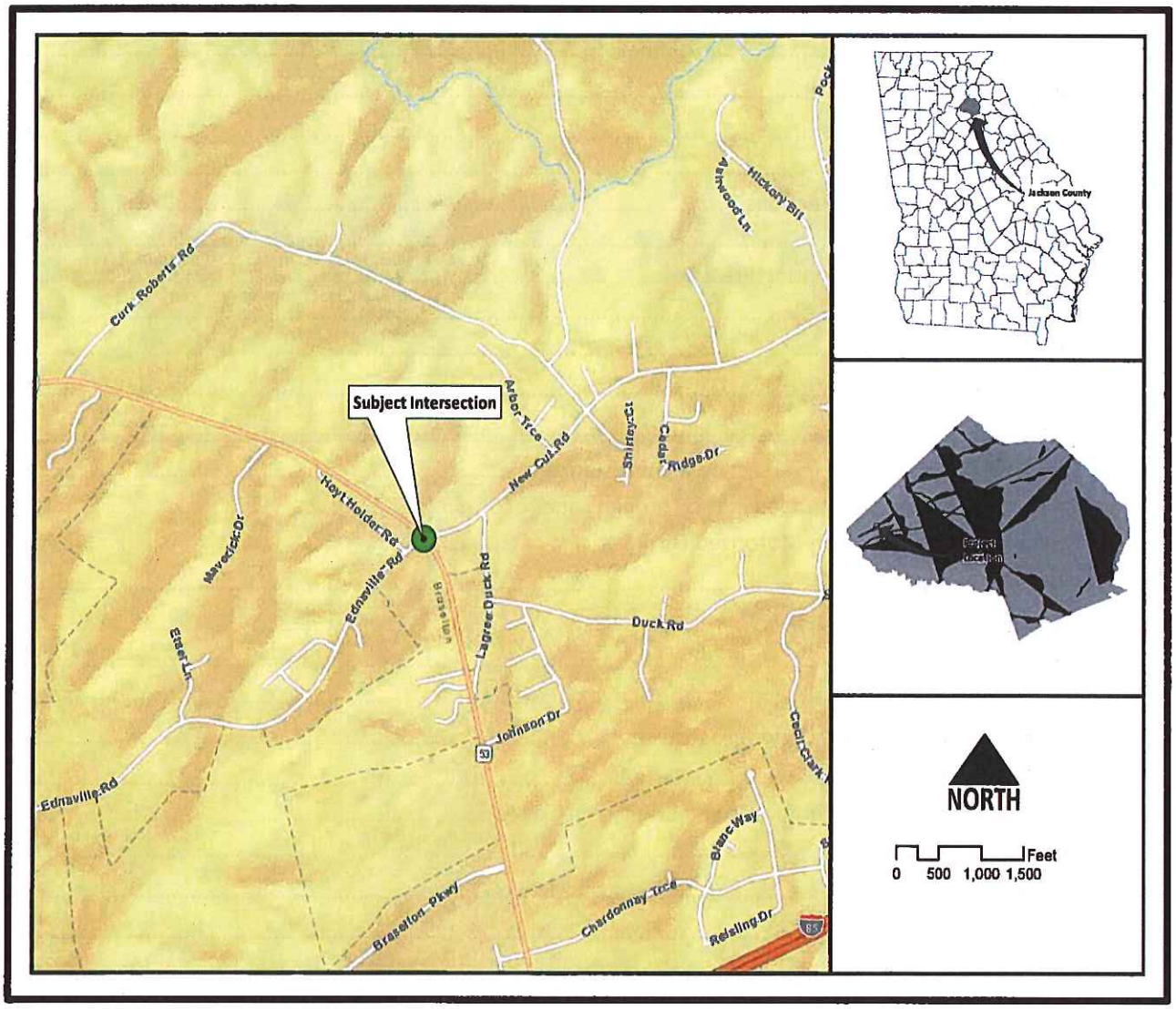
Traffic Engineering Study

State Route 53 at New Cut Road/Ednaville Road
Jackson County, Georgia



Requested by: Georgia Department of Transportation, District 1

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INTRODUCTION

Highway safety improvement projects are intended to increase safety performance by minimizing or eliminating risk to roadway users. The identification of locations within a highway system that present potentially higher risk to roadway users is a critical component of achieving the Georgia Department of Transportation's (GDOT) ultimate goal of zero fatalities and injuries on Georgia's roadways. The unsignalized intersection located at State Route (SR)-53 and New Cut Road near the City of Braselton was identified as an intersection with potential risk to roadway users . To improve safety and mobility as well as non-motorized road user connectivity, GDOT commissioned the Atkins team to complete this traffic engineering study.

Project Location

The intersection of SR-53 and New Cut Road, shown in **Figure 1**, is located on western edge of Jackson County, north of the City of Braselton, GA.

Reason for Investigation

This location was selected for further study due to the presence of a large volume of truck traffic, relatively high historical traffic crash rates, and concerns related to high speeds.

STUDY OBJECTIVES

The objectives of this preliminary traffic engineering report include:

- Review traffic safety, operations, and non-motorized road user connectivity at the intersection;
- Identify physical and operational problems that may affect traffic safety; and
- Develop and evaluate potential countermeasures to improve safety, mobility, and connectivity.

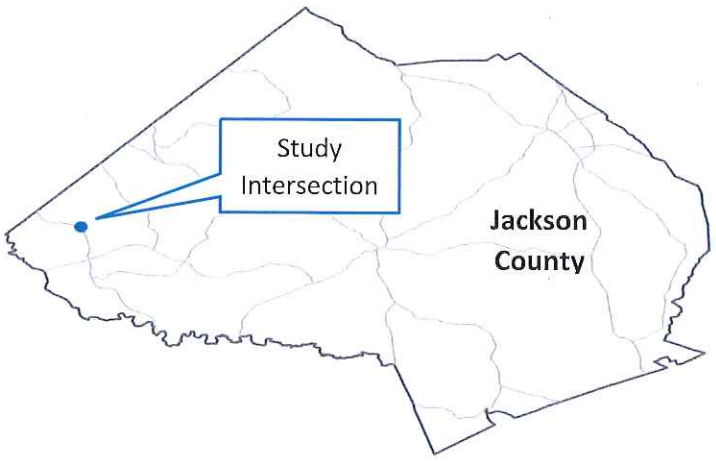

Figure 1. Location of Study Intersection

LOCATION DESCRIPTION

The study location is a four-leg, unsignalized (minor-route stop) intersection between SR-53, a north-south running principal arterial, New Cut Road, an east-west running local street, and Ednaville Road, an east-west running local street, adjacent to New Cut Road. SR-53 is a high-speed, two-lane roadway that functions as a connection between US-23/I-985 north of the study intersection as well as SR-403/I-85 south of the study intersection. New Cut Road and Ednaville Road are local streets that provide access to residential areas east and west of the study intersection. The study intersection serves an important role as a connection between the residential area and the adjacent highway network. The study intersection and surrounding land use are shown in **Figure 2**.

