

Triangle Expressway

AND THE REAL PROPERTY OF THE PARTY OF THE PA

TENERTER

Roadway Operations Statistics Report

2019 Fourth Quarter October - December

Table of Contents

Table of Contents

Table of Contents	1
Introduction	
Purpose	3
Project	3
Traffic Statistics	6
Average Weekday Traffic (AWT)	6
Roadway Safety Statistics	
Roadway Operations Statistics	
Roadway Maintenance Statistics	
Assessment Schedule	
Assessment Results	

List of Figures

Figure 1: Triangle Expressway System Map	4
Figure 2: Triangle Expressway Interchange Map	7
Figure 3: Toll N.C. 147 at I-40 Interchange AWT	8
Figure 4: Toll N.C. 147 at Hopson Road	9
Figure 5: Toll N.C. 147 at Davis Drive	10
Figure 6: Toll N.C. 540 at N.C. 54 Interchange AWT	11
Figure 7: Toll N.C. 540 at Toll N.C. 147 Interchange AWT	12
Figure 8: Toll N.C. 540 at N.C. 55 Interchange AWT	13
Figure 9: Toll N.C. 540 at Green Level West Rd. Interchange AWT	14
Figure 10: Toll N.C. 540 at U.S. 64 Interchange AWT	15
Figure 11: Toll N.C. 540 at South Salem Street Interchange AWT	16
Figure 12: Toll N.C. 540 at U.S. 1 Interchange AWT	17
Figure 13: Toll N.C. 540 at Veridea Parkway Interchange AWT	18
Figure 14: Toll N.C. 540 at N.C. 55 Bypass Interchange AWT	19
Figure 15: 2019 IMAP Services by Type, YTD	26
Figure 16: Average IMAP Response & Clearance Times (Minutes), Fourth Quarter by Month	27

List of Tables

Table 1: Safety Statistics, December 1, 2016 – November 30, 2019	22
Table 2: 2019 SHP Chargeable Activities, YTD	25
Table 3: 2019 SHP Non-Chargeable Activities, YTD	25
Table 4: 2019 IMAP Services, YTD	26
Table 5: 2019 Average IMAP Response & Clearance Times (Minutes), YTD	27
Table 6: MRP Assessment Results	30

Introduction

Purpose

The North Carolina Turnpike Authority (NCTA) presents the operations statistics for the Triangle Expressway during the fourth quarter (October – December) of 2019. The report includes data related to traffic volumes, roadway operations, and maintenance. The statistics will allow for future analysis to identify quarterly and annual trends over time, providing a quantifiable method to track performance.

Project

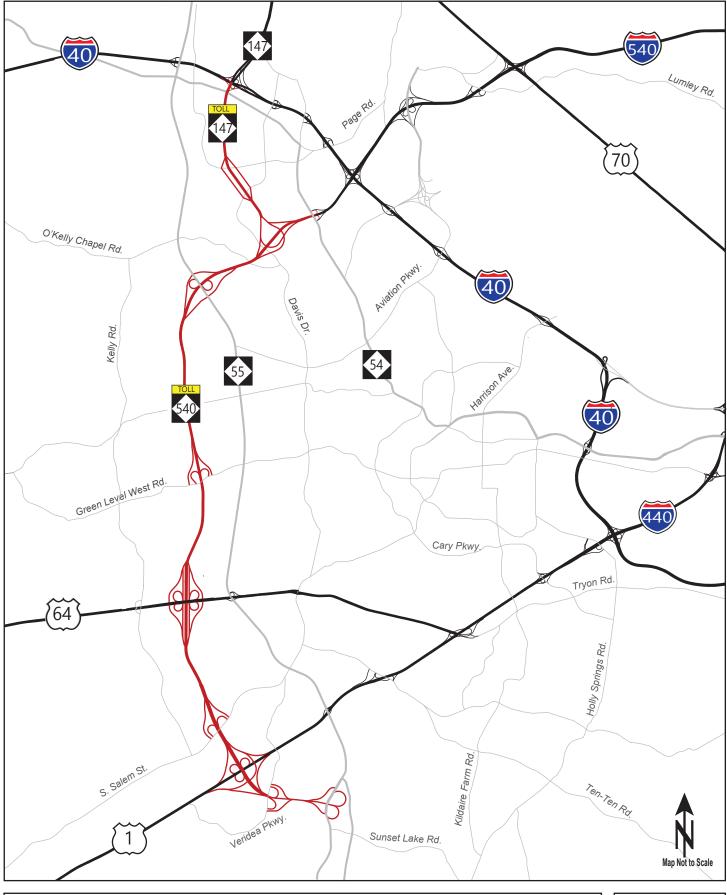
The Triangle Expressway is an 18.8-mile toll road that extends the partially completed "Outer Loop" around the greater Raleigh, North Carolina area from I-40 to N.C. 55 Bypass. The six-lane, controlledaccess toll facility relieves congestion on N.C. 55 while improving access to the Research Triangle Park by reducing travel times for commuters residing to the south and east. The Triangle Expressway is currently comprised of two sections: Toll N.C. 147 and Toll N.C. 540.

Toll N.C. 147 includes 3.4 miles of toll road between I-40 and Toll N.C. 540. This section of the Triangle Expressway includes interchanges at Hopson Road, Davis Drive, and Toll N.C. 540. It opened to toll-free traffic on December 8, 2011; tolling on this section began on January 3, 2012.

Toll N.C. 540 includes 15.4 miles of toll road between N.C. 54 in western Cary and the N.C. 55 Bypass near the Town of Holly Springs. The section from N.C. 54 to U.S. 64 opened to general traffic (toll-free) on August 1, 2012, and toll collection started on August 2, 2012. This section includes interchanges at N.C. 54, N.C. 55, Green Level West Road, and U.S. 64. The section from U.S. 64 to N.C. 55 Bypass opened to general traffic (toll-free) on December 20, 2012, and toll collection started on January 2, 2013. This section includes interchanges at S. Salem Street, U.S. 1, and N.C. 55 Bypass. On April 3, 2017, a new interchange at Veridea Parkway was opened in this last section of Toll N.C. 540.

The Triangle Expressway utilizes an all-electronic, non-stop tolling system where there are no toll plazas at which drivers stop and pay cash tolls. Instead, free-flow toll zones are employed where vehicles are detected while traveling at highway speeds. Payments are accepted through an Electronic Toll Collection (ETC) program called NC Quick Pass® or a video billing program called Bill by Mail.

