NORTH CAROLINA
Turnpike Authority

Triangle Expressway

Roadway Operations Statistics Report

2023 Fourth Quarter
October - December

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Introduction

Purpose

The North Carolina Turnpike Authority (NCTA) presents the operations statistics for the Triangle Expressway during the fourth quarter (October – December) of 2023. 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, controlled-access 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. 885 and Toll N.C. 540.

Toll N.C. 885 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. With the opening of the East End Connector in Durham, this section was renamed from Toll N.C. 147 to Toll N.C. 885 on June 30, 2022.

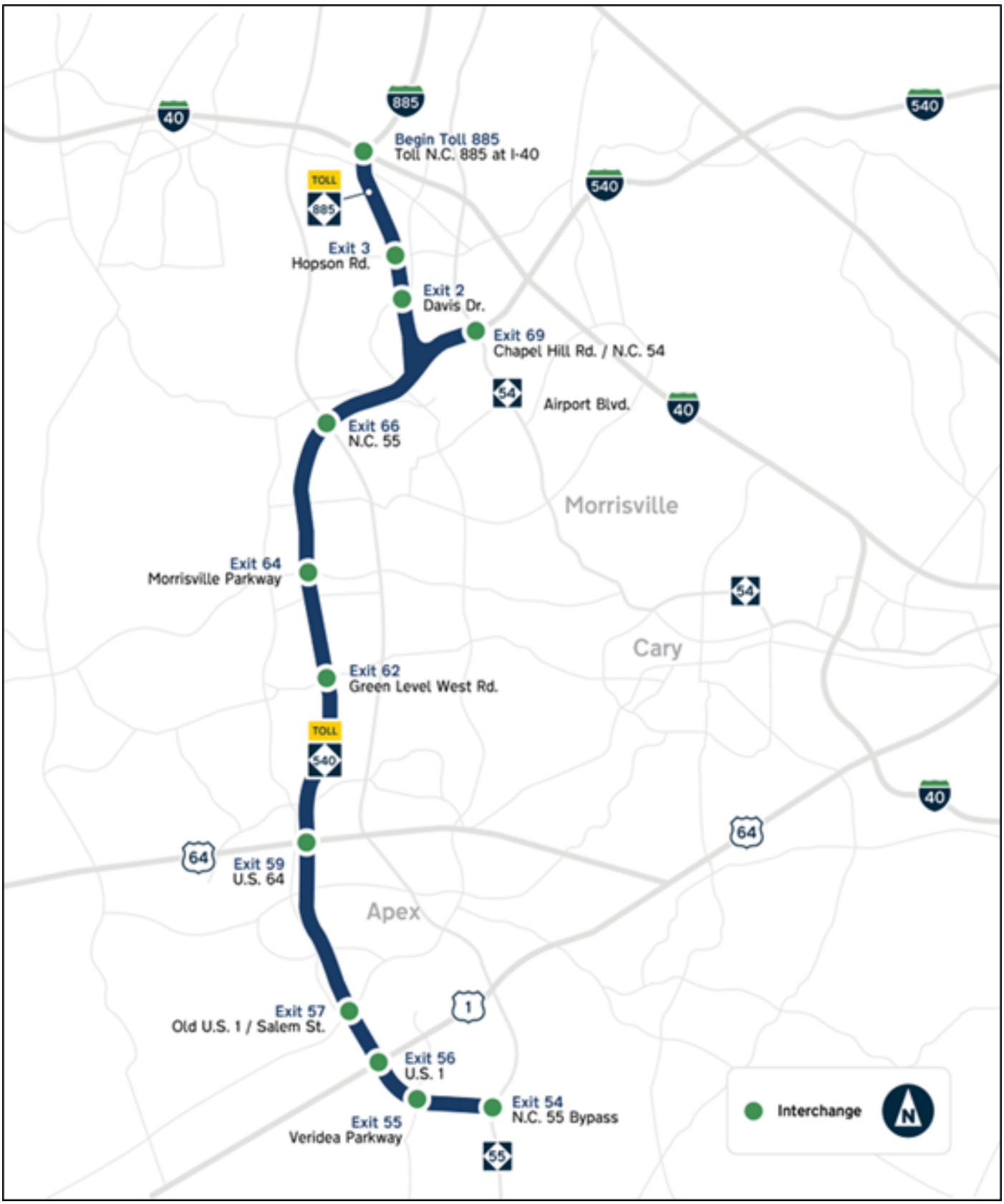
Toll N.C. 540 includes 15.4 miles of toll road between N.C. 54 in western Cary and the N.C. 55 Bypass near the Town of Holly Springs. The section from N.C. 54 to U.S. 64 opened to general traffic (toll-free) on August 1, 2012, and toll collection started on August 2, 2012. This section includes interchanges at N.C. 54, N.C. 55, Green Level West Road, and U.S. 64. On February 3rd, 2020, a new interchange at Morrisville Parkway between N.C. 55 and Green Level West Road was opened to motorists.

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*.