Figure 2. Surrounding Land Use – SR-53 and New Cut Road Study Intersection

Residential homes and forest areas fill each quadrant of the minor approach, stop-controlled intersection. The immediate surrounding area is primarily single family residential and forest/agriculture areas. A commercial strip mall is located on the southeast side of the intersection. **Figure 3** shows a satellite view of the study intersection.

Figure 3. Satellite View of SR-53 and New Cut Road Intersection

EXISTING CONDITIONS/FIELD VISIT

A variety of traffic engineering data specific to the study intersection were collected, including historical traffic volume and crash data. Additionally, a site visit was conducted on July 12th, 2017, to collect site condition data as well as observe the study location in operation. Satellite imagery of the minor route-stop controlled study intersection is shown in **Figure 3**.

The northbound SR-53 approach includes one left-turn/through lane and one right-turn lane, which are uncontrolled. The southbound SR-53 approach presents one left/through/right-turn lane, which is also uncontrolled. The westbound New Cut Road approach includes a left/through/right-turn lane. The eastbound Ednaville Road approach includes a left/through/right-lane . The westbound and eastbound approaches are stop controlled. Although there is lighting coming from the commercial area in the southeast quadrant, the intersection is still not lit well at night.

Historical Traffic Volumes

Annual average daily traffic (AADT) counts from the online GDOT database were collected specific to SR-53 from 2012 to 2016. These data are collected from a GDOT count station located approximately 500 feet north of the study intersection. It should be noted that historical traffic volumes specific to New Cut Road/Ednaville Road are not available within the GDOT database. The historical traffic volume data are summarized in **Table 1**.

Table 1. Summary of Historical Traffic Volume Data for SR-53 from GDOT Traffic Count Database

Year	AADT	Percent Change from 2016	Truck AADT	Percent Trucks
2012	7,980	-11.14%	847	10.61
2013	8,520	-5.12%	937	11.00
2014	8,520	-5.12%	937	11.00
2015	8,720	-2.90%	959	10.99
2016	8,980	-	987	10.99
Average	**8,544**	-	**933**	**10.92**

While the data presented in Table 1 suggest that volumes have been increasing along SR-53 in recent years, it is worth noting that pre-recession traffic volumes averaged approximately 6,500 vehicles per day (vpd) in the year 2000. Truck volumes averaged approximately 935 heavy vpd during the most recent five-year period, representing just around five percent of all traffic along the major route. To supplement the GDOT count data, the Atkins team performed 12-hour turning movement counts and 24-hour classification counts at the study location in May 2017. A summary of the morning (AM) and evening (PM) peak hour periods as well as the total 24-hour count is provided in **Table 2**.

Table 2. Total Entering Volumes at SR-53 and New Cut Road/Ednaville Road Intersection – May 2017

	Major Route (SR-53)			Minor Route (Ednaville Road/New Cut Road)			Entering Intersection
Time Period	NB	SB	Total	EB	WB	Total	Total
AM Peak Hour (7:00 to 8:00)	547	367	914	35	268	303	1,217
PM Peak Hour (5:00 to 6:00)	490	564	1,054	88	166	254	1,304
Total 24 Hours	**6,374**	**5,314**	**11,688**	**903**	**2,593**	**3,496**	**15,184**

The AM peak hour occurs between 7:00 and 8:00 a.m. with a total approach volume of 1,217 vehicles per hour (vph). The PM peak hour occurs between 5:00 and 6:00 p.m. with a higher total approach volume of 1,304 vph. Overall, SR-53 served 11,688 vehicles during the 24-hour classification count, approximately 30 percent greater than the 8,980 vpd estimated from the prior GDOT counts. **Figure 4** summarizes the 24-hour classification count by time of day for each approach of the study intersection.