NCTA toll zones are located along the Triangle Expressway at mainline, ramp, and loop locations. An illustration of the Triangle Expressway can be seen in *Figure 1*.



Triangle Expressway System Map

Traffic Statistics

Traffic Statistics

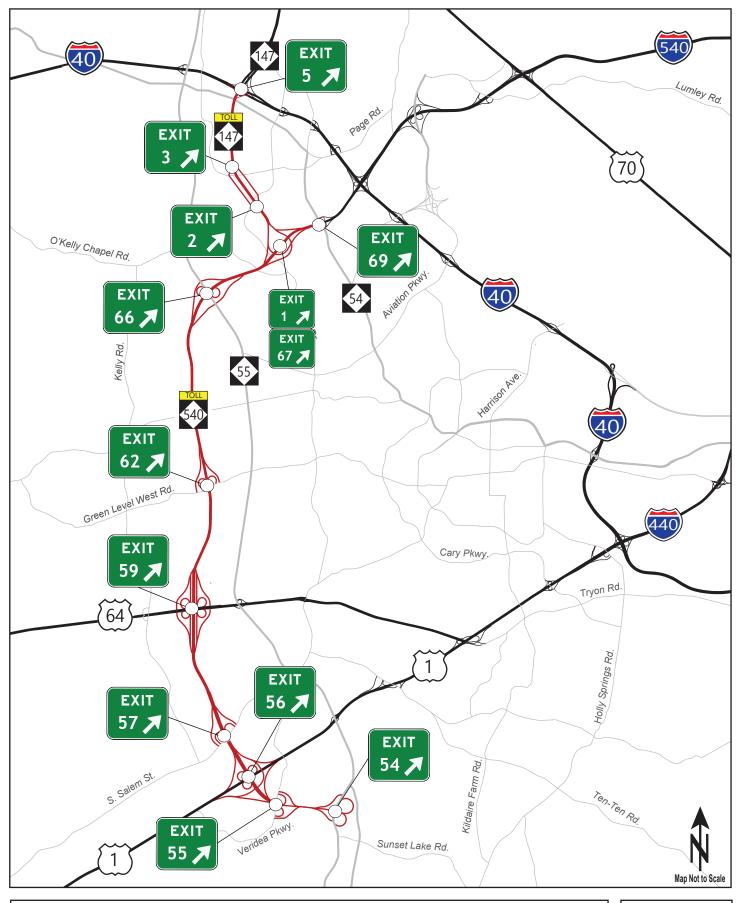
Current and historical traffic data is collected and stored using roadside microwave vehicle detectors (MVDs) installed throughout the Triangle Expressway, providing an overview of the roadway's current utilization. The data is analyzed to identify trends that could more accurately predict future utilization.

It should be noted that the Triangle Expressway is transitioning from a traffic pattern known as "ramp-up" to a stabilized pattern. During a ramp-up period, the traffic volumes on a new facility increase at a faster rate than typical growth on existing facilities. Traffic volumes increase significantly as the customers become more familiar with the facility. The Triangle Expressway is expected to reach a more stabilized pattern through 2020.

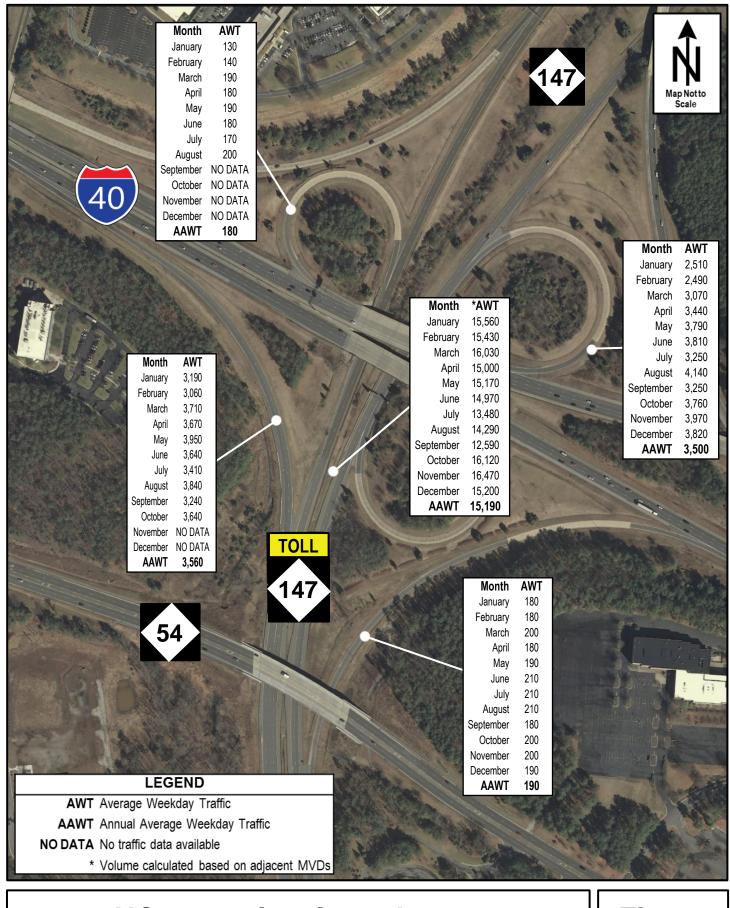
Average Weekday Traffic (AWT)

Traffic volume data is collected at all ramps and mainline segments between interchanges. The location of interchanges along the Triangle Expressway can be seen in *Figure 2*. Typically, there is a large difference between peak and off-peak volumes, as well as between weekday and weekend volumes. This gap becomes significantly larger for a tolled facility because it tends to have a much higher percentage of traffic on weekdays during peak hours than non-toll facilities, as there is less of a benefit for toll users during off-peak hours. For this reason, Average Weekday Traffic (AWT) is reported instead of Average Daily Traffic (ADT). AWT is a measure of the average daily traffic collected on a typical Monday through Friday over a designated time period.

Data collected by the MVDs is utilized to present AWT along the facility in *Figures 3* to *14*. It should be noted that if an MVD fails to provide reliable data (meeting the established threshold) for at least five days in a month then "NO DATA" is reported for that MVD. Reliability of MVD devices are monitored daily by comparing volumes with transaction counts and expected volumes. Maintenance tickets are submitted if MVD devices do not meet established thresholds.