Figure 1: Triangle Expressway System Map



Traffic Statistics

Traffic Statistics

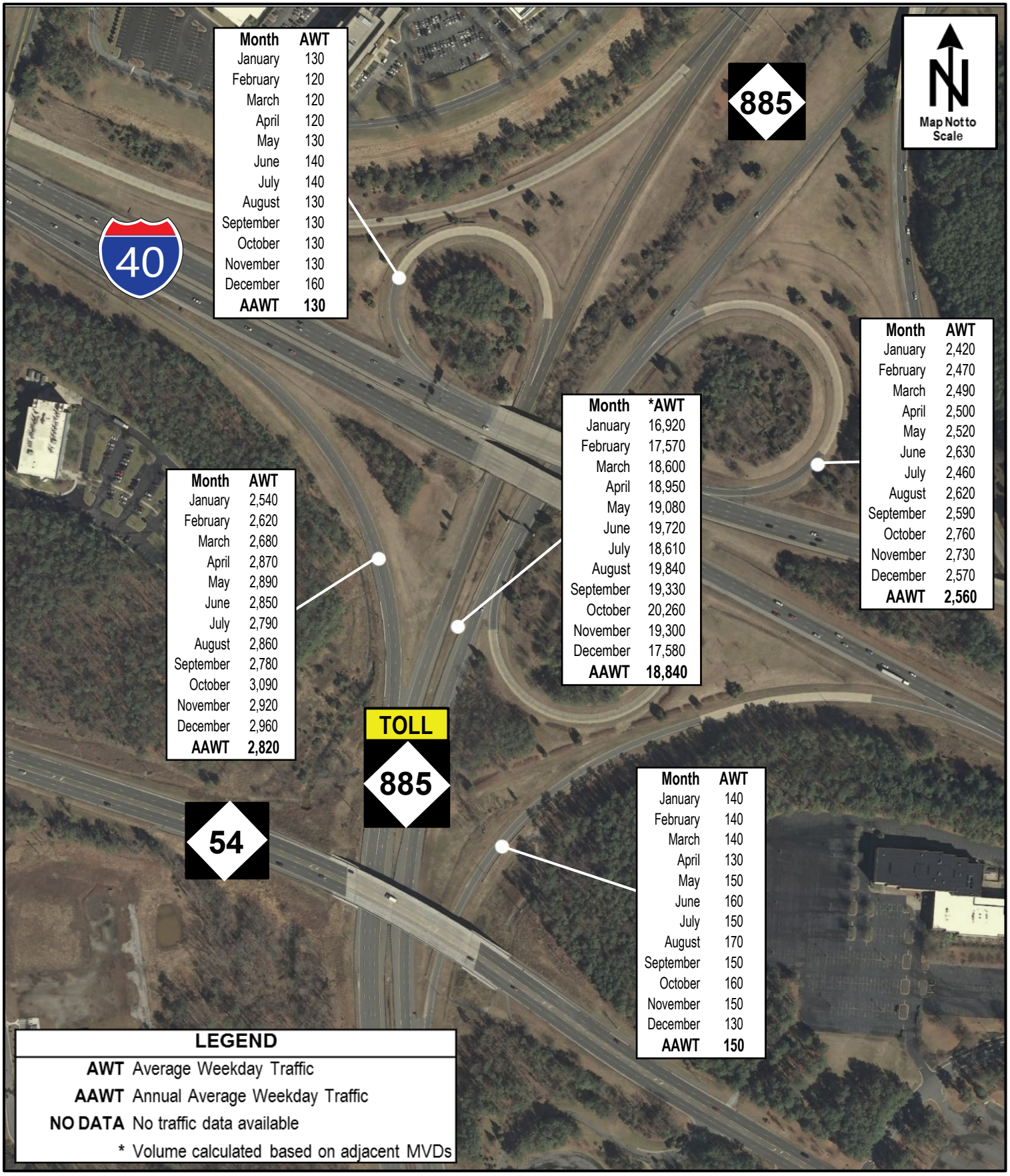
Current and historical traffic data is collected and stored using roadside microwave vehicle detectors (MVDs) installed throughout the Triangle Expressway, providing an overview of the roadway's current utilization. The data is analyzed to identify trends that could more accurately predict future utilization.

It should be noted that due to the state of emergency declaration on March 10, 2020, in response to novel coronavirus, travel and gatherings were restricted statewide. This state of emergency was lifted August 15, 2022. Traffic statistics continue to be impacted by the shift to remote work and may not be representative of historical utilization trends.

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 on Triangle Expressway because it tends to have a much higher percentage of traffic on weekdays during 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 *15*. 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 is monitored daily by comparing volumes with transaction counts and historical volumes. Maintenance tickets are submitted if MVD devices do not meet established thresholds.



Month	AWT
January	130
February	120
March	120
April	120
May	130
June	140
July	140
August	130
September	130
October	130
November	130
December	160
AAWT	**130**

Month	AWT
January	2,420
February	2,470
March	2,490
April	2,500
May	2,520
June	2,630
July	2,460
August	2,620
September	2,590
October	2,760
November	2,730
December	2,570
AAWT	**2,560**

Month	*AWT
January	16,920
February	17,570
March	18,600
April	18,950
May	19,080
June	19,720
July	18,610
August	19,840
September	19,330
October	20,260
November	19,300
December	17,580
AAWT	**18,840**

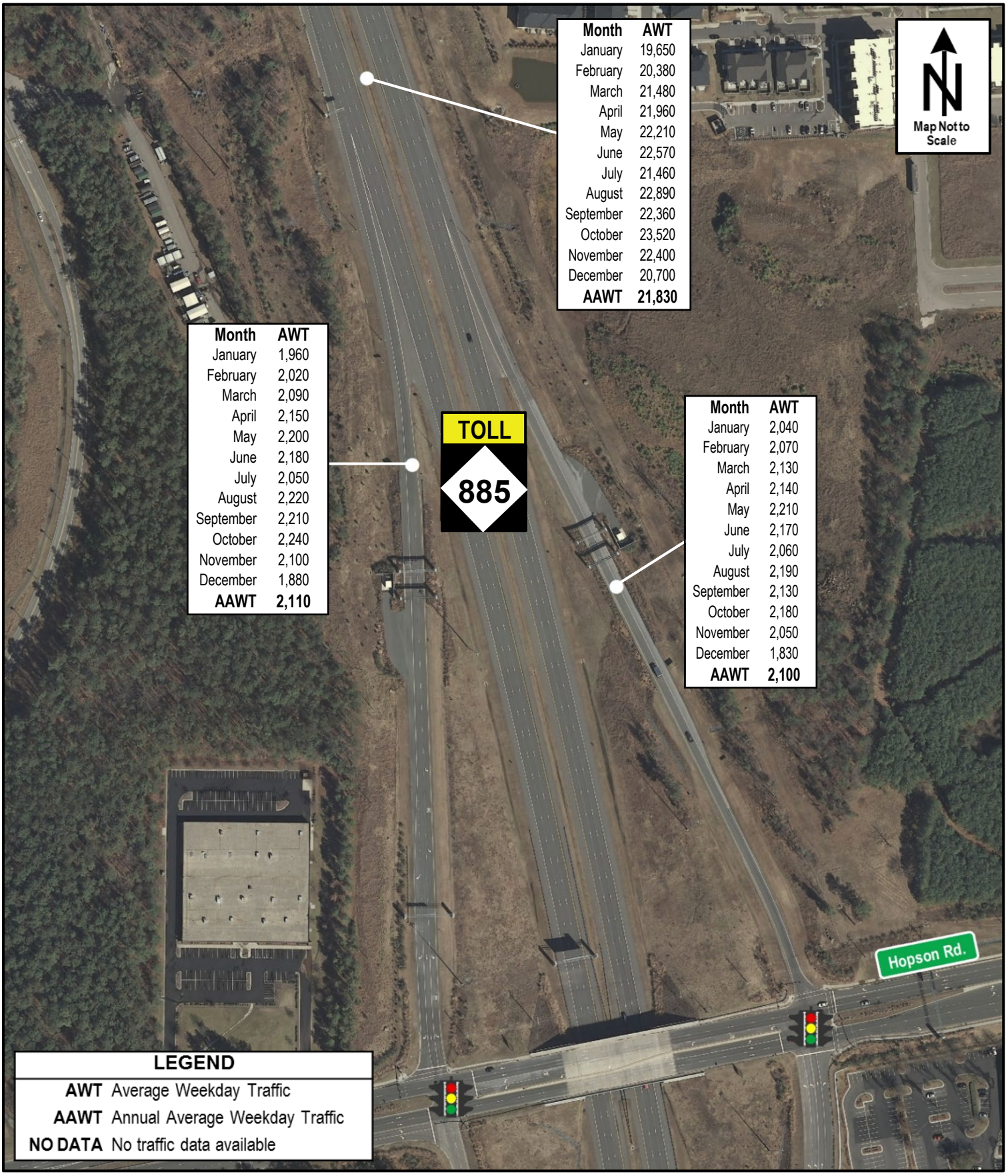
Month	AWT
January	2,540
February	2,620
March	2,680
April	2,870
May	2,890
June	2,850
July	2,790
August	2,860
September	2,780
October	3,090
November	2,920
December	2,960
AAWT	**2,820**