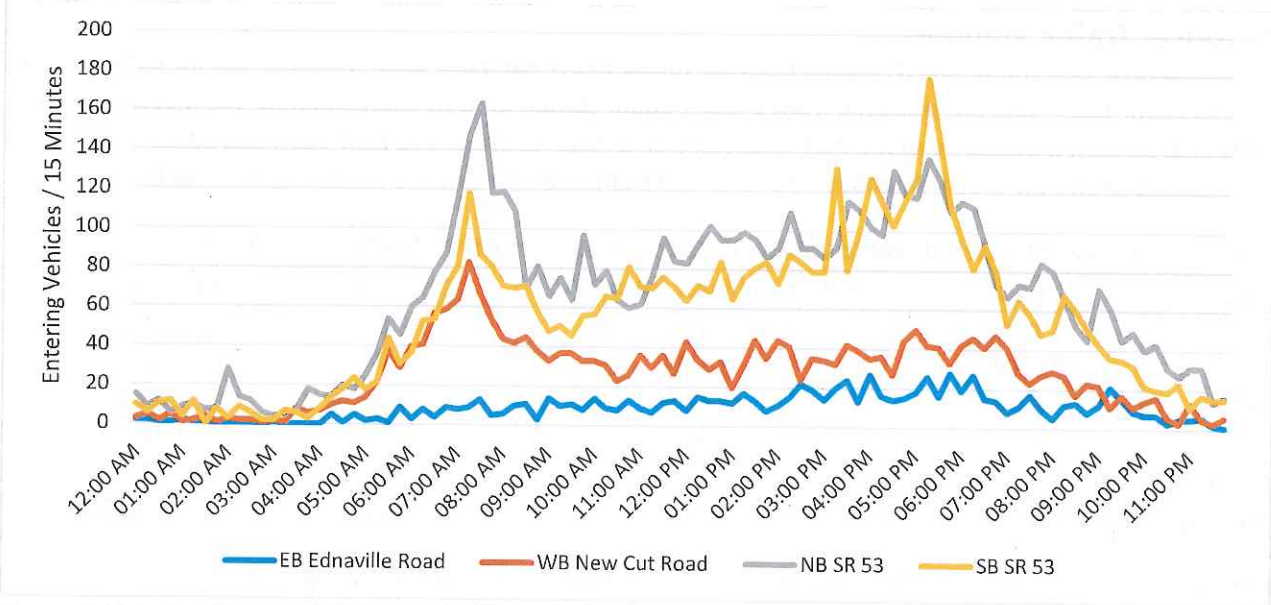

Figure 4. Entering Approach Volumes by Time of Day from 24-Hour Classification Count (May 2017)

Southbound PM peak volumes along SR-53 represent the highest flow rates, presumably related to commuter traffic. This can be assumed due to northbound traffic having the highest peak flow rate during the AM peak period. Additionally, flow rates remain consistent along each direction throughout the afternoon.

Existing Traffic Control

Westbound New Cut Road and eastbound Ednaville Road are controlled by a stop sign on each road, shown in **Figure 3**. Both northbound and southbound SR-53 are uncontrolled. The northbound approach is a single left-turn/through lane and a right-turn lane with a storage length of about 300 feet.

Adjacent Signalized Intersections

There are two adjacent signalized intersections along SR-53, one north and one south of the study location. A signalized intersection is located about five miles north of New Cut Road at SR 211/Old Winder Highway, which will have no impact on the intersection. There is also a signalized intersection over 3,600 feet south of the study area at SR 53/Braselton Parkway.

Vehicular Speeds

The posted speed limit along SR-53 is 55 miles per hour (MPH). New Cut Road and Ednaville Road are local streets posted at 55 MPH.

Other Modes of Transportation Present

There are no transit stops within proximity to the study intersection. Additionally, historical traffic count data from GDOT suggest trucks accounted for approximately 11.0 percent of the total vehicular traffic along SR-53 during the last five years.

Pedestrian Movements

No crosswalks are provided on any of the approaches at the study intersection. There are no sidewalks in the area. No pedestrians were observed during the 12-hour turning movement count. For the bicycle movements, there were no bicyclists observed during the 12-hour turning movement count.

Parking

No on-street parking is included adjacent to the study intersection.

CRASH HISTORY

Historical traffic crash data from the most recent five-year period (2012-2016) were collected from the Georgia Electronic Accident Reporting System to perform a comprehensive safety analysis of the study location. A summary of the historical traffic crash data, including both fatal and injury (FI) and property damage only (PDO) crashes, specific to the SR-53 and New Cut Road intersection is shown in **Table 3**. Entering traffic volumes were estimated based upon the GDOT count data and the classification counts collected by the Atkins team, adjusted each year during the five-year study period by the percentage change in traffic volumes on the mainline as noted in **Table 1**.

Table 3. Summary of Traffic Crash Data at SR-53 and New Cut Road (2012-2016)

	Entering Volumes			Traffic Crashes			Traffic Crash Rate*		
Year	Major	Minor	Total	FI	PDO	TOTAL	FI	PDO	TOTAL
2012	7,980	3,110	11,090	2	8	10	0.49	1.98	2.47
2013	8,520	3,320	11,840	3	8	11	0.69	1.85	2.54
2014	8,520	3,320	11,840	4	6	10	0.93	1.39	2.32
2015	8,720	3,400	12,120	5	11	16	1.13	2.49	3.62
2016	8,980	3,500	12,480	5	8	13	1.10	1.76	2.86
All Years	**8,544**	**3,330**	**11,870**	**19**	**41**	**60**	**0.88**	**1.89**	**2.77**

**Traffic crashes per one million entering vehicles*

Sixty traffic crashes occurred at the study intersection during the last five years, including 19 FI crashes that resulted in zero fatalities and eight severe injuries. There was only one crash involving a bicycle and no pedestrian-involved crashes at the study location during the five-year study period. The location of traffic crashes occurring at SR-53 and New Cut Road is shown in **Figure 5**.