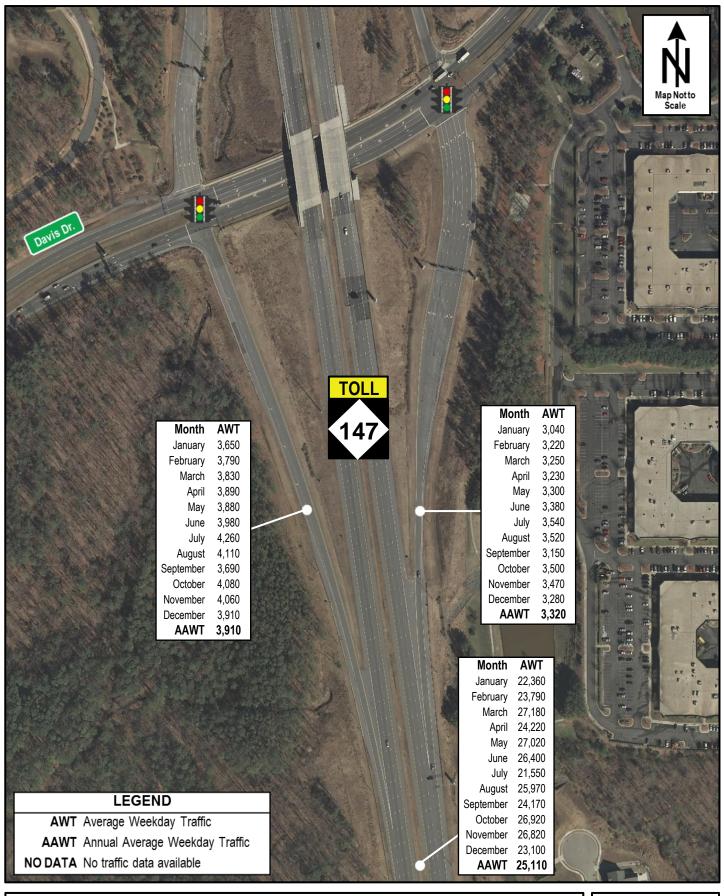
Triangle Expressway Interchange Map



NC-147 at I-40 Interchange 2019 Average Weekday Traffic

	Month AWT January 26,810 February 25,730 March 26,530 Mpril 26,120 May 29,620 June 25,850 July 22,220 August 24,630 September 22,700 October 25,410 November 27,730 December 26,200 AWT 26,313	Revenue of the second sec
Month AWT January 2,560 February 2,780 March 2,870 April 2,790 May 2,850 June 2,830 July 2,480 August 2,840 September 2,660 October 2,920 November 2,890 December 2,510 AAWT 2,770		Month AWT January 2,820 February 3,080 March 3,160 April 3,100 June 3,130 July 2,730 August 3,070 September 2,840 October 3,130 November 3,090 December 2,690 AAWT 3,020
LEGEND AWT Average Weekday Traffic AAWT Annual Average Weekday Traffic NO DATA No traffic data available		Hopson Rei