Month	AWT
January	140
February	140
March	140
April	130
May	150
June	160
July	150
August	170
September	150
October	160
November	150
December	130
AAWT	**150**

NC-885 at I-40 Interchange

2023 Average Weekday Traffic

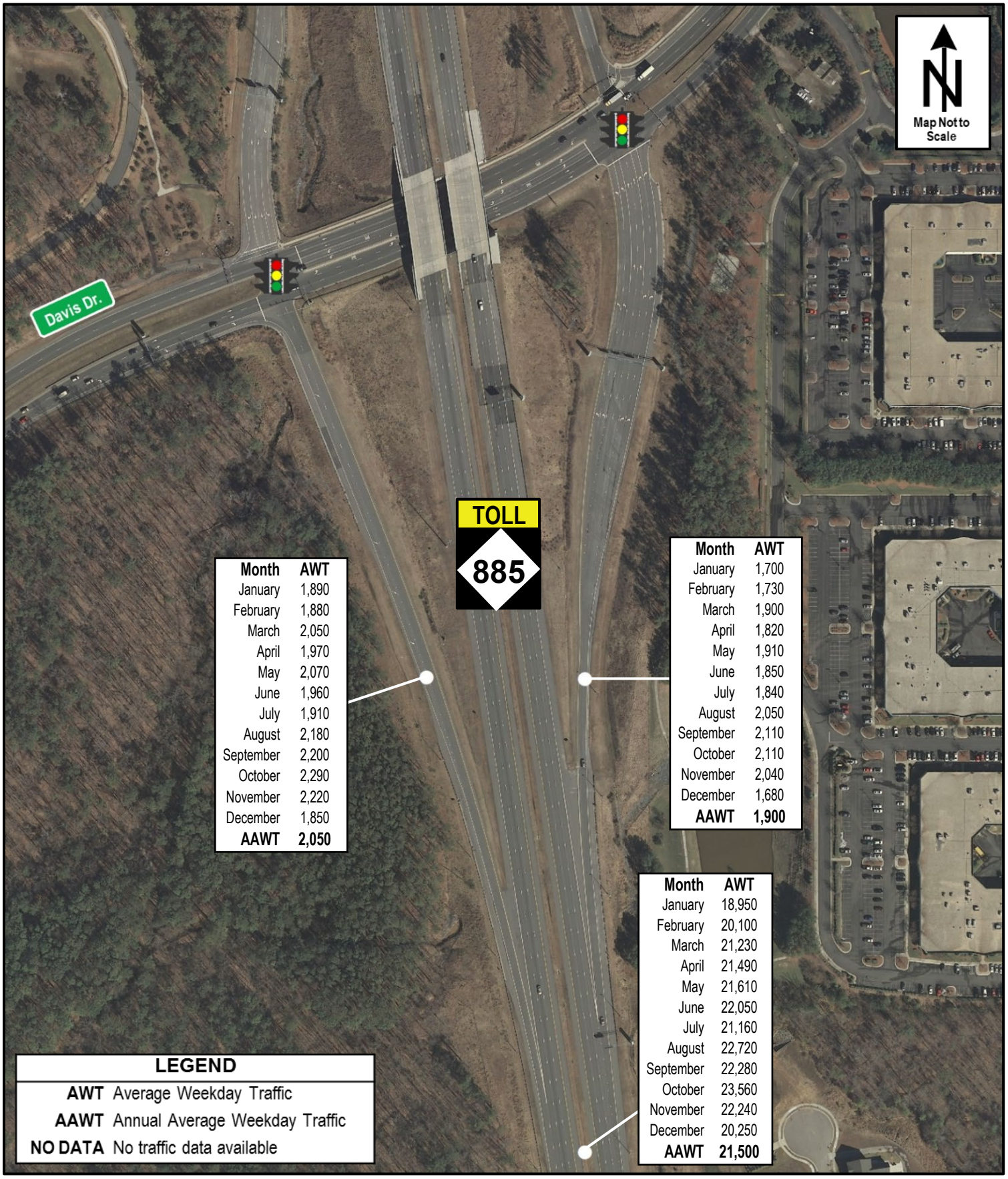
Figure 3



NC-885 at Hopson Rd. Interchange

2023 Average Weekday Traffic

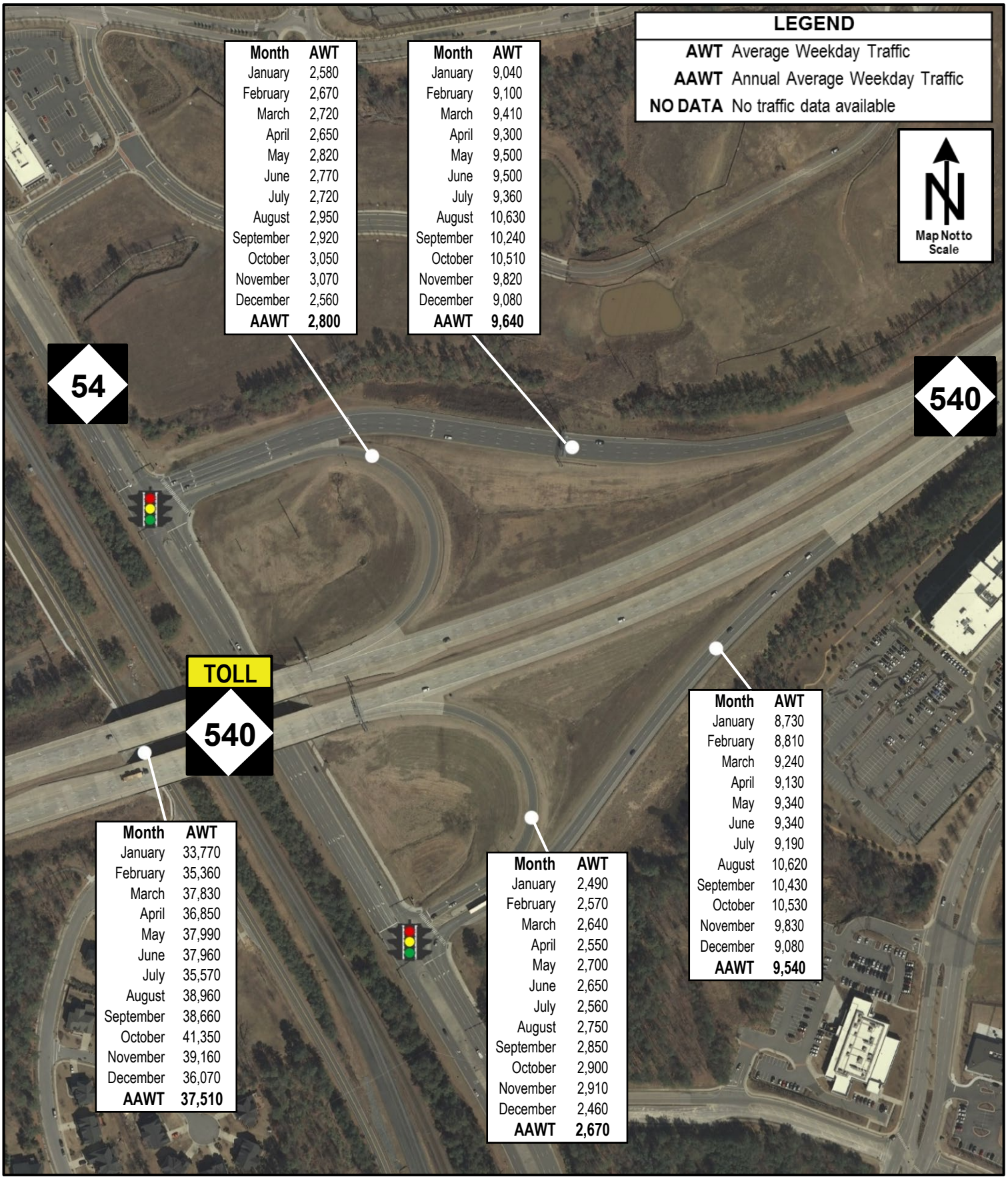
Figure 4



NC-885 at Davis Dr. Interchange

2023 Average Weekday Traffic

Figure 5



Month	AWT
January	2,580
February	2,670
March	2,720
April	2,650
May	2,820
June	2,770
July	2,720
August	2,950
September	2,920
October	3,050
November	3,070
December	2,560