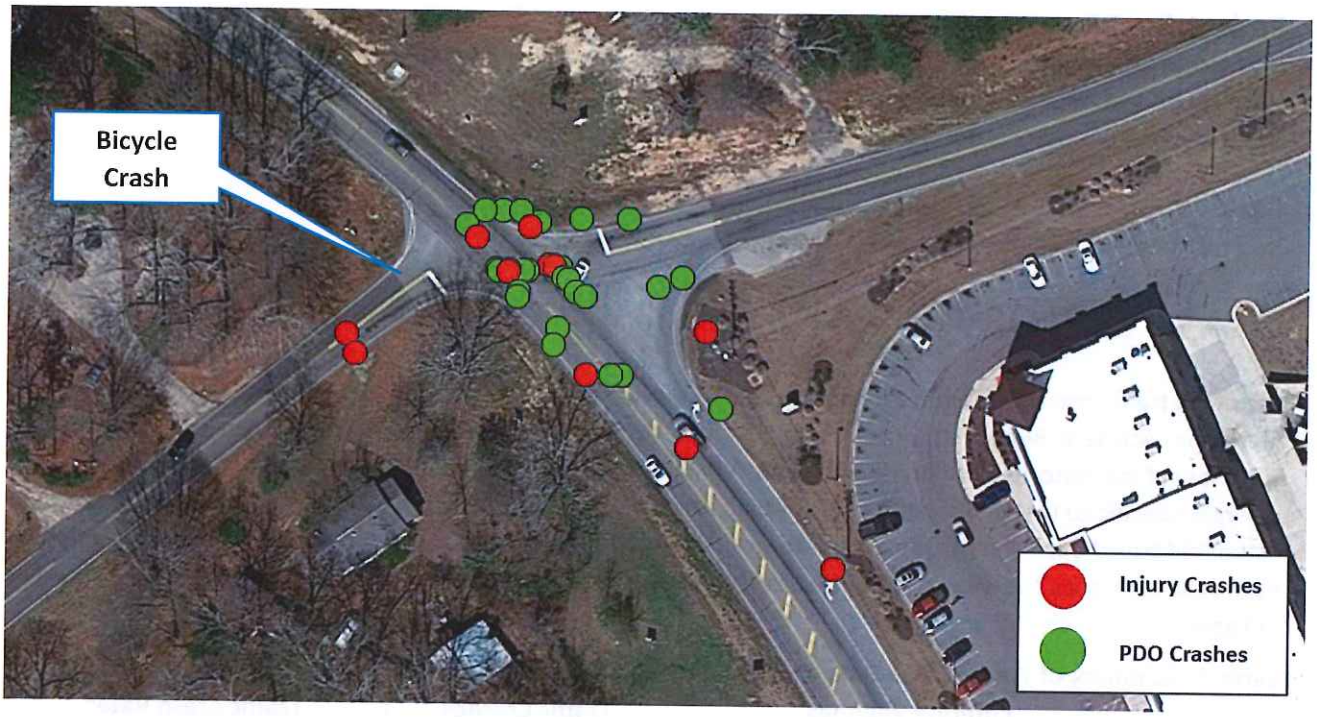

Figure 5. Location of Traffic Crashes, SR-53 and New Cut Road (2012-2016)

As shown in **Figure 6**, angle (39 percent), rear end (32 percent) and single vehicle (24 percent), represent the most frequent collision types occurring at the intersection. In comparison with other similar intersections from GDOT Districts 1, 2, and 5, single vehicle crashes are overrepresented by approximately 10.6 percent, meaning they occur at a greater percentage when compared to a peer group of similar intersections. Similarly, rear end crashes were also overrepresented by approximately 6.2 percent when compared to this peer group. Treatments selected for this location should specifically consider these crash types. Of the 19 injury crashes occurring at this intersection, 18 attributed either angle (8), rear end (7), or single vehicle (3) as their manner of collision.

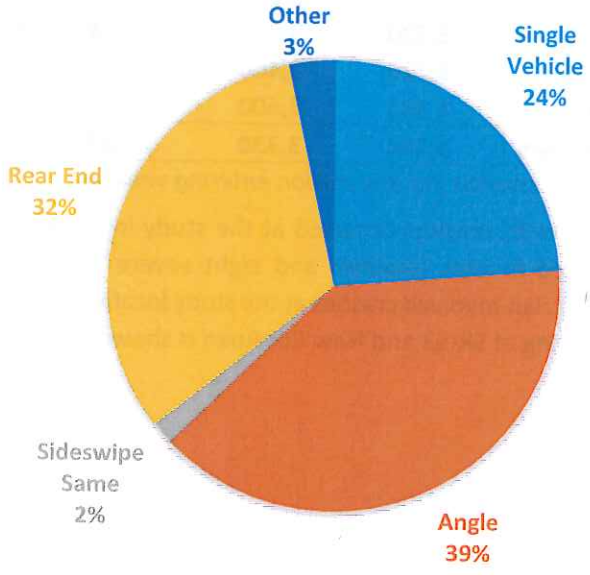

Figure 6. Distribution of Crash Types

SAFETY ISSUES

Specific safety issues were identified at this intersection based upon the analysis of historical crash data and a field review. The overall goal involves identifying appropriate safety countermeasures and recommendations for improving safety, mobility, and connectivity.

The Safety Risk Matrix provided in **Appendix C** was applied to quantify the apparent safety risk of each issue. This framework is included within the Federal Highway Administration (FHWA) Road Safety Audit (RSA) Guidelines. The expected frequency and severity of crashes caused by each safety issue have been identified and rated according to categories shown in the Safety Risk Matrix. The expected crash frequency is taken from the Highway Safety Manual (HSM) analysis. These two risk elements were then combined to obtain a risk assessment. Consequently, each safety issue is assessed on the basis of a ranking between F (highest risk and highest priority) and A (lowest risk and lowest priority). For each safety issue identified, possible mitigation measures have also been suggested. More details on the methodology are provided in **Appendix C.**

Safety Issue 1: Restricted Intersection Sight Distance

As shown in **Figure 7**, drivers turning from Ednaville Road are presented with obstructed intersection sight distance (ISD). The field measured distances of 594' and 425' are less than the required distances of 610' and 530' as mentioned in AASHTO Green book for roads with a speed limit of 55 mph. This restricted ISD limits visibility for drivers looking up for a gap in cross traffic. This restricted ISD is partly due to the presence of curvature on SR-53 south of the intersection, but is also compounded by the vegetation interfering with driver vision in the area. Thus, drivers have less time to make decisions due to opposing vehicles traveling at high rates of speed within a more limited sight distance window. This issue is apparent in the crash data as well, where over 50 percent of angle crashes cited involved vehicles turning left.