NC-147 at Hopson Rd. Interchange 2019 Average Weekday Traffic

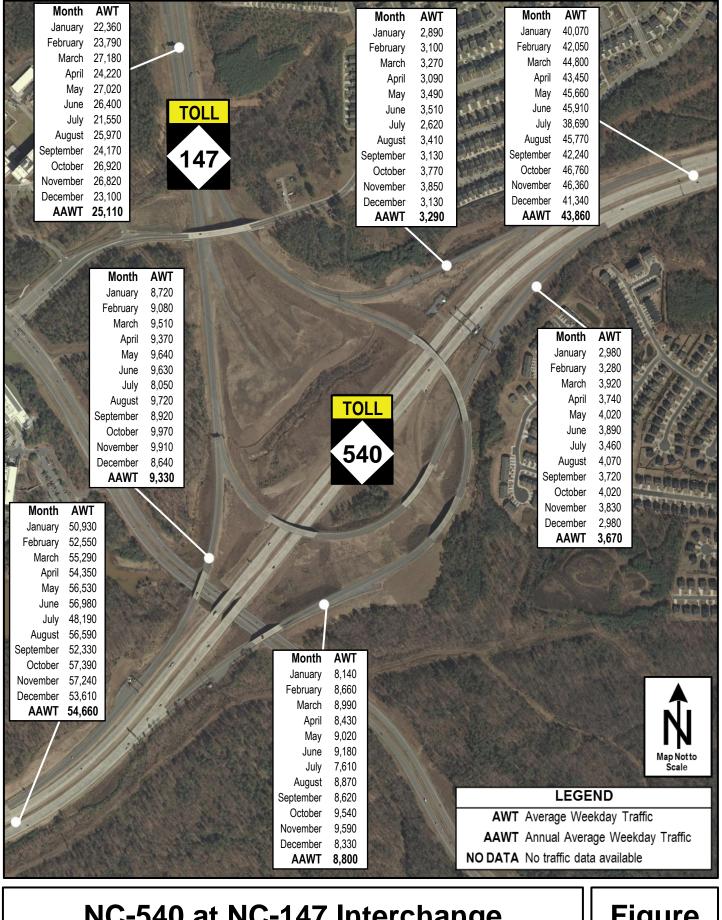


NC-147 at Davis Dr. Interchange 2019 Average Weekday Traffic



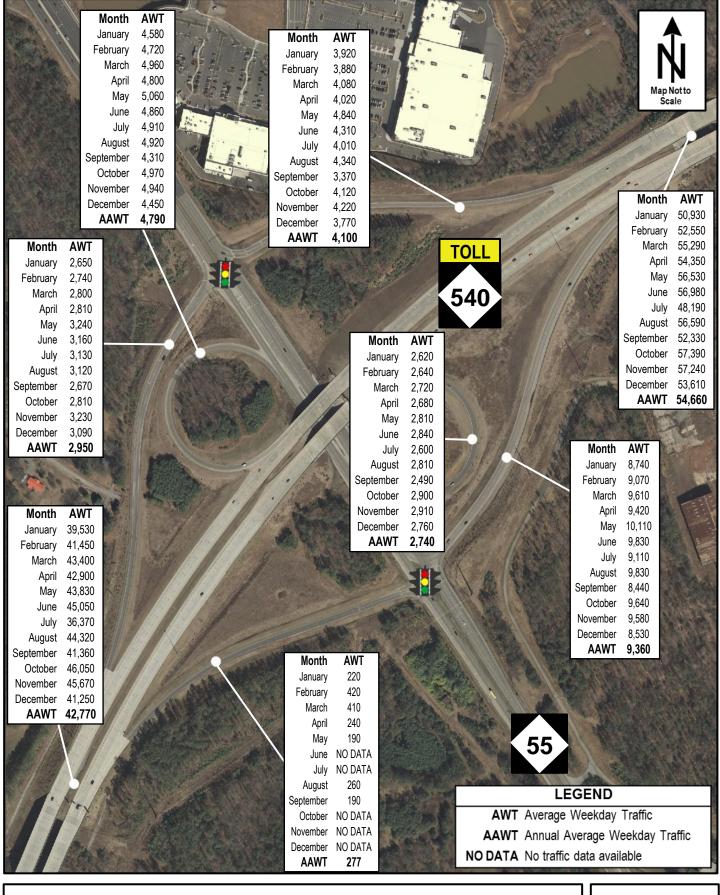
And the second s		1	A IL COM	AND MADE AND AND	-		LEG	END
	Month	AWT	Mont	AWT	A PAR	AWT A	verage We	ekday Traffic
of a still a start	January	3,700	Januar			AAWT A	nnual Aver	age Weekday Traffic
	February March	3,710 3,840	Februar Marc			NO DATA N		· · ·
LO CALLA	April	3,840 3,710	Apr			**		at the second
	Мау	3,870	Ma	The second se	1 The			
	June	3,950	Jun					
y //	July	4,120 3,930	Jul		there a	2		
	August September	3,330	Augus Septembe		Var and			Map Notto Scale
	October	3,930	Octobe			The second		Scale
	November	3,970	Novembe		1			
	December	3,770	Decembe					A A A A A A A A A A A A A A A A A A A
	AAWT	3,820	AAW	F 9,090				
	a superior	1.18			w h		, Aut	
54	N. Salar		and the second second			Alle Recently		E 40
								540
1 38 HILL Strand			- Contraction					200
M. 196 11. June		-						
					formation			////
				No management				XXX
	1 1			IN 200				ANDER
							1	
	1 Ling						1/1/00	
	North Ste						11.5	
		-			33		5	A A A A
		F /	100	1000	NTOP		18	
	OLL	+		C. MAR			~	
						Mor		N 70 5 - 1
5	40	James -	The second second			Janu Febru		
		N.			1	Ma	-	A. C. A. S. J.
		111	VIMA TATI				oril 9,590	A LAND
and the second second		1.1.1.1					ay 9,930	
Month AWT		1.100			111		ne 9,710	the lot of the
January 40,070			Masel	Month	AWT	Aug	uly 7,700 ust 9,300	1 100 V
February 42,050				January	3,070	Septem		
March 44,800 April 43,450		Carlos -		February	3,100	Octo	ber 10,430	
May 45,660			ANSING OF	March	3,200	Novem		
June 45,910				April May	3,200 3,270	Decem		The second second
July 38,690		F III		June	3,270	AAV	VT 9,820	Distance I A. 100
August 45,770		18		July	3,130		-	
September 42,240 October 46,760			1 8 1 1 1	August	3,290			
November 46,360				September	2,800		1 Aller	
December 41,340			1 424	October November	3,260 3,310		1 Linth	
AAWT 43,860	3 S S S			December	3,310	- T.	C. C.	
				AAWT	3,180	No. 19 19 19 19 19 19 19 19 19 19 19 19 19	A BLATLAND	
	E AN	A D		1-11.11.20				and i share
	The AVENT	ME REPAIR		STATE IN THE	A HOUSE AND	Carlos and States	TO FREE TO	ALL AN A REAL

NC-540 at NC-54 Interchange 2019 Average Weekday Traffic



NC-540 at NC-147 Interchange 2019 Average Weekday Traffic





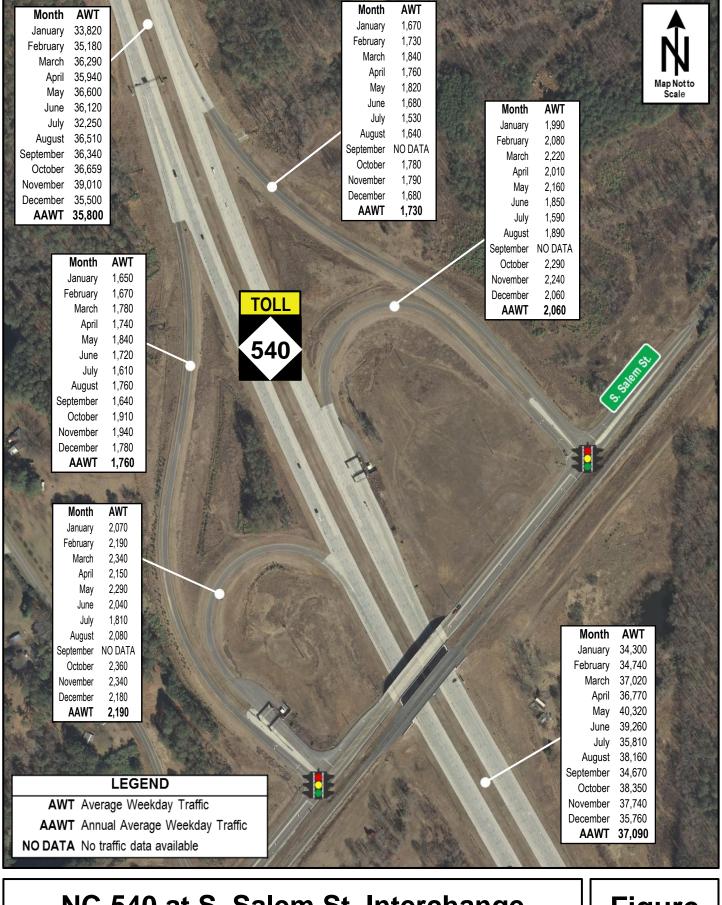
NC-540 at NC-55 Interchange 201 Average Weekday Traffic

	Month AWT January 39,530 February 41,450 March 43,400 April 42,900 May 43,830 June 45,050 July 36,370 August 44,320 September 41,360 October 46,050
Month AWT January 2,340 February 2,350 March 2,510 April 2,400 June 2,540 June 2,540 July 2,420 August 2,520 September 2,150 October 2,490 November 2,520 December 2,370 AAWT 2,440	November 45,670 December 41,250 AAWT 42,770 Month AWT January 2,000 February 2,060 March 2,190 April 2,110 May 2,420 June 2,240 July 2,090 August 2,240 September 1,970 October 2,300 November 2,140 AAWT 2,180
Month AWT January 2,000 February 2,070 March 2,300 April 2,210 May 2,360 July 2,060 August 2,280 September 2,100 October 2,350 November 2,320 December 2,060 AAWT 2,200	Month AWT January 1,910 February 2,000 March 2,430 April 2,220 May 2,390 June 2,230 July 2,080 August 2,100 September 1,820 October 2,180 November 2,100 December 1,890 AWT 2,130
LEGEND AWT Average Weekday Traffic AAWT Annual Average Weekday Traffic NO DATA No traffic data available	May 44,310 June 43,980 July 41,390 August 43,510 September 37,980 October 44,620 November 45,030 December 41,010 AAWT 42,500

