	589	2,070	0	0	0	2
7:45 AM	0	34	237	1	0	32	251	12	0	1	3	43	1	2	0	3	620	1,749	0	0	0	0
8:00 AM	0	25	227	2	0	27	149	9	0	1	0	26	0	4	0	3	473	1,376	0	0	0	0
8:15 AM	0	11	177	2	0	15	142	4	0	1	3	23	0	2	0	8	388	1,127	0	0	0	0
8:30 AM	0	12	105	1	0	17	94	1	0	4	4	20	0	4	0	6	268	985	0	0	0	0
8:45 AM	0	11	117	1	0	20	74	1	0	2	1	16	0	2	0	2	247	917	0	0	0	0
9:00 AM	0	9	83	4	0	16	83	0	0	1	3	16	0	1	3	5	224	889	0	0	0	0
9:15 AM	0	6	95	1	0	15	97	3	0	3	2	17	0	1	1	5	246	849	0	0	0	0
9:30 AM	0	4	71	3	0	12	77	2	0	3	1	21	0	1	1	4	200	814	0	0	0	0
9:45 AM	0	5	76	4	0	11	84	5	0	3	3	19	2	1	2	4	219	861	0	0	0	0
10:00 AM	0	4	71	5	0	12	60	2	0	0	1	17	0	7	0	5	184	851	0	0	0	0
10:15 AM	0	4	69	4	0	18	87	4	0	2	4	15	0	1	1	2	211	895	0	0	0	0
10:30 AM	0	7	93	1	0	8	96	2	0	4	4	22	0	1	3	6	247	934	0	0	0	0
10:45 AM	0	5	82	2	0	15	79	1	0	1	1	13	0	1	2	7	209	953	0	0	0	0
11:00 AM	0	6	77	6	0	16	91	2	0	1	1	21	0	1	0	6	228	1,005	0	0	0	0
11:15 AM	0	4	96	5	0	14	87	4	0	6	1	18	0	3	3	9	250	1,069	0	0	0	0
11:30 AM	0	5	97	4	0	12	112	1	0	4	3	15	0	4	1	8	266	1,065	0	0	0	0
11:45 AM	0	6	104	2	0	26	99	1	0	2	0	15	0	1	0	5	261	1,068	0	0	0	0
12:00 PM	0	4	122	6	0	13	111	5	0	5	2	17	0	0	2	5	292	1,071	0	0	0	0
12:15 PM	0	5	104	7	0	15	90	4	0	4	0	9	0	3	1	4	246	1,070	0	0	0	0
12:30 PM	0	3	109	5	0	22	94	2	0	7	3	11	0	2	2	9	269	1,083	0	0	0	0
12:45 PM	0	4	98	2	0	19	110	3	0	2	3	21	0	0	0	2	264	1,107	0	0	0	0
1:00 PM	0	2	113	5	0	31	99	4	0	2	2	27	0	1	0	5	291	1,136	0	0	0	0
1:15 PM	0	3	99	2	0	24	95	3	0	1	1	23	0	2	1	5	259	1,146	0	0	0	0
1:30 PM	0	7	96	6	0	30	113	2	0	5	2	22	0	2	7	1	293	1,207	0	0	0	0
1:45 PM	0	7	102	3	0	37	102	3	0	2	4	16	0	2	8	7	293	1,251	0	0	0	0
2:00 PM	0	5	92	2	0	19	114	1	0	1	9	47	0	2	3	6	301	1,284	0	0	0	0
2:15 PM	0	7	120	5	0	30	117	3	0	2	5	25	0	1	0	5	320	1,480	0	0	0	0
2:30 PM	0	9	125	5	0	22	136	7	0	0	2	20	0	3	3	5	337	1,520	0	0	0	0

2:45 PM	0	9	94	5	0	35	138	3	0	3	1	22	0	2	7	7	326	1,605	0	0	0	0
3:00 PM	0	5	195	3	0	28	142	4	0	9	3	84	0	1	0	23	497	1,641	0	0	0	0
3:15 PM	0	5	148	2	0	34	120	5	0	0	4	30	0	1	4	7	360	1,575	0	0	0	0
3:30 PM	0	4	160	5	0	41	148	6	0	1	6	38	0	1	1	11	422	1,529	0	0	0	0
3:45 PM	0	1	114	1	0	33	155	5	0	1	3	28	0	5	1	15	362	1,508	0	0	0	0
4:00 PM	0	1	141	6	0	44	185	6	0	1	5	23	0	1	0	18	431	1,502	0	0	0	0
4:15 PM	0	1	92	3	0	29	154	3	0	1	2	22	0	1	0	6	314	1,713	0	0	0	0
4:30 PM	0	6	169	2	0	43	124	2	0	1	4	35	0	2	3	10	401	1,808	0	0	0	0
4:45 PM	0	2	130	2	0	22	154	1	0	2	1	28	0	0	0	14	356	1,837	0	0	0	0
5:00 PM	0	4	236	7	0	49	262	8	0	1	1	32	0	3	0	39	642	1,804	0	0	0	0
5:15 PM	0	4	124	4	0	39	177	1	0	3	1	32	0	1	7	16	409		0	0	0	0
5:30 PM	0	2	152	2	0	34	170	3	0	2	3	46	0	3	4	9	430		0	0	0	0
5:45 PM	0	0	119	3	0	23	139	4	0	2	0	24	0	3	2	4	323		0	0	0	0

Peak Rolling Hour Flow Rates

	Eastbound				Westbound				Northbound				Southbound				
Vehicle Type	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total
Articulated Trucks	0	4	50	0	0	0	52	0	0	1	0	0	0	0	0	4	111
Lights	0	75	757	12	0	122	770	31	0	10	11	153	1	7	1	16	1,966
Mediums	0	0	32	0	0	7	26	1	0	1	0	11	0	0	0	0	78
Total	0	79	839	12	0	129	848	32	0	12	11	164	1	7	1	20	2,155

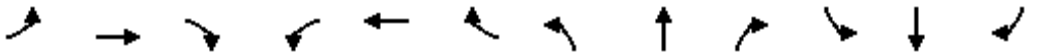
Appendix E: Existing Intersection Operational Analysis

Existing Condition

2019

4: Old Dixie Rd/5 Springs Rd & SR 3 Performance by run number

Run Number	1	2	3	4	5	Avg
Denied Del/Veh (s)	0.8	0.7	0.8	0.8	0.7	0.7
Total Del/Veh (s)	6.9	6.7	7.2	5.5	5.4	6.4



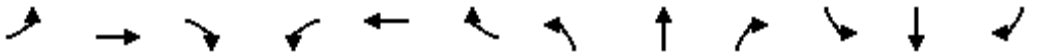
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	839	12	129	848	32	12	11	164	7	1	20
Future Volume (Veh/h)	79	839	12	129	848	32	12	11	164	7	1	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	86	912	13	140	922	35	13	12	178	8	1	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	922			912			1826	2286	456	1836	2286	461
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	922			912			1826	2286	456	1836	2286	461
tC, single (s)	4.3			4.3			7.7	6.7	7.1	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	88			80			58	51	66	42	96	96
cM capacity (veh/h)	689			695			31	24	530	14	24	526

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	86	456	456	13	140	461	461	35	203	31
Volume Left	86	0	0	0	140	0	0	0	13	8
Volume Right	0	0	0	13	0	0	0	35	178	22
cSH	689	1700	1700	1700	695	1700	1700	1700	206	52
Volume to Capacity	0.12	0.27	0.27	0.01	0.20	0.27	0.27	0.02	0.98	0.60
Queue Length 95th (ft)	11	0	0	0	19	0	0	0	213	59
Control Delay (s)	11.0	0.0	0.0	0.0	11.5	0.0	0.0	0.0	107.0	131.8
Lane LOS	B				B				F	F
Approach Delay (s)	0.9				1.5				107.0	131.8
Approach LOS									F	F

Intersection Summary				
Average Delay	12.1			
Intersection Capacity Utilization	48.2%	ICU Level of Service		A
Analysis Period (min)	15			

4: Old Dixie Rd/5 Springs Rd & SR 3 Performance by run number

Run Number	1	2	3	4	5	Avg
Denied Del/Veh (s)	0.8	0.9	0.8	0.9	0.8	0.9
Total Del/Veh (s)	4.4	4.6	3.8	3.9	3.5	4.1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	642	18	144	763	13	8	6	138	7	11	78
Future Volume (Veh/h)	12	642	18	144	763	13	8	6	138	7	11	78
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	698	20	157	829	14	9	7	150	8	12	85
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	829			698			1458	1867	349	1522	1867	414
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	829			698			1458	1867	349	1522	1867	414
tC, single (s)	4.3			4.3			7.7	6.7	7.1	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	98			81			82	87	76	82	77	85
cM capacity (veh/h)	749			843			50	52	624	44	52	565

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	13	349	349	20	157	414	414	14	166	105
Volume Left	13	0	0	0	157	0	0	0	9	8
Volume Right	0	0	0	20	0	0	0	14	150	85
cSH	749	1700	1700	1700	843	1700	1700	1700	530	257
Volume to Capacity	0.02	0.21	0.21	0.01	0.19	0.24	0.24	0.01	0.31	0.41
Queue Length 95th (ft)	1	0	0	0	17	0	0	0	33	47
Control Delay (s)	9.9	0.0	0.0	0.0	10.2	0.0	0.0	0.0	21.5	33.4
Lane LOS	A				B				C	D
Approach Delay (s)	0.2				1.6				21.5	33.4
Approach LOS									C	D

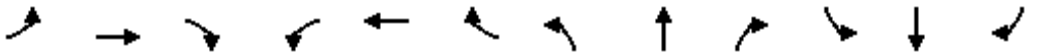
Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	43.1%	ICU Level of Service	A	
Analysis Period (min)	15			

No Build Condition

2024 & 2044

4: Old Dixie Rd/5 Springs Rd & SR 3 Performance by run number

Run Number	1	2	3	4	5	Avg
Denied Del/Veh (s)	64.3	12.0	18.9	0.8	0.7	19.3
Total Del/Veh (s)	33.0	26.6	43.2	7.9	6.7	23.4



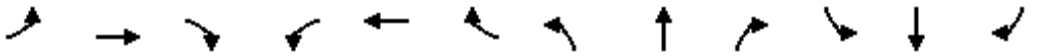
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	925	15	140	935	35	15	10	180	5	1	20
Future Volume (Veh/h)	85	925	15	140	935	35	15	10	180	5	1	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	1005	16	152	1016	38	16	11	196	5	1	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1016			1005			2002	2509	502	2012	2509	508
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1016			1005			2002	2509	502	2012	2509	508
tC, single (s)	4.3			4.3			7.7	6.7	7.1	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	85			76			25	32	60	24	94	96
cM capacity (veh/h)	632			639			21	16	494	7	16	489

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	92	502	502	16	152	508	508	38	223	28
Volume Left	92	0	0	0	152	0	0	0	16	5
Volume Right	0	0	0	16	0	0	0	38	196	22
cSH	632	1700	1700	1700	639	1700	1700	1700	134	38
Volume to Capacity	0.15	0.30	0.30	0.01	0.24	0.30	0.30	0.02	1.66	0.73
Queue Length 95th (ft)	13	0	0	0	23	0	0	0	406	67
Control Delay (s)	11.7	0.0	0.0	0.0	12.4	0.0	0.0	0.0	384.8	175.3
Lane LOS	B				B				F	F
Approach Delay (s)	1.0				1.6				384.8	175.3
Approach LOS									F	F

Intersection Summary				
Average Delay	36.4			
Intersection Capacity Utilization	51.3%	ICU Level of Service		A
Analysis Period (min)	15			

4: Old Dixie Rd/5 Springs Rd & SR 3 Performance by run number

Run Number	1	2	3	4	5	Avg
Denied Del/Veh (s)	0.8	0.9	0.9	0.8	0.8	0.8
Total Del/Veh (s)	4.5	6.6	4.5	4.2	4.2	4.8



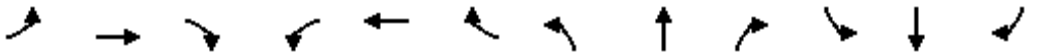
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	710	20	160	840	15	10	5	150	5	10	85
Future Volume (Veh/h)	15	710	20	160	840	15	10	5	150	5	10	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	772	22	174	913	16	11	5	163	5	11	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	913			772			1614	2065	386	1682	2065	456
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	913			772			1614	2065	386	1682	2065	456
tC, single (s)	4.3			4.3			7.7	6.7	7.1	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	98			78			67	87	72	83	70	83
cM capacity (veh/h)	694			789			34	37	590	30	37	530

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	16	386	386	22	174	456	456	16	179	108
Volume Left	16	0	0	0	174	0	0	0	11	5
Volume Right	0	0	0	22	0	0	0	16	163	92
cSH	694	1700	1700	1700	789	1700	1700	1700	388	236
Volume to Capacity	0.02	0.23	0.23	0.01	0.22	0.27	0.27	0.01	0.46	0.46
Queue Length 95th (ft)	2	0	0	0	21	0	0	0	59	55
Control Delay (s)	10.3	0.0	0.0	0.0	10.9	0.0	0.0	0.0	28.1	37.3
Lane LOS	B				B				D	E
Approach Delay (s)	0.2				1.7				28.1	37.3
Approach LOS									D	E

Intersection Summary				
Average Delay	5.0			
Intersection Capacity Utilization	46.0%	ICU Level of Service	A	
Analysis Period (min)	15			

4: Old Dixie Rd/5 Springs Rd & SR 3 Performance by run number

Run Number	1	2	3	4	5	Avg
Denied Del/Veh (s)	248.9	351.5	241.2	222.4	236.2	260.8
Total Del/Veh (s)	62.0	170.3	159.5	63.6	73.1	105.7



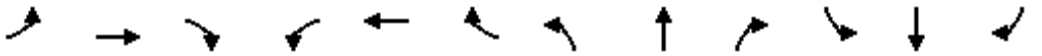
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	1375	20	210	1390	50	20	20	270	10	1	30
Future Volume (Veh/h)	130	1375	20	210	1390	50	20	20	270	10	1	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	141	1495	22	228	1511	54	22	22	293	11	1	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1511			1495			2989	3744	748	3008	3744	756
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1511			1495			2989	3744	748	3008	3744	756
tC, single (s)	4.3			4.3			7.7	6.7	7.1	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	65			44			0	0	13	0	2	90
cM capacity (veh/h)	401			407			0	1	338	0	1	334

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	141	748	748	22	228	756	756	54	337	45
Volume Left	141	0	0	0	228	0	0	0	22	11
Volume Right	0	0	0	22	0	0	0	54	293	33
cSH	401	1700	1700	1700	407	1700	1700	1700	3	0
Volume to Capacity	0.35	0.44	0.44	0.01	0.56	0.44	0.44	0.03	116.51	2396.13
Queue Length 95th (ft)	39	0	0	0	83	0	0	0	Err	Err
Control Delay (s)	18.7	0.0	0.0	0.0	24.5	0.0	0.0	0.0	Err	Err
Lane LOS	C				C				F	F
Approach Delay (s)	1.6				3.1				Err	Err
Approach LOS									F	F

Intersection Summary				
Average Delay	998.7			
Intersection Capacity Utilization	68.5%	ICU Level of Service	C	
Analysis Period (min)	15			

4: Old Dixie Rd/5 Springs Rd & SR 3 Performance by run number

Run Number	1	2	3	4	5	Avg
Denied Del/Veh (s)	234.6	281.0	294.6	148.9	216.4	235.7
Total Del/Veh (s)	87.4	81.3	84.5	86.4	87.4	85.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1055	30	235	1250	20	15	10	225	10	20	125
Future Volume (Veh/h)	20	1055	30	235	1250	20	15	10	225	10	20	125
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	1147	33	255	1359	22	16	11	245	11	22	136
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									2			2
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1359			1147			2392	3060	574	2492	3060	680
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1359			1147			2392	3060	574	2492	3060	680
tC, single (s)	4.3			4.3			7.7	6.7	7.1	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	95			55			0	0	45	0	0	64
cM capacity (veh/h)	462			561			0	6	443	0	6	376

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	22	574	574	33	255	680	680	22	272	169
Volume Left	22	0	0	0	255	0	0	0	16	11
Volume Right	0	0	0	33	0	0	0	22	245	136
cSH	462	1700	1700	1700	561	1700	1700	1700	1	1
Volume to Capacity	0.05	0.34	0.34	0.02	0.45	0.40	0.40	0.01	366.50	228.87
Queue Length 95th (ft)	4	0	0	0	59	0	0	0	Err	Err
Control Delay (s)	13.2	0.0	0.0	0.0	16.6	0.0	0.0	0.0	Err	Err
Lane LOS	B				C				F	F
Approach Delay (s)	0.2				2.6				Err	Err
Approach LOS									F	F

Intersection Summary				
Average Delay	1346.2			
Intersection Capacity Utilization	60.5%	ICU Level of Service	B	
Analysis Period (min)	15			

Appendix F: Signal Warrant Analysis

Traffic Signal Warrant Summary Worksheet 100%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: SR 3 @ 5 Springs Rd/Old Dixie Hwy
County: Whitfield
City: Dalton

Major Street: SR 61
Critical Approach Speed: 55 mph
Lanes: 2 or more lanes

Minor Street: 5 Springs Rd/Old Dixie Hwy
Critical Approach Speed: 45 mph
Lanes: 1 lane

% Right Turns Included
From North (SB) 0%
From East (WB) 0%
From South (NB) 0%
From West (EB) 0%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 4 or more
If it is a "T" intersection, inflate minor threshold to 150%? No
Manually set volume level? 100%

Analysis based on EXISTING volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
10/9/2019	Wednesday	6:00	AM	6:00	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**No**
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	No
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	**No**
Warrant 3: Peak Hour Volume	**No**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**No**
Warrant 8: Roadway Network	**N/A**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:

Name: KB
Agency: Arcadis US Inc.
Date: 4/14/2021

Warrant 1: Eight - Hour Vehicular Volume 100%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	100%	80%
Major Rd. Req	600	480
Minor Rd. Req	150	120
Number of Hours	0	0

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	100%	80%
Major Rd. Req	900	720
Minor Rd. Req	75	60
Number of Hours	0	0

Satisfied? No

Condition C: Combination of A & B at 80%

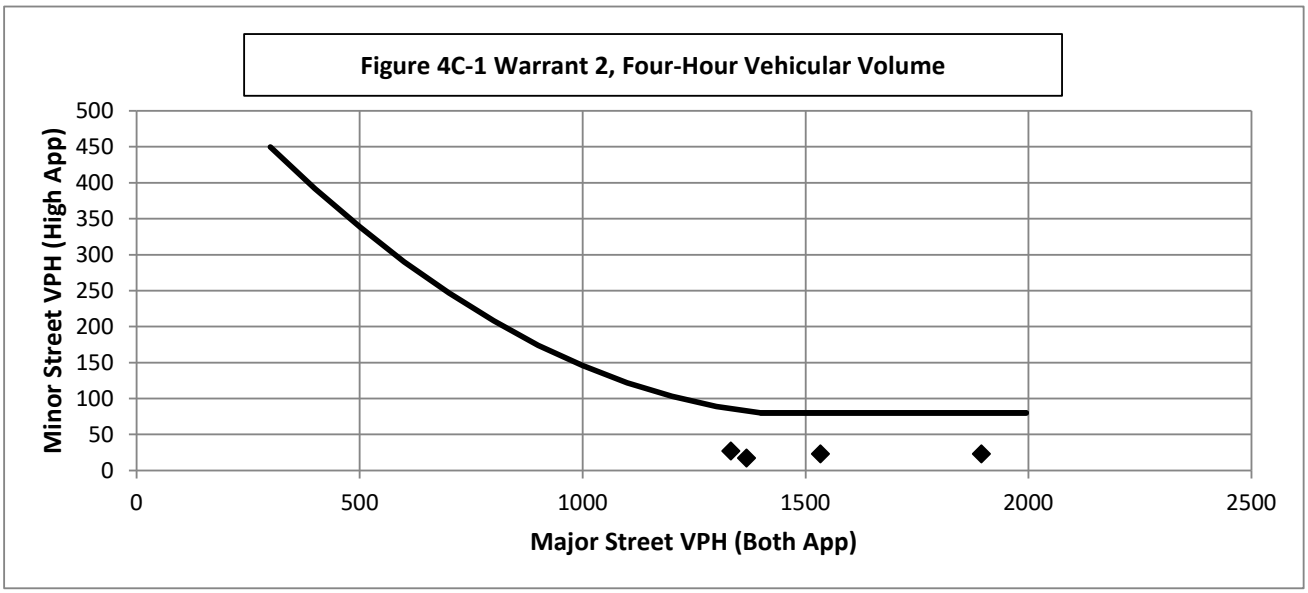
Satisfied? No

6:00 AM	Enter Start Time (Military Time) (HH:MM)				
Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	1368	17	1385
2	7:00	8:00	1895	23	1918
3	8:00	9:00	1223	16	1239
4	9:00	10:00	744	19	763
5	10:00	11:00	710	17	727
6	11:00	12:00	852	18	870
7	12:00	13:00	923	26	949
8	13:00	14:00	960	23	983
9	14:00	15:00	1072	23	1095
10	15:00	16:00	1333	27	1360
11	16:00	17:00	1297	17	1314
12	17:00	18:00	1534	23	1557
13	18:00	19:00	0	0	0
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 100%

Warrant Evaluated? Yes
Warrant Satisfied? No
Manually Set To:

Hour Start	7:00	17:00	15:00	6:00
Major Road Vol.	1895	1534	1333	1368
Minor Road Vol.	23	23	27	17



Warrant 3: Peak Hour Volume 100%

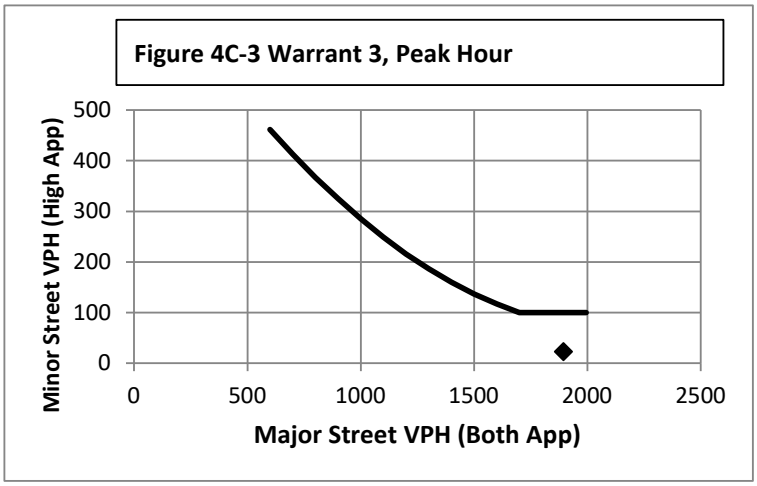
Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	Yes
Volume on Minor Approach	100	No
Total Entering Volume (veh/h)	800	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
7:00	1895	23



Warrant 4: Pedestrian Volume 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

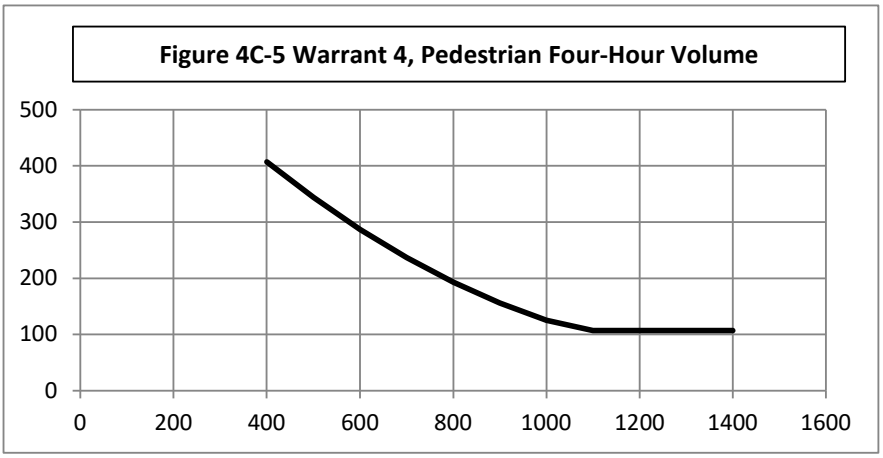
Criterion A: Four Hour

Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol? **No**

Avg. walk speed less than 3.5 ft/s? **No**

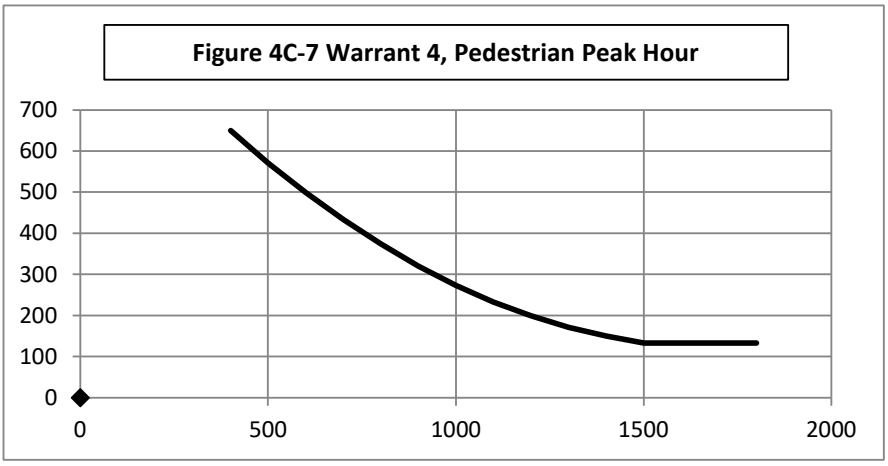
Criterion A Satisfied?



Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?