AAWT	**2,800**

Month	AWT
January	9,040
February	9,100
March	9,410
April	9,300
May	9,500
June	9,500
July	9,360
August	10,630
September	10,240
October	10,510
November	9,820
December	9,080
AAWT	**9,640**

Month	AWT
January	8,730
February	8,810
March	9,240
April	9,130
May	9,340
June	9,340
July	9,190
August	10,620
September	10,430
October	10,530
November	9,830
December	9,080
AAWT	**9,540**

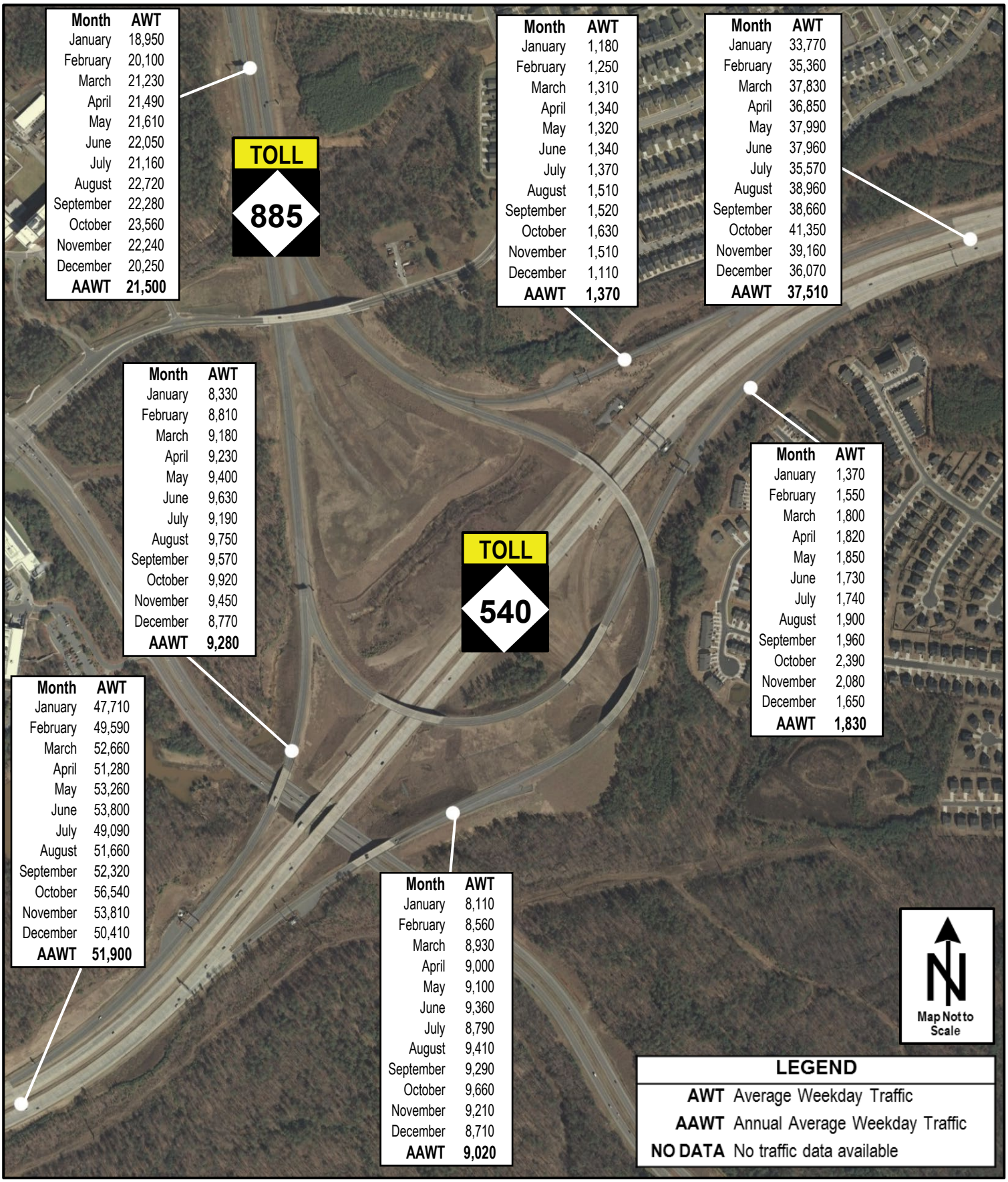
Month	AWT
January	33,770
February	35,360
March	37,830
April	36,850
May	37,990
June	37,960
July	35,570
August	38,960
September	38,660
October	41,350
November	39,160
December	36,070
AAWT	**37,510**