NC-540 at Green Level West Rd. Interchange 2019 Average Weekday Traffic

LEGEND		-		Month	AWT		111	A SA	
AWT Average Weekday Traf	ffic			January	40,150	and the second sec			
AAWT Annual Average Weeko				February	40,860	Se alle		A_1	NI
NO DATA No traffic data available		mile /		March April	42,920 42,360	Ma	-4h A\A/T		
NO DATA No tranic data available		D.		Мау	44,310	Mo Janu			Map Not to
and and the second s	Manth	AVAIT	4	June	43,980	Febru	-	Real Property in	Scale
	Month January	AWT 3,430		July	41,390	the second se	rch 2,870		C K
2	February	3,430 3,500		August		and the second s	vpril 3,220		
	March	3,690		September	37,980	4 4	<i>M</i> ay 3,140	Month	AWT
	April	3,720		October November	44,620 45,030		une 2,860	January	100
Month AWT	May	3,790	TOLL	December	45,030		July 2,750	February	100
January 1,140	June	3,790	TOLL		42,500		just 2,890	March	
February 1,130	July	3,410				Septem Octo		Apri	1,650
March 1,200	August	3,750	540		10.00 A	Novem		May	100
April 1,160	September October	3,170 3,790				Decem		June	
May 1,220	November	3,790 3,840		1 1 2	P VIEW	AA		July	1000
June 1,180 July 1,070	December	3,650			A LANG	Les Mar	NE SE	August September	
August 1,220	AAWT	3,650				A.		October	
September 1,030						See.		November	
October 1,190					A.S.	1	- Acti	December	
November 1,220		1/18			1000	/		AAWT	1,540
December 1,180					1	74			AME
AAWT 1,170				and in	-			Month	AWT
Month AWT					1 7	N MASS		January February	3,170 3,170
January 3,080						· ····································		March	3,350
February 2,980				体图为的		WE THE STATE	NON P	April	3,350
March 3,080				all and a	1 de C		1	May	3,500
April 3,040		A CONTRACTOR						June	3,500
May 3,210 June 3,160					Contrast 1/1	100-100	all T	July	3,320
	-			Annex				August	3,410
64 July 2,900 August 3,130	Set D/						1	September October	3,020 3,510
September 2,700							MA A	November	3,510
October 3,200					1 /13	Mo		December	3,320
November 3,260					1/1	Janu	-	AAWT	3,350
December 3,070 AAWT 3,090	Month A	NT N	ma			Febru	-	A CARA	A I
AAWT 3,090		570		K C			rch 1,250 pril 1,190	E SALES	A GA E S
		580		Month	AWT		May 1,310		8 9 6 6
		730		January	33,820	All shares and the	une 1,150		a
		680		February	35,180		luly 1,060	and the form	Here a managered
		300		March	36,290	Aug		10.00	5/10
		800		April	35,940	Septem		the and	
		670 870		May	36,600	Octo Novem			
		510	Red I.L	June July	36,120 32,250	Decem		1. Car	
SALAS TRANS		800		August		AA			
	November 1,	880		September	36,340	- Allen	and Ch	191	a
E AN AN AN AN		700		October	36,659	et al al			T. A.
Kelly Rd.	AAWT 1,7	730		November	39,010	1	14 M	the second	1 10
	AND STAN				35,500	and a set		the states	C LOUPE
	A STATE	R. H		AAWT	30,800		16 (B.)		and the second

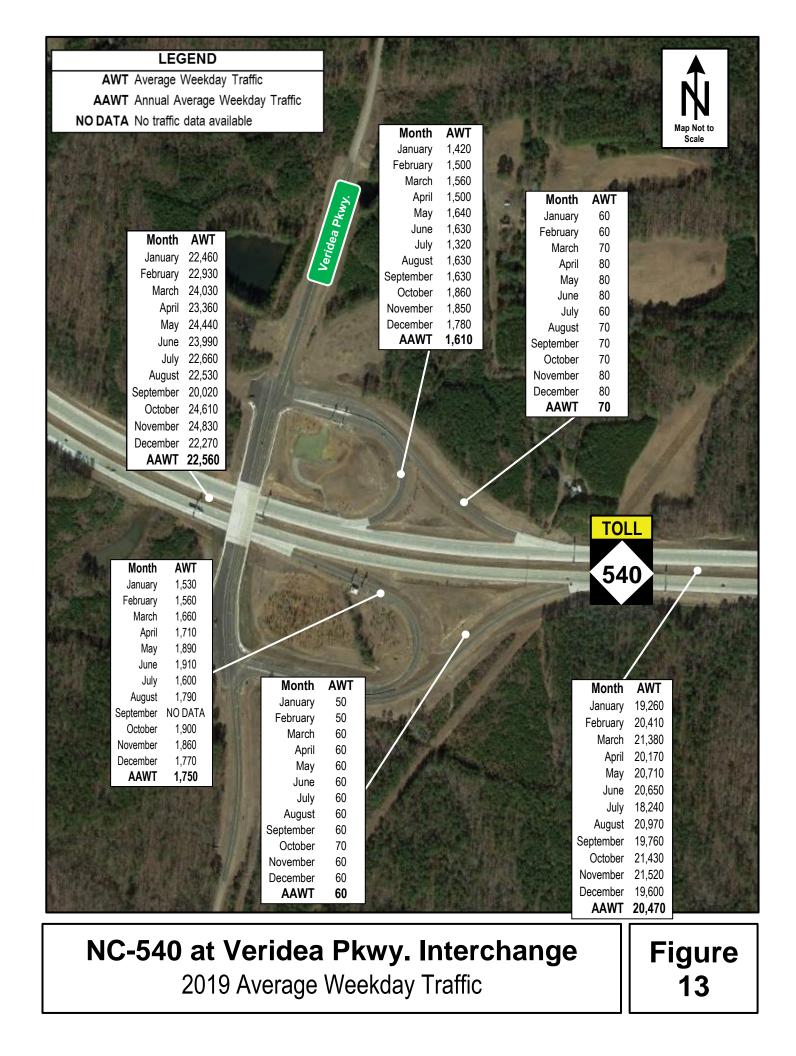
NC-540 at US-64 Interchange 2019 Average Weekday Traffic