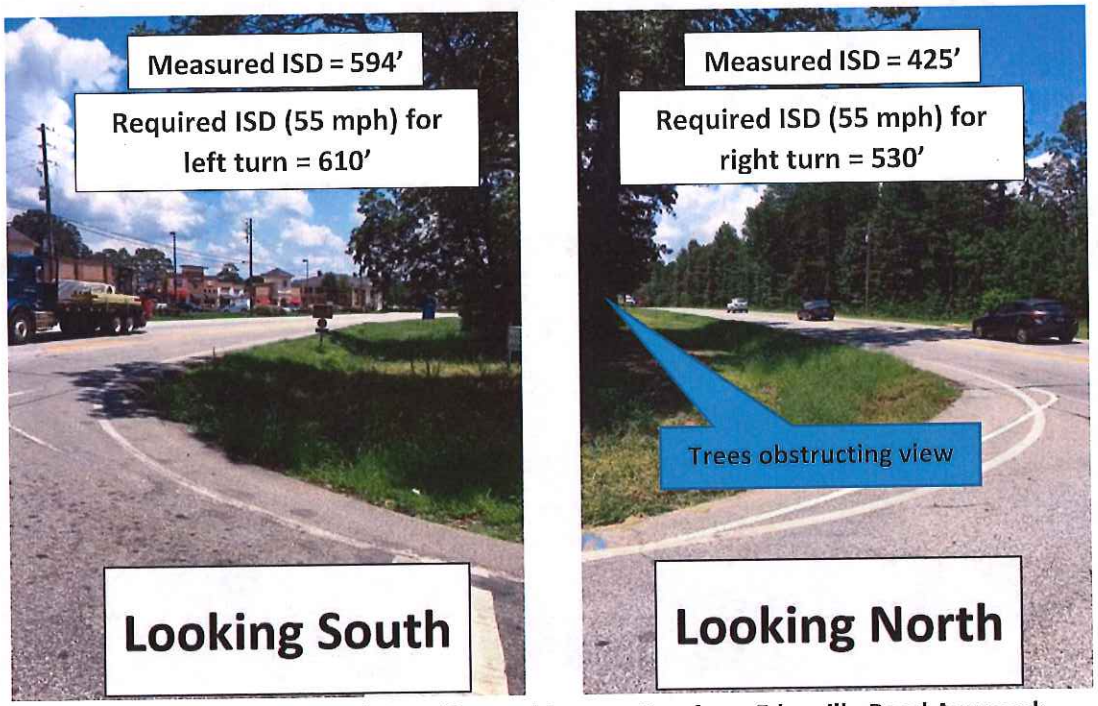

Figure 7. Views of SR-53 and New Cut/Ednaville Road Intersection from Ednaville Road Approach

Expected Crash Types: Angle
Expected Frequency: Occassional
Expected Severity: High
Risk: D

Safety Issue 2: Vehicles Stopped in the Through Lanes of SR-53

Drivers turning left from SR-53 must slow down or stop within the main travel lane increasing the risk for rear end crashes. These crashes are caused by vehicles approaching at high speeds that do not expect a stopped vehicle in the through lane of a state route. This issue is made worse by the horizontal curve present on the SR-53 approaches. Further illustrating this point, negotiating a curve was cited as a vehicle maneuver in nearly half of the 19 rear end crashes at this intersection. In addition, inattentiveness, following too close, and failure to yield were contributing factors in nearly 42 percent of all crashes recorded during the 5-year analysis period.

Figure 8. Driver's View of NB SR-53 while making Left to WB Ednaville Road

Figure 9. Driver's View of SB SR-53 while making Left to EB New Cut Road

Expected Crash Types: Angle, or other crashes related to left-turning vehicles
Expected Frequency: Occasional
Expected Severity: High
Risk: D

Safety Issue 3: Lack of Non-Motorized Facilities

Even though pedestrian and bicyclist counts were minimal, the bicycle crash that occurred on this roadway in 2015 is an indicator of usage by non-motorized users. Accidents involving collision of a bicyclist or pedestrian with a vehicle, given the relatively high posted speeds for this area, would be expected to involve an incapacitating injury or probable fatality.

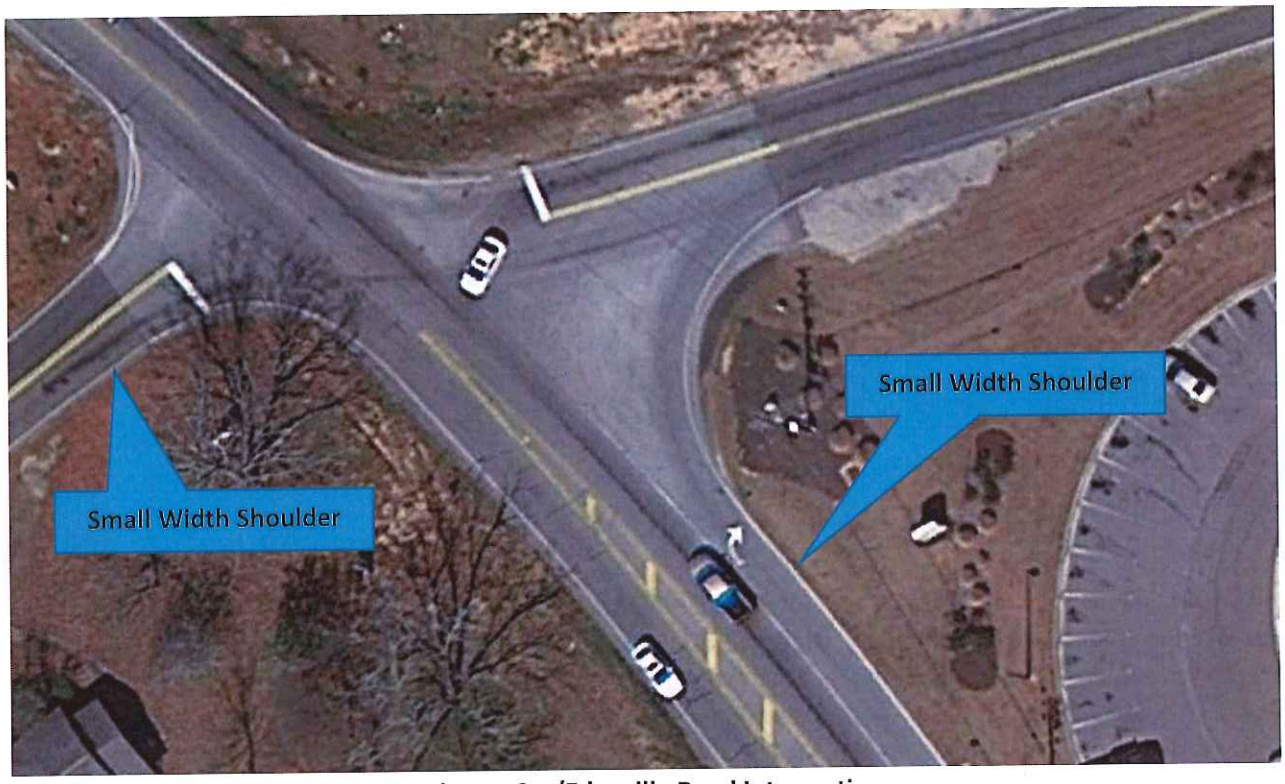

Figure 10. Satellite View of SR-53 and New Cut/Ednaville Road Intersection

Expected Crash Types: Bicycle, Pedestrian
Expected Frequency: Rare
Expected Severity: Extreme
Risk: C

OPERATIONAL ANALYSIS

Planning Level Capacity Analysis

Background for a planning level capacity analysis procedure is provided in **Appendix D.** The acceptable AADT for a two-lane road using this methodology is 13,300. Observed AADTs on SR-53 in this location were 10,900 vpd north of New Cut Road and 13,200 vpd south of the same roadway. Observed AADTs on New Cut Road and Endaville Road were 4,600 vpd, and 1,900 vpd, respectively. Therefore, available capacity may be an issue at this location.