Month	AWT
January	2,490
February	2,570
March	2,640
April	2,550
May	2,700
June	2,650
July	2,560
August	2,750
September	2,850
October	2,900
November	2,910
December	2,460
AAWT	**2,670**

NC-540 at NC-54 Interchange

2023 Average Weekday Traffic

Figure 6



Month	AWT
January	18,950
February	20,100
March	21,230
April	21,490
May	21,610
June	22,050
July	21,160
August	22,720
September	22,280
October	23,560
November	22,240
December	20,250
AAWT	**21,500**

Month	AWT
January	1,180
February	1,250
March	1,310
April	1,340
May	1,320
June	1,340
July	1,370
August	1,510
September	1,520
October	1,630
November	1,510
December	1,110
AAWT	**1,370**

Month	AWT
January	33,770
February	35,360
March	37,830
April	36,850
May	37,990
June	37,960
July	35,570
August	38,960
September	38,660
October	41,350
November	39,160
December	36,070
AAWT	**37,510**

Month	AWT
January	8,330
February	8,810
March	9,180
April	9,230
May	9,400
June	9,630
July	9,190
August	9,750
September	9,570
October	9,920
November	9,450
December	8,770
AAWT	**9,280**

Month	AWT
January	1,370
February	1,550
March	1,800
April	1,820
May	1,850
June	1,730
July	1,740
August	1,900
September	1,960
October	2,390
November	2,080
December	1,650
AAWT	**1,830**

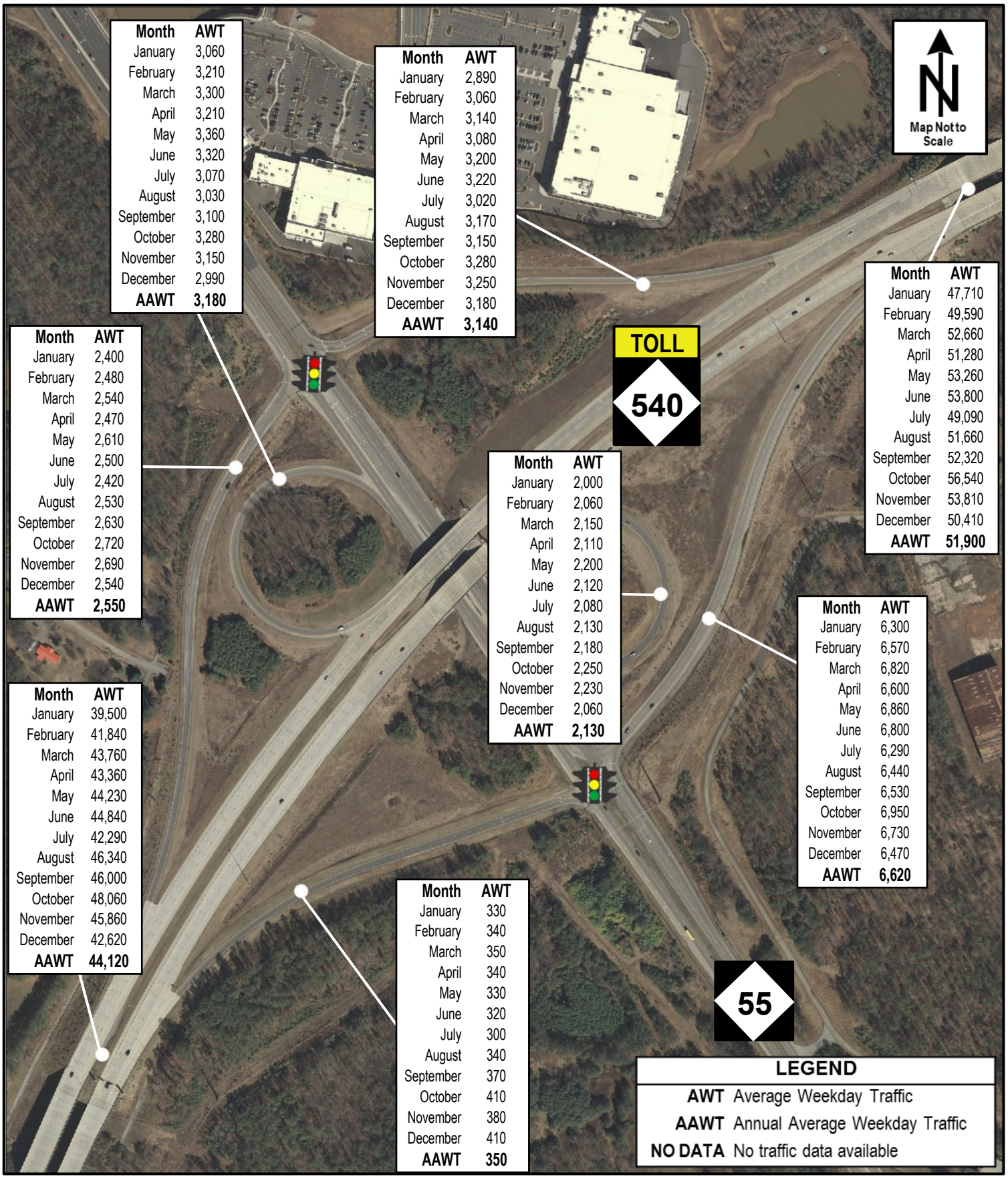
Month	AWT
January	47,710
February	49,590
March	52,660
April	51,280
May	53,260
June	53,800
July	49,090
August	51,660
September	52,320
October	56,540
November	53,810
December	50,410
AAWT	**51,900**