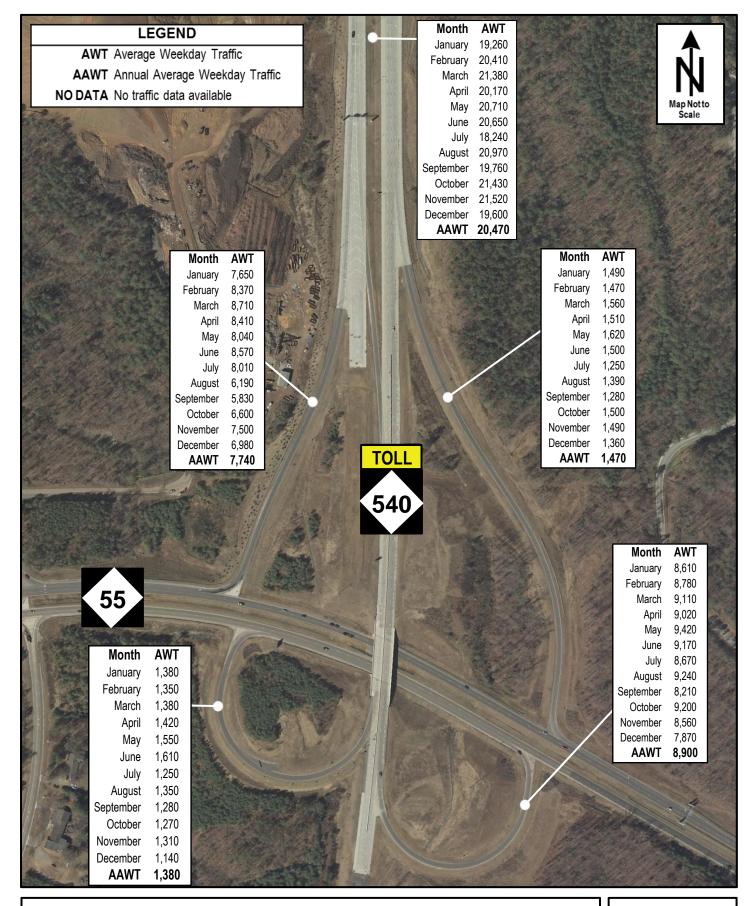


NC-540 at S. Salem St. Interchange 2019 Average Weekday Traffic

		Month	AWT	Month AW	T	
Month AWT		January	370	January 2,92	The second s	
January 34,300		February	380	February 3,10	Manager Street, or other street, and the street of the str	
February 34,740		Contraction of the Contract of the	420		a subscription of the subscription of the	A NI
March 37,020		March	420 400	March 3,11	The second se	
April 36,770		April		April 3,11	the second se	
May 40,320		May	430	May 3,40		Map Not to Scale
June 39,260	and a set of the second	June	410	June 3,23		Scale
July 35,810		July	380	July 2,94		
August 38,160		August	400	August 3,19		The arts of
September 34,670		September	350	September 2,89		
October 38,350	The second second	October	390	October 3,32		Nº 85 79 11/10
November 37,740	NHAL THE AND	November	400	November 3,30		ALANDAR AN
December 35,760	Month AWT	December	370	December 3,08		\sim
AAWT 37,090	January 3,380	AAWT	390	AAWT 3,19	90	
	February 3,270	A WELL BROOM			No.	
	March 3,480	TALL	112	A STREET STREET	A CONTRACTOR	
	April 3,600	TOLL		A State of the second s	N REA	1/ . And F
	May 3,640		1000			ATTA A
A Carlos	June 3,570			A B B B STON		Month AWT
	July 2,880	540		A BIENER		1000
AND AND AND	August 3,490	N. A.			11/2/6/16	January 750
CARD IN	September 3,150	ALL PARTIES		15 8 1/4		February 840 March 850
	October 4,100				and the second	
	November 3,990	and the second			2- //	April 820
	December 3,680		Carl .	1/1/200		May 890
A CALLER OF	AAWT 3,560	12 1 1 1	3/	11/100	A AND AND AND AND AND AND AND AND AND AN	June 870
			-	198		July 760
Month AWT			L.S.		Month AWT	August 860
January 530	Plank by				January 3,790	September 810
February 520	and a start of the				February 3,870	October 920
March 620		1/1 Abit	011		March 3,920	November 950
April 630		11 6 1 2 3	$[1/_{i}]_{i}$	ET SE	April 3,230	December 860
May 730		1 · · ·	3.1.1		May 3,850	AAWT 850
June 610			2		June 3,770	
July 550		-			July 3,740	
August 540	Month AWT		1 st		August 4,050	
September 560	January 3,683			S	September 3,570	Month AWT
October 630	February 3,723	AL A	Sent .		October 4,280	January 22,460
November 530	March 4,158		TO BE		November 4,350	February 22,930
December 550	April 3,540	And the State of State		A REAL PROPERTY AND A REAL PROPERTY.	December 3,960	March 24,030
AAWT 590	May 3,930	· ····································		The states and the	AAWT 3,870	April 23,360
1 A Balance	June 3,650		A14/T			May 24,440
The second second	July 3,280		AWT		ALL MARSE	June 23,990
ALA TOTAL	August 3,700	January	410			July 22,660
Service and	September 3,260	February	430		1 1 TO TO LA	August 22,530
and the second second	October 3,990	March	450			September 20,020
and the second second	November 3,870	April	430	A AN		October 24,610
	December 3,710	May	460		A WWW.	November 24,830
C.S. C. ALL AND	AAWT 3,700		450			December 22,270
		July	400		Sec. 1	AAWT 22,560
	LEGEND	August	450		State .	
		September	390			
AWT Avera	age Weekday Traffic	October	440			
AAWT Annu	al Average Weekday Traffic	November	450	A CONTRACTOR	The star	
	affic data available	December	420		South States	San 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		AAWT	430		A START	The P

NC-540 at US-1 Interchange 2019 Average Weekday Traffic





NC-540 at NC-55 Bypass Interchange 2019 Average Weekday Traffic

Roadway Safety Statistics

Roadway Safety Statistics

Vehicle crashes are often related to deficiencies in the safety and capacity characteristics of a transportation facility. To identify these deficiencies early, and therefore reduce the likelihood of crashes on the Triangle Expressway, NCTA monitors safety conditions on the facility through quarterly crash analyses. These analyses involve the use of the Traffic Engineering Accident Analysis System (TEAAS) to collect monthly crash data along the facility, separated into four (4) segments:

- Toll N.C. 147, from I-40 to Toll N.C. 540
- Toll N.C. 540, from I-40 to N.C. 55
- Toll N.C. 540, from N.C. 55 to U.S. 64
- Toll N.C. 540, from U.S. 64 to N.C. 55 Bypass

The data collected includes total crashes and the number of fatal and injury crashes reported along each segment. This data is analyzed over a rolling three-year period to determine the Total Crash Rate of each of the four segments selected, as well as for the entire facility. These crash rates can then be compared to the Critical Crash Rates.