Delay

An existing capacity analysis for the project location was conducted using the traffic operations software Synchro, version 10 and the 2010 Highway Capacity Manual (HCM). AM, mid-day, and PM peak hour periods were estimated from the traffic counts collected by the Atkins team. It should be noted that for the purposes of this analysis, it was assumed that a level of service (LOS) D or better will be considered adequate (or acceptable). LOS worse than D would indicate that an intersection or approach is nearing unacceptable levels of operation and would be unable to accommodate substantial increases in traffic without significant increases in congestion and delay. **Table 4** summarizes results from the Synchro model.

Table 4. Existing Synchro Model Results – SR-53 and New Cut Road/Ednaville Road Intersection

Peak Period	Overall (Delay/LOS)	V/C Ratio	EB		WB		NB		SB		ICU (%/LOS)
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	
AM	41.4/E	1.27	17.8	C	196.1	F	0.3	A	0.2	A	60/B
Mid-day	7.7/A	0.61	16.3	C	32.5	D	0.7	A	0.6	A	56/B
PM	27.7/D	1.24	38.9	E	227.2	F	0.7	A	1.0	A	77/D

The major approaches along SR-53 operate at LOS A for AM, midday, and PM peak periods at the study intersection. The New Cut Road minor street westbound approach experiences excessive delay during the AM and PM peak periods with unacceptable LOS. The AM and PM peak experiences LOS F while the PM peak for Endaville Road presents an LOS E. For the westbound New Cut Road approach, the traffic along SR-53 during the peak periods could be remaining too high for vehicles to find acceptable gaps. The overall LOS for the intersection is unacceptable with an LOS E for the AM peak period.

Traffic Signal Warrant Analysis

The Atkins team evaluated traffic signal warrants based upon the FHWA's Manual on Uniform Traffic Control Devices (MUTCD) to determine if a traffic signal may improve safety and/or operations at this location. Traffic signal warrants #1 (eight-hour vehicular volume) and #2 (four-hour vehicular volume) were evaluated using traffic counts collected as part of this study. Traffic volumes were projected to the future 2020 build year based upon the annual 1.5 percent growth rate developed using local data. Since the MUTCD suggests the peak hour signal warrant #3 should only be used in special circumstances, warrant #3 was not evaluated. Furthermore, the subject intersection was analyzed using one lane for each approach and the 100-percent basic minimum hourly volumes were applied. It should also be noted that right-turning movement reductions were applied per the National Cooperative Highway Research Program (NCHRP) 457 and full details can be found in **Appendix F.**

Table 5 provides a summary of the traffic signal warrant evaluation. Full details of the signal warrant evaluations can be found in **Appendix G**.

Table 5. Summary of Traffic Signal Warrant Evaluations

Intersection	Warrant 1	Warrant 2	Warrant 3	Warrant 4	Warrant 5	Warrant 6	Warrant 7	Warrant 8
SR-53 at New Cut Road/Ednaville Road	No	No	N/A	N/A	N/A	N/A	No	N/A

Given the counts collected by the Atkins team and projected to the future 2020 build year, this location does not meet traffic signal warrants #1 or #2 and the implementation of a traffic signal will not be recommended as a potential treatment at this location. It should be noted that this location may meet signal warrants prior to the 2040 design year and should be monitored for operational performance if treatments are not applied.

ANALYSIS OF ALTERNATIVES AND COUNTERMEASURES

Given the traffic and safety data outlined in the preceding subsections, the Atkins team identified several potential design alternatives and countermeasures to improve both safety and operations at the study location. These potential design alternatives and countermeasures were ultimately evaluated for further implementation.

Intersection Control Evaluation

The Atkins team performed a formal intersection control evaluation (ICE), which is included in **Appendix I**. The alternatives evaluated within ICE correspond to the selected safety alternatives and recommendations that were analyzed as a part of this study.

Safety Impact of Alternatives and Countermeasures

Table 6 summarizes the alternatives and countermeasures selected for further consideration, along with a crash modification factor (CMF) identified from the HSM or FHWA *CMF Clearinghouse*. While many safety countermeasures are suggested, only those treatments with known safety performance impacts are analyzed.

Table 6: Potential Alternatives and Countermeasures – Crash Modification Factors

	Countermeasure	CMF (FI Crashes)	CMF (PDO Crashes)	Safety Issue Addressed
1	Add Flasher Assembly to Intersection Ahead Signs on SR-53	0.67	0.67	1, 2
2	Install Exclusive Left Turn Lanes on SR-53	0.53	0.53	2
3	Convert Intersection to Modern Roundabout	0.22	0.22	1, 2, 3
4	Provide Americans with Disabilities Act (ADA)-Compliant Non-Motorized Facilities	N/A	N/A	3

The installation of a flasher assembly to the W2-1 intersection ahead signs on both approaches of SR-53 leading up to New Cut/Ednaville Road would help to address safety issues #1 and #2 identified for this intersection. More specifically, this traffic control device would provide additional warning to drivers of the upcoming intersection, helping to reduce possible conflicts related to left-turning, and slowed or stopped vehicles at the intersection. Moreover, it would also actively alert drivers approaching the intersection, increasing its conspicuity and making them more aware of potentially conflicting traffic by drivers turning from the minor approaches. Further addressing this issue, the installation of exclusive left turn lanes on SR-53 would completely remove left-turning vehicles from the main traffic stream, addressing safety issue #2. However, this would require additional right-of-way to install a turning lane as evaluated and is subject to further evaluation for feasibility of construction.