Warrant 5: School Crossing 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience 100%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

	Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			Yes
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months: 3		No
3	Warrant 1, Condition A (80%)		No	No
	Warrant 1, Condition B (80%)		No	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		No	

Warrant 8: Roadway Network 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria					Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour				1918	Yes	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.					No	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)						
		Hour					
		Volume					

Characteristics of Major Routes - Select yes if all intersecting routes have characteristic

		Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	
2	Rural or suburban highway outside of, entering, or traversing a city	
3	Appears as a major route on an official plan	

Warrant 9: Intersection Near a Grade Crossing 100%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors				Manually Set Peak Hour?			No
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
				7:00	1895	23	23

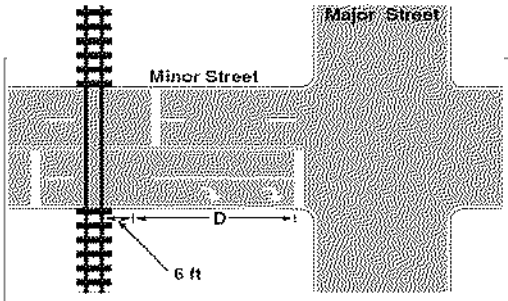
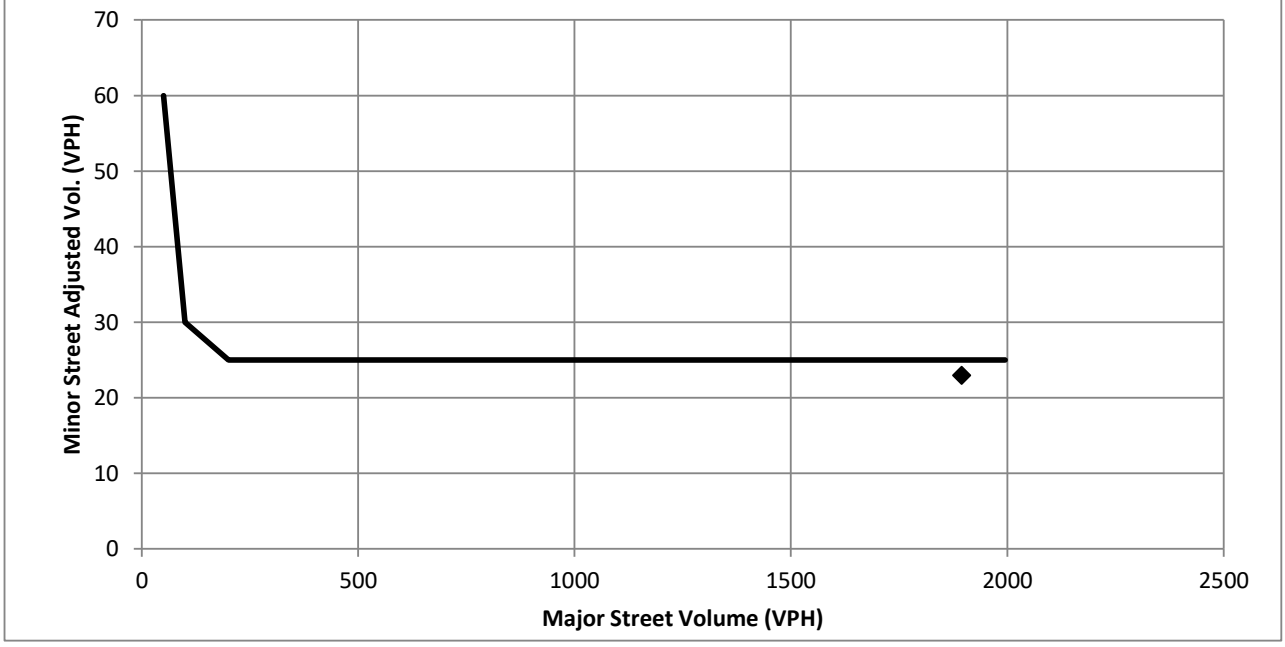


Figure 4C-9 Warrant9, Intersection Near a grade Crossing (One Approach Lane at the Track Crossing)



Conclusions/Comments:

Appendix G: Intersection Control Evaluation (ICE)

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

ICE Version 2.15 | Revised 07/01/2019

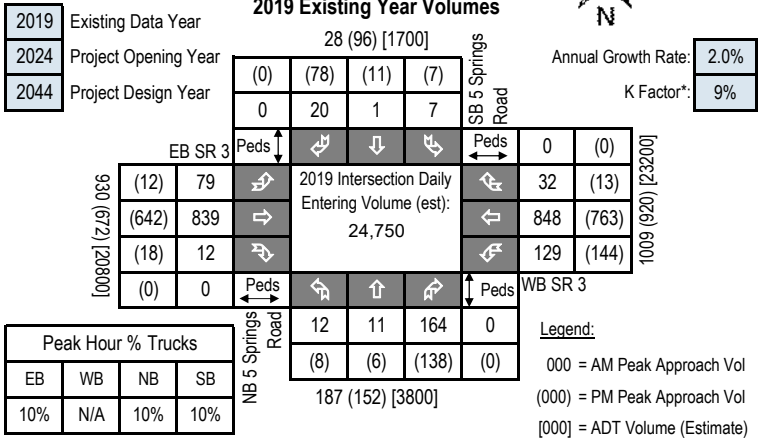
GDOT PI # (or N/A):	N/A	Request By:	GDOT Traffic Ops
County:	Whitfield	GDOT District:	6 - Cartersville
Major (State) Road:	SR 3	Speed Limit:	55 mph
Minor (Crossing) ST:	5 Springs Road	Speed Limit:	50 mph
Major ST Direction:	East/West	Area Type:	Rural
Intersection Control:	Conventional (Minor Stop)		
Prepared By:	Arcadis	Analyst:	Kelli Roberts
Date:	7/15/2020	Project ID:	N/A
Project Purpose:	Safety Improvement		

2019	Existing Data Year
2024	Project Opening Year
2044	Project Design Year

Annual Growth Rate: 2.0%

K Factor*: 9%

2019 Existing Year Volumes



Peak Hour % Trucks			
EB	WB	NB	SB
10%	N/A	10%	10%

Legend:

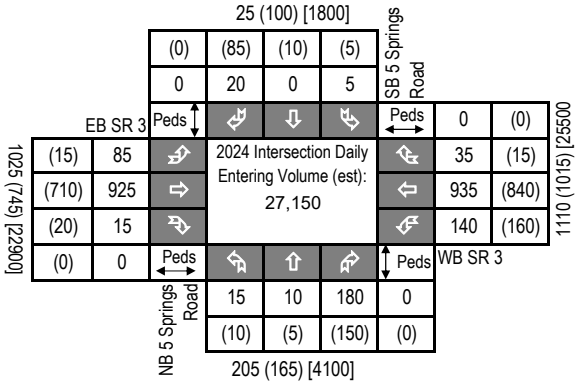
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

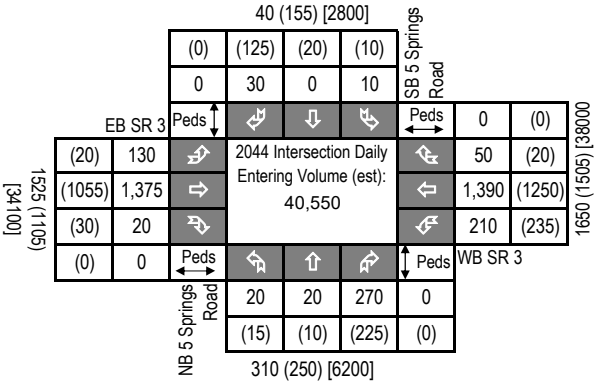
[000] = ADT Volume (Estimate)

Approach Splits: SR 3 - 0.88 / 5 Springs Road - 0.12

2024 Opening Year Volumes



2044 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.15 | Revised 07/01/2019

GDOT PI #	N/A
Project Location:	SR 3 @ 5 Springs Road
Existing Control:	Conventional (Minor Stop)
Prepared by:	Arcadis
Date:	7/15/2020

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

	Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constrains & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	**Screening Decision Justification:**
Unsignalized Intersections	Conventional (Minor Stop)	No	No	No	No	No	No	No	Existing Condition
	Conventional (All-Way Stop)	No	No	No	No	No	No	No	Multilane Mainline
	Mini Roundabout	No	No	No	No	No	No	No	High Speed Mainline
	Single Lane Roundabout	No	No	No	No	No	No	No	Multilane Mainline
	Multilane Roundabout	**No**	**Yes**	**No**	**Yes**	**No**	**No**	**Yes**	Potential Alternative to Evaluate
	RCUT (stop control)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Potential Alternative to Evaluate
	RIRO w/down stream U-Turn	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No	High left turn volume on main street
	High-T (unsignalized)	No	No	No	No	No	No	No	Not a Tee intersection
	Offset-T Intersections	No	No	No	No	No	No	No	Not a Tee intersection
	Diamond Interch (Stop Control)	No	No	No	No	No	No	No	Not an Interchange
	Diamond Interch (RAB Control)	No	No	No	No	No	No	No	Not an Interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other unsignalized (provide description):	No	No	No	No	No	No	No	N/A
Signalized Intersections	Traffic Signal	No	No	No	No	No	No	No	Signal Warrants Not Met
	Median U-Turn (Indirect Left)	No	No	No	No	No	No	No	Signal Warrants Not Met
	RCUT (signalized)	No	No	No	No	No	No	No	Signal Warrants Not Met
	Displaced Left Turn (CFI)	No	No	No	No	No	No	No	Signal Warrants Not Met
	Continuous Green-T	No	No	No	No	No	No	No	Signal Warrants Not Met
	Jughandle	No	No	No	No	No	No	No	Signal Warrants Not Met
	Quadrant Roadway	No	No	No	No	No	No	No	Signal Warrants Not Met
	Diamond Interch (Signal Control)	No	No	No	No	No	No	No	Signal Warrants Not Met
	Diverging Diamond	No	No	No	No	No	No	No	Signal Warrants Not Met / Not an Interchange
	Single Point Interchange	No	No	No	No	No	No	No	Signal Warrants Not Met / Not an Interchange
	No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
	Other Signalized (provide description):	No	No	No	No	No	No	No	N/A

= Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.15 | Revised 07/01/2019

GDOT PI # (or N/A): N/A
County: Whitfield
Project Location: SR 3 @ 5 Springs Road
Existing Intersection Control: Conventional (Minor Stop)

GDOT District: 6 - Cartersville
Area Type: Rural

Date: 7/15/2020
Agency/Firm: Arcadis
Analyst: Kelli Roberts
Type of Analysis: Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	None	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	Synchro 10	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2024 Opening Yr No-Build Peak Hr Intersection Delay	23.4 sec	4.8 sec
2024 Opening Yr No-Build Peak Hr Intersection V/C	1.66	0.46
2044 Design Yr No-Build Peak Hr Intersection Delay	105.7 sec	85.4 sec
2044 Design Yr No-Build Peak Hr Intersection V/C	5.00	5.00

Complete Streets Warrants Met?
- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Data: Enter most recent 5 years of crash data	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Crash Type: Angle	6	10	1	37%
Head-On	0	0	0	0%
Rear End	15	3	0	39%
Sideswipe - same	1	0	0	2%
Sideswipe - opposite	0	0	0	0%
Not Collision w/Motor Veh	4	6	0	22%
TOTALS:	26	19	1	46

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Multilane Roundabout	RCUT (stop control)	N/A	N/A	N/A
Project Cost: (From CostEst Worksheet)					
Construction Cost	$1,600,000	$750,000			
ROW Cost	$0	$50,000			
Environmental Cost	$0	$0			
Reimbursable Utility Cost	$100,000	$50,000			
Design & Contingency Cost	$705,000	$250,000			
Cost Adjustment (justification req'd)					
Total Cost	$2,405,000	$1,100,000			
Traffic Operations:					
Traffic Analysis Software Used	SIDRA 7	Synchro 10			
Analysis Period	AM Peak Hr / PM Peak Hr	AM Peak Hr / PM Peak Hr			
2044 Design Yr Build Intersection Delay	14.2 sec / 8.8 sec	4.3 sec / 2.5 sec			
2044 Design Yr Build Intersection V/C	0.82 / 0.54	1.00 / 0.62			
Safety Analysis:					
Predefined CRF: PDO	32%	31%			
Predefined CRF: Fatal/Inj	71%	53%			
Predefined CRF Source:	FHWA Clearinghouse #s 236 / 237	NC/MO Table 4-7			
User Defined CRF: PDO	71%	43%			
User Defined CRF: Fatal/Inj	87%	54%			
User Defined CRF Source (write in if applicable):	FHWA Clearinghouse #s 229 / 230	FHWA Clearinghouse #s 5556 / 5557			
Environmental Impacts:[1]					
Historic District/Property	None	None			
Archaeology Resources	None	None			
Graveyard	None	None			
Stream	None	None			
Underground Tank/Hazmat	None	None			
Park Land	None	None			
EJ Community	None	None			
Wooded Area	None	None			
Wetland	None	None			
Stakeholder Posture:					
Local Community Support	Neutral	Neutral			
GDOT Support	Neutral	Neutral			
Final ICE Stage 2 Score:	6.4	5.6			
Rank of Control Type Alternatives:	1	2			

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*

[1] *Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report*

Note: Stage 2 score is not given (shown as "**-**") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary):

2015-2020 Crash Data
The maximum V/C for the side streets exceeds 5 in the No Build condition
B/C ratio: Multi-lane(13.2) RCUT(16.3)

Appendix H: Alternatives Operational Analysis

Build Condition 2044

Multi-lane Roundabout

LANE SUMMARY

Site: [SR 3 @ 5 Springs/Old Dixie_2044 AM]

New Site
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 20 years

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Old Dixie Hwy													
Lane 1[d]	312	10.0	383	0.815	100	43.9	LOS E[11]	7.8	209.6	Full	1600	0.0	0.0
Approach	312	10.0		0.815		43.9	LOS E[11]	7.8	209.6				
East: SR 3													
Lane 1	763	10.0	1155	0.661	100	12.3	LOS B	6.7	181.1	Full	1600	0.0	0.0
Lane 2[d]	926	10.0	1401	0.661	100	10.7	LOS B	7.0	187.9	Full	1600	0.0	0.0
Approach	1689	10.0		0.661		11.4	LOS B	7.0	187.9				
North: 5 Springs Road													
Lane 1[d]	40	10.0	377	0.105	100	11.3	LOS B	0.5	12.8	Full	1600	0.0	0.0
Approach	40	10.0		0.105		11.3	LOS B	0.5	12.8				
West: SR 3													
Lane 1	699	10.0	1085	0.645	100	12.4	LOS B	7.7	207.7	Full	1600	0.0	0.0
Lane 2[d]	860	10.0	1335	0.645	100	10.7	LOS B	6.5	174.7	Full	1600	0.0	0.0
Approach	1560	10.0		0.645		11.4	LOS B	7.7	207.7				
Intersection	3600	10.0		0.815		14.2	LOS B	7.8	209.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
d Dominant lane on roundabout approach

LANE LEVEL OF SERVICE

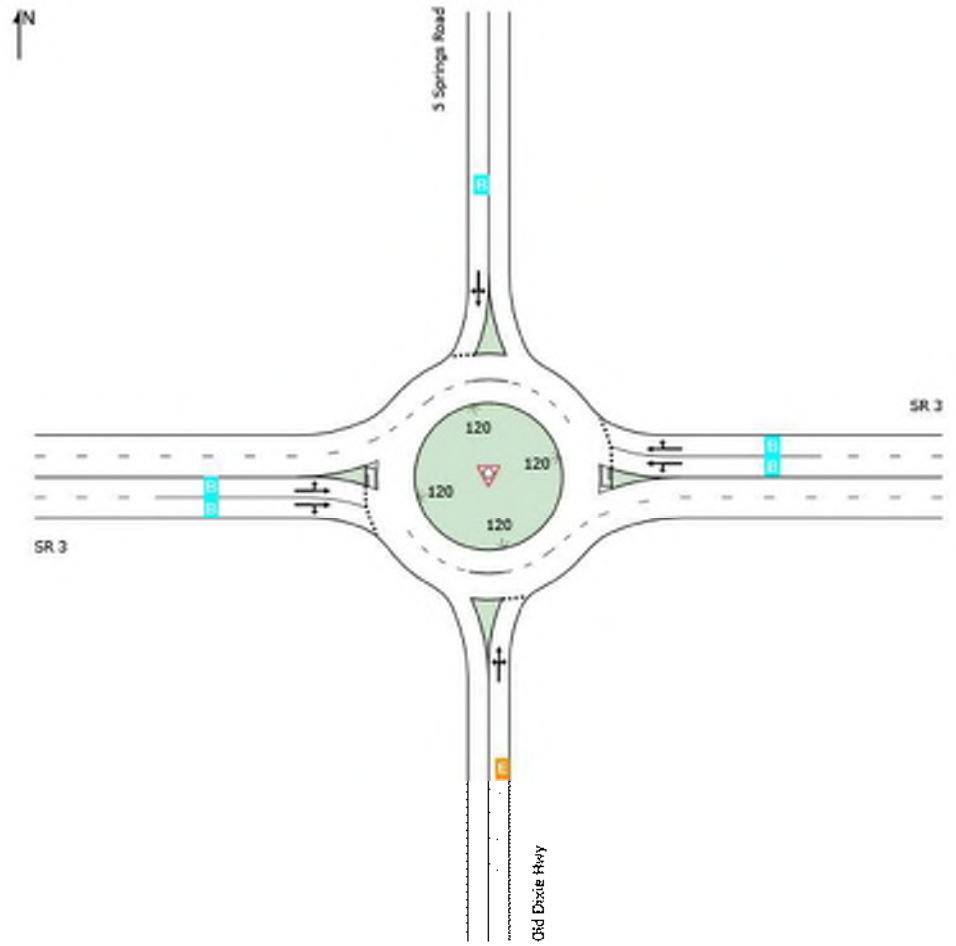
Lane Level of Service

Site: [SR 3 @ 5 Springs/Old Dixie_2044 AM]

New Site
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 20 years

	Approaches				Intersection
	South	East	North	West	
LOS	E[11]	B	B	B	B

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

LANE SUMMARY

Site: [SR 3 @ 5 Springs/Old Dixie_2044 PM]

New Site
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 20 years

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Old Dixie Hwy													
Lane 1[d]	251	10.0	541	0.464	100	14.7	LOS B	2.7	73.4	Full	1600	0.0	0.0
Approach	251	10.0		0.464		14.7	LOS B	2.7	73.4				
East: SR 3													
Lane 1	711	10.0	1328	0.535	100	8.5	LOS A	4.9	133.5	Full	1600	0.0	0.0
Lane 2[d]	834	10.0	1559	0.535	100	7.6	LOS A	5.0	134.3	Full	1600	0.0	0.0
Approach	1545	10.0		0.535		8.0	LOS A	5.0	134.3				
North: 5 Springs Road													
Lane 1[d]	152	10.0	500	0.305	100	11.9	LOS B	1.4	37.2	Full	1600	0.0	0.0
Approach	152	10.0		0.305		11.9	LOS B	1.4	37.2				
West: SR 3													
Lane 1	505	10.0	1065	0.474	100	8.8	LOS A	3.4	92.2	Full	1600	0.0	0.0
Lane 2[d]	628	10.0	1325	0.474	100	7.5	LOS A	3.6	96.7	Full	1600	0.0	0.0
Approach	1134	10.0		0.474		8.1	LOS A	3.6	96.7				
Intersection	3082	10.0		0.535		8.8	LOS A	5.0	134.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

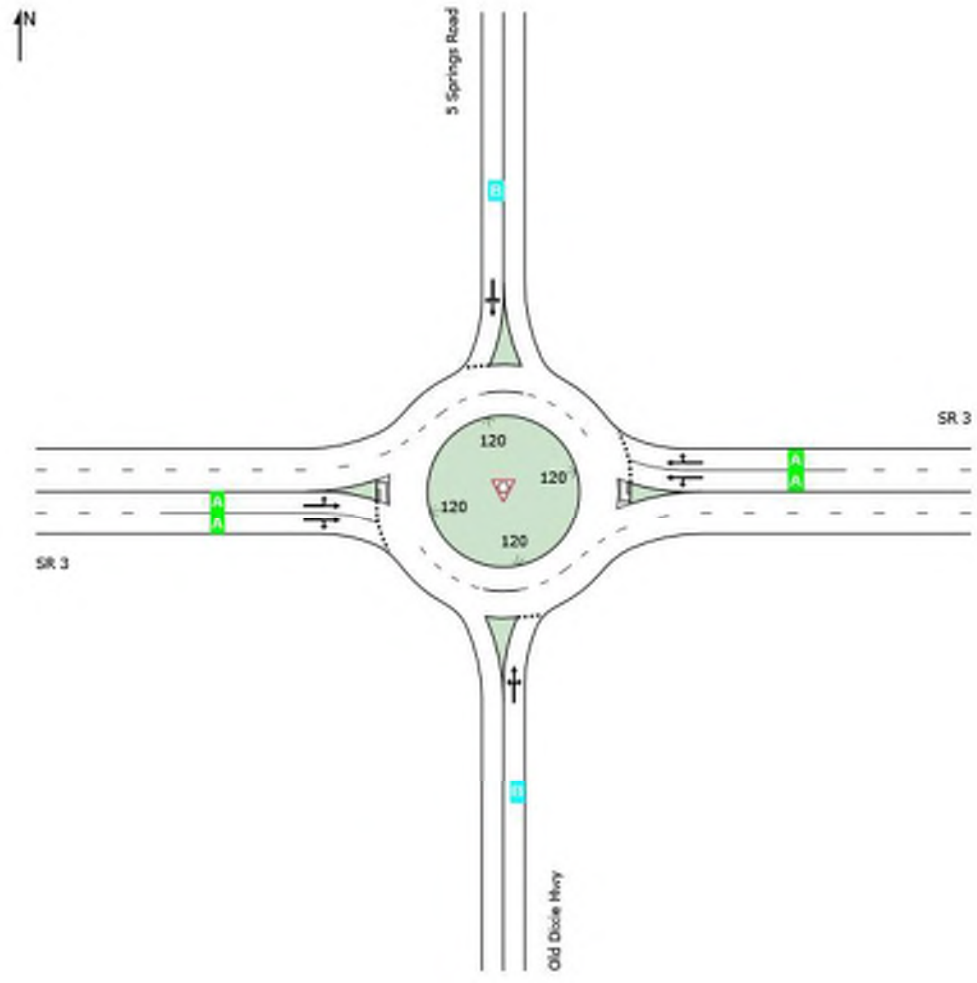
LANE LEVEL OF SERVICE

Lane Level of Service

Site: [SR 3 @ 5 Springs/Old Dixie_2044 PM]

New Site
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 20 years

	Approaches				Intersection
	South	East	North	West	
LOS	B	A	B	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Build Condition 2044

RCUT

4: Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBR	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0
Total Del/Veh (s)	14.1	1.8	1.8	20.8	1.6	2.2	13.8	1.5	4.3

6: Performance by movement

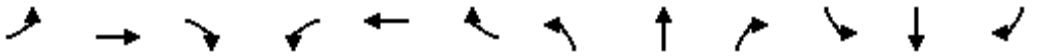
Movement	EBU	EBT	WBT	All
Denied Del/Veh (s)	0.0	0.0	0.4	0.2
Total Del/Veh (s)	40.3	3.4	1.6	3.0

8: Performance by movement

Movement	EBT	WBU	WBT	All
Denied Del/Veh (s)	0.3	0.0	0.0	0.2
Total Del/Veh (s)	1.4	42.1	1.4	1.5

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	10.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	1385	21	210	1410	70	0	0	310	0	0	41
Future Volume (Veh/h)	130	1385	21	210	1410	70	0	0	310	0	0	41
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	141	1505	23	228	1533	76	0	0	337	0	0	45
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1533			1505			3010	3776	752	3024	3776	766
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1533			1505			3010	3776	752	3024	3776	766
tC, single (s)	4.3			4.3			7.7	6.7	7.1	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	64			44			100	100	0	0	100	86
cM capacity (veh/h)	393			404			2	1	335	0	1	328

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	141	752	752	23	228	766	766	76	337	45
Volume Left	141	0	0	0	228	0	0	0	0	0
Volume Right	0	0	0	23	0	0	0	76	337	45
cSH	393	1700	1700	1700	404	1700	1700	1700	335	328
Volume to Capacity	0.36	0.44	0.44	0.01	0.56	0.45	0.45	0.04	1.00	0.14
Queue Length 95th (ft)	40	0	0	0	84	0	0	0	284	12
Control Delay (s)	19.2	0.0	0.0	0.0	24.9	0.0	0.0	0.0	86.5	17.7
Lane LOS	C				C				F	C
Approach Delay (s)	1.6				3.1				86.5	17.7
Approach LOS									F	C

Intersection Summary				
Average Delay	9.9			
Intersection Capacity Utilization	64.1%	ICU Level of Service	C	
Analysis Period (min)	15			

4: Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBR	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.0
Total Del/Veh (s)	10.5	1.3	1.9	11.2	1.4	2.0	3.6	3.6	2.5

6: Performance by movement

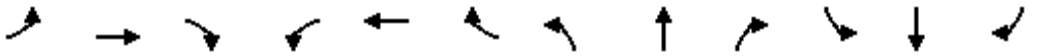
Movement	EBU	EBT	WBT	All
Denied Del/Veh (s)	0.0	0.0	0.3	0.2
Total Del/Veh (s)	28.2	2.4	1.4	2.1

8: Performance by movement

Movement	EBT	WBU	WBT	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	1.0	29.0	2.0	1.9

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	7.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1065	50	235	1265	30	0	0	250	0	0	155
Future Volume (Veh/h)	20	1065	50	235	1265	30	0	0	250	0	0	155
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	1158	54	255	1375	33	0	0	272	0	0	168
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1375			1158			2400	3087	579	2508	3087	688
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1375			1158			2400	3087	579	2508	3087	688
tC, single (s)	4.3			4.3			7.7	6.7	7.1	7.7	6.7	7.1
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	95			54			100	100	38	100	100	55
cM capacity (veh/h)	455			555			5	5	439	3	5	371

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	22	579	579	54	255	688	688	33	272	168
Volume Left	22	0	0	0	255	0	0	0	0	0
Volume Right	0	0	0	54	0	0	0	33	272	168
cSH	455	1700	1700	1700	555	1700	1700	1700	439	371
Volume to Capacity	0.05	0.34	0.34	0.03	0.46	0.40	0.40	0.02	0.62	0.45
Queue Length 95th (ft)	4	0	0	0	60	0	0	0	102	57
Control Delay (s)	13.3	0.0	0.0	0.0	16.9	0.0	0.0	0.0	25.7	22.5
Lane LOS	B				C				D	C
Approach Delay (s)	0.2				2.6				25.7	22.5
Approach LOS									D	C

Intersection Summary				
Average Delay	4.6			
Intersection Capacity Utilization	51.6%	ICU Level of Service		A
Analysis Period (min)	15			