Total Crash Rates are a function of the length of roadway, average daily traffic, and number of reported crashes along a route during a specific time frame. These rates are expressed in crashes per 100 million vehicle miles traveled (MVMT). In the crash analysis conducted during the fourth quarter, the Total Crash Rates of the four segments selected and the entire facility were calculated based on the roadway segment length, the average annual daily traffic (AADT) and the number of crashes recorded from December 1, 2016 to November 30, 2019 for each segment. The AADT used for this quarter analysis was collected from the NCDOT 2016 Wake County AADT Map. The Statewide Crash Rate (129.58 crashes per 100 MVMT) used for comparison purposes in this analysis was collected from the 2015-2017 NCDOT Statewide Total Crash Rates for urban interstate facilities, as the Triangle Expressway operates more like an interstate than a state route.

Critical Crash Rates are crash rates that have been statistically adjusted with a 95% level of confidence to remove the elements of chance and randomness. They are used as a reference to determine if the Total Crash Rate at a given location is significantly higher than a predetermined average rate for locations with similar characteristics.

Table 1 provides a summary of the crash data collected and the results of the fourth quarter analysis.

Segment	Length	AADT ¹	Total Crashes	Vehicle Exposure (MVMT)	Total Crash Rate	Statewide Crash Rate ²	Critical Crash Rate
Toll N.C. 147 I-40 to Toll N.C. 540	3.1	15,400	53	52.38	101.18	129.58	156.41
Toll N.C. 540 I-40 to N.C. 55	2.8	38,800	70	118.75	58.95	129.58	147.18
Toll N.C. 540 N.C. 55 to U.S. 64	6.7	31,000	96	226.72	42.34	129.58	142.24
Toll N.C. 540 U.S. 64 to N.C. 55 Bypass	5.9	22,800	89	146.33	60.82	129.58	145.40
Triangle Expressway	18.4	27,000	308	545.22	56.49	129.58	137.69

Table 1: Safety Statistics, December 1, 2016 – November 30, 2019

¹ AADT provided from NCDOT 2016 AADT Maps, Wake County ² Statewide Crash Rate for Urban Interstate Facilities Applied

Roadway Operations Statistics

Roadway Operations Statistics

Highly trained NCTA operators monitor and manage traffic operations and coordinate incident response and maintenance/construction work along the Triangle Expressway. These operators work at the Traffic Management Center (TMC) located in the North Carolina National Guard's Joint Force Headquarters in Raleigh. They are responsible for monitoring the facility 24 hours a day, 7 days a week, and 365 days a year using closed-circuit TV (CCTV) cameras, microwave vehicle detectors (MVD), and toll zone security cameras. Additionally, they monitor roadside toll technology and toll facilities.

Operators can communicate travel conditions and emergencies to customers via 10 full-color Dynamic Message Signs (DMS), NCDOT's 511 system, and NCDOT's Traveler Information Management System (TIMS) website. They can also quickly dispatch toll technology technicians to address equipment failures via the Maintenance Online Management Software (MOMS). Additionally, in the event of incidents on the facility, they can use interoperable 800MHz radio frequency dispatch from local 911 and statewide Highway Patrol communications to dispatch Incident Management Assistance Patrol (IMAP).

The NCTA Toll Safety Patrol program consists of dedicated SHP and IMAP services provided on the Triangle Expressway. This program provides one SHP officer and one IMAP responder to the facility during working hours, Monday through Friday. During this time, the assigned SHP officer and IMAP driver are responsible for patrolling the facility and responding to reported incidents.

This section presents operations statistics reported by SHP and IMAP during the fourth quarter of 2019. It includes driver violations and warnings issued by SHP and total IMAP assistance recorded, as well as average monthly IMAP response and clearance time.

Table 2 and *Table 3* present SHP operation statistics during 2019. "Chargeable Activities" are SHP activities involving fines. It should be noted that the "Other Violations" category includes chargeable activities such as load and equipment violations, driver's license violations, vehicle registration violations, and littering.

Chargeable Activities	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Speed Violations	56	56	53	45	42	38	33	36	32	35	30	40	496
Alcohol Violations	0	0	1	0	0	2	0	1	0	1	0	0	5
Seat Belt Violations	5	12	14	21	18	5	2	13	3	3	3	5	104
Child Restraint Violations	2	1	0	0	0	1	0	0	0	0	0	0	4
Reckless Driving	5	2	5	5	1	4	5	4	2	2	2	2	39
Drug Violations	0	0	0	0	0	1	0	0	0	0	1	0	2
Obstructed Plates	0	0	0	0	0	0	0	0	5	0	0	0	5
Other Violations	40	23	39	24	34	26	22	35	17	30	18	28	336
Total Charges	108	94	112	95	95	77	62	89	59	71	54	75	991

Table 2: 2019 SHP Chargeable Activities, YTD

Table 3: 2019 SHP Non-Chargeable Activities, YTD

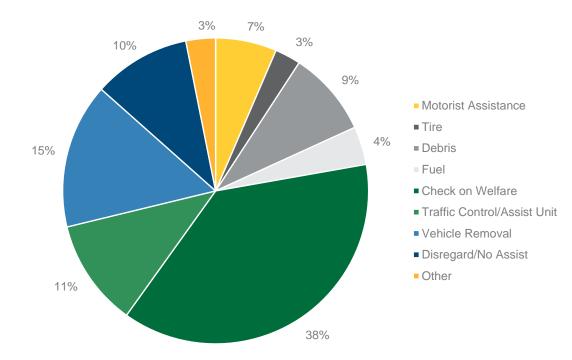
Non- Chargeable Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Warnings	42	47	56	48	76	51	71	96	77	89	33	45	731
Crashes Investigated	9	5	12	5	11	8	5	6	7	10	9	5	92
Calls for Service	25	20	25	33	35	22	38	35	17	22	30	33	335
Total	76	72	93	86	122	81	114	137	101	121	72	83	1,158

The IMAP assists with stranded motorists and incident clearance, thereby maintaining the flow of traffic along the roadway. *Table 4* and *Figure 15* present the monthly breakdown of IMAP services, by type, for the Triangle Expressway during 2019. The "other" category includes extinguish fire service, first aid service, and other rare miscellaneous services.