Finally, converting from a conventional minor-stop controlled intersection to a modern roundabout was also considered for both operational and safety improvements. While the CMF included in the HSM suggests a significant reduction in crashes, it is important to note the high-speed nature of SR-53 may result in crash outcomes that vary from the results of prior research. **Table 7** summarizes the annual safety performance impact of the proposed countermeasures.

Table 7: Annual Safety Impact of Proposed Alternatives Countermeasures

Safety Countermeasure Combination	Combined CMFs		Expected Crashes Without Treatment		Expected Crashes With Treatment		Annual Reduction in Traffic Crashes	
	FI	PDO	FI	PDO	FI	PDO	FI	PDO
Flasher Assembly Only	0.67	0.67	1.75	5.45	1.17	3.65	33%	33%
Exclusive Left Turn Lanes and Flasher Assembly	0.36	0.36	1.75	5.45	0.93	2.89	47%	47%
Roundabout	0.22	0.22	1.75	5.45	0.39	1.20	78%	78%

Consistent with the CMFs presented in **Table 7**, all of the safety treatments evaluated are expected to result in significant crash reductions at the study intersection. The impacts of several treatment combinations are shown in **Figure 12**.

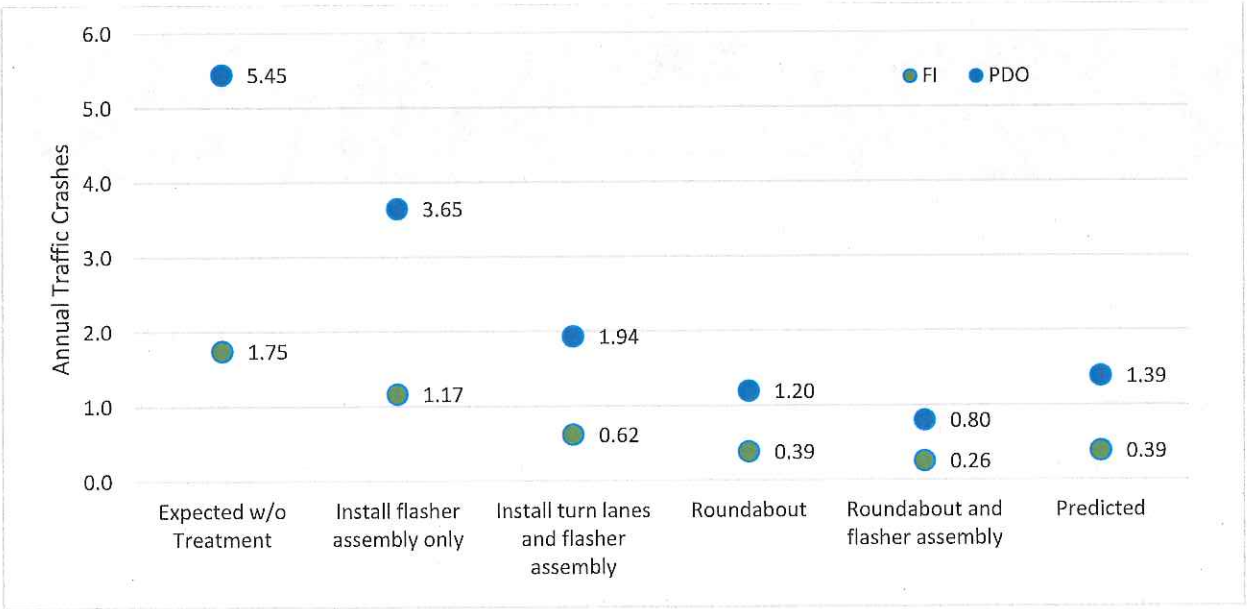

Figure 12. Safety Impact of Various Treatment Scenarios – SR-53 at New Cut/Ednaville Road Intersection

While **Figure 12** demonstrates expected annual FI and PDO crash frequencies that are less than the predicted values of 0.39 FI crashes and 1.39 PDO crashes for some of the treatments, use caution when interpreting the results since these treatments are subject to diminishing returns when combined with each other. However, implementation of any of the treatment scenarios shown in **Figure 12** represent a significant improvement over the existing condition with respect to safety performance.

Operational Impact of Alternatives and Countermeasures

Despite the noted potential crash reductions, design alternatives that impact traffic operations should be further evaluated to ensure unreasonable delays will not be incurred. This is specifically important in the context of this study. The single lane roundabout and the addition of left-turn lanes alternatives provide a significant estimated safety benefit and additional information is required to determine the best option. Each alternative (no build and additional left-turn lanes intersections) was modeled in Synchro to determine the operational impact, including both the AM and PM peak periods. The roundabouts were analyzed with the GDOT Roundabout Analysis Tool. Several traffic scenarios, including the estimated 2020 and 2040 traffic volumes, were evaluated based upon a 1.5 percent annual growth rate developed using local data. Synchro results for each alternative modeled using 2020 traffic volumes are provided in **Table 8**.

Table 8. Summary of Synchro Model Results – 2020 Volumes

Intersection	Peak Period	Overall (Delay/LOS)	V/C Ratio	Ednaville Road Eastbound		New Cut Road Westbound		SR-53 Northbound		SR-53 Southbound		ICU (%/LOS)
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	
Existing - No Build	AM	57.3	1.45	19.0	C	272.3	F	0.3	A	0.2	A	62/B
	PM	40.9*	1.51	46.6	E	343.3	F	0.7	A	1.0	A	80/D
Left Turn Lanes on SR-53 (Unsignalized)	AM	56	1.44	18.9	C	265.9	F	0.3	A	0.2	A	53/A
	PM	35.5*	1.41	42.9	E	295.5	F	0.7	A	1.0	A	58/B
Left Turn Lanes on All Approaches (Unsignalized)	AM	28.6	1.18	17.7	C	133.6	F	0.3	A	0.2	A	49/A
	PM	20.5*	1.19	40.4	E	159.3	F	0.7	A	1.0	A	54/A

*Due to the extremely high delay on some approaches, it appears Synchro did not account for them in the overall delay/LOS

The model results developed using the estimated 2020 traffic volumes scenario experience acceptable LOS/delay for the traffic signal and roundabout alternatives. The westbound approach of the No Build and left-turn lane alternatives present an unacceptable LOS/delay during all peak periods. During the PM peak, the eastbound approach also illustrates unacceptable LOS. The roundabout and traffic signal alternatives demonstrate acceptable LOS at all approaches with the estimated 2020 traffic volumes. Model results for the projected 2040 traffic volumes scenarios are presented in **Table 9**.