Appendix I: Summary of Right-of-way and Construction Costs Estimates

CONSTRUCTION COST ESTIMATE
SR 3 @ 5 Springs Rd/Old Dixie Hwy

PAY ITEM	DESCRIPTION	UNIT	QUANTITY	PRICE	AMOUNT
150-1000	TRAFFIC CONTROL -	LS	1	$ 150,000.00	$ 150,000.00
150-5010	TRAFFIC CONTROL, PORTABLE IMPACT ATTENUATOR	EA	4	$ 8,014.30	$ 32,057.22
210-0100	GRADING COMPLETE -	LS	1	$ 200,000.00	$ 200,000.00
310-1101	GR AGGR BASE CRS, INCL MATL	TN	1045	$ 30.49	$ 31,866.07
402-3121	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	TN	250	$ 85.42	$ 21,354.79
402-3190	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2,INCL BITUM MATL & H LIME	TN	100	$ 92.30	$ 9,229.98
402-3130	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	TN	855	$ 108.67	$ 92,909.71
413-0750	TACK COAT	GL	625	$ 2.60	$ 1,626.36
429-1000	RUMBLE STRIPS	EA	12	$ 752.63	$ 9,031.59
432-0206	MILL ASPH CONC PVMT, 1 1/2 IN DEPTH	SY	9425	$ 4.72	$ 44,477.56
439-0022	PLAIN PC CONC PVMT, CL 3 CONC, 10 INCH THK	SY	536	$ 94.13	$ 50,451.30
441-0748	CONCRETE MEDIAN, 6 IN	SY	1042	$ 66.96	$ 69,776.35
441-5008	CONCRETE HEADER CURB, 6 IN, TP 7	LF	285	$ 17.28	$ 4,924.09
441-5025	CONCRETE HEADER CURB, 4 IN, TP 9	LF	405	$ 17.11	$ 6,930.04
441-6222	CONC CURB & GUTTER, 8 IN X 30 IN, TP 2	LF	1720	$ 31.00	$ 53,327.94
446-1100	PVMT REINF FABRIC STRIPS, TP 2, 18 INCH WIDTH	LF	1130	$ 5.97	$ 6,744.23
643-8200	BARRIER FENCE (ORANGE), 4 FT	LF	3580	$ 2.15	$ 7,699.70
550-1180	STORM DRAIN PIPE, 18 IN, H 1-10	LF	900	$ 52.91	$ 47,616.61
668-1100	CATCH BASIN, GP 1	EA	8	$ 2,709.73	$ 21,677.88
668-2100	DROP INLET, GP 1	EA	8	$ 2,508.99	$ 20,071.94
163-0232	TEMPORARY GRASSING	AC	1	$ 585.34	$ 585.34
163-0240	MULCH	TN	3	$ 303.10	$ 909.31
163-0300	CONSTRUCTION EXIT	EA	4	$ 1,612.65	$ 6,450.61
163-0503	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 3	EA	2	$ 491.01	$ 982.01
700-6910	PERMANENT GRASSING	AC	2	$ 1,240.82	$ 2,481.63
700-7000	AGRICULTURAL LIME	TN	4	$ 129.92	$ 519.67
700-8000	FERTILIZER MIXED GRADE	TN	1	$ 829.36	$ 829.36
700-8100	FERTILIZER NITROGEN CONTENT	LB	200	$ 4.92	$ 984.18
716-2000	EROSION CONTROL MATS, SLOPES	SY	500	$ 1.59	$ 793.96
636-1033	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 9	SF	100	$ 20.42	$ 2,041.84
636-2080	GALV STEEL POSTS, TP 8	LF	168	$ 10.63	$ 1,785.48
653-0110	THERMOPLASTIC PVMT MARKING, ARROW, TP 1	EA	2	$ 86.39	$ 172.77
653-0120	THERMOPLASTIC PVMT MARKING, ARROW, TP 2	EA	2	$ 90.51	$ 181.02
653-0130	THERMOPLASTIC PVMT MARKING, ARROW, TP 3	EA	4	$ 143.44	$ 573.77
653-0296	THERMOPLASTIC PVMT MARKING, WORD, TP 15	EA	7	$ 211.19	$ 1,478.32
653-1501	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	LF	5824	$ 1.04	$ 6,040.98
653-1502	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	LF	3400	$ 0.99	$ 3,360.37
653-1806	THERMOPLASTIC SOLID TRAF STRIPE, 8 IN, YELLOW	LF		$ 2.42	$ -
653-3501	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	GLF	1080	$ 11.66	$ 12,588.38
654-1001	RAISED PVMT MARKERS TP 1	EA	400	$ 5.08	$ 2,031.01
654-1003	RAISED PVMT MARKERS TP 3	EA	400	$ 5.17	$ 2,069.70
500-3101	CLASS A CONCRETE	CY	0.5	$ 1,125.18	$ 562.59
511-1000	BAR REINF STEEL	LB	2600	$ 1.24	$ 3,216.91
647-2120	PULL BOX, PB-2	EA	12	$ 495.65	$ 5,947.84
681-4220	LIGHTING STD, 40 FT MH, POST TOP	EA	4	$ 3,625.33	$ 14,501.32
681-6470	LUMINAIRE, TP 4, 275 W, LED	EA	22	$ 932.65	$ 20,518.30
682-1506	CABLE, TP RHH/RHW, AWG NO 6	LF	1300	$ 1.36	$ 1,765.83
682-6222	CONDUIT, NONMETL, TP 2, 2 IN	LF	1300	$ 9.08	$ 11,804.06
682-6233	CONDUIT, NONMETL, TP 3, 2 IN	LF	1300	$ 6.26	$ 8,135.66
682-9000	MAIN SERVICE PICK UP POINT	LS	1	$ 10,000.00	$ 10,000.00
682-9010	SVC POLE RISER	EA	12	$ 2,335.45	$ 28,025.38
682-9950	DIRECTIONAL BORE -	LF	150	$ 15.72	$ 2,358.12
700-9300	SOD	SY	280	$ 8.26	$ 2,312.90
702-0212	CRATAEGUS VIRIDIS -	EA	3	$ 631.89	$ 1,895.67
702-0470	ILEX VOMITORIA NANA -	EA	100	$ 53.62	$ 5,361.68
702-9005	SPRING APPLICATION FERTILIZER	LB	100	$ 11.59	$ 1,159.48
702-9025	LANDSCAPE MULCH	SY	280	$ 9.99	$ 2,797.34

ENGINEERING AND INSPECTION	$	1,048,996.17
10% CONTINGENCY	$	104,899.62
Total (rounded)	**$**	**1,154,000.00**

Appendix I: Safety Benefit-Cost Analysis

SR 3 @ 5 Springs Rd/Old Dixie Hwy - Safety Benefits

Targeted Crash Types: All

Recommendation	CRF IDs	E_k	R	r	R_p	r_p
Multi-lane Roundabout	CMF Clearinghouse ID: 229/230	0.087	0.87	0.13	0.71	0.29

Description	Symbol	Value
Reduction Factor (F, I)	R	0.87
Reduction Factor (PDO)	Rp	0.71
Capital Recovery Factor	Ek	0.087
Initial Improvement Cost	Ci	$ 2,405,000

Accident Data	Symbol	Value
Fatality	K	0.2
Serious Injury	A	0.3
Visible Injury	B	1.5
Complaint Injury	C	1.3
Property Damage Only	O	4.3

Weighted cost of fatal and injury collisions

Q = $ 1,020,500

Annual Benefit: $ 3,033,290

Annual Cost: $ 229,235

Annual B/C Ratio: **13.23**

Design Life Benefit

B = $ 60,665,800

Design Life Cost

C = $ 4,584,700

Design Life Benefit/Cost Ratio

B/C = **13.23**

SR 3 @ 5 Springs Rd/Old Dixie Hwy - Safety Benefits

Targeted Crash Types: All

Recommendation	CRF IDs	E_k	R	r	R_p	r_p
RCUT	CMF Clearinghouse ID: 5556/5557	0.087	0.54	0.46	0.43	0.57

Description	Symbol	Value
Reduction Factor (F, I)	R	0.54
Reduction Factor (PDO)	Rp	0.43
Capital Recovery Factor	Ek	0.087
Initial Improvement Cost	Ci	$ 1,100,000

Accident Data	Symbol	Value
Fatality	K	0.2
Serious Injury	A	0.3
Visible Injury	B	1.5
Complaint Injury	C	1.3
Property Damage Only	O	4.3

Weighted cost of fatal and injury collisions

Q = $ 1,020,500

Annual Benefit: $ 1,881,620

Annual Cost: $ 115,700

Annual B/C Ratio: **16.26**

Design Life Benefit

B = $ 37,632,400

Design Life Cost

C = $ 2,314,000

Design Life Benefit/Cost Ratio

B/C = **16.26**

Appendix K: Environmental Screening Report

Memo

GDOT Office of Traffic Operations
935 Confederate Ave., SE
Atlanta, GA 30316

Arcadis U.S., Inc.
2410 Paces Ferry Road
#400
Atlanta
Georgia 30339
Tel 770 431 8666
Fax 770 435 2666

Subject: Environmental Screening Memo
State Route (SR) 3 @ Five Springs Road/Old Dixie Highway
P.I. No. N/A, Whitfield Co., Georgia

The Georgia Department of Transportation (GDOT) has identified the need for improvements to State Route (SR) 3 @ Five Springs Road/Old Dixie Highway, in Whitfield County, Georgia. The proposed project is to be included in the GDOT Safety Lump Sum Program within the Office of Traffic Operations.

SR 3 is a four-lane rural major arterial that runs in the east-west direction with a posted speed limit of 55 miles per hour (MPH). Old Dixie Highway is a two-lane rural major collector that connects traffic from the south to the intersection. The posted speed limit along Old Dixie Hwy is 50 MPH. Five Springs Rd is a two-lane rural local road that connects traffic from the north to the intersection. The posted speed limit along Five Springs Rd is 40 MPH. The intersection is stop controlled on the side streets (Five Springs Rd/Old Dixie Hwy).

The proposed project is the conversion of a four (4) legged, two-way stop-controlled intersection, to a Multi Lane Roundabout (MLR). The roundabout would maintain the 4 approaches with adjustments to include the required horizontal curves/radii to slow the traffic prior to entering the circulatory roadway. The proposed roundabout may require additional Right-of-Way (ROW); however, the project's development is in early stages and specific related information is yet to be determined.

To assist GDOT in understanding the potential environmental constraints within the corridor, Arcadis staff conducted a desktop survey. Arcadis used National Wetland Inventory (NWI) maps, Georgia's Natural, Archaeological, and Historic Geographic Information System (GNAHRGIS), the U.S. Environmental Protection Agency's (USEPA) EnviroMapper, and the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) to identify environmental resources that may be afforded protection under the National Environmental Policy Act (NEPA). Based on the desktop survey, the following environmental concerns/constraints were observed in the corridor:

NEPA

Environmental Justice/Community Impact

During this desktop survey, the presence of minority or low-income populations was not apparent within the study corridor. The nature of the proposed project (converting an existing intersection into a roundabout) is minor and is unlikely to result in disproportionate effects to minority or low-income residents.

Section 4(f) Properties

Section 4(f) properties include significant publicly owned public parks, recreation areas, and wildlife or waterfowl refuges, or any publicly or privately owned historic site listed or eligible for listing on the National Register of Historic Places (NRHP). Historic properties that may be afforded protection under Section 4(f) were identified within and adjacent to the project limits. Please see the History discussion on page 4 of this screening for more information.

Environmental Documentation

Based on the 2018 Programmatic Categorial Exclusion (PCE) Process Agreement, the proposed project type is minor and may qualify for a PCE; however, for planning purposes it is assumed that environmental clearance will be obtained with a CE.

Ecology

Protected Species

The proposed SR 3 @ Five Springs Road/Old Dixie Highway project is approximately 4.18 miles south of Dalton, GA. Protected species and their habitats may exist but are less likely to exist within the project corridor due to development, utility easements and proximity to the existing roadway. A separate discussion regarding bat species follows. An Ecological Resource Survey Report and Assessment of Effects for protected species and their habitats would be prepared to assess habitat suitability, species presence, and the effect of the proposed project on protected species.

Bats

All bats are protected under Georgia state law and some species have additional protections under the federal Endangered Species Act of 1973. Bridges and culverts are often potential bat roosting locations and forested areas can serve as roosting and foraging habitat. The proposed project is adjacent to forested areas within the range of the Gray Bat (*Myotis grisescens*). The United States Fish & Wildlife Service's *Interim Guidance: Bat Consultation Ranges* (October 7, 2019) showed no additional species for the area.

Waters of the United States

According to the NWI map, there are Waters of the United States near the study corridor (Figure 1). None of these waters are designated as trout streams. An Ecological Resource Survey would be necessary to confirm the extent of any jurisdictional and state waters within the project corridor. Additionally, an Assessment of Effects would be necessary to analyze and document the impacts of the project on jurisdictional and state waters should any be confirmed.

Figure 1. Waters of the United States

Floodplain

FEMA FIRM Panel 13313CO230D, Whitfield County (dated 09/09/2007) was reviewed to identify flood hazard zones within the project corridor. Based on this review, a portion of the study corridor contains a flood zone or flood hazard area (Figure 2). Coordination with project engineers and designers is necessary to confirm the location of the floodplain and any impacts resulting from the proposed project's design. Encroachments and fill impacts within the Zone AE floodplain and regulatory floodway would necessitate a hydraulic study to be conducted to measure the resulting increases in floodplain and floodway elevations and floodway width. Efforts to avoid and minimize fill impacts will be undertaken as design and plan development proceed.

Figure 2. Floodplain

History

A GNAHRGIS query returned one (1) result for historic resources (structures 50 years of age and older) within or adjacent to the project corridor. Five (5) historic resources were identified using information from the Whitfield County Tax Assessor. These resources are listed below (Figure 3). Note: this segment of Old Dixie Highway may be determined to be eligible for listing in the National Register of Historic Places (NRHP). Section 106 Coordination and a Historic Resources Survey Report by a certified historian would be necessary to confirm the full extent of historic resources and their eligibility for listing in the NRHP. Preparation of a Cultural Resources Assessment of Effects Report may be necessary.

A. 3092 Five Springs Rd, 1961

B. 3072 Five Springs Rd, 1961

C. 3051 Five Springs Rd, 1961 (GNAHRGIS data point)

D. 3067 Five Springs Rd, 1961

E. 3073 Five Springs Rd, 1961

Figure 3. Historic Resources

Archaeology

According to GNAHRGIS, no publicly documented archaeological resources are present within the project limits, and the possibility of encountering archaeological resources is low. Most of the areas adjacent to the study corridor have been modified and disturbed by transportation facilities, utilities, and other development. Based on the desktop survey, Section 106 Coordination and an Archaeological Short Report appears to be the likely path for reporting; a site file search and field work by certified archaeologists may necessitate the preparation of a Management Summary and a Phase 1 Archaeology Resource Report if previously listed sites or newly uncovered sites are confirmed or found.

Hazardous Waste/Underground Storage Tanks

The EPA's EnviroMapper, Georgia Environmental Protection Division's (GAEPD) underground storage tank (UST) database, and desktop surveys, were used to identify facilities with UST(s) that are present within the study corridor. None were found. Should unpredicted UST(s) be located, a Phase I Environmental Site Assessment (ESA) would likely be necessary, and a Phase II ESA could be required.

Public Involvement

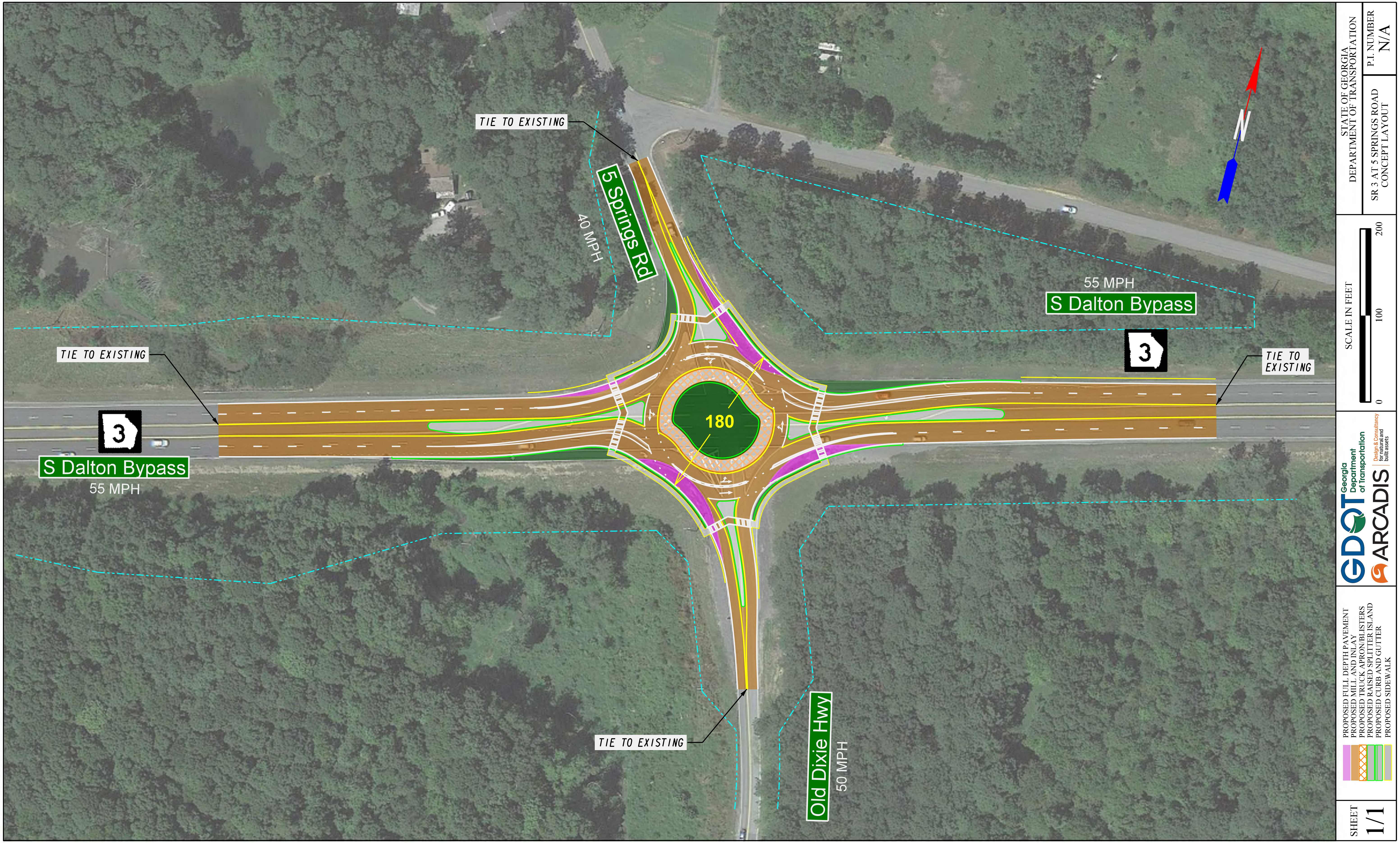
A determination on the level of public involvement has not yet been made. A Public Information Open House (PIOH) may be recommended.

Anticipated Permits

No permits are anticipated. A U.S. Army Corps of Engineers (USACE) Section 404 Permit would be required if impacts to Waters of the U.S. were unavoidable.

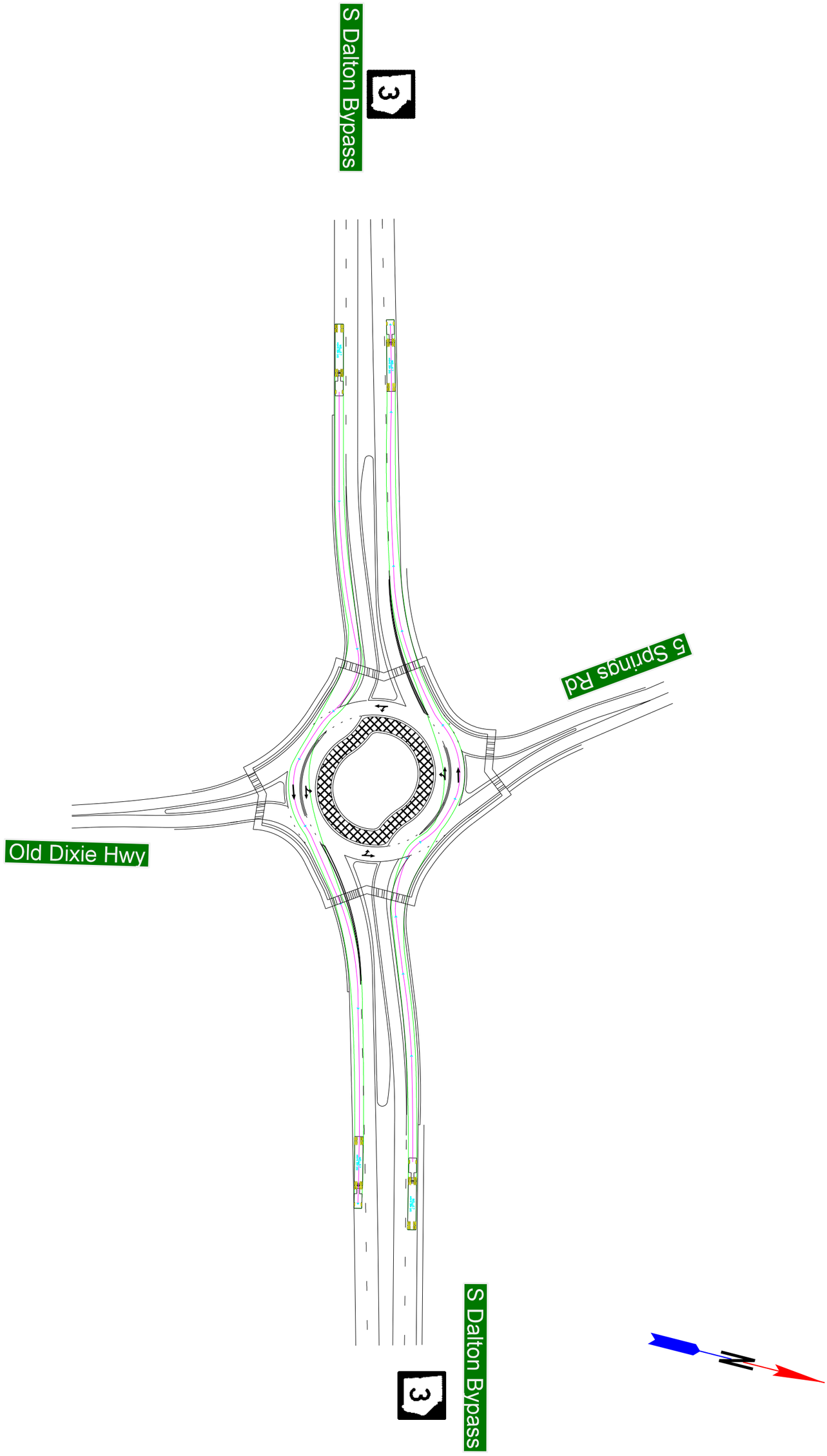
Appendix L: Existing and Preferred Alternative Sketches

SHEET			SCALE IN FEET	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION	
1/1		GDOT Georgia Department of Transportation ARCADIS Design & Consultancy for natural and built assets	0 100 200	SR 3 AT 5 SPRINGS ROAD CONCEPT LAYOUT	P.I. NUMBER N/A

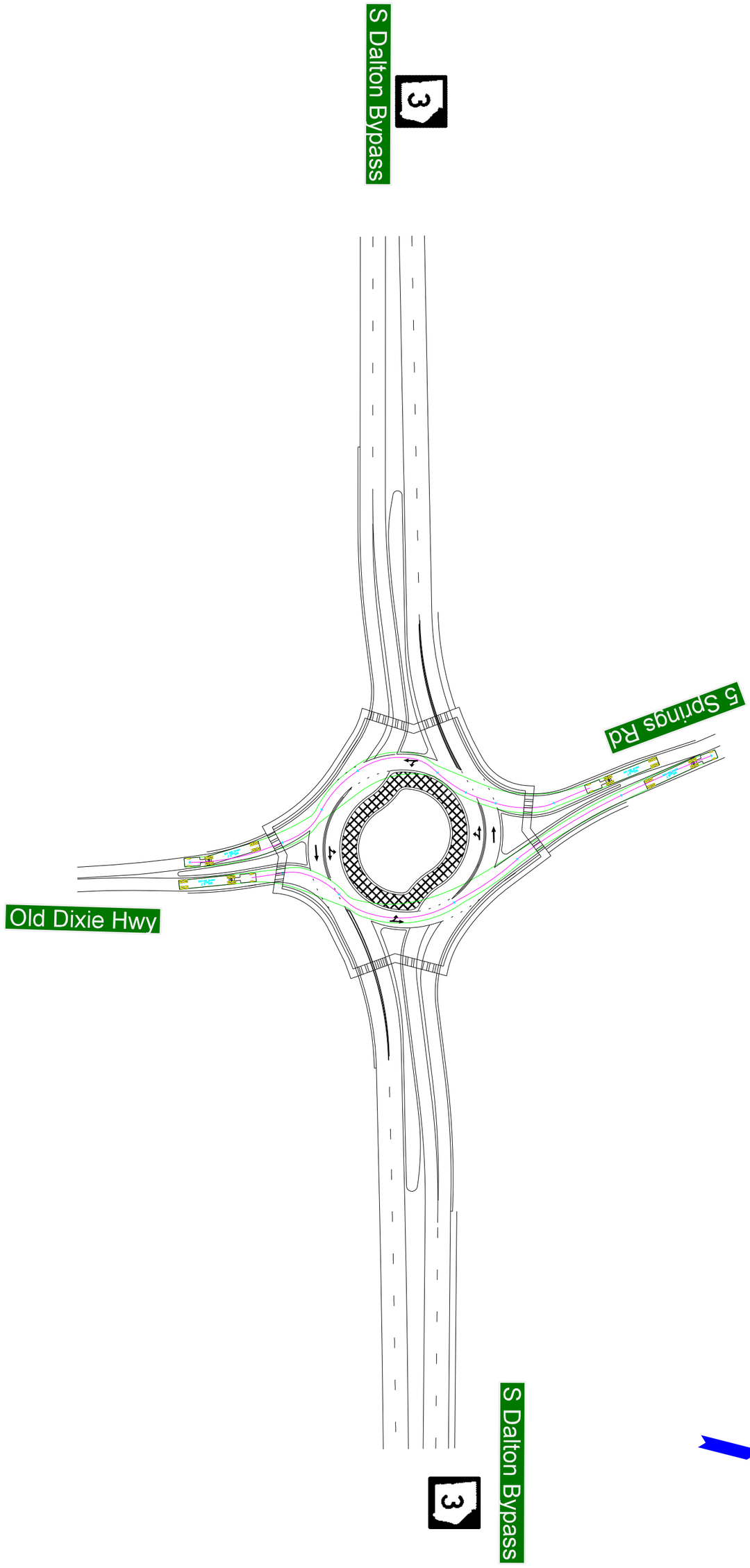


TIE TO EXISTING
5 Springs Rd
40 MPH
55 MPH
S Dalton Bypass
3
TIE TO EXISTING
TIE TO EXISTING
3
S Dalton Bypass
55 MPH
180
N
TIE TO EXISTING
Old Dixie Hwy
50 MPH
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
P.I. NUMBER
N/A
SR 3 AT 5 SPRINGS ROAD
CONCEPT LAYOUT
SCALE IN FEET
0
100
200
Georgia Department of Transportation
ARCADIS
Design & Consultancy for natural and built assets
PROPOSED FULL DEPTH PAVEMENT
PROPOSED MILL AND INLAY
PROPOSED TRUCK APRON/BLISTERS
PROPOSED RAISED SPLITTER ISLAND
PROPOSED CURB AND GUTTER
PROPOSED SIDEWALK
SHEET
1/1