Month	AWT
January	8,110
February	8,560
March	8,930
April	9,000
May	9,100
June	9,360
July	8,790
August	9,410
September	9,290
October	9,660
November	9,210
December	8,710
AAWT	**9,020**

NC-540 at NC-885 Interchange

2023 Average Weekday Traffic

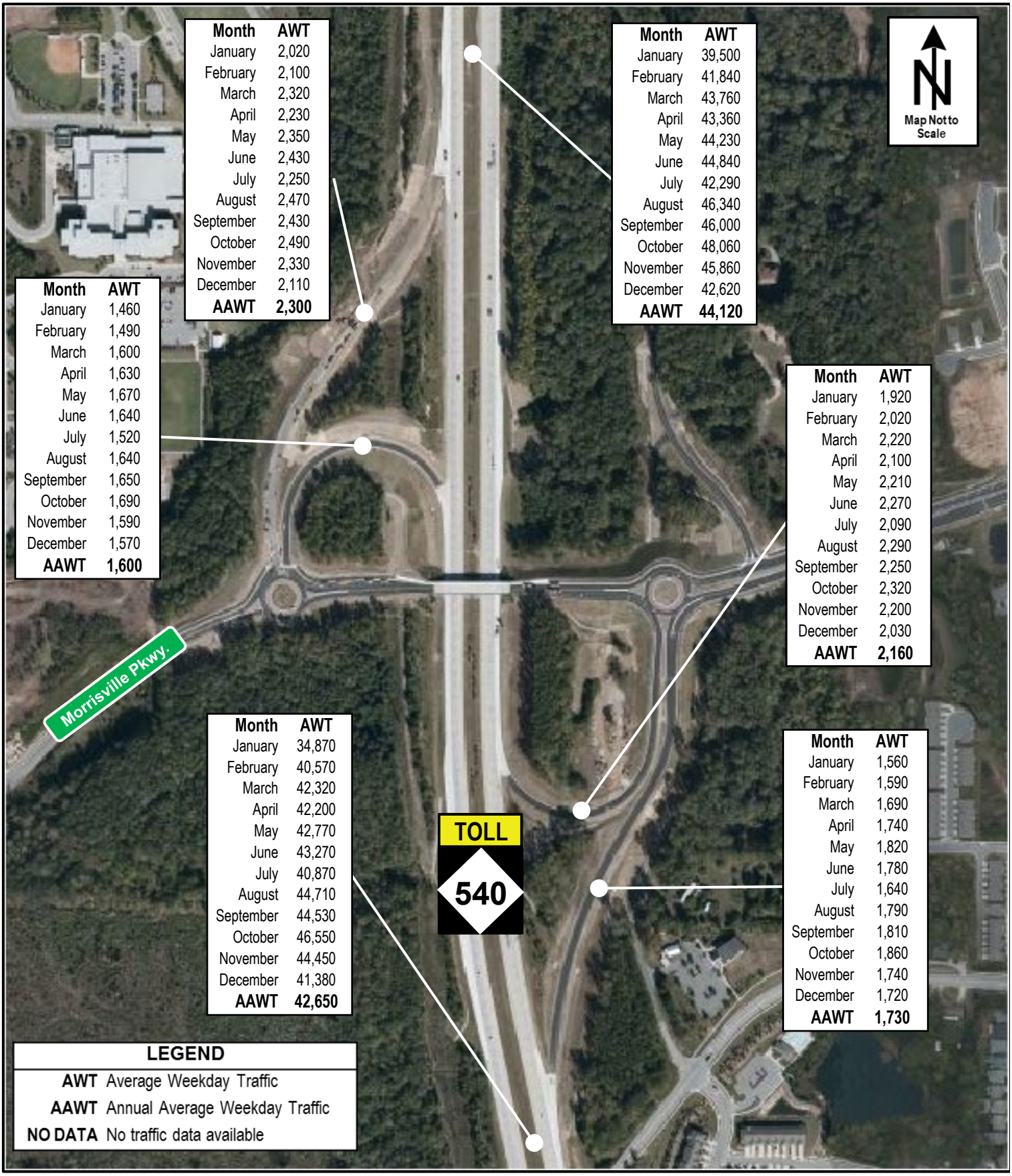
Figure 7



NC-540 at NC-55 Interchange

2023 Average Weekday Traffic

Figure 8



Month	AWT
January	2,020
February	2,100
March	2,320
April	2,230
May	2,350
June	2,430
July	2,250
August	2,470
September	2,430
October	2,490
November	2,330
December	2,110
AAWT	**2,300**

Month	AWT
January	39,500
February	41,840
March	43,760
April	43,360
May	44,230
June	44,840
July	42,290
August	46,340
September	46,000
October	48,060
November	45,860
December	42,620
AAWT	**44,120**

Month	AWT
January	1,460
February	1,490
March	1,600
April	1,630
May	1,670
June	1,640
July	1,520
August	1,640
September	1,650
October	1,690
November	1,590
December	1,570
AAWT	**1,600**

Month	AWT
January	1,920
February	2,020
March	2,220
April	2,100
May	2,210
June	2,270
July	2,090
August	2,290
September	2,250
October	2,320
November	2,200
December	2,030
AAWT	**2,160**