Table 9. Summary of Synchro Model Results – 2040 Volumes

Intersection	Peak Period	Overall (Delay/LOS)	V/C Ratio	Ednaville Road Eastbound		New Cut Road Westbound		SR-53 Northbound		SR-53 Southbound		ICU (%/LOS)
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	
Existing - No Build	AM	288.0	3.89	40.4	F	1387.2	F	0.3	A	0.3	A	79/D
	PM	24.5*	1.57	405.5	F	~	~	0.8	A	1.1	A	101/G
Left Turn Lanes on SR-53 (Unsignalized)	AM	273.5	3.74	38.8	E	1317.3	F	0.3	A	0.3	A	67/C
	PM	18.1*	1.34	296.3	F	~	~	0.8	A	1.1	A	70/C
Left Turn Lanes on All Approaches (Unsignalized)	AM	170.1	3.24	30.5	D	817.3	F	0.3	A	0.3	A	62/B
	PM	15.1*	1.23	245.0	F	~	~	0.8	A	1.1	A	66/C

~Volume exceeds capacity and LOS/delay are too large to be defined

*Due to the extremely high delay on some approaches, it appears Synchro did not account for them in the overall delay/LOS

The results of the Synchro models, given the estimated 2040 traffic volumes, present unacceptable LOS for the No Build, and the left-turn lanes alternatives. For the westbound approach, during the PM peak period, the delay/LOS are too large to be defined through HCM 2010.

Roundabout Evaluation

In addition, the Atkins team evaluated the single lane roundabout using both the GDOT Roundabout Tool (version 4.1) and SIDRA (version 7.0). **Tables 10** and **11** provide the comparison in results between these two

tools using the forecasted 2020 and 2040 peak hour volumes respectively, with a single lane roundabout resulting in LOS of D or better in both analyses.

Table 10. Summary of GDOT Tool and SIDRA Results – 2020 Volumes

Approach	Measure of Effectiveness	Period Analyzed			
		AM		PM	
2020 Build Year (Single Lane)		GDOT	SIDRA	GDOT	SIDRA
Eastbound (Ednaville Rd)	V/C Ratio	0.1	0.1	0.1	0.2
	Approach Delay (sec/veh)	**6**	**6**	**7**	**8**
	Avg. Queue Length (lane feet)	7	12	12	23
	LOS	**A**	**A**	**A**	**A**
Westbound (New Cut Rd)	V/C Ratio	0.4	0.4	0.2	0.2
	Approach Delay (sec/veh)	**10**	**9**	**6**	**6**
	Avg. Queue Length (lane feet)	48	61	18	29
	LOS	**B**	**A**	**A**	**A**
Northbound (SR-53)	V/C Ratio	0.5	0.5	0.5	0.5
	Approach Delay (sec/veh)	**8**	**9**	**9**	**10**
	Avg. Queue Length (lane feet)	73	123	74	111
	LOS	**A**	**A**	**A**	**A**
Southbound (SR-53)	V/C Ratio	0.4	0.5	0.6	0.2
	Approach Delay (sec/veh)	**9**	**9**	**11**	**12**
	Avg Queue Length (lane feet)	58	88	110	155
	LOS	**A**	**A**	**B**	**B**
	Intersection Total:	**-**	**A**	**-**	**B**

Table 11. Summary of GDOT Tool and SIDRA Results –2040 Volumes

Approach	Measure of Effectiveness	Period Analyzed			
		AM		PM	
2040 Design Year (Single Lane)		GDOT	SIDRA	GDOT	SIDRA
Eastbound (Ednaville Rd)	V/C Ratio	0.1	0.1	0.3	0.3
	Approach Delay (sec/veh)	**8**	**8**	**12**	**15**
	Avg. Queue Length (lane feet)	12	22	25	59
	LOS	**A**	**A**	**B**	**C**
Westbound (New Cut Rd)	V/C Ratio	0.7	0.6	0.3	0.3
	Approach Delay (sec/veh)	**20**	**17**	**9**	**9**
	Avg. Queue Length (lane feet)	121	150	33	53
	LOS	**C**	**C**	**A**	**A**
Northbound (SR-53)	V/C Ratio	0.7	0.7	0.7	0.7
	Approach Delay (sec/veh)	**12**	**12**	**14**	**14**
	Avg. Queue Length (lane feet)	144	218	160	207
	LOS	**B**	**B**	**B**	**B**
Southbound (SR-53)	V/C Ratio	0.6	0.7	0.9	0.9
	Approach Delay (sec/veh)	**14**	**14**	**25**	**24**
	Avg. Queue Length (lane feet)	126	180	298	428
	LOS	**B**	**B**	**C**	**C**
	Intersection Total:	**-**	**B**	**-**	**C**

CONCLUSION

The prior sections of this report demonstrated that the proposed alternatives and countermeasures will operate at an acceptable level of delay, and are proven in prior research to improve traffic safety. A single lane roundabout with the addition of flasher assemblies to the existing intersection warning signs was selected as the preferred intersection alternative due to its ability to address all three safety issues and improve the intersection operationally. The single lane roundabout reduces the number of conflict points at the intersection and helps to address the history of angle crashes the intersection has experienced over the past five years. The installation of left turn lanes, although an improvement over the current intersection layout, does not help to address the sight distance issues that are present at the intersection. Therefore, GDOT should consider the recommended safety countermeasures and treatments presented in **Table 12** for further implementation.

Table 12: Suggested Safety Countermeasures and CMFs for SR-53 and New Cut Road Intersection

No.	Countermeasure	Approximate Implementation Timeline	Safety Issue Addressed
1	Add Flasher Assembly to Intersection Ahead Signs on SR-53	Short	1, 2
2	Convert Intersection to Modern Roundabout	Long	1, 2, 3