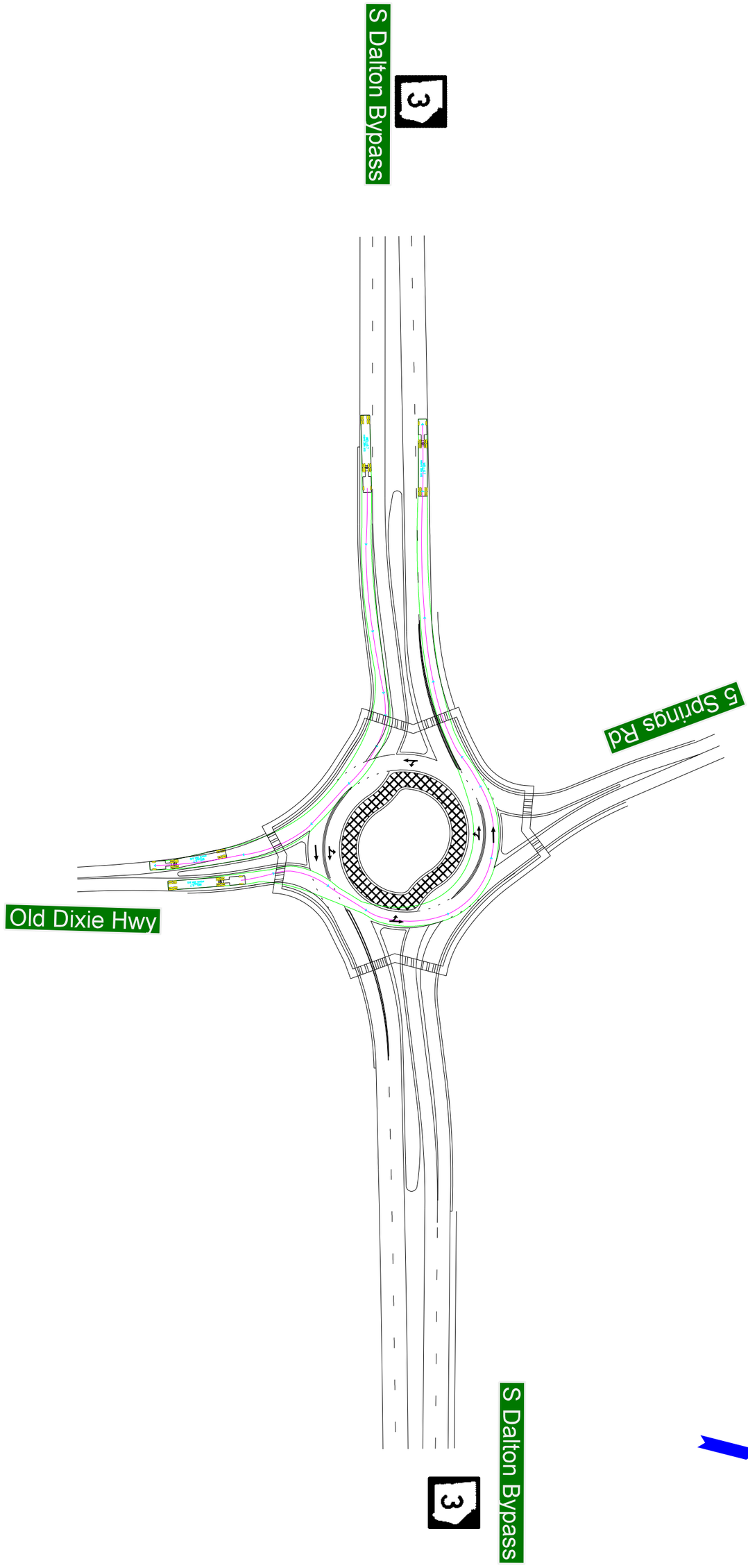
Appendix M: Roundabout Checks and Layout Iterations



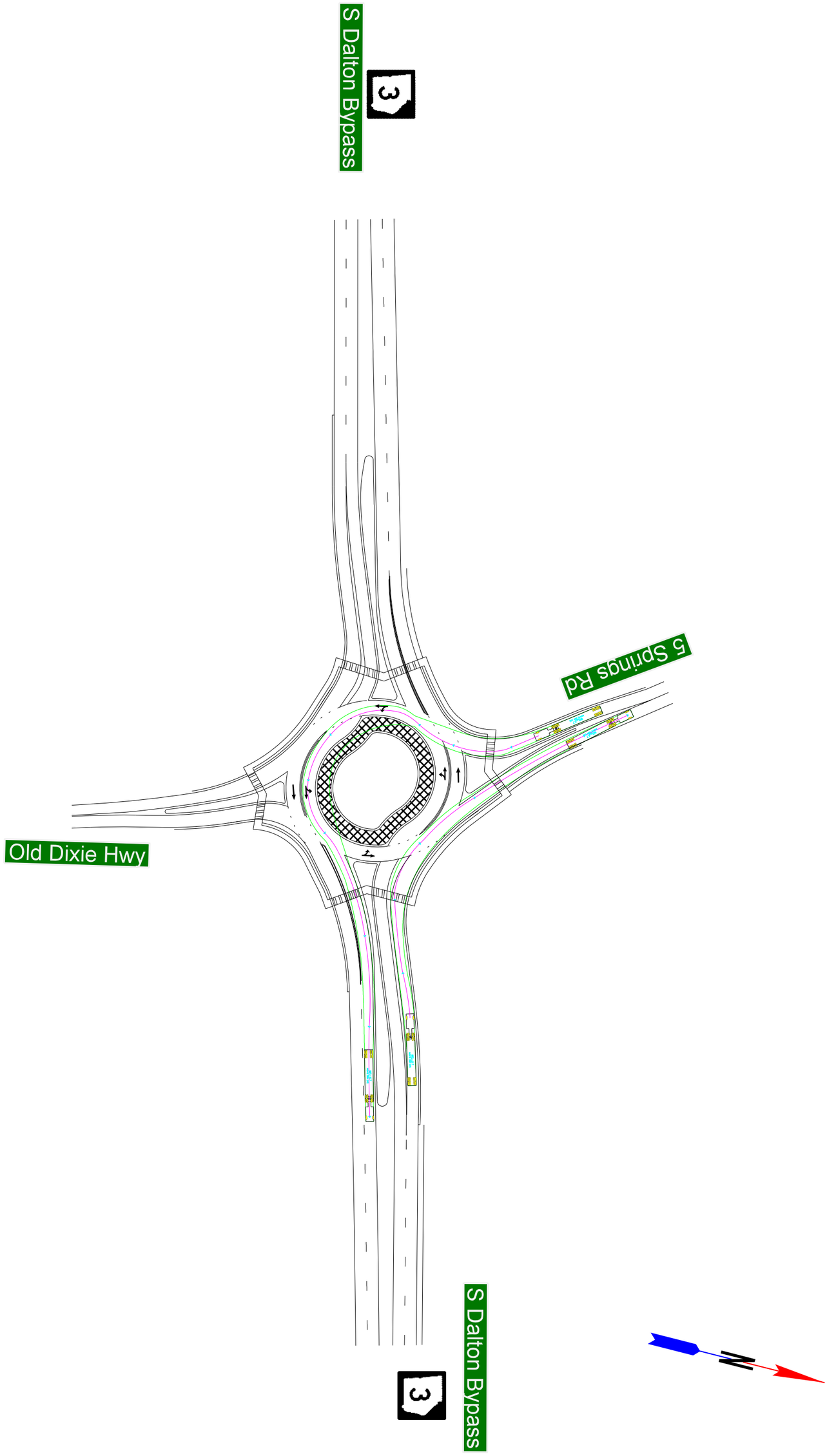
SHEET 1/6	TRUCK PATH DESIGN VEHICLE: WB 67	GDOT Georgia Department of Transportation ARCADIS Design & Consultancy for natural and built assets	SCALE IN FEET 0 100 200	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION SR 3 AT 5 SPRINGS ROAD CONCEPT LAYOUT	P.I. NUMBER N/A



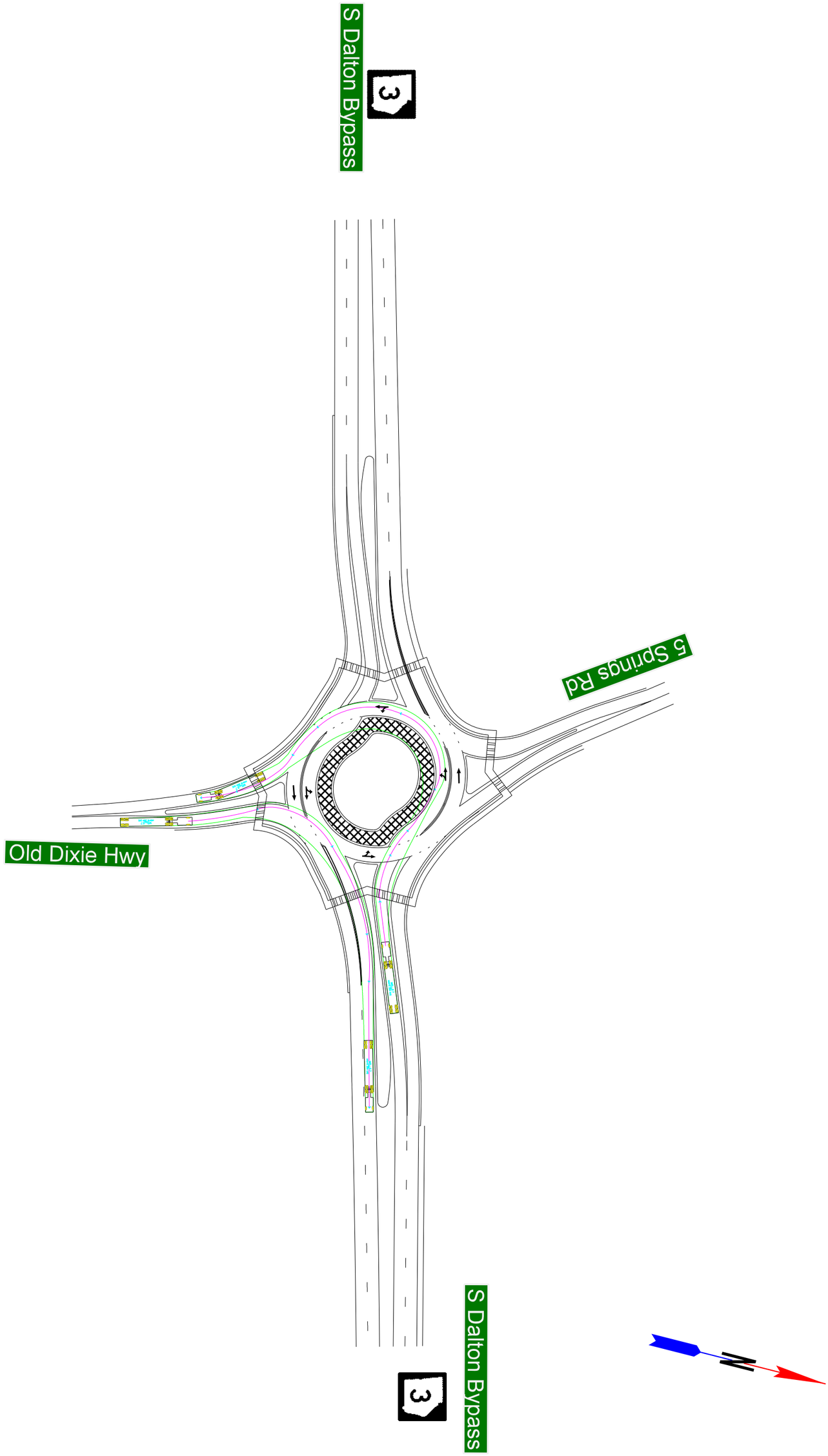
SHEET	TRUCK PATH DESIGN VEHICLE: WB 67	GDOT Georgia Department of Transportation ARCADIS Design & Consultancy for natural and built assets	SCALE IN FEET 0 100 200	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION	
2/6				SR 3 AT 5 SPRINGS ROAD CONCEPT LAYOUT	P.I. NUMBER N/A



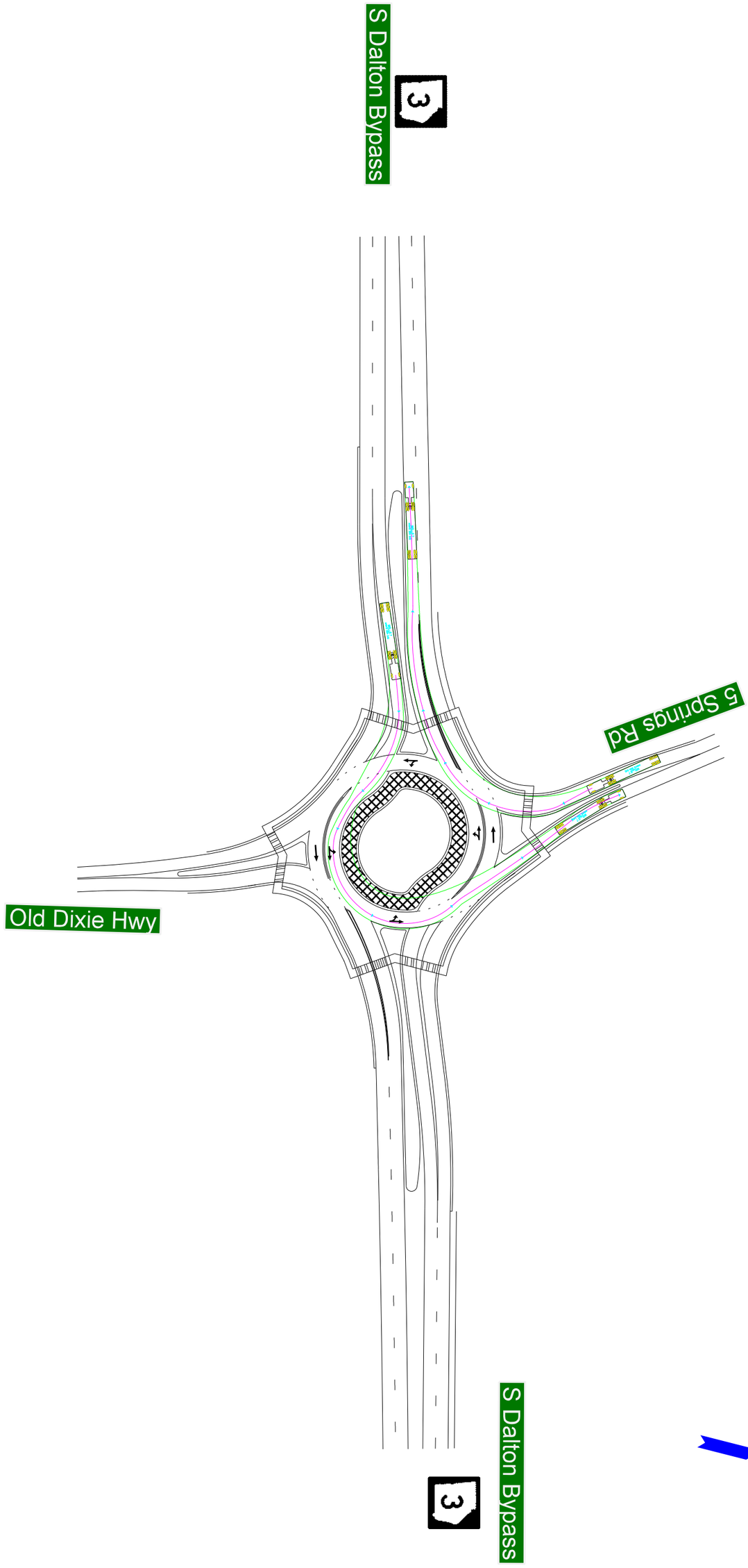
SHEET				
3/6	TRUCK PATH DESIGN VEHICLE: WB 67	GDOT Georgia Department of Transportation ARCADIS Design & Consultancy for natural and built assets	SCALE IN FEET 0 100 200	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION SR 3 AT 5 SPRINGS ROAD CONCEPT LAYOUT P.I. NUMBER N/A



SHEET	TRUCK PATH DESIGN VEHICLE: WB 67	GDOT Georgia Department of Transportation ARCADIS Design & Consultancy for natural and built assets	SCALE IN FEET 0 100 200	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION	
4/6				SR 3 AT 5 SPRINGS ROAD CONCEPT LAYOUT	P.I. NUMBER N/A



SHEET	TRUCK PATH DESIGN VEHICLE: WB 67	GDOT Georgia Department of Transportation ARCADIS Design & Consultancy for natural and built assets	SCALE IN FEET 0 100 200	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION	
5/6				SR 3 AT 5 SPRINGS ROAD CONCEPT LAYOUT	P.I. NUMBER N/A



SHEET				
6/6	TRUCK PATH DESIGN VEHICLE: WB 67	GDOT Georgia Department of Transportation ARCADIS Design & Consultancy for natural and built assets	SCALE IN FEET 0 100 200	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION SR 3 AT 5 SPRINGS ROAD CONCEPT LAYOUT P.I. NUMBER N/A

To minimize ROW impacts on the south leg, the bypass was removed in the final draft shown in Appendix L. Removing the bypass is not anticipated to worsen traffic operations on the south leg. In the design year, traffic is expected to operate at LOS E on the south leg.

5 Springs Rd

S Dalton Bypass

3

S Dalton Bypass

3

Bypass is removed in the final draft as shown in Appendix L

Old Dixie Hwy

N

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

P.I. NUMBER
N/A

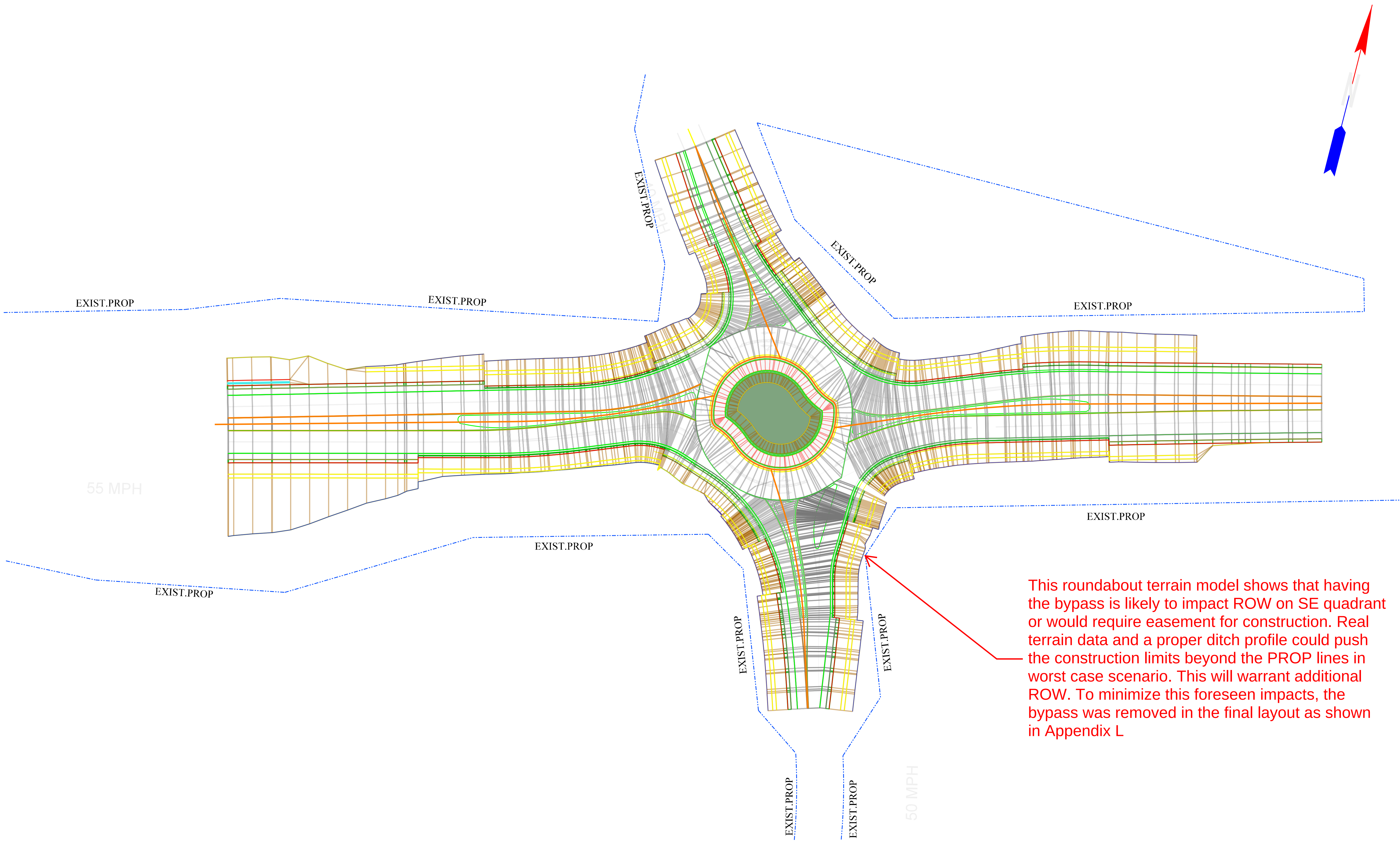
SR 3 AT 5 SPRINGS ROAD
CONCEPT LAYOUT

SCALE IN FEET
0 100 200

GDOT Georgia Department of Transportation
ARCADIS Design & Consultancy for natural and built assets

PROPOSED FULL DEPTH PAVEMENT
PROPOSED MILL AND INLAY
PROPOSED TRUCK APRON/BLISTERS
PROPOSED RAISED SPLITTER ISLAND
PROPOSED CURB AND GUTTER

SHEET
1/1



STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

PI NUMBER:
N/A

SR 3 AT SR 5 SPRING ROAD
CONCEPT LAYOUT

CONSTRUCTION LIMITS

GDOT Georgia Department of Transportation

SHEET
1/1

Appendix N: Previous GDOT TE Study (4/20/2020)

Georgia Department of Transportation

SR 3 @ Old Dixie HWY/ Five Springs Rd

Whitfield County

04/20/2020

Prepared By: Manara ALI

TABLE OF CONTENTS

STUDY LOCATION

The location of study is at intersection SR 3 @ Old Dixie HWY/ Five Springs Rd in Whitfield County.

REASON FOR INVESTIGATION

The intersection of SR 3 @ Old Dixie Hwy/ Five Springs Rd is being analyzed due to a fatality and different safety and operation concerns.

TOPOGRAPHY

The studied intersection, SR 3 @ Old Dixie Hwy/ Five Springs Rd, is a relatively flat intersection in urbanized area. Direction of travel for SR 3 is East/West with this section of road composed of four-lanes Urban Arterial. State Route SR 3 currently is a four-lane, 13-foot-wide undivided highway with unpaved, grass shoulders. The speed limit along State Route SR 3 is posted as 55 MPH. The intersecting roads, Five Springs Rd and Old Dixie Hwy are Rural Major Collector roads with a North/South direction of travel, respectively. The intersecting roads are both two-lane undivided with grass shoulder roadway with a speed limit of 50 MPH for Old Dixie Hwy and 40 MPH for Five Springs Rd. This intersection is considered an Urban area.

The required sight distance for Old Dixie Hwy/ Five Springs Rd at the intersection with SR 3, based on the *Regulation for Driveway and Encroachment Control Manual* is 690 feet for traffic approaching the minor road from the left and 610 feet for traffic approaching the side road from the right.

Upon site visit at the intersection of SR 3 and Old Dixie Hwy/ Five Springs Rd, sight distances were measured and recorded as presented in the table below.

	Sight Distance on Old Dixie Hwy/ Five Springs Rd (Feet)			
	Old Dixie Hwy		Five Springs Rd	
	SDL	SDR	SDL	SDR
Required Sight distance	690	610	690	610
Measured Sight Distance	1600	1830	1830	1600

**All measurements where determined based on *Regulation for Driveway and Encroachment Control Manual* for a 55 MPH speed limit on the mainline SR 3.

EXISTING TRAFFIC CONTROL

The current existing traffic control is Two-Way stop controlled at this intersection. The main line, SR 3, is free flow, while the side roads, Old Dixie Hwy and Five Springs Rd are stop controlled.

VEHICLE VOLUME HISTORY

The AADT for State Route SR 3 is 10,600 with a 6% Truck and Old Dixie Hwy/ Five Springs volume is 2,010 from the Transportation Data Viewer. A 12-hour traffic count was collected at the above intersection and data tabulated in Appendix H.

PEDESTRIAN MOVEMENTS

None Observed.

CRASH HISTORY

Crash reports were generated through the GEARS Database over a study period of five (5) years. There has been a total of 28 crashes between January 1st, 2015 and April 20th, 2020. From these collected data, the crash data distribution read as follows, 16 Angle crashes and 11 Rear End and 1 Side-swipe crashes collision.

The crash data was distributed as follows:

- 7 Angle crashes originated from Old Dixie Hwy, out of which 6 were Right Angle crashes between commuters attempting to cross SR 3 coming off Old Dixie Hwy and crashing with both Eastbound and Westbound traffic, 1 Left turn angle crash between commuters attempting to turn and left onto SR 3 coming off Old Dixie Hwy and crashing with Eastbound traffic.
  6 Angle crashes originated from SR 3, out of which 5 were Left turn angle crashes between commuters attempting to turn left onto Old Dixie Hwy coming off the main line SR 3 and crashing with Eastbound traffic and 1 Left turn angle crash between commuters attempting to turn left onto Five Springs Rd coming off the main line SR 3 and crashing with Westbound traffic.
  3 Angle crashes originated from Five Springs Rd, out of which 2 were Right angle crashes between commuters attempting to cross SR 3 and crashing with both Eastbound and Westbound traffic and 1 Left turn angle crash between commuters attempting to turn left onto SR 3 coming off the main line Five Springs Rd and crashing with Northbound traffic.
- 11 Rear End crashes on Old Dixie Hwy, all of which were between Northbound commuters.
- 1 Side-swipe crash between Southbound commuters on Five Springs Rd.