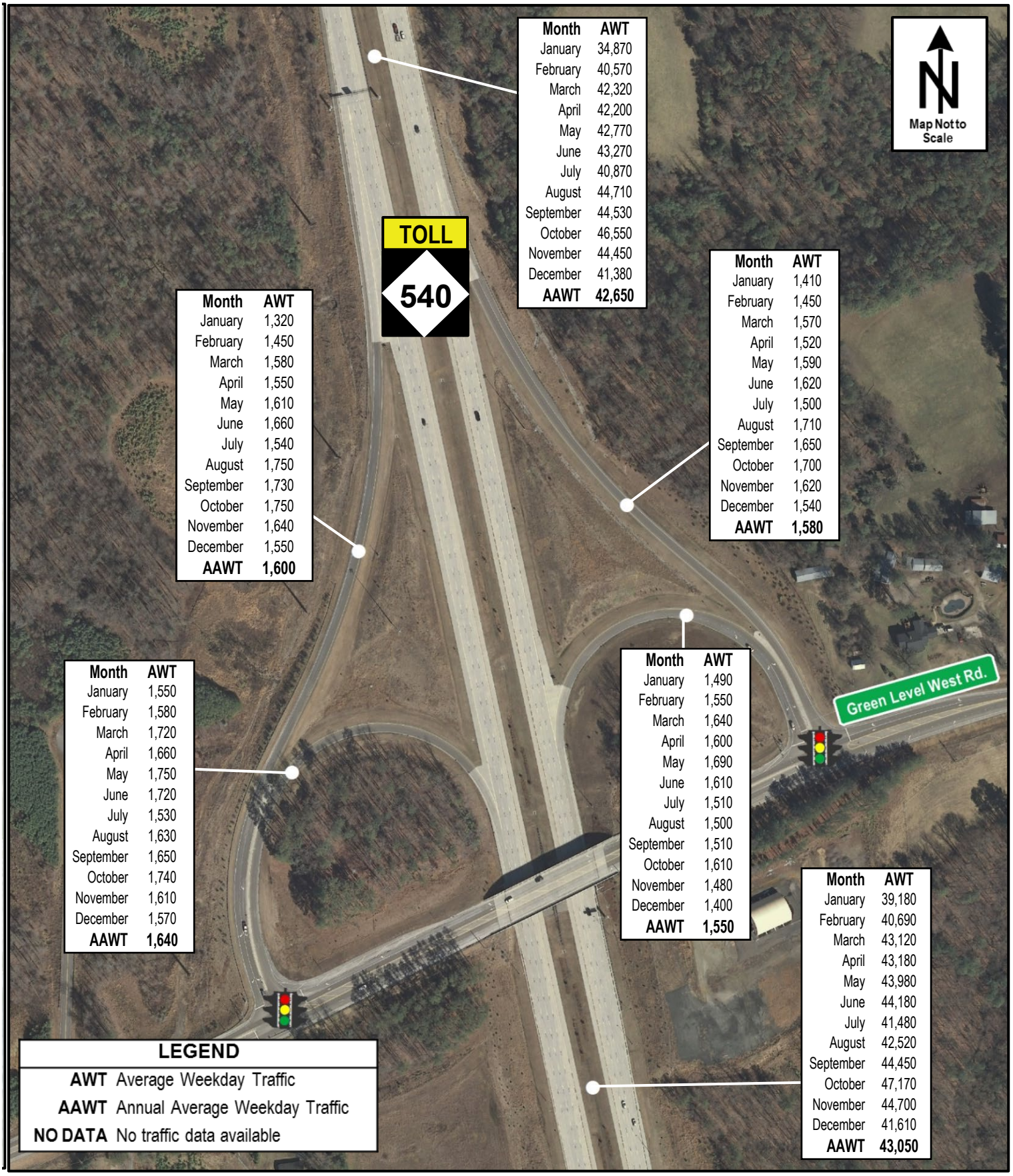
Month	AWT
January	34,870
February	40,570
March	42,320
April	42,200
May	42,770
June	43,270
July	40,870
August	44,710
September	44,530
October	46,550
November	44,450
December	41,380
AAWT	**42,650**

Month	AWT
January	1,560
February	1,590
March	1,690
April	1,740
May	1,820
June	1,780
July	1,640
August	1,790
September	1,810
October	1,860
November	1,740
December	1,720
AAWT	**1,730**