Assist Type	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Motorist Assistance	11	4	1	7	6	7	8	10	3	2	0	5	64
Tire	3	3	0	3	1	2	7	0	5	2	0	1	27
Debris	4	6	5	5	6	12	20	11	10	6	4	0	89
Fuel	9	2	2	0	3	4	4	5	1	4	2	4	40
Check on Welfare	18	24	31	40	28	37	53	37	33	30	27	15	373
Traffic Control / Assist Unit	6	7	6	15	8	10	18	13	9	8	6	6	112
Vehicle Removal	4	5	9	8	17	20	25	17	22	10	8	7	152
Disregard / No Assist	0	3	11	9	14	14	17	16	8	3	4	3	102
Other	0	4	1	3	0	0	3	5	2	5	4	4	31
Total Assists	55	58	66	90	83	106	155	114	93	70	55	45	990

Table 4: 2019 IMAP Services, YTD

Figure 15: 2019 IMAP Services by Type, YTD



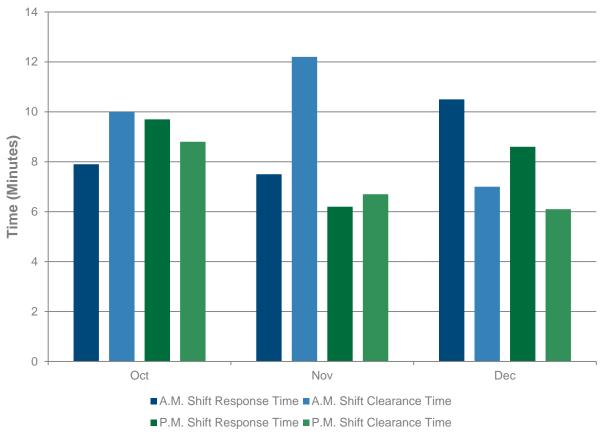
The response and clearance times for all IMAP assists are logged by IMAP and provided to the NCTA. Response time is the time from which a responder receives a call to the time they arrive on the scene. Clearance time is the time it takes the responder to clear the incident and return the roadway to normal operation. The IMAP staff's A.M. shift occurs from 6AM to 2PM, while the P.M. shift occurs from 2PM to 10PM. Shift response times may differ due to the number of drivers on duty and their coverage areas.

Table 5 and *Figure 16* present the average IMAP assistance response and clearance times, in minutes, for the Triangle Expressway.

Response Type	Jan	Feb	Mar	Apr	Мау	Jun e	July	Aug	Sep	Oct	Nov	Dec	2019 Average
A.M. Shift Response	9	10	5	8	8	4	8	9	8	8	8	11	7.8
A.M. Shift Clearance	4	4	6	8	9	8	7	7	8	10	12	7	7.6
P.M. Shift Response	7	11	8	8	9	9	6	9	11	10	6	9	8.5
P.M. Shift Clearance	6	7	6	8	8	8	9	6	4	9	7	6	6.8

Table 5: 2019 Average IMAP Response & Clearance Times (Minutes), YTD





Roadway Maintenance Statistics

Roadway Maintenance Statistics

This section outlines the NCTA Maintenance Rating Program (MRP), which is a maintenance evaluation program for roadway features and toll facilities. MRP is a comprehensive planning, measuring, and managing process that provides a means for communicating to managers, stakeholders, and customers the impacts of policy and budget decisions on program service delivery.

Using outcome-based performance measures and the service level scale (0 through 100), the inspection results are rated against established threshold criteria. The program analysis is accomplished using sampling procedures that capture the level of service being provided for individual asset features. Over time, these ratings will then be charted to identify work needs and subsequent necessary actions. The evaluations are based on the establishment of threshold conditions that quantify the maximum defect allowed to exist for a characteristic before it is considered unacceptable. The NCTA performance standards, threshold criteria, and Maintenance Rating Program were developed through a collaborative effort by NCTA managers, NCDOT maintenance staff, and consultants.

Using field survey information, a maintenance matrix can be developed to show the ties between maintenance activities and the characteristics of various roadway features. The purpose of this evaluation is to provide information that will be used to schedule and prioritize routine maintenance activities and provide uniform maintenance conditions that meet established objectives.

Assessment Schedule

As part of the NCTA MRP, a "baseline" assessment is scheduled for each newly opened roadway section soon after opening to toll collection. The baseline assessments include a complete inventory data collection and assessment on 100% of the roadway assets. A baseline assessment for the Veridea Parkway interchange was completed in March of 2018. A baseline assessment for Morrisville Parkway Interchange will similarly be performed in 2020.

After the baseline assessment is completed, future assessments for that segment switch over to a statistical sampling assessment. Inspections are performed during the months of February, May, August, and November to account for dynamic seasonal changes to assets. These inspections are accomplished using statistically valid, random sampling procedures that capture the level of service for individual assets with a 95% confidence level in sampling.

Assessment Results

Table 6 presents the 2019 quarterly and annual MRP Assessment rating for the Triangle Expressway. It is important to note that the Quarterly Ratings are only representative of the samples inspected during each quarter. Therefore, they are not a statistically valid representation of the assets' conditions until after the fourth quarter; only the annual rating provides a 95% confidence level in statistical sampling.

Table 6: MRP Assessment Results

Element	Q1 2019 Rating	Q2 2019 Rating	Q3 2019 Rating	Q4 2019 Rating	2019 Annual Rating	
Road Surface	96.0	92.6	96.9	89.5	93.8	
Unpaved Shoulders and Ditches	97.4	97.8	94.7	99.1	97.3	
Drainage	91.3	94.0	91.4	98.1	93.9	
Roadside	92.8	92.8	94.2	96.2	94.1	
Traffic Control Devices	92.1	87.9	86.6	90.9	89.3	
Overall MRP Performance Rating	93.7	92.1	92.2	93.6	93.0	