SR 3 @ Old Dixie Hwy/ Five Springs Rd							
Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Total per Crash Type**
Angle	3	1	1	4	7	0	16
Head On	0	0	0	0	0	0	0
Rear End	2	0	2	2	4	1	11
Side Swipe	1	0	0	0	0	0	1
Total per Year	6	1	3	6	11	1	**28**
Grand Total	**28**						
Injuries	3	0	0	5	4	0	**12**
Fatalities	0	0	0	0	0	1	**1**

ADJACENT SIGNALIZED INTERSECTIONS

The nearest traffic signal is within 1,800 feet in the Eastbound direction of the intersection.

SPEED STUDY

The posted speed limit on State Route SR 3 within the study area is 55 MPH, which is enforceable through radar surveillance by the Whitfield County Sheriff's Office and the Department of Public Safety.

ROUNDABOUT ANALYSIS

The total volumes for the intersection are 12,610 with volumes on State Route SR 3 equivalent to 10,600 and contribution from Old Dixie Hwy/ Five Springs Rd equivalent to 2,010 vehicles. These contributions are equivalent to 84% of the total volumes for SR 3 and 16% of total volumes for Old Dixie Hwy/ Five Springs Rd. Because the contribution from the minor road, Old Dixie Hwy/ Five Springs Rd, is over 10% of the total volumes, a roundabout intersection as an alternative intersection design is considered in our study and results of the study are summarized below and full report in Appendix C.

SR 3 @ Old Dixie Hwy/ Five Springs Rd	
Approach Delays (s/veh)	10.7
Level of Service	B

MUTCD WARRANT ANALYSIS

Traffic signal warrant analysis was performed for the intersection of State Route SR 3 @ Old Dixie Hwy/ Five Springs Rd using the criteria provided in the Manual on Uniform Traffic Control Device (MUTCD) published by the Federal Highway Administration (FWHA). According to the MUTCD, the investigation of the need for traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants and other factors related to existing operation and safety at the study location:

- Warrant 1 – Eight Hour Volume
- Warrant 2 – Four Hour Volume
- Warrant 3 – Peak Hour
- Warrant 4 – Pedestrian Volume
- Warrant 5 – School Crossing
- Warrant 6 – Coordinated Signal System
- Warrant 7 – Crash Experience
- Warrant 8 – Roadway Network

None of the 8 warrants were satisfied for this intersection.

HCS7 TWO-WAY STOP CONTROL ANALYSIS

A Two-Way stop control analysis was conducted at the intersection of SR 3 @ Old Dixie Hwy/ Five Springs Rd and a level of service of E and F was returned for both Old Dixie Hwy and Five Springs Rd

respectively. However, analysis of State Route SR 3, direction of travel East/West, resulted in an approach Level of Service of B in either direction during peak hour. Parts of the Two-Way stop control report describing the different Level of Service and approach delays at the intersection of State Route SR 3 @ Old Dixie Hwy/ Five Springs Rd are summarized below, and full report can be found in Appendix E.

	Eastbound	Westbound	Northbound	Southbound
Approach Delays (s/veh)	0.9	1.4	49.2	108.1
Level of Service	B	B	E	F

HCS7 ALL WAY STOP CONTROL

An All-Way stop control analysis was conducted at the intersection of SR 3 @ Old Dixie Hwy/ Five Springs Rd and an intersection delay of 73.8 seconds per vehicle and a Level of Service of F was recorded as the overall intersection performance. Based on these results, it is evident that converting the intersection at SR 3 @ Old Dixie Hwy/ Five Springs Rd will translate into a worst overall performance for the intersection especially for commuters traveling the main line SR 3. Although this intersection meets warrants for an All-Way Stop according to the MUTCD Section 2B.07 criterion C, regarding minimum volumes, it states that vehicular volume entering the intersection from the major street approaches (total of both approaches) in both directions averages at least 300 vehicles per hour for any 8 hours of an average day; AND the combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, WITH an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour, we will not consider this alternative as it will not improve operation at the intersection of SR 3 @ Old Dixie Hwy/ Five Springs Rd.

Parts of the All-Way Stop Control report summarizing Level of Service and approach delays at the intersection of State Route SR 3 and Old Dixie Hwy/ Five Springs Rd are recounted below and full report can be found in Appendix F.

SR 3 @ Old Dixie Hwy/ Five Springs Rd	
Intersection Delays (s/veh)	73.8
Level of Service	F

HCS7 TWO-WAY STOP CONTROL RCUT ANALYSIS

Finally, a Two-Way stop controlled Restricted Crossing U-Turn or RCUT intersection analysis was performed at the intersection of SR 3 @ Old Dixie Hwy/ Five Springs Rd. This alternative intersection proved to have a higher performance level than all other considered alternatives. In fact, results from the ICE analysis indicated an intersection delay of 2.8 seconds per vehicle with a Level of Service of A for the entire intersection. Parts of the RCUT report summarizing Level of Service and intersection delays at State Route SR 3 @ Old Dixie Hwy/ Five Springs Rd are recounted below, and full report can be found in Appendix G.

SR 3 @ Old Dixie Hwy/ Five Springs Rd	
Intersection Delays (s/veh)	2.8
Level of Service	A

CONCLUSION

Considering the various alternatives we looked at, Two-Way stop control (existing condition), All-way stop control, Traffic Signal, Multi-lane Roundabout, RCUT, and Offset Left Turn Lanes the most feasible options were either upgrading the intersection to a Multi-Lane Roundabout, reshaping the intersection as an RCUT intersection or redesigning the current intersection to an Offset left turn lanes intersection. Level of Service, approach delays and safety concerns were analyzed. Due to its high approach delays, poor level of service and the current recorded fatality, the Two-Way stop control made it a less desirable alternative than all other presented alternatives. Based on the Signal Warrant Analysis, a traffic signal is not a recommended feasible alternative to consider in order to improve traffic operation, level of service and safety at the intersection of State Route SR 3 @ Old Dixie Hwy/ Five Springs. GDOT ICE Tool was then used to examine and rank the remaining alternatives, Multi-lane Roundabout, RCUT and Offset Left Turn Lane. The GDOT tool found the Multi-lane Roundabout to be the most desirable intersection alternative for the intersection of SR 3 @ Old Dixie Hwy/ Five Springs, and report of this ranking can be found in Appendix B

RECOMMENDATIONS

Our recommendations for this intersection are to convert the existing intersection into a multi-lane roundabout which will address the majority of the crashes found here.

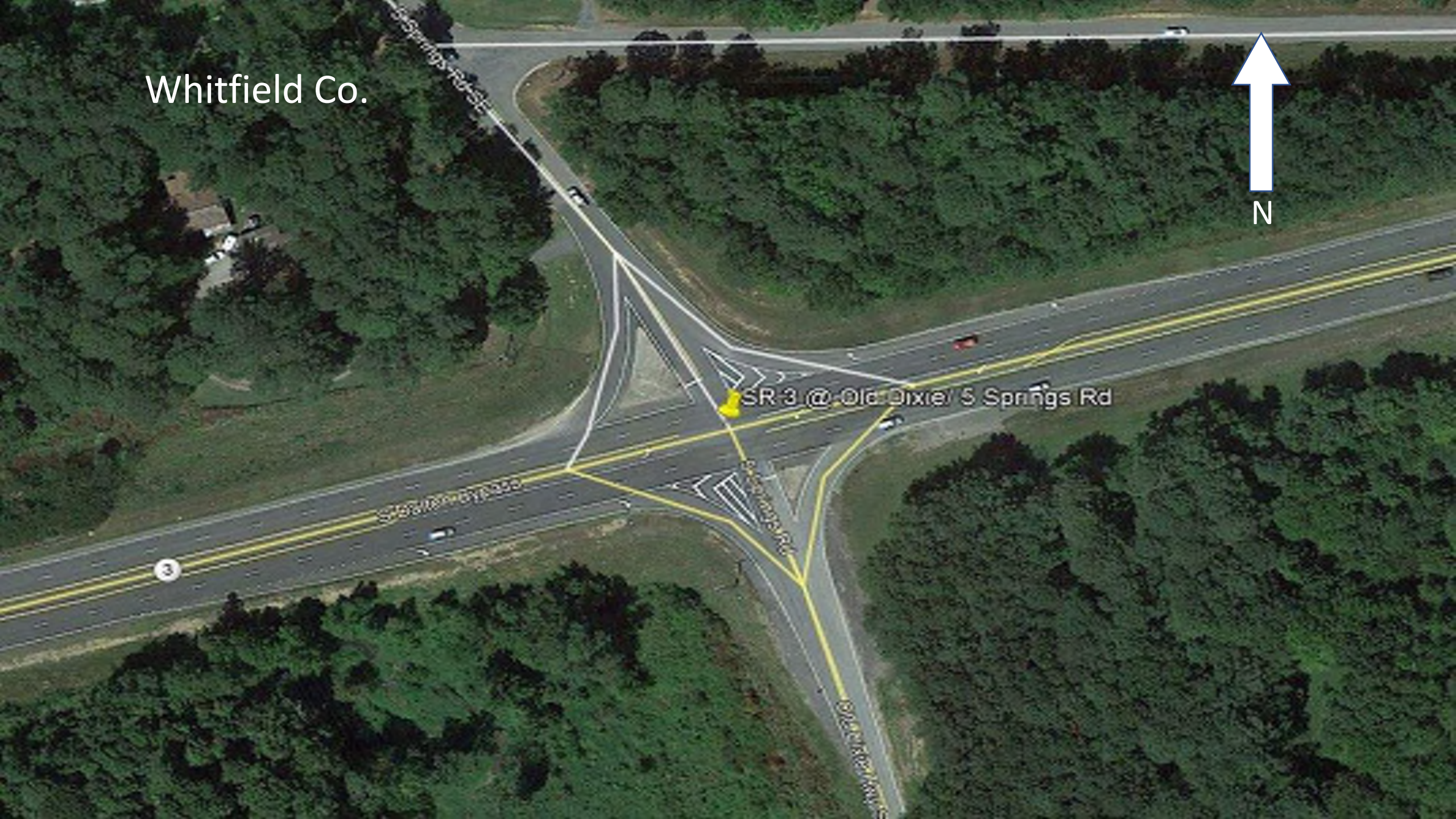
This intersection will be submitted to the statewide safety office for further review and assessment, while District 6 Traffic Operations will continue to monitor this intersection after the additional changes have been made, but also during the statewide safety assessment for the feasibility of a safety project to determine if further measures can be taken.

PREPARED BY: _____ DATE: _____

Civil Engineer II

RECOMMENDED BY: _____ DATE: _____

District Traffic Engineer


Whitfield Co.
N
SR 3 @ Old Dixie / 5 Springs Rd

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

ICE Version 2.14 | Revised 08/03/2018

Frequently Asked Questions:

Question 1: What is new in ICE Version 2.1 compared to version 2.0?

ANS: Enhancements have been made to reduce or simplify data requirements, provide reviewers with AM/PM and forecast intersection traffic data and better predict alternative cost estimates. However, the minor changes to scoring criteria and alternatives analysis should not substantially impact alternative scoring and ranking compared to the previous software version. Specific changes include:

- Intersection graphics and text have been enhanced, including photos and document links for each juncture type
- Several intersection types were added, including signalized and unsignalized Diamond and Dual Roundabout interchanges
- Users are asked to input both AM and PM peak period volumes and analysis results. The volume input data is used to project existing and design year entering intersection volumes and average daily traffic for approaches. Stage 2 operations analysis use a weighted average of AM and PM intersection delay and V/C results.
- In Stage 2, users can now analyze and compare intersection operations by Delay and V/C or Network Delay
- Right-of-Way impact is selected by land use type and cost per acre is auto-populated from countywide averages
- Additional CMF data is now auto-populated using FHWA CMF Clearinghouse and other resources as appropriate

Question 2: Several intersection control alternatives include multiple intersections. How is intersection delay compared to the base intersection conditions of a singular intersection?

ANS: Engineering judgement is required on a case-by-case basis, but the general principle is to add the delay incurred by vehicles with longer travel paths weighed by the number (or percentage) of those vehicles making that movement.

Question 3: Not all tools give overall intersection delay and V/C ratios. Which delay value should I choose?

ANS: For unsignalized intersections (where one or more movements are not required to stop and thus have zero delay), use the worst-case approach movement delay. If all intersection movements have some form of intersection control (yield, stop or signal), use a weighted average of each approach delay multiplied by the volume on each approach.

Question 4: How do I analyze multiple intersections along a corridor?

ANS: The ICE tool is designed for individual intersection analyses, but an ICE analysis is required for all public street intersections and major driveways along a corridor (unless otherwise stipulated in the ICE waiver section). Use engineering judgement in the recommendation of intersection control choices to ensure corridor continuity (as appropriate) and document intersection control recommendations that are not ranked highest but provide better continuity along the overall corridor.

Question 5: For an ICE Waiver, when is the traffic and crash data required and when is it optional?

ANS: Crash data is required for all existing intersections. ADT's are required if available (from counts if collected or from the nearest GDOT traffic count station site). Capacity data is optional unless needed to justify the basis of the waiver request (i.e. required for RIRO where the ICE process is being waived altogether to show that it will operate acceptably).

Question 6: Which worksheets should be printed and included in an ICE submittal?

ANS: Submissions for and ICE Waiver require submission of the singular *Waiver* worksheet. Full ICE submissions should include the *Introduction*, *Stage 1* and *Stage 2* worksheets, with *CostEst* (if used) and *Scoring* worksheets as optional.

For questions or comments about this ICE Tool, contact Daniel Trevorrow (DTrevorrow@dot.ga.gov) or Jonathan Reid (jonathan.reid@arcadis.com)

Tool Version Tracking

Version	Released	Tool Updates:
2.0	7/17/2017	- Initial ICE Tool release date, corresponding with ICE Policy release date of July 1,2017
2.01	9/18/2017	- Modifications made to the Waiver type to include other submittal categories and data requirements
2.1	1/5/2018	- Intersection worksheet graphics/text have been enhanced, including photos & document links for interchange types - Added intersection types, including Diamond Interchanges (signal & unsignalized) and Dual Roundabout interchange - Cost of Right-of-Way (by acre) for rural and urban parcels are now auto-populated based on individual countywide data - Additional CMF data is now auto-populated using FHWA CMF Clearinghouse and other resources as appropriate - Users can now choose to analyze and compare intersection operations by Delay and V/C or Network Delay
2.11	1/25/2018	- Fixed bug to report ROW costs for all Counties
2.12	2/20/2018	- Fixed bug to in calculating B/C ratio for Safety Funded Projects - Updated Mult-File Summary sheet to iclude PI#, waiver and Stage 1 and Stage 2 Descision Matrix w/signature line
2.13	3/12/2018	- Refomatted volume inputs for easier data export; Differentiated existing, opening and design years; added new CMFs
2.14	8/6/2018	- Minor bug fixes; Updated headers to include new GDOT logo - Updated several CMF's and added single RT and LT lanes - Added graphic of Opening & Design Year volumes (auto-generated based on growth rates or user input)

INTERSECTION CONTROL TYPE DESCRIPTIONS

Click on intersection images for additional resource publications

ICE Version 2.14 | Revised 08/03/2018

Unsignalized At-Grade Intersections

Conventional Minor Street or All-Way Stop: At minor-street stop (2-way stop) intersections, vehicles on minor street stop and give right-of-way to major street. At all-way stop (AWS) intersections, all vehicles must stop and take turns entering the intersection. Both (4-leg) intersection types have 32 baseline conflict points and have limited operational and safety benefits as traffic volumes become significant.

Mini Roundabouts: Roundabout type characterized by a small diameter and traversable central island; offers most of the benefits of single-lane roundabouts with added benefit of a smaller footprint; best suited to lower-speed environments and where environmental constraints preclude use of a larger roundabout with a raised central island. Mini-roundabouts are emerging in U.S. in states including MD, MI and GA.

Single-Lane Roundabouts: Form of circular intersection in which traffic travels counterclockwise around a central island and in which entering traffic must yield to circulating traffic. Circulating traffic has priority with entries controlled by yield. Geometry slows all traffic into and thru the roundabout. At a 4-leg roundabout there are 8 baseline conflict points.

Also known as: Modern Roundabout

Multilane Roundabouts: Share same circulatory travel and yield-at-entry in single-lane roundabouts, but include multiple entry and circulatory lanes for one or more approaches that must accommodate vehicles traveling side by side. Important design features include proper entry path alignment and geometry, signing and marking that allows entry to exit paths without forcing a lane change in the circle.

Restricted Crossing U-Turn (RCUT): Redirects minor street left turn movements as right-turns followed by a U-turn movement via a downstream directional crossover in the median (+/- 500 feet from the main intersection). An RCUT intersection has 14 conflict points and can provide substantial safety benefits with minor delay increases to some movements

Also known as: "J-turn" intersection

RIRO w/Downstream U-Turn: Redirects minor street thru & left turn movements as right-turns followed by a U-turn via directional median crossover (+/- 500 feet from main intersection). Major street lefts are also made indirectly, passing the crossing street and using the same U-turn crossovers in the median. Minor street intersections are reduced to right-in/right-out movements making this the safest intersection type.

Unsignalized High-T: Unsignalized 3-leg intersection features raised channelization to separate "top" thru movement from turning lanes at intersection, allowing the through movement to operate continuously. A high-T intersection has 9 baseline conflict points, the same as a conventional 3-leg.

Also known as: "Seagull" intersection

Offset-Tee Intersection: Creates an offset of minor street approaches to form 2 intersections with the major roadway separated by some distance (between 300' and 500'). Through movements on the minor street "jog" using the major street (right-turns followed by left-turns or vice versa). The Offset-T has a total of 18 baseline conflict points (over two intersections).

Also known as: Paired Intersection

Double Roundabout Interchange: Use of single or dual lane roundabouts at traditional diamond interchange ramp terminals. The use of roundabouts requires only through lanes on the bridge (no turn lane storage lanes) and the elimination of signal control at the ramp terminals. There are a total of 16 baseline conflict points (over two intersections).

Also known as: Teardrop Interchange

Signalized At-Grade Intersections

Signalized Intersection: The most common type of signalized intersection with high driver familiarity. Signal could be simple two-phase or more complex 8-phase to serve vehicular demand. Left turns can be permitted or protected (or combination of both). At a conventional 4-leg intersection there are 32 baseline conflict points.

Median U-Turn: Left turn movements otherwise occurring at the main intersection are made via U-turns in the median, preceding or following right turns. U-turns may be only on major roadway or on both major and minor roadways. A conventional MUT has 16 baseline conflict points and has shown significant operational and safety benefits.

Also known as: Indirect Left, Michigan Left, MUT

Signalized RCUT: Similar to the Median U-turn but features break in cross-street traffic that allows signals on opposite directions to operate independently. Left turns can make directly turns onto the minor road but minor road thru and left turn movements are made using the directional U-turn crossovers. An RCUT has 14 baseline conflict points (over 3 intersections).

Also known as: Superstreet

Displaced Left-Turn (DLT): Left turn traffic crosses opposing lanes in advance of main intersection and are stored in additional lanes. At main intersection, thru and left turns can be made simultaneously during same signal phase. A full DLT (both routes) has 28 baseline conflict points; a partial DLT (one route) has 30 baseline conflict points.

Also known as: Continuous Flow Intersection

Continuous Green-T: Three-leg intersection that features raised channelization to allow the "top" through movement to operate under continual green. The opposite direction intersects with the major and minor street lefts at a signalized intersection (minor left turns merge with the continual through movement downstream). A Continuous Green-T has 9 baseline conflict points, the same as a conventional 3-leg.

Jughandle: Much like an at-grade diamond interchange, ramps on the major street diverge from the right side in advance of a cross street intersection, removing the left turn movement from directly at the cross-street intersection. Major street left turns are made at minor, stop-controlled intersections on the cross-street. Left turns from the cross-street remain as direct movements at the main intersection.

Quadrant Roadway: Left turns are removed from the main intersection via an additional roadway in one intersection quadrant. Left-turn movements are routed from the arterial and cross-street (using unique turning paths for each approach) onto the quadrant roadway to complete the left turn movement at the quadrant roadway "minor" T-intersections. A Quadrant Roadway has 28 baseline conflict points (over 3 intersections).

Diverging Diamond Interchange (DDI): All traffic crosses over to left side of road at first ramp terminal intersection before crossing back over at second ramp terminal. Crossover movements allow left turns to be made unopposed. A DDI has a total 14 baseline conflict points (over two intersections) and has shown both operational and safety benefits.

Also known as: Double Crossover Diamond

Single Point Urban Diamond (SPUI): Free-flow major street thru movements are provided by creating a separate, signalized intersection of major street turning movements with the cross-street on a separate grade, creating an intersection either under or over the priority thru roadway. Right turns are made at unsignalized ramps separated from the main intersection.

GDOT INTERSECTION CONTROL EVALUATION (ICE) TOOL

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A): N/A Request By: D6

County: Whitfield GDOT District: 6 - Cartersville

Major (State) Road: SR 3 Speed Limit: 55 mph

Minor (Crossing) ST: Old Dixie hwy Speed Limit: 50 mph

Major ST Direction: East/West Area Type: Urban

Intersection Control: Conventional (Minor Stop)

Prepared By: D6 TrafficOperations Analyst: Manara ALI

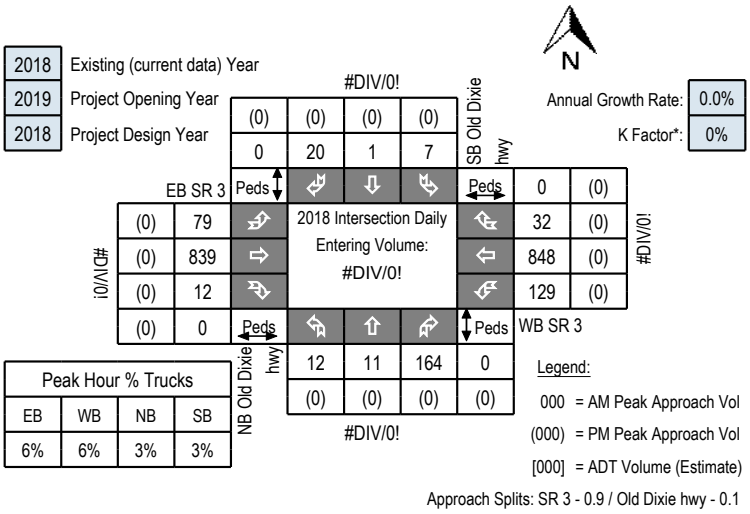
Date: 12/30/2019 Project ID:

Project Purpose: Mitigate Current Traffic Condition

2018	Existing (current data) Year
2019	Project Opening Year
2018	Project Design Year

Annual Growth Rate: 0.0%

K Factor*: 0%



Peak Hour % Trucks			
EB	WB	NB	SB
6%	6%	3%	3%

Legend:

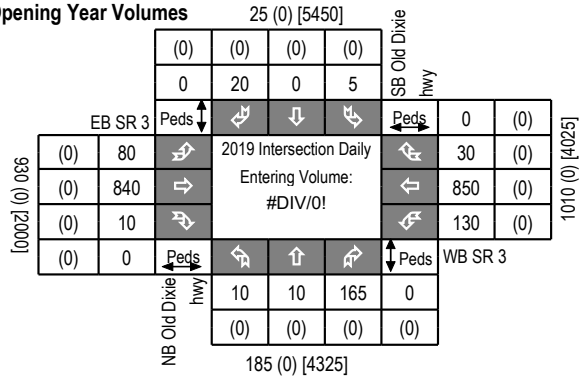
000 = AM Peak Approach Vol

(000) = PM Peak Approach Vol

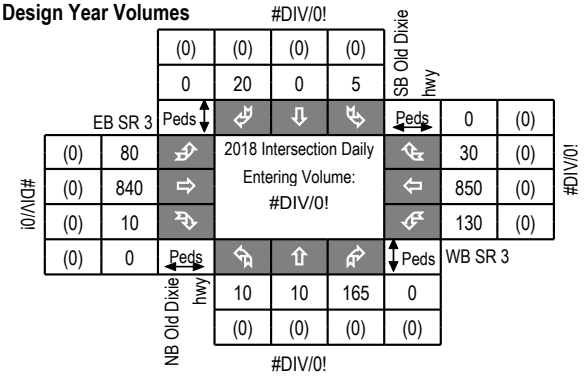
[000] = ADT Volume (Estimate)

Approach Splits: SR 3 - 0.9 / Old Dixie hwy - 0.1

2019 Opening Year Volumes



2018 Design Year Volumes



Introduction: In 2005, SAFETEA-LU established the Highway Safety Improvement Program (HSIP) and mandated that each state prepare a Strategic Highway Safety Plan (SHSP) to prioritize safety funding investments. Intersections quickly became a common component of most states' SHSP emphasis areas and HSIP project lists, including Georgia's SHSP. Intersection Control Evaluation (ICE) policies and procedures represent a traceable and transparent procedure to streamline the evaluation of intersection control alternatives, and further leverage safety advancements for intersection improvements beyond just the safety program. Approximately one-third of all traffic fatalities and roughly seventy five percent of all traffic crashes in Georgia occur at or adjacent to intersections. Accordingly, the Georgia SHSP includes an emphasis on enhancing intersection safety to advance the *Toward Zero Deaths* vision embraced by the Georgia Governor's Office of Highway Safety (GOHS). This ICE tool was developed to support the ICE policy, developed and adopted to help ensure that intersection investments across the entire Georgia highway system are selected, prioritized and implemented with defensible benefits for safety towards those ends.

Tool Goal: The goal of this ICE tool is to provide a simplified and consistent way of importing traffic, safety, cost, environmental impact and stakeholder posture data to assess and quantify intersection control improvement benefits. The tool supports the ICE policy and procedures to provide traceability, transparency, consistency and accountability when identifying and selecting an intersection control solution that both meets project purpose and reflects overall best value in terms of specific performance-based criteria.

Requirements: An ICE is required for any intersection improvement (e.g. new or modified intersection, widening/reconstruction or corridor project, or work accomplished through a driveway or encroachment permit that affects an intersection) where: **1)** the intersection includes at least one roadway designated as a State Route (State Highway System) or as part of the National Highway System; or **2)** the intersection will be designed or constructed using State or Federal funding. In certain circumstances where an ICE would otherwise be required, the requirement may be waived based on appropriate evidence presented with a written request. (See the "**Waiver**" tab to review criteria that may make a project waiver eligible and for instructions to submit a waiver request to the Department). An ICE is not required when the proposed work does not include any changes to the intersection design, involves only routine traffic signal timing and equipment maintenance, or for driveway permits where the driveway is not a new leg to an already existing intersection on either 1) a divided, multi-lane highway with a closed median and only right-in/right-out access or 2) an undivided roadway where the development is not required to construct left and/or right turn lanes (as per the Driveway Manual and District Traffic Engineer).

Two-Stage Process: A complete ICE process consists of two (2) distinct stages, and it is expected that the respective level of effort for completing both stages of ICE will correspond to the magnitude and complexity of the intersection. Prior to starting an ICE, the District Traffic Engineer and/or State Traffic Engineer should be consulted for advice on an appropriate level of effort. The Stage 1 and Stage 2 ICE forms are designed minimize required data inputs using drop-down menu choices and limiting text entry. All fields shaded grey include drop down menu choices and all fields shaded blue require data entry. All other cells in the worksheet are locked.

Stage 1: Screening Decision Record Stage 1 should be conducted early in the project development process and is intended to inform which alternatives are worthy of further evaluation in Stage 2. Stage 1 serves as a screening effort meant to *eliminate* non-competitive options and identify which alternatives merit further considerations based on their practical feasibility. Users should use good engineering judgement in responding to the seven policy questions by selecting "Yes" or "No" in the drop-down boxes. Alternatives should not be summarily eliminated without due consideration, and reasons for eliminating or advancing an alternative should be documented in the "Screening Decision Justification" column.

Stage 2: Alternative Selection Decision Record Stage 2 involves a more detailed and familiar evaluation of the alternatives identified in Stage 1 in order to support the selection of a preferred alternative that may be advanced to detailed design. Stage 2 data entry may require the use of external analysis tools to determine costs, operations and/or safety data that, combined with environmental and stakeholder posture data, form the basis of the ICE evaluation. A separate "CostEst" worksheet tab helps users develop pre-planning-level cost estimates for each Stage 2 alternative evaluated, and a separate Users Guide has been prepared to give guidance on Stage 1 and Stage 2 data entry. Once all data is entered, each alternative is scored and ranked, with the results reported at the bottom of the Stage 2 worksheet to inform on the best of the intersection controls evaluated for project recommendation.

Documentation: A complete ICE document consists of the combination of the outputs from either a completed and signed waiver form or both Stage 1 and Stage 2 worksheets (along with supporting costing and/or environmental documentation), to be included in the approved project Concept Report (or equivalent) or as a stand-alone document.

GDOT ICE STAGE 1: SCREENING DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI #	N/A
Project Location:	SR 3 @ Old Dixie hwy
Prepared by:	D6 TrafficOperations
Analyst:	Manara ALI
Date:	12/30/2019

Answer "Yes" or "No" to each policy question for each control type to identify which alternatives should be evaluated in the Stage 2 Decision Record; enter justification in the rightmost column

Note: Up to 5 alternatives may be selected and evaluated; Use this ICE Stage 1 to screen 5 or fewer alternatives to evaluate in Stage 2

		Intersection Alternative (see "Intersections" tab for detailed description of intersection/interchange type)	1. Does alternative address the project need in a balanced manner and in scale with the project?	2. Does alternative improve safety performance in terms of reducing severe crashes?	3. Does alternative incorporate safety, convenience and accessibility for pedestrians and/or bicyclists?	4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?	5. Does alternative appear feasible given the site characteristics, constraints & location context?	6. Does alternative appear feasible with respect to other project factors?	7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?	Screening Decision
Unsignalized Intersections		Conventional (Minor Stop)	**No**	**No**	**No**	**No**	**Yes**	**No**	**Yes**	Current Intersection set up
		Conventional (All-Way Stop)	No	No	No	No	**Yes**	No	No	Results do not warrantan All-Way Stop
		Mini Roundabout	No	**Yes**	**Yes**	No	**Yes**	No	No	N/A
		Single Lane Roundabout	No	**Yes**	**Yes**	No	**Yes**	No	No	N/A
		Multilane Roundabout	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Considered for further Analysis
		RCUT (stop control)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Considered for further Analysis
		RIRO w/down stream U-Turn	No	No	No	No	No	No	No	Would not address existing type crashes
		High-T (unsignalized)	No	No	No	No	No	No	No	N/A
		Offset-T Intersections	No	No	No	No	No	No	No	N/A
		Diamond Interch (Stop Control)	No	No	No	No	No	No	No	N/A
		Diamond Interch (RAB Control)	No	No	No	No	No	No	No	N/A
		No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
		Offset Left Turn Lanes	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Consider for further analysis
Signalized Intersections		Traffic Signal	**No**	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	Does not meet warrants
		Median U-Turn (Indirect Left)	No	**Yes**	No	**Yes**	**Yes**	No	No	N/A
		RCUT (signalized)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No	Would not address existing type of crashes
		Displaced Left Turn (CFI)	No	No	No	No	No	No	No	N/A
		Continuous Green-T	No	No	No	No	No	No	No	N/A
		Jughandle	No	No	No	No	No	No	No	N/A
		Quadrant Roadway	No	No	No	No	No	No	No	N/A
		Diamond Interch (Signal Control)	No	No	No	No	No	No	No	N/A
		Diverging Diamond	No	No	No	No	No	No	No	N/A
		Single Point Interchange	No	No	No	No	No	No	No	N/A
		No LT Lane Improvements No RT Lane Improvements	No	No	No	No	No	No	No	N/A
		Other Signalized (provide description):	No	No	No	No	No	No	No	N/A

= Intersection type selected for more detailed analysis in Stage 2 Alternative Selection Decision Record

GDOT ICE STAGE 2: ALTERNATIVE SELECTION DECISION RECORD

ICE Version 2.14 | Revised 08/03/2018

GDOT PI # (or N/A): N/A
County: Whitfield
Project Location: SR 3 @ Old Dixie hwy
Existing Intersection Control: Conventional (Minor Stop)

GDOT District: 6 - Cartersville
Area Type: Urban

Date: 12/30/2019
Agency/Firm: D6 TrafficOperations
Analyst: Manara ALI

Type of Analysis: Conventional Non-Safety Funded Project

Opening / Design Year Traffic Operations

Intersection meets signal/AWS warrants?	Meets Signal Warrants	
Traffic Analysis Measure of Effectiveness	Intersection Delay	
Traffic Analysis Software Used	HCS 2010	
Analysis Time Period	AM Peak Hr	PM Peak Hr
2019 Opening Yr No-Build Peak Hr Intersection Delay	108.1 sec	0.0 sec
2019 Opening Yr No-Build Peak Hr Intersection V/C	0.51	0.00
2018 Design Yr No-Build Peak Hr Intersection Delay	0.0 sec	0.0 sec
2018 Design Yr No-Build Peak Hr Intersection V/C	0.00	0.00

Complete Streets Warrants Met?
- ☐ PEDESTRIANS
- ☐ BICYCLES
- ☐ TRANSIT

Crash Data: Enter 5 most recent years of intersection crash data	Crash Severity: PDO	Injury Crash*	Fatal Crash*	
Crash Type: Angle	5	10	1	57%
Head-On				0%
Rear End	9	2		39%
Sideswipe - same	1			4%
Sideswipe - opposite				0%
Not Collision w/Motor Veh				0%
TOTALS:	15	12	1	28

* Number of crashes resulting in injuries / fatalities, not number of persons

Alternatives Analysis:

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Proposed Control Type/Improvement:	Conventional (Minor Stop)	Multilane Roundabout	RCUT (stop control)	Offset Left Turn Lanes	Traffic Signal
Project Cost: (From CostEst Worksheet)	*Additional description here*	*Additional description here*	*Additional description here*	*Additional description here*	*Add LT bays all approaches*
Construction Cost	$3,000	$3,000,000	$1,500,000	$1,000,000	$1,500,000
ROW Cost	$0	$0	$0	$0	$0
Environmental Cost	$0	$0	$0	$0	$0
Reimbursable Utility Cost	$0	$0	$0	$0	$0
Design & Contingency Cost	$0	$0	$0	$0	$0
Cost Adjustment (justification req'd)					
Total Cost	$3,000	$3,000,000	$1,500,000	$1,000,000	$1,500,000

Traffic Operations:

	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
Traffic Analysis Software Used	HCS 2010		--select one--		--select one--		--select one--		--select one--	
Analysis Period	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr	AM Peak Hr	PM Peak Hr
2018 Design Yr Build Intersection Delay	108.1 sec	0.0 sec	10.7 sec	0.0 sec	17.1 sec	0.0 sec	108.1 sec	0.0 sec	0.0 sec	0.0 sec
2018 Design Yr Build Intersection V/C	0.51	0.00	0.32	0.00	0.00	0.00	0.51	0.00	0.00	0.00

Safety Analysis:

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Predefined CRF: PDO	0%	32%	31%	0%	39%
Predefined CRF: Fatal/Inj	0%	71%	53%	0%	40%
Predefined CRF Source:	N/A	FHWA Clearinghouse #s 236 / 237	NC/MO Table 4-7	N/A	FHWA Clearinghouse #s 7982 / 7984
User Defined CRF: PDO				39%	
User Defined CRF: Fatal/Inj				39%	
User Defined CRF Source (write in if applicable):					

Environmental Impacts:[1]

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Historic District/Property	None	None	None	None	None
Archaeology Resources	None	None	None	None	None
Graveyard	None	None	None	None	None
Stream	None	None	None	None	None
Underground Tank/Hazmat	None	None	None	None	None
Park Land	None	None	None	None	None
EJ Community	None	None	None	None	None
Wooded Area	None	None	None	None	None
Wetland	None	None	None	None	None

*Note: If environmental impact is significant (**RED**), provide justification impact won't jeopardize project delivery using "Env" worksheet*
[1]Environmental impacts are only preliminary estimates; detailed environmental impact documentation will be included with project concept report

Stakeholder Posture:

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Local Community Support	Neutral	Neutral	Neutral	Neutral	Neutral
GDOT Support	Neutral	Neutral	Neutral	Neutral	Neutral

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Final ICE Stage 2 Score:	4.0	6.6	5.6	5.2	4.0
Rank of Control Type Alternatives:	5	1	2	3	4

Note: Stage 2 score is not given (shown as "-") if signal or AWS is selected as control type but respective warrants are not met

Provide additional comments and/or explain any unique analysis inputs, or results (as necessary):

GDOT ICE TOOL: COST ESTIMATING AID

ICE Version 2.14 | Revised 08/03/2018

Project Information

Location:	SR 3 @ Old Dixie hwy	County:	Whitfield	Date:	12/30/2019
GDOT PI # (or N/A):	N/A	Area Type:	Urban	Agency/Firm:	D6 TrafficOperations
Existing Intersection Control:	Conventional (Minor Stop)	GDOT District:	6 - Cartersville	Analyst:	Manara ALI
Type of Analysis:	Conventional Non-Safety Funded Project			Major Street Direction:	East/West

Table 1: Existing Conditions

Movement	EB SR 3			WB SR 3			NB Old Dixie hwy			SB Old Dixie hwy		
	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn	Left Turn	Thru	Right Turn
Number of Lanes	0	0	0	0	0	0	0	0	0	0	0	0
Lane Widths*	0'	0'	0'	0'	0'	0'	0'	0'	0'	0'	0'	0'
Bay Length**	0'		0'	0'		0'	0'		0'	0'		0'
Median Width		0'			0'			0'			0'	
Right-of-Way	0'						0'					

Table 2: Proposed Conditions

	Conventional (Minor Stop)	Multilane Roundabout	RCUT (stop control)	Offset Left Turn Lanes	Traffic Signal
Proposed Pavement Type	None	None	None	None	None
Reimbursable Utility:	Moderate	Moderate	Moderate	Moderate	Moderate
# of Driveway(s) Impacted	0	0	0	0	0
Modify/Replace Traffic Signal	0	0	0	0	0
Lighting Poles (ea)	0	0	0	0	0
Flashing Beacons (ea)	0	0	0	0	0
RFB/PHB Ped Crossings (ea)	0	0	0	0	0
New/Replace Sidewalks (LF)	0'	0'	0'	0'	0'
New/Replace Cross Drains (LF)	0'	0'	0'	0'	0'
New/Replace Guardrail (LF)	0'	0'	0'	0'	0'
New Retaining Wall (LF)	0'	0'	0'	0'	0'
Bridge:New/Widen/Replace (sqft)	0	0	0	0	0
Add'l ROW/Easements/Demolition	$0	$0	$0	$0	$0

Site Context

Topography:	Rolling
Traffic Mgmt Plan:	Maintain Traffic
Project Size:	Single Intersection

Cost Multipliers

Grading Complete:	20%
Reimbursable Utility:	5%
Traffic Control:	20%
Project Size:	0%
Prelim Engineering:	15%
Project Contingency:	20%

Intersections

Signal Poles	Mast Arm
Design Vehicle	WB-67
Existing Interchange?	No

Roundabouts

Inscribed DIA - Mini	80
Inscribed DIA - Single	140
Inscribed DIA - Multi	200
Circulating Lane Width	18

ROW Costs

Prevalent ROW Type:	Mixed (Average)
ROW Cost/Acre:	$69,563
ROW Multiplier:	1.6

Table 3: Control Type Cost Breakdown

Pay Item	Per Ln Mi Unit Cost	Unit Cost	Conventional (Minor Stop) Quantity	Conventional (Minor Stop) Cost	Multilane Roundabout Quantity	Multilane Roundabout Cost	RCUT (stop control) Quantity	RCUT (stop control) Cost	Offset Left Turn Lanes Quantity	Offset Left Turn Lanes Cost	Traffic Signal Quantity	Traffic Signal Cost
New Construction (Base & Pave)	$500K/LM	$9.47/sqft	0	$0	0	$0	0	$0	0	$0	0	$0
Roadway Mill and Overlay	$64K/LM	$1.21/sqft	0	$0	0	$0	0	$0	0	$0	0	$0
Urban C&G/Drainage - both sides	441-6720	$19.08/LF	0	$0	2,400	$60,903	3,600	$68,688	0	$0	4,000	$76,320
Rural Typ Drainage - both sides	$150K/LM	$2.84/LF	0	$0	0	$0	0	$0	0	$0	0	$0
Concrete Island (sqyd)	n/a	$51.58/syd	0	$0	0	$0	500	$25,790	0	$0	0	$0
Median Landscaping	$100K/LM	$1.89/LF	0	$0	3,600	$9,068	5,400	$10,227	0	$0	0	$0
Typical Driveways Impacted (ea)	n/a	$7,500 ea	0	$0	0	$0	0	$0	0	$0	0	$0
Typical E&S Control Temp/Perm	$150K/LM	$34.09/LF	0	$0	1,200	$54,409	1,800	$61,364	0	$0	2,000	$68,182
Roundabout Truck Apron (sqft)	n/a	$10.25/sqft	0	$0	3,707	$50,540	0	$0	0	$0	0	$0
Signing & Marking	$0	$22.73/LF	0	$0	1,200	$36,277	1,800	$40,914	0	$0	2,000	$45,460
Flashing Beacon (ea)	n/a	$20,000 ea	0	$0	0	$0	0	$0	0	$0	0	$0
New Traffic Signal (Mast Arms)	674-1000	$182,575ea	0	$0	0	$0	0	$0	0	$0	0	$0
Lighting (per pole)	n/a	$5,607 ea	0	$0	0	$0	0	$0	0	$0	0	$0
Signalized Ped Crossings (ea)	n/a	$19,637 ea	0	$0	0	$0	0	$0	0	$0	0	$0
6' Sidewalk (LF)	n/a	$49.23/LF	0	$0	0	$0	0	$0	0	$0	0	$0
New/replace cross drains (LF)	n/a	$41.31/LF	0	$0	0	$0	0	$0	0	$0	0	$0
Typical Guardrail (LF)	n/a	$65.56/LF	0	$0	0	$0	0	$0	0	$0	0	$0
Retaining Wall (LF)	n/a	$808.52/LF	0	$0	0	$0	0	$0	0	$0	0	$0
Bridge widen/replace (SF)	n/a	$210/sqft	0	$0	0	$0	0	$0	0	$0	0	$0
Env Costs (from Stage 2 impacts)	n/a	n/a	0	$0	0	$0	0	$0	0	$0	0	$0
Grading Complete - 20%	n/a	n/a		$0		$84,268		$41,397		$0		$0
Traffic Control - 20%	n/a	n/a		$0		$56,179		$41,397		$0		$0
Reimbrusable Utility	n/a	n/a		$0		$10,560		$10,349		$0		$9,498
Preliminary Engineering - 15%	n/a	n/a		$0		$42,134		$31,047		$0		$28,494
Contigency - 20%	n/a	n/a		$0		$56,179		$41,397		$0		$37,992
ROW Cost/Acre: Mixed (Average)	n/a	$69,563ac		$0		$77,292		$103,481		$0		$0
Add'l ROW / Displacement / Demo	n/a	n/a		$0		$0		$0		$0		$0
ROW Multiplier - 1.6	n/a	n/a		$0		$46,375		$62,089		$0		$0
Project Scale Reduction - 0.0%	n/a	n/a		$0		$0		$0		$0		$0
Grand Total Costs				**$0**		**$584,000**		**$538,000**		**$0**		**$266,000**

Table 4: Assumption Adjustments/Quantity Overrides

Alternative Evaluated	Assumptions:	Pavement	Calculated ROW (ac)	User Override*	Calculated Pavement	User Override*	Major ST Const Limits	User Override*	Minor ST Const Limits	User Override*
Conventional (Minor Stop)	N/A	None	0.00	0.0	0	0.0	50	0.0	50	0.0
Multilane Roundabout	--select one--	None	1.11	0.0	18,549	0.0	600	0.0	600	0.0
RCUT (stop control)	--select one--	None	1.49	0.0	29,358	0.0	1,300	0.0	500	0.0
Offset Left Turn Lanes	N/A	None	0.00	0.0	0	0.0	0	0.0	0	0.0
Traffic Signal	--select one--	None	0.0	0.0	16,000	0.0	1,000	0.0	1,000	0.0

GDOT INTERSECTION CONTROL EVALUATION (ICE) WAIVER FORM

ICE Version 2.14 | Revised 08/03/2018

Waiver Request - Level 1

In certain circumstances where an ICE would otherwise be required, an ICE may be waived based on appropriate evidence presented with a written request. Scenarios in which an ICE waiver request may be considered include:

1. Proposed improvements do not substantially alter the character of the intersection, and are considered minor in nature, such as extending existing turn lane(s) or modifying signal phasing at an existing traffic signal
2. The intersection consists of a public roadway intersecting a divided, multilane roadway where the access will be limited to a closed median with only right-in/right-out access that will operate acceptably; or
3. The intersection is along an undivided, two-lane roadway that will not be widened and meets the following criteria:
   - Low risk in terms of exposure (total intersection entering volume less than 1,000 vehicles /day)
   - Latest 5 years of crash history is not indicative of a crash problem (no discernible crash patterns coupled with low crash frequency and severity)
   - Layout has no unusual or undesirable geometric features (such as restricted sight distance)
   - The proposed changes are not expected to adversely affect safety

If only one alternative is determined to be feasible from the ICE Stage 1, then a waiver may be submitted in lieu of completing ICE Stage 2. The waiver must clearly explain why there is no other feasible alternative. A Waiver Form should also be submitted to document an agreed upon decision to select a preferred alternative other than the highest scoring alternative in Stage 2.

ICE waiver forms with supporting documentation should be submitted for approval to the Office of Traffic Operations or District Engineer (depending on Waiver level). Questions regarding the waiver process should be routed to the State Traffic Engineer.

Project Information:

Location:	SR 3 @ Old Dixie hwy
County:	Whitfield
GDOT District:	6 - Cartersville
Area Type:	Urban
Existing Intersection Control:	Conventional (Minor Stop)

GDOT PI # (or N/A):	N/A
Requested By:	D6
Prepared By:	D6 TrafficOperations
Analyst:	Manara ALI
Date:	12/30/2019
Waiver Request Type:	GDOT PDP Project

Traffic and Operations Data:[1]

Intersection meets signal/AWS warrants?	Meets Signal Warrants	
Traffic Analysis Type:	Intersection Delay	
Existing Avg Daily Traffic (Major Street):	0	
Existing Avg Daily Traffic (Minor Street):	0	
Analysis Period:	AM Peak	PM Peak
2019 Opening Yr Peak Hour Intersection Delay:	108.1 sec	0.0 sec
2019 Opening Yr Peak Hour Intersection V/C:	0.51	0.00
2018 Design Yr Peak Hour Intersection Delay:	0.0 sec	0.0 sec
2018 Design Yr Peak Hour Intersection V/C:	0.00	0.00

[1]Crash data required for all existing intersections. ADT's required if available (from data collected or nearest GDOT count station site). Capacity data is optional unless needed to justify basis of the waiver request.

Crash Data (Required):[1]

Crash Data:Enter 5 most recent years of intersection crash data	Crash Severity		
Crash Type	PDO	Injury Crash*	Fatal Crash*
Angle	5	10	1
Head-On	0	0	0
Rear End	9	2	0
Sideswipe - same	1	0	0
Sideswipe - opposite	0	0	0
Not Collision w/Motor Veh	0	0	0
TOTALS:	**15**	**12**	**1**

* Number of crashes resulting in injuries / fatalities, not number of persons

Description of Work / Justification for Waiver (Required): At this stage it is recommended that the Two-way Stop Control be replaced with a Multi-lane Roundabout

Proposed Intersection Control: Other Unsignalized

REQUESTED BY: _____ Date: _____

Title: _____

APPROVED BY: _____ Date: _____

Name: _____

Chief Engineer or (Approved Delegate)

ICE ENVIRONMENTAL FACTORS

ICE Version 2.14 | Revised 08/03/2018

Project Information

GDOT District:	6 - Cartersville	Date:	12/30/2019
Requested By:	D6	Area Type:	Urban
County:	Whitfield	Prepared By:	D6 TrafficOperations
Project Location:	SR 3 @ Old Dixie hwy	Analyst:	Manara ALI
Existing Intersection Control:	Conventional (Minor Stop)		

Environmental Factors

In the box below, document any significant environmental factors for any alternative considered. Include a plan and costs for mitigation that retains the proposed intersection type as a viable alternative. Include in ICE documentation package only if one or more alternatives have significant impacts.

Proposed Intersection Control #1: Conventional (Minor Stop)

None

Proposed Intersection Control #2: Multilane Roundabout

None

Proposed Intersection Control #3: RCUT (stop control)

None

Proposed Intersection Control #4: Offset Left Turn Lanes

None

Proposed Intersection Control #5: Traffic Signal

None

Georgia Department of Transportation

Roundabout Analysis Tool

v 4.1
5/19/17

Welcome to GDOT's Roundabout Analysis Tool. This tool is designed for the user to determine the functionality of a proposed roundabout. The analysis is based on the Highway Capacity Manual 2010 Edition and 6th Edition Methodologies, NCHRP Report 672, and FHWA's Roundabout Informational Guide. Please read the notes in the Instructions tab before using the spreadsheet.

Analyst:	Manara ALI
Agency/Company:	GDOT
Date:	12/23/2019
Project Name or PI#:	
Year, Peak Period:	Peak Hour
County/District:	Whitfield/District 6
Intersection:	SR 3 @ Old Dixie Hwy/ Five Springs Rd

Insert Project Information Here in the BLUE SPACE. This information is linked to the Mini, Single Lane and Multi Lane Worksheets.

Roundabout Considerations Worksheet

Roundabouts may not operate well if there is too much traffic entering the intersection or if the percentage of traffic on the major road is too high. Candidate intersections shall be analyzed to determine whether a roundabout will perform acceptably. Shown below are planning level thresholds. A capacity analysis should be performed to determine lane configuration based on traffic volumes.

# of circulatory lanes	ADTs (current/ build year)	Condition met?	% traffic on Major Road	Condition met?
Mini	less than 15,000	Yes	less than 90%	Yes
Single Lane	less than 25,000	Yes	less than 90%	Yes
Multi-Lane	less than 45,000	Yes	less than 90%	Yes

Other things to consider when evaluating roundabouts as an alternative are Right of Way, sight distance, environmental impacts, and access to adjacent properties.

Volume Information (for Analysis Time Period)

1 Enter the Major/Minor Street ADT Volumes in the Chart below:

	Volumes	Split
Major Street	10,600	84%
Minor Street	2,010	16%
Total volumes	12,610	

Proximity to Other Intersections

2 How close is the nearest signal (miles or feet)? 0 mi | 1800 '

3 Is the proposed intersection located within a coordinated signal network? No

Go up to next section...

Georgia Department of Transportation

Proposed Design Configuration Chart

Directions for this Section only: *(see **Instructions Tab** for other sections)*

1. Select the type of roundabout you are analyzing.
2. Key in the number of approaches and the street names at the proposed intersections.
3. Complete the Approach Characteristics Chart:
   a. Select the Street Name from the pulldown menu for each approach leg
   b. Select the Lane Type for each entry apporach lane
      **The first box is the inner lane, the second box is the outer lane*
   c. Select Yes or No if a right turn bypass will be added to each approach leg

Roundabout Characteristics

Roundabout Type:	Single Lane
# of Approaches:	2
Name of Streets:	SR 3
	Old Dixie Hwy
	Five Springs Rd

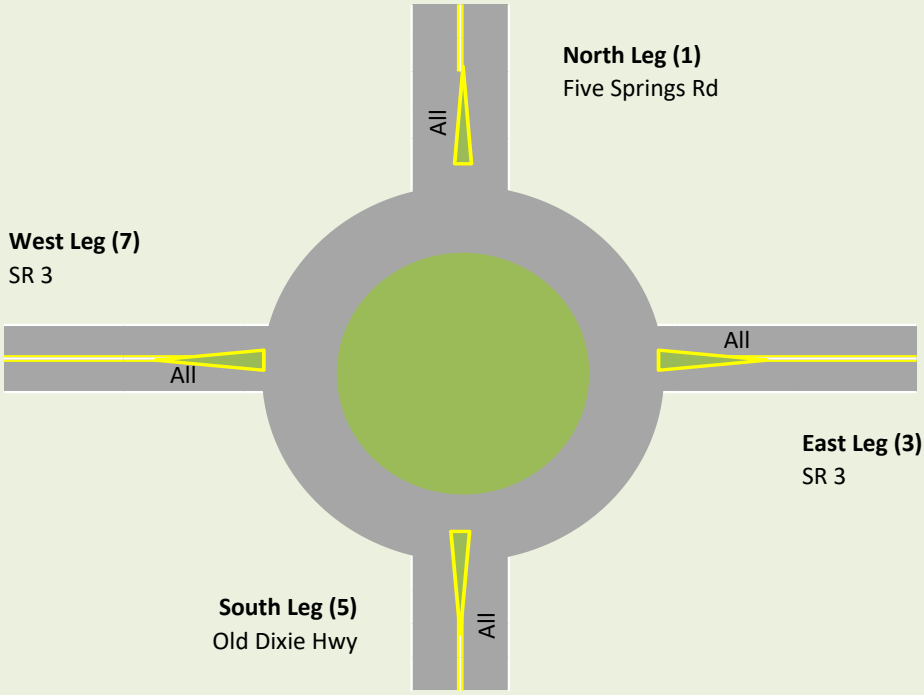
Chart Key:

Mini/Single Lane	Street Name	
	All	
	Bypass?	
Multi-lane	Street Name	
	Inner Ln	Outer Ln
	Bypass?	

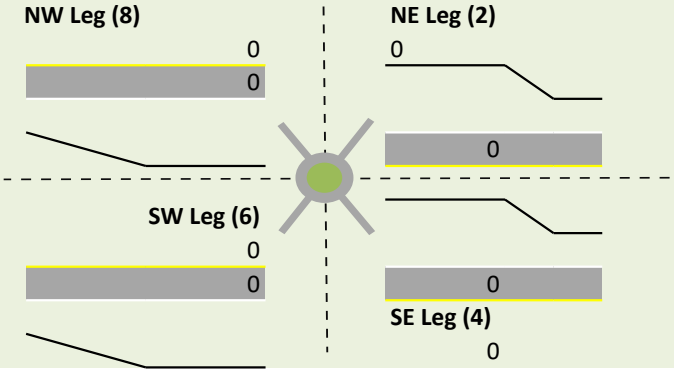
Approach Leg Characteristics:

	North Leg (1)	NE Leg (2)	East Leg (3)	SE Leg (4)
Street Name:	Five Springs Rd		SR 3	
Entry Lane Config	All		All	
Bypass to Adj Leg?	No		No	
	South Leg (5)	**SW Leg (6)**	**West Leg (7)**	**NW Leg (8)**
Street Name:	Old Dixie Hwy		SR 3	
Entry Lane Config	All		All	
Bypass to Adj Leg?	No		No	

Preliminary Roundabout Rendering**



Additional Legs



***Note**

This roundabout sketch does not include the secondary cardinal direction legs due to restrictions in the Excel software. For complex roundabouts, a separate sketch is recommended by the designer.

Worksheet Instructions

This workbook contains an analysis spreadsheet for a mini, single lane and a multi lane roundabout. It also has an option to analyze a bypass lane if it is included as a design option. The worksheets are protected to prevent accidental changing of formulas except in the General/Site Information, Volumes, and Volume Characteristics sections.
Insert values into Blue Boxes to avoid accidental changes in the spreadsheet.

Common Items to all calculators

General & Site Information

Analyst name, work organization, today's date, project name/PI#, intersecting street names, time period (i.e. 4:00 - 5:00 PM), analysis year (existing, 2030 Build, etc), and county/district should be entered.

The roundabout calculator can support up to eight legs for maximum geometric flexibility (leg placement). Highlighting the legs used on a printed version of the provided diagram can help when routing volumes.

Volumes

Volumes are entered in columns that correspond to the existing or proposed roundabout legs. Volumes are entered as origin destination pairs with the column heading denoting the origin and row heading denoting the destination. For example, volumes arriving on the north leg and making a left turn onto the east leg are coded in the cell intersection of the N column and the E row. This format makes it possible if leg placement is not standard or is more than four legs where there might be more than one discrete left or right turn. This format also allows for u-turns to be coded into the model. However the engineer shoud take care when entering the OD pairs not to accidentally code a left turn, through movement, or right turn as a u-turn. Entering a u-turn value will cause the background of that value to change to yellow. This helps the user recognize when a u-turn value has been entered.

Volume Characteristics

Changing the peak hour factor (PHF) and the percentage of trucks, SU/buses, or bicycles will cause the background of these values to change to yellow and dark blue respectively. This will allow the user and reviewer to keep track of changes to the default values.

A PHF derived from current counts should be used to replace the default PHF. The truck equivalency factor is normally set at 2.0. However, this value can change based on facility type (i.e. two-lane highway versus multilane highway) or if the approach is on a grade. Current counts should be used to determine the percent of trucks and bicycles on an approach. To change the equivalency factors, update the Pink Boxes in the Equivalency Factor table.

The heavy vehicle factor will be automatically computed and will be combined with the PHF to determine flow rates.

Entry/Conflicting Flows

This section automatically computes the entry flows for each leg and the corresponding conflicting flow. No input is needed.

Results

Results will only be shown for columns where entry volumes have been entered. This section computes the entry capacity based on the HCM formula and reports the conflicting flow, the entry leg volume-to-capacity ratio, the approach control delay, the approach LOS, and the 95th percentile queue. The 95th percentile queue is based the HCM formula for calculating 95th Queue length at unsignalized intersections. The HCM 2010 and 6th Edition capacity models are based on an analytical method based on gap acceptance behavior on roundabouts in the United States.

Mini Roundabout Calculator Notes

Roundabout Type

This worksheet calculates values for mini roundabouts. Mini roundabouts have fully mountable central islands and smaller diameters, generally below 100 ft. There may be right turn bypasses on the approaches but only one circulating lane in the circulatory roadway

Single Lane Calculator Notes

Roundabout Type

This worksheet calculates values for single lane roundabouts. There may be right turn bypasses on the approaches but only one circulating lane in the circulatory roadway. If you have a hybrid roundabout (1 lane circulatory roadway in some areas and 2 lane circulatory roadway in other areas) it is recommended to use the multilane tab as this tab will allow inputs for any entry/circulating combinations for 1 lane 2 lane hybrid roundabouts.

Multi-Lane Calculator Notes

Volumes

This section supports up to two entry lanes with any logical movement configuration that can now be entered in the box that says "SELECT." Use Lane 1 (i.e. N1) for the **inside approach lane** and Lane 2 (i.e. N2) for the **outside approach (curb) lane**. If a leg only has a single lane, choose either lane but be consistent.

Critical Lane Volumes

This section computes the critical lane volumes from the above section by finding the highest volume in each approach lane pair. The critical volume is only used to determine the critical entry flow used in the approach leg v/c and control delay equations. In this method, the approach flows are assumed to be in conflict with both circulating lanes. This method using critical lane volumes is NCHRP 572 specific.
The HCM Method does not use a critical lane methodology to calculate conflicting flows, but uses the total exiting traffic.

Results

In addition to the other results as previously discussed, the critical lane entry flow is shown.

Geometric Variations

Bypass Lanes

If a bypass lane is included in the roundabout configuration, use the following method:
Any bypass lane volume will need to be subtracted out of the appropriate right turn volume. Insert this subtracted volume into the appropriate space on the bypass analysis chart. This value becomes the bypass entry flow and the conflicting flow is generated from the exit volumes from the roundabout on the exit leg. The capacity generated is based on the bypass lane flow yielding to the exiting flow from the roundabout. The multi-lane bypass lane uses three methods for determining the conflicting flow: default method which generates a conservative value based on the total exiting flow, the HCM Methodology, and a manual method which prompts the user to calculate the projected conflicting volume in the outer most exit lane.

References:

TRB (2016). ***Highway Capacity Manual: 6th Edition. A Guide for Multimodal Mobility Analysis.*** Transportation Research Board, National Research Council, Washington, D.C., U.S.A. ("HCM6")

TRB (2010). ***HCM 2010: Highway Capacity Manual***. Transportation Research Board, National Research Council, Washington, D.C., U.S.A. ("HCM2010").

TRB (2000). ***Highway Capacity Manual***. Transportation Research Board, National Research Council, Washington, D.C., U.S.A. ("HCM2000").

Robinson, B.W., et al., ***Roundabouts: An Informational Guide***, Publication No. FHWA-RD-00-067, Federal Highway Administration, Washington, DC, June 2000.

Rodegerdts, L., Bansen, J., Tiesler, C., Knudsen, J., Myers, E., Johnson, M., Moule, M., Persaud, B., Lyon, C., Hallmark, S., Isebrands, H., Crown, R.B., Guichet, B., O'Brien, A., ***NCHRP Report 672, Roundabouts: An Informational Guide, Second Edition***. Washington, D.C., Transportation Reserach Board, (2010)

Rodegerdts, L. A., Blogg, M., Wemple, E., Myers, E., Kyte, M., Dixon, M., List, G., Flannery, A., Troutbeck, R., Brilon, W., Wu, N., Persaud, B., Lyon, C., Harkey, D., and Carter, E. C., "Roundabouts in the United States." ***NCHRP Report 572***, Washington, D.C., Transportation Research Board of the National Academies, (2007)

Rodegerdts, L. A. "**Reassessment of Roundabout Capacity Models for the Highway Capacity Manual**." 4th International Conference on Roundabouts, Seattle, (2014). <http://teachamerica.com/RAB14/RAB1406CRodegerdts/index.htm>

**This workbook was adapted from ODOT's Roundabout Calculator.

Updates:

Version 1.0 (3/17/2009)

Version 1.1 (9/1/2009)

- Improved "START HERE" Page to include Design Worksheet to include Proposed Configuration.
- Condensed Bypass Tabs into the Main Analysis Tabs
- Streamlined "Results" to show level of service for unsignalized only.
- Revised Entry Flow for the UK Model, in the Multi-Lane Tab.

Version 1.2 (8/10/2010)

- Revised Roundabout Type Section to indicate "Standard Single Lane" and "Urban Compact"
- Revised Multi-Lane Tab to include user input for number of conflicting lanes in circulatory roadway for a given approach.

Version 1.3 (9/8/2010)

- Critical Update/Revision to Single Lane Bypass Formula and Multi-Lane Analysis MOEs

Version 2.0 (9/8/2010)

- Critical Update/Revision to Single Lane and Multi-Lane sheets to conform to HCM 2010 Methodology from the NCHRP 572

Version 2.1 (2/19/2012)

- Critical Update replaces the UK Model with the Calibrated HCM Model based on Oregon and California site-specific empirical data for critical headway and follow-up headway.

Version 3.0 (3/23/2016)

- Critical Update replaces the single lane models with the HCM 6th Edition Model.
- The multilane models on the Multilane Tab are replaced with the HCM 6th Edition Model.
- PHF is changes to .95 for urban and .92 for suburban
- Various updates to the Instructions Tab

Version 3.1 (7/25/2016)

- Update corrects the Single Lane Tab to calculate the approach with bypass delay and LOS according to the HCM 6th Edition formulas.

Version 4.0 (2/13/2017)

- Critical Update creates Mini Roundabout Tab, using HCM 2010 Edition for capacity calcuations
- Updated START HERE and INSTRUCTIONS tab to include Mini Roundabouts

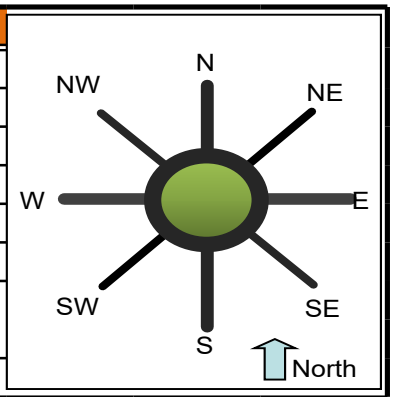
Version 4.1 (5/19/2017)

- 'Conditions met?' column with Yes/No options added to START HERE tab beside planning level thresholds
- GDOT logo added to every tab

General & Site Information

v 4.1

Analyst:	Manara ALI
Agency/Co:	GDOT
Date:	12/23/2019
Project or PI#:	
Year, Peak Hour:	Peak Hour
County/District:	Whitfield/District 6
Intersection Name:	SR 3 @ Old Dixie Hwy/ Five Springs Rd



Volumes

		Entry Legs (FROM) N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
	N (1), vph			**20**		**107**		**91**	
Exit	NE (2), vph								
Legs	E (3), vph	**4**				**125**		**220**	
(TO)	SE (4), vph								
	S (5), vph	**48**		**57**				**5**	
	SW (6), vph								
	W (7), vph	**37**		**289**		**1**			
	NW (8), vph								
Output	Total Vehicles	89	0	366	0	233	0	316	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
% Heavy Vehicles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% Bicycle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians **(ped/hr)**	0	0	0	0	0	0	0	0
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
F_{HV}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
F_{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	22	0	116	0	99	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	4	0	0	0	136	0	239	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	52	0	62	0	0	0	5	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	40	0	314	0	1	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	97	0	398	0	253	0	343	0
Conflicting flow, pcu/h	377	0	216	0	342	0	118	0

Results: Approach Measures of Effectiveness

HCM 2010 Edition	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	775	NA	910	NA	802	NA	1004	NA
Entry Flow Rates, vph	97	NA	398	NA	253	NA	343	NA
V/C ratio	**0.12**		**0.44**		**0.32**		**0.34**	
Control Delay, sec/pcu	**6**		**9**		**8**		**7**	
LOS	A		A		A		A	
95th % Queue (ft)	**11**		**56**		**34**		**38**	

Notes: v 4.0

Unit Legend:
vph = vehicles per hour
PHF = peak hour factor
F_{HV} = heavy vehicle factor
pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
Does the bypass have a dedicated receiving lane?						
Volumes						
Right Turn Volume removed from Entry Leg						
Volume Characteristics (for entry leg)						
PHF						
F_{HV}						
F_{ped}						
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow, pcu/hr						
Conflicting Flow, pcu/hr						
Bypass Lane Results (HCM 2010 Edition)						
Entry Capacity of Bypass, vph						
Flow Rates of Exiting Traffic, vph						
V/C ratio						
Control Delay, s/veh						
LOS						
95th % Queue (ft)						
Approach w/Bypass Delay, s/veh						
Approach w/Bypass LOS						

General & Site Information

v 4.1

Analyst:	Manara ALI
Agency/Co:	GDOT
Date:	12/23/2019
Project or PI#:	
Year, Peak Hour:	Peak Hour
County/District:	Whitfield/District 6
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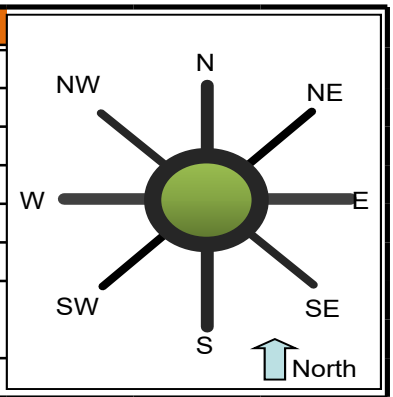

Volumes		Entry Legs (FROM) N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
	N (1), vph			**32**		**11**		**79**	
Exit	NE (2), vph								
Legs	E (3), vph	**7**				**164**		**839**	
(TO)	SE (4), vph								
	S (5), vph	**1**		**129**				**12**	
	SW (6), vph								
	W (7), vph	**20**		**848**		**12**			
	NW (8), vph								
Output	Total Vehicles	28	0	1009	0	187	0	930	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	97.0%	100.0%	94.0%	100.0%	97.0%	100.0%	94.0%	100.0%
% Heavy Vehicles	3.0%	0.0%	6.0%	0.0%	3.0%	0.0%	6.0%	0.0%
% Bicycle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians **(ped/hr)**	0	0	0	0	0	0	0	0
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
F_{HV}	0.971	1.000	0.943	1.000	0.971	1.000	0.943	1.000
F_{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	37	0	12	0	91	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	8	0	0	0	184	0	967	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	1	0	149	0	0	0	14	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	22	0	977	0	13	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	31	0	1163	0	209	0	1072	0
Conflicting flow, pcu/h	1139	0	117	0	1066	0	158	0

Results: Approach Measures of Effectiveness

HCM 6th Edition	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	419	NA	1156	NA	452	NA	1109	NA
Entry Flow Rates, vph	30	NA	1097	NA	203	NA	1011	NA
V/C ratio	**0.07**		**0.95**		**0.45**		**0.91**	
Control Delay, sec/pcu	**10**		**35**		**17**		**30**	
LOS	A		D		C		D	
95th % Queue (ft)	**6**		**449**		**59**		**379**	

Notes: v 4.0

Unit Legend:
vph = vehicles per hour
PHF = peak hour factor
F_{HV} = heavy vehicle factor
pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
Does the bypass have a dedicated receiving lane?						
Volumes						
Right Turn Volume removed from Entry Leg						
Volume Characteristics (for entry leg)						
PHF						
F_{HV}						
F_{ped}						
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow, pcu/hr						
Conflicting Flow, pcu/hr						
Bypass Lane Results (HCM 6th Edition)						
Entry Capacity of Bypass, vph						
Flow Rates of Exiting Traffic, vph						
V/C ratio						
Control Delay, s/veh						
LOS						
95th % Queue (ft)						
Approach w/Bypass Delay, s/veh						
Approach w/Bypass LOS						

General & Site Information

v 4.1

Analyst:	Manara ALI
Agency/Co:	GDOT
Date:	12/23/2019
Project or PI#:	
Year, Peak Hour:	Peak Hour
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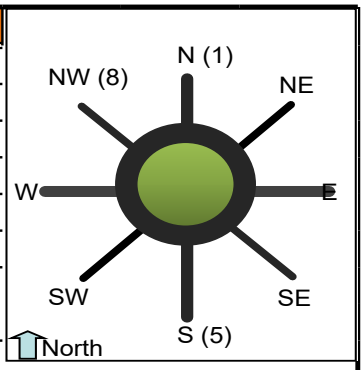
Intersection:	SR 3 @ Old Dixie Hwy/ Five Springs Rd



Volumes

Volumes	Entry Legs (FROM)							
	N1 (1)	N2 (1)	NE1 (2)	NE2 (2)	E1 (3)	E2 (3)	SE1 (4)	SE2 (4)
Lane Designation	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT
N (1), vph					32			
Exit Legs (TO) NE (2), vph								
E (3), vph	7							
SE (4), vph								
S (5), vph	1				129			
SW (6), vph								
W (7), vph	20				345	503		
NW (8), vph								
Entry Volume, vph	28	0	0	0	506	503	0	0

	S1 (5)	S2 (5)	SW1 (6)	SW2 (6)	W1 (7)	W2 (7)	NW1 (8)	NW2 (8)
Lane Designation	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT
N (1), vph	11				79			
NE (2), vph								
E (3), vph		164			358	481		
SE (4), vph								
S (5), vph					12			
SW (6), vph								
W (7), vph	12							
NW (8), vph								
Entry Volume, vph	23	164	0	0	449	481	0	0

	N	NE	E	SE	S	SW	W	NW
# of Entry Flow Lanes	1	0	2	0	2	0	2	0
# of Conflict Flow Lanes	2	2	2	2	2	2	2	2

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	97.0%	100.0%	94.0%	100.0%	97.0%	100.0%	94.0%	100.0%
% Heavy Vehicles	3.0%	0.0%	6.0%	0.0%	3.0%	0.0%	6.0%	0.0%
% Bicycles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians **(ped/hr)**	0	0	0	0	0	0	0	0
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
F_{hv}	0.971	1.000	0.943	1.000	0.971	1.000	0.943	1.000
F_{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW

Flow to Leg #	N (1), pcu/h	0	0	37	0	12	0	91	0
	NE (2), pcu/h	0	0	0	0	0	0	0	0
	E (3), pcu/h	8	0	0	0	184	0	967	0
	SE (4), pcu/h	0	0	0	0	0	0	0	0
	S (5), pcu/h	1	0	149	0	0	0	14	0
	SW (6), pcu/h	0	0	0	0	0	0	0	0
	W (7), pcu/h	22	0	977	0	13	0	0	0
	NW (8), pcu/h	0	0	0	0	0	0	0	0
	Entry flow, pcu/h	31	0	1163	0	209	0	1072	0
	Entry flow Lane 1, pcu/h	31	0	583	0	26	0	517	0
	Entry flow Lane 2, pcu/h	0	0	580	0	184	0	554	0
	Conflicting flow, pcu/h	1139	0	117	0	1066	0	158	0

Results: Approach Measures of Effectiveness

HCM 6th Edition	N		E		S		W	
Lane Designations	*Lane 1*	*Lane 2*	*Lane 1*	*Lane 2*	*Lane 1*	*Lane 2*	*Lane 1*	*Lane 2*
Entry Capacity, veh/h	524	NA	1144	1213	492	557	1102	1172
Entry Flow Rates, veh/h	30	NA	550	547	25	178	488	523
V/C ratio	**0.06**	#VALUE!	**0.48**	**0.45**	**0.05**	**0.32**	**0.44**	**0.45**
Control Delay, s/veh	**7.6**	#VALUE!	**8.4**	**7.6**	**8.0**	**11.1**	**8.1**	**7.8**
LOS	A	#VALUE!	A	A	A	B	A	A
95th % Queue (ft)	**5**	#VALUE!	**71**	**63**	**4**	**35**	**61**	**62**
Approach Delay, LOS	7.6 sec, LOS A		8 sec, LOS A		10.7 sec, LOS B		7.9 sec, LOS A	

	NE		SE		SW		NW	
Lane Designations	*Lane 1*	*Lane 2*	*Lane 1*	*Lane 2*	*Lane 1*	*Lane 2*	*Lane 1*	*Lane 2*
Entry Capacity, veh/h	NA	NA	NA	NA	NA	NA	NA	NA
Entry Flow Rates, veh/h	NA	NA	NA	NA	NA	NA	NA	NA
V/C ratio			#VALUE!	#VALUE!			#VALUE!	#VALUE!
Control Delay, sec/pcu			#VALUE!	#VALUE!			#VALUE!	#VALUE!
LOS			#VALUE!	#VALUE!			#VALUE!	#VALUE!
95th % Queue (ft)			#VALUE!	#VALUE!			#VALUE!	#VALUE!
Approach Delay, LOS			#N/A				#N/A	

v 4.0

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
Does the bypass have a dedicated receiving lane?						
# of Conflicting Exit Flow Lanes	**2**	**2**	**2**	**2**	**2**	**2**
Volumes						
Entry Leg: Insert Right Turn Volume						
Exit Leg: ***(Select Input Method)***						
*Lane Flow in Exit Leg****						
Sum of inner circulatory flow lane to exit leg (leg bypass merges into)	N/A	N/A	N/A	N/A	N/A	N/A
Sum of outer circulatory flow lane to exit leg (leg bypass merges into)	N/A	N/A	N/A	N/A	N/A	N/A
*Critical Lane Flow (Manual) in Exit Leg****						
Volume Characteristics						
PHF (Entry Leg)						

F_{HV} (Entry Leg)						
F_{ped}						
PHF (Exit Leg)***	N/A	N/A	N/A	N/A	N/A	N/A
F_{HV} (Exit Leg)***	N/A	N/A	N/A	N/A	N/A	N/A
Volume Characteristics are already taken into account for Default method ONLY. Insert Values above if Manual method.						
Entry/Conflicting Flows						
Entry Flow						
Conflicting Critical Flow						
Bypass Lane Results						
Entry Capacity of Bypass, veh/h						
Flow Rates of Exiting Traffic, veh/h						
V/C ratio						
Control Delay, sec/pcu						
LOS						
95th % Queue (ft)						

Geogia Department of Transportation

SR 3 @ Old Dixie HWY/ Five Springs Rd
with Right Turn Reduction

Signal Warrants - Summary

Major Street Approaches

Eastbound: **SR 3**
Number of Lanes: **2**
Approach Speed: **55**
Total Approach Volume: **6,594**

Westbound: **SR 3**
Number of Lanes: **2**
Approach Speed: **55**
Total Approach Volume: **7,676**

Minor Street Approaches

Northbound: **Old Dixie HWY**
Number of Lanes: **1**
Total Approach Volume: **233**

Southbound: **5 Springs Rd**
Number of Lanes: **1**
Total Approach Volume: **175**

Warrant Summary **(Urban values apply.)**

Warrant 1 - Eight Hour Vehicular Volumes ..... **Not Satisfied**

Warrant 1A - Minimum Vehicular Volume .....**Not Satisfied**
Required volumes reached for 0 hours, 8 are needed

Warrant 1B - Interruption of Continuous Traffic .....**Not Satisfied**
Required volumes reached for 0 hours, 8 are needed

Warrant 1 A&B - Combination of Warrants .....**Not Satisfied**
Required volumes reached for 0 hours, 8 are needed

Warrant 2 - Four Hour Volumes ..... **Not Satisfied**
Number of hours (0) volumes exceed minimum < minimum required (4).

Warrant 3 - Peak Hour ..... **Not Satisfied**

Warrant 3A - Peak Hour Delay .....**Not Satisfied**
Total approach volumes and delays on minor street do not exceed minimums for any hour.

Warrant 3B - Peak Hour Volumes .....**Not Satisfied**
Volumes do not exceed minimums for any hour.

Warrant 4 - Pedestrian Volumes ..... **Not Satisfied**
Required 4 Hr pedestrian volume reached for 0 hour(s) and the single hour volume for 0 hour(s)

Warrant 5 - School Crossing ..... **Not Satisfied**
Number of gaps > .0 seconds (0) exceeds the number of minutes in the crossing period (0).

Warrant 6 - Coordinated Signal System ..... **Not Satisfied**
No adjacent coordinated signals are present

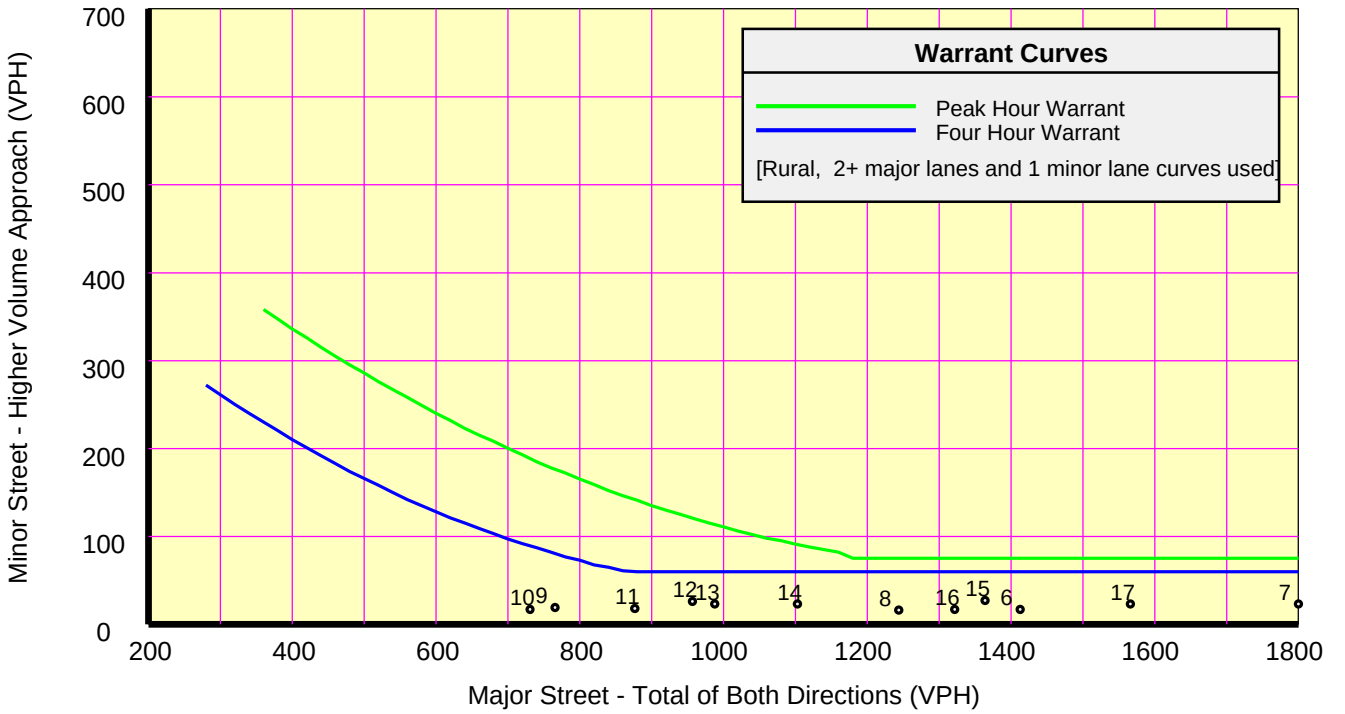
Warrant 7 - Crash Experience ..... **Not Satisfied**
Number of accidents (-1) is less than minimum (5). Volume minimums are not met.

Warrant 8 - Roadway Network ..... **Not Satisfied**
Major Route conditions not met. One or more volume requirement met.

Geogia Department of Transportation

SR 3 @ Old Dixie HWY/ Five Springs Rd
with Right Turn Reduction

Signal Warrants - Summary



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher Minor		War-1A			War-1B			War-1A&B		
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
01:00	0	0	NB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
02:00	0	0	NB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
03:00	0	0	NB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
04:00	0	0	NB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
05:00	0	0	NB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
06:00	1,413	17	SB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
07:00	1,939	23	NB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
08:00	1,244	16	NB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
09:00	766	19	NB	600-Yes	150-No	Major	900-No	75-No	---	720-Yes	120-No	Major
10:00	731	17	NB	600-Yes	150-No	Major	900-No	75-No	---	720-Yes	120-No	Major
11:00	877	18	NB	600-Yes	150-No	Major	900-No	75-No	---	720-Yes	120-No	Major
12:00	957	26	NB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
13:00	988	23	SB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
14:00	1,103	23	NB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
15:00	1,364	27	NB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
16:00	1,322	17	NB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
17:00	1,566	23	SB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
18:00	0	0	NB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
19:00	0	0	NB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
20:00	0	0	NB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
21:00	0	0	NB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
22:00	0	0	NB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---
23:00	0	0	NB	600-No	150-No	---	900-No	75-No	---	720-No	120-No	---

HCS7 Two-Way Stop-Control Report

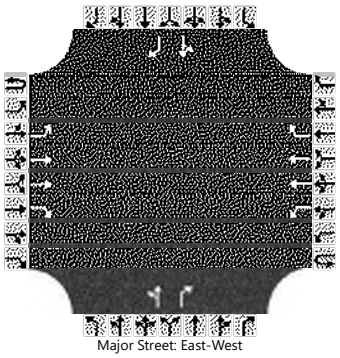
General Information

Analyst	Manara Ali
Agency/Co.	GDOT
Date Performed	12/16/2019
Analysis Year	2019
Time Analyzed	Peak Hour
Intersection Orientation	East-West
Project Description	TWSC

Site Information

Intersection	SR 3 @ Old Dixie HWY
Jurisdiction	D6- Traffic Opefrations
East/West Street	SR 3
North/South Street	Old Dixie Hwy/Five Spring
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	1	0	1	2	1		0	1	1		0	1	1
Configuration		L	T	R		L	T	R		LT		R		LT		R
Volume (veh/h)	0	79	839	12	0	129	848	32		12	11	164		7	1	20
Percent Heavy Vehicles (%)	0	6			0	6				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		Yes				Yes				Yes				Yes		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.22				4.22				7.56	6.56	6.96		7.56	6.56	6.96
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.26				2.26				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		86				140				25		178		9		22
Capacity, c (veh/h)		712				718				30		549		17		545
v/c Ratio		0.12				0.20				0.82		0.32		0.51		0.04
95% Queue Length, Q_{95} (veh)		0.4				0.7				2.7		1.4		1.4		0.1
Control Delay (s/veh)		10.7				11.2				295.5		14.7		348.6		11.9
Level of Service (LOS)		B				B				F		B		F		B
Approach Delay (s/veh)		0.9				1.4				49.2				108.1		
Approach LOS										E				F		

HCS7 All-Way Stop Control Report

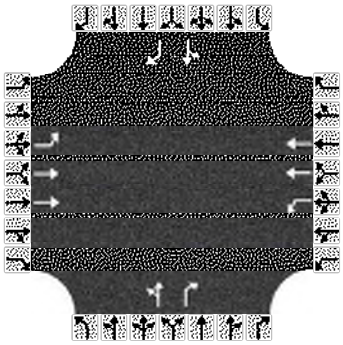
General Information

Analyst	Manara Ali
Agency/Co.	GDOT
Date Performed	11/26/2019
Analysis Year	2019
Analysis Time Period (hrs)	0.25
Time Analyzed	Peak Hour
Project Description	AWSC

Site Information

Intersection	SR 3 @ Old Dixie HWY
Jurisdiction	D6- Traffi Operations
East/West Street	SR 3
North/South Street	Oldi Dixie HWY
Peak Hour Factor	0.92

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	79	839		129	848		12	11	164	7	0	20
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L	T	T	L	T	T	LT	R		LT	R	
Flow Rate, v (veh/h)	86	456	456	140	461	461	25	178		8	22	
Percent Heavy Vehicles	6	0	0	6	0	0	3	3		3	3	

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20		3.20	3.20	
Initial Degree of Utilization, x	0.076	0.405	0.405	0.125	0.410	0.410	0.022	0.158		0.007	0.019	
Final Departure Headway, hd (s)	8.95	8.35	8.35	8.84	8.24	8.24	11.32	10.36		12.24	11.04	
Final Degree of Utilization, x	0.213	1.057	1.057	0.344	1.055	1.055	0.079	0.513		0.026	0.067	
Move-Up Time, m (s)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3		2.3	2.3	
Service Time, ts (s)	6.65	6.05	6.05	6.54	5.94	5.94	9.02	8.06		9.94	8.74	

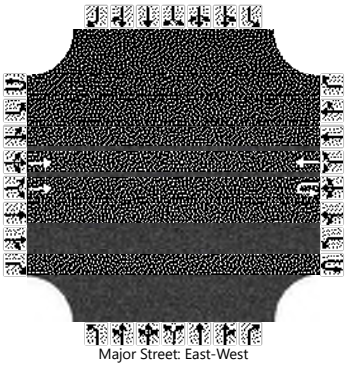
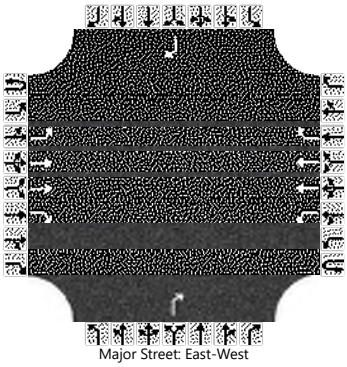
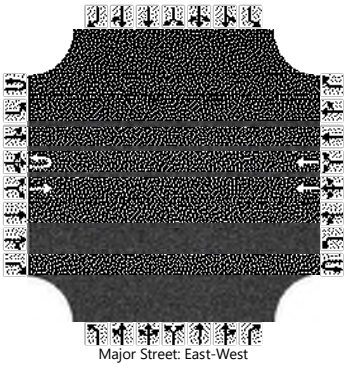
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	86	456	456	140	461	461	25	178		8	22	
Capacity	402	431	431	407	437	437	318	347		294	326	
95% Queue Length, Q_{95} (veh)	0.8	14.7	14.7	1.5	14.7	14.7	0.3	2.8		0.1	0.2	
Control Delay (s/veh)	14.1	88.2	88.2	16.1	87.0	87.0	15.0	23.5		15.3	14.5	
Level of Service, LOS	B	F	F	C	F	F	B	C		C	B	
Approach Delay (s/veh)	81.8			77.7			22.4			14.7		
Approach LOS	F			F			C			B		
Intersection Delay, s/veh | LOS	73.8						F					

HCS7 Alternative Intersections Results Summary

General Information				Alternative Intersection Information	
Agency	GDOT			Intersection Type	RCUT with TWSC
Analyst	Manara Ali	Analysis Date	12/23/2019	Segment One Distance, ft	700
Jurisdiction	D6- Traffic Operations	Duration, h	0.25	Segment Two Distance, ft	700
Intersection	SR 3 @ Old Dixie Hwy	PHF	0.92	Arterial Direction	East-West
Main Intersection File	RCUT ASIS.xtw				
West Crossover File	RCUT WB Crossover.xtw				
East Crossover File	RCUT EB Crossover.xtw				
Project Description	R-CUT				

Demand	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Intersection One Demand (*v*), veh/h			930		8		880									
Intersection Two Demand (*v*), veh/h	0	79	846	13	0	129	860	43				187				28
Intersection Three Demand (*v*), veh/h	23		1010				1009									

(1) West Crossover	(2) Main Intersection	(3) East Crossover
		
Major Street: East-West	Major Street: East-West	Major Street: East-West

Queue-to-Storage Ratio	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Intersection One (R_Q)					0.01											
Intersection Two (R_Q)																
Intersection Three (R_Q)	0.02															

Alternative Intesection Results

O-D	O-D Movements	Flow Rate (veh/h)	Control Delay (s/veh)	EDTT (s/veh)	ETT (s/veh)	LOS
EBL	EBL(2)	86	10.8	--	10.8	B
EBT	--	912	0.0	--	0.0	A
EBR	--	13	0.0	--	0.0	A
WBL	WBL(2)	140	11.3	--	11.3	B
WBT	--	922	0.0	--	0.0	A
WBR	--	35	0.0	--	0.0	A
NBL	NBR(2) + EBU(3)	13	15.5	17.3	32.8	C
NBT	NBR(2) + EBU(3)	12	15.5	17.3	32.8	C
NBR	NBR(2)	178	15.5	--	15.5	B
SBL	SBR(2) + WBU(1)	8	12.1	17.3	29.4	C
SBT	SBR(2) + WBU(1)	1	12.1	17.3	29.4	C
SBR	SBR(2)	22	12.1	--	12.1	B

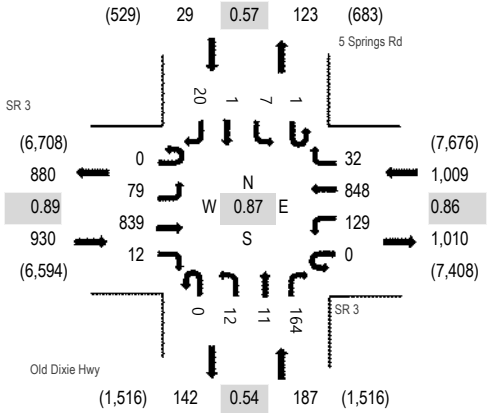
Overall Results	EB		WB		NB		SB	
Approach ETT, s/veh | LOS	0.9	A	1.4	A	17.6	B	17.1	B
Intersection ETT, s/veh | LOS	2.8				A			

All Traffic Data Services Inc.

(303) 216-2439
www.alltrafficdata.net

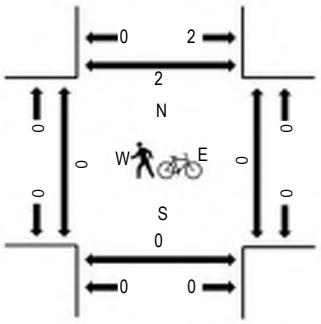
Location: #4 Old Dixie Hwy & SR 3 AM
Date and Start Time: Wednesday, October 9, 2019
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

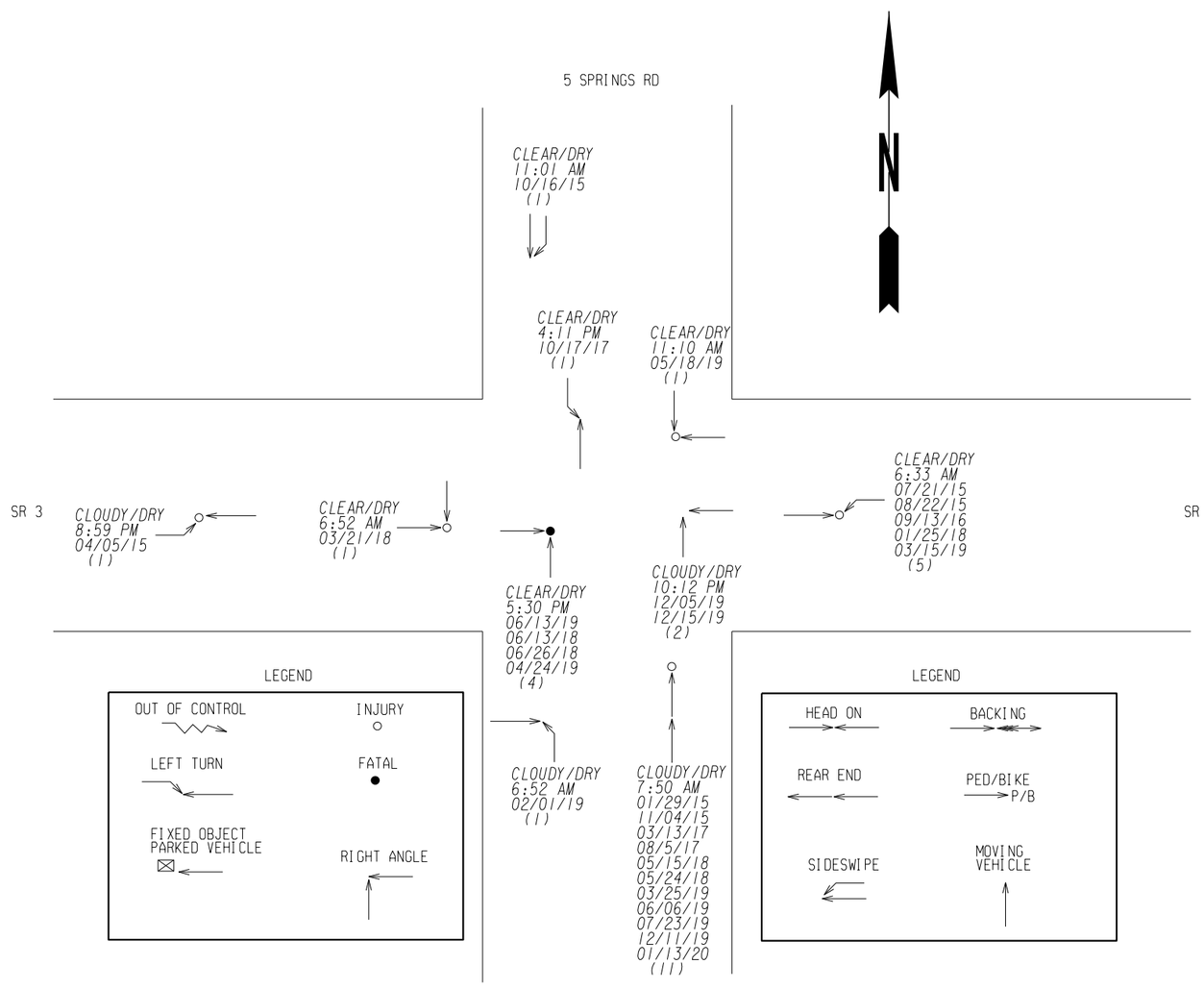
Interval Start Time	SR 3 Eastbound				SR 3 Westbound				Old Dixie Hwy Northbound				5 Springs Rd Southbound					Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
6:00 AM	0	7	59	1	0	14	91	2	0	3	6	35	0	1	4	2	225	1,601	0	0	0	0
6:15 AM	0	20	110	6	0	28	139	3	0	1	0	29	0	2	2	1	341	1,874	0	0	0	0
6:30 AM	0	20	164	11	0	47	209	7	0	1	1	38	0	1	0	6	505	1,981	0	0	0	0
6:45 AM	0	30	170	8	0	64	196	7	0	1	2	41	0	1	6	4	530	2,065	0	0	0	0
7:00 AM	0	10	208	3	0	37	163	8	0	5	6	49	0	2	0	7	498	2,155	0	0	0	0
7:15 AM	0	9	171	5	0	31	187	5	0	3	0	29	0	2	1	5	448	2,130	0	0	0	0
7:30 AM	0	26	223	3	0	29	247	7	0	3	2	43	0	1	0	5	589	2,070	0	0	0	2
7:45 AM	0	34	237	1	0	32	251	12	0	1	3	43	1	2	0	3	620	1,749	0	0	0	0
8:00 AM	0	25	227	2	0	27	149	9	0	1	0	26	0	4	0	3	473	1,376	0	0	0	0
8:15 AM	0	11	177	2	0	15	142	4	0	1	3	23	0	2	0	8	388	1,127	0	0	0	0
8:30 AM	0	12	105	1	0	17	94	1	0	4	4	20	0	4	0	6	268	985	0	0	0	0
8:45 AM	0	11	117	1	0	20	74	1	0	2	1	16	0	2	0	2	247	917	0	0	0	0
9:00 AM	0	9	83	4	0	16	83	0	0	1	3	16	0	1	3	5	224	889	0	0	0	0
9:15 AM	0	6	95	1	0	15	97	3	0	3	2	17	0	1	1	5	246	849	0	0	0	0
9:30 AM	0	4	71	3	0	12	77	2	0	3	1	21	0	1	1	4	200	814	0	0	0	0
9:45 AM	0	5	76	4	0	11	84	5	0	3	3	19	2	1	2	4	219	861	0	0	0	0
10:00 AM	0	4	71	5	0	12	60	2	0	0	1	17	0	7	0	5	184	851	0	0	0	0
10:15 AM	0	4	69	4	0	18	87	4	0	2	4	15	0	1	1	2	211	895	0	0	0	0
10:30 AM	0	7	93	1	0	8	96	2	0	4	4	22	0	1	3	6	247	934	0	0	0	0
10:45 AM	0	5	82	2	0	15	79	1	0	1	1	13	0	1	2	7	209	953	0	0	0	0
11:00 AM	0	6	77	6	0	16	91	2	0	1	1	21	0	1	0	6	228	1,005	0	0	0	0
11:15 AM	0	4	96	5	0	14	87	4	0	6	1	18	0	3	3	9	250	1,069	0	0	0	0
11:30 AM	0	5	97	4	0	12	112	1	0	4	3	15	0	4	1	8	266	1,065	0	0	0	0
11:45 AM	0	6	104	2	0	26	99	1	0	2	0	15	0	1	0	5	261	1,068	0	0	0	0
12:00 PM	0	4	122	6	0	13	111	5	0	5	2	17	0	0	2	5	292	1,071	0	0	0	0
12:15 PM	0	5	104	7	0	15	90	4	0	4	0	9	0	3	1	4	246	1,070	0	0	0	0
12:30 PM	0	3	109	5	0	22	94	2	0	7	3	11	0	2	2	9	269	1,083	0	0	0	0
12:45 PM	0	4	98	2	0	19	110	3	0	2	3	21	0	0	0	2	264	1,107	0	0	0	0
1:00 PM	0	2	113	5	0	31	99	4	0	2	2	27	0	1	0	5	291	1,136	0	0	0	0
1:15 PM	0	3	99	2	0	24	95	3	0	1	1	23	0	2	1	5	259	1,146	0	0	0	0
1:30 PM	0	7	96	6	0	30	113	2	0	5	2	22	0	2	7	1	293	1,207	0	0	0	0
1:45 PM	0	7	102	3	0	37	102	3	0	2	4	16	0	2	8	7	293	1,251	0	0	0	0
2:00 PM	0	5	92	2	0	19	114	1	0	1	9	47	0	2	3	6	301	1,284	0	0	0	0
2:15 PM	0	7	120	5	0	30	117	3	0	2	5	25	0	1	0	5	320	1,480	0	0	0	0
2:30 PM	0	9	125	5	0	22	136	7	0	0	2	20	0	3	3	5	337	1,520	0	0	0	0

2:45 PM	0	9	94	5	0	35	138	3	0	3	1	22	0	2	7	7	326	1,605	0	0	0	0
3:00 PM	0	5	195	3	0	28	142	4	0	9	3	84	0	1	0	23	497	1,641	0	0	0	0
3:15 PM	0	5	148	2	0	34	120	5	0	0	4	30	0	1	4	7	360	1,575	0	0	0	0
3:30 PM	0	4	160	5	0	41	148	6	0	1	6	38	0	1	1	11	422	1,529	0	0	0	0
3:45 PM	0	1	114	1	0	33	155	5	0	1	3	28	0	5	1	15	362	1,508	0	0	0	0
4:00 PM	0	1	141	6	0	44	185	6	0	1	5	23	0	1	0	18	431	1,502	0	0	0	0
4:15 PM	0	1	92	3	0	29	154	3	0	1	2	22	0	1	0	6	314	1,713	0	0	0	0
4:30 PM	0	6	169	2	0	43	124	2	0	1	4	35	0	2	3	10	401	1,808	0	0	0	0
4:45 PM	0	2	130	2	0	22	154	1	0	2	1	28	0	0	0	14	356	1,837	0	0	0	0
5:00 PM	0	4	236	7	0	49	262	8	0	1	1	32	0	3	0	39	642	1,804	0	0	0	0
5:15 PM	0	4	124	4	0	39	177	1	0	3	1	32	0	1	7	16	409		0	0	0	0
5:30 PM	0	2	152	2	0	34	170	3	0	2	3	46	0	3	4	9	430		0	0	0	0
5:45 PM	0	0	119	3	0	23	139	4	0	2	0	24	0	3	2	4	323		0	0	0	0

Peak Rolling Hour Flow Rates

	Eastbound				Westbound				Northbound				Southbound				
Vehicle Type	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total
Articulated Trucks	0	4	50	0	0	0	52	0	0	1	0	0	0	0	0	4	111
Lights	0	75	757	12	0	122	770	31	0	10	11	153	1	7	1	16	1,966
Mediums	0	0	32	0	0	7	26	1	0	1	0	11	0	0	0	0	78
Total	0	79	839	12	0	129	848	32	0	12	11	164	1	7	1	20	2,155

COLLISION DIAGRAM



YEAR : 2015-2020

ACCIDENT SUMMARY

TIME OF DAY	NO. ACC'S
6 A.M.-10 A.M.	12
10 A.M.-4 P.M.	6
4 P.M.-7 P.M.	7
7 P.M.-12 MID	3
TOTAL	28

DIR OF APPROACH	NO. VEH'S
NORTH	30
SOUTH	5
EAST	12
WEST	9
TOTAL	56

WEATHER	NO. ACC'S
CLEAR.	16
CLOUDY	11
RAIN	1
FOG	
SNOW	
TOTAL	28

TYPE ACCIDENT	NO. ACC'S
SIDESWIPE	1
REAR END	11
RIGHT ANGLE	8
LEFT TURN	8
OTHER	
TOTAL	28

PAVEMENT	NO. ACC'S
DRY	25
WET	3
ICY	
TOTAL	28

SEVERITY	NUMBER
FATAL	1
INJURIES	12
TOTAL	13

TIME OF THE YEAR	NO. ACC'S
WINTER DEC-FEB	7
SPRING MAR-MAY	9
SUMMER JUNE-AUG	
FALL SEPT-NOV	4
TOTAL	28

TYPE OF VEHICLE	NO. VEH'S
PASSENGER CAR	
8TRUCKS	
OTHER	
TOTAL	

INTERSECTION SR 3 @ OLD DIXIE HWY/ 5 SPRINGS RD

COUNTY WHITFIELD CITY DIV.

PERIOD 2015-2020 FROM 01/01/2015 TO 04/20/2020

BY MANARA ALI DATE 04/20/2020

Accident No	Date	Time	Injuries	Fatalities	Manner of Collision	Light	Surface	LatDec	LongDec
5151884	1/29/2015	7:50:00	0	0	Rear End	Daylight	Dry	34.70	-84.97
5245257	4/5/2015	20:59:00	3	0	Angle	DarkNot Lighted	Dry	34.70	-84.97
5368438	7/21/2015	6:33:00	1	0	Angle	Daylight	Dry	34.70	-84.97
5400361	8/22/2015	13:44:00	1	0	Angle	Daylight	Dry	34.70	-84.97
5497568	11/4/2015	12:28:00	0	0	Rear End	Daylight	Dry	34.70	-84.97
5531848	10/16/2015	11:01:00	0	0	Side-Swipe	Daylight	Dry	34.70	-84.97
5917302	9/13/2016	6:40:00	0	0	Angle	DarkNot Lighted	Dry	34.70	-84.97
6149505	3/13/2017	6:10:00	0	0	Rear End	DarkNot Lighted	Dry	34.70	-84.97
6342159	8/5/2017	10:54:00	0	0	Rear End	Daylight	Dry	34.70	-84.97
6432561	10/17/2017	16:11:00	0	0	Angle	Daylight	Dry	34.70	-84.97
6567813	1/25/2018	5:52:00	2	0	Angle	DarkNot Lighted	Dry	34.70	-84.97
6644288	3/21/2018	6:52:00	3	0	Angle	DarkNot Lighted	Dry	34.70	-84.97
6714617	5/15/2018	7:52:00	0	0	Rear End	Daylight	Dry	34.70	-84.97
6724009	5/24/2018	17:19:00	1	0	Rear End	Daylight	Dry	34.70	-84.97
6749549	6/13/2018	7:05:00	1	0	Angle	Daylight	Dry	34.70	-84.97
6770840	6/26/2018	17:17:00	1	0	Angle	Daylight	Dry	34.70	-84.97
7073523	2/1/2019	6:52:00	0	0	Angle	Daylight	Dry	34.70	-84.97
7126771	3/15/2019	8:06:00	0	0	Angle	Daylight	Wet	34.70	-84.97
7139586	3/25/2019	17:11:00	0	0	Rear End	Daylight	Wet	34.70	-84.97
7189618	4/24/2019	15:10:00	1	0	Angle	Daylight	Dry	34.70	-84.97
7213258	5/18/2019	11:10:00	3	0	Angle	Daylight	Dry	34.70	-84.97
7238760	6/6/2019	6:35:00	0	0	Rear End	Dawn	Dry	34.70	-84.97
7253929	6/13/2019	17:30:00	1	1	Angle	Daylight	Dry	34.70	-84.97
7295765	7/23/2019	17:09:00	0	0	Rear End	Daylight	Dry	34.70	-84.97
7467020	12/5/2019	22:12:00	0	0	Angle	DarkNot Lighted	Dry	34.70	-84.97
7480817	12/11/2019	17:08:00	1	0	Rear End	Daylight	Dry	34.70	-84.97
7481779	12/15/2019	6:45:00	1	0	Angle	DarkNot Lighted	Dry	34.70	-84.97
7585029	1/13/2020	23:07:00	0	0	Rear End	DarkNot Lighted	Wet	34.70	-84.97