NC-540 at Morrisville Pkwy. Interchange

2023 Average Weekday Traffic

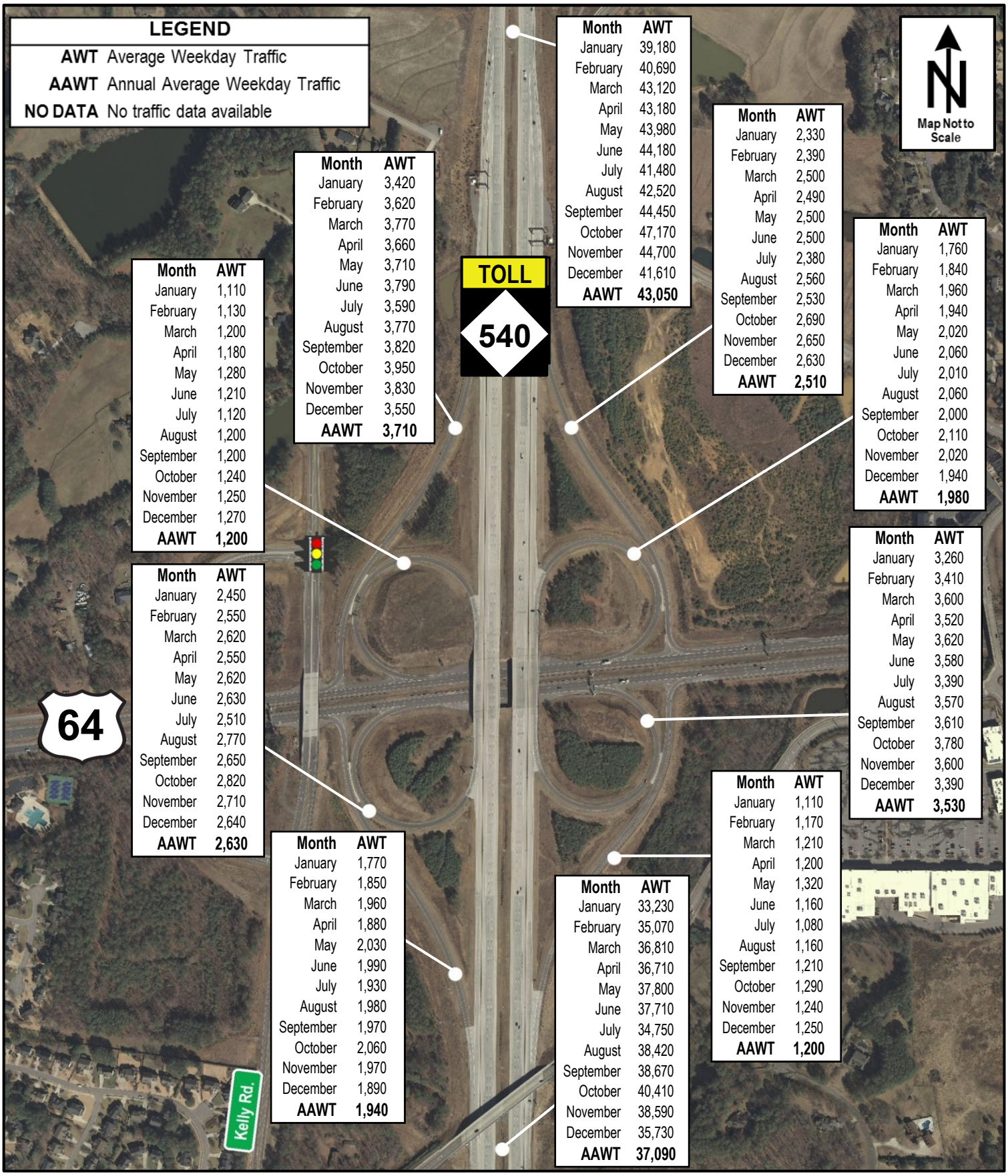
Figure 9



NC-540 at Green Level West Rd. Interchange

2023 Average Weekday Traffic

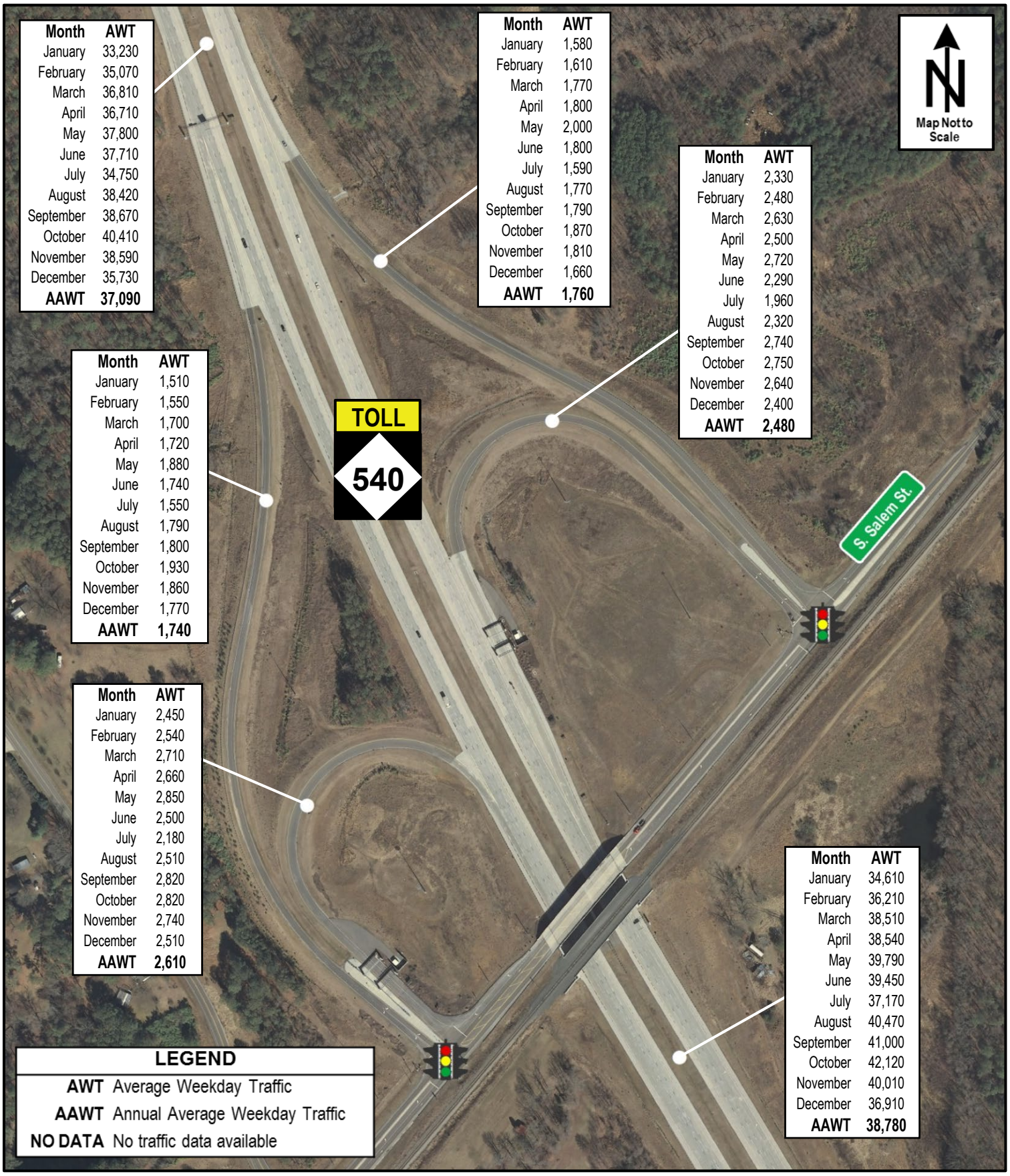
Figure 10



NC-540 at US-64 Interchange

2023 Average Weekday Traffic

Figure 11



Month	AWT
January	33,230
February	35,070
March	36,810
April	36,710
May	37,800
June	37,710
July	34,750
August	38,420
September	38,670
October	40,410
November	38,590
December	35,730
AAWT	**37,090**

Month	AWT
January	1,580
February	1,610
March	1,770
April	1,800
May	2,000
June	1,800
July	1,590
August	1,770
September	1,790
October	1,870
November	1,810
December	1,660
AAWT	**1,760**

Month	AWT
January	2,330
February	2,480
March	2,630
April	2,500
May	2,720
June	2,290
July	1,960
August	2,320
September	2,740
October	2,750
November	2,640
December	2,400
AAWT	**2,480**

Month	AWT
January	1,510
February	1,550
March	1,700
April	1,720
May	1,880
June	1,740
July	1,550
August	1,790
September	1,800
October	1,930
November	1,860
December	1,770
AAWT	**1,740**

Month	AWT
January	2,450
February	2,540
March	2,710
April	2,660
May	2,850
June	2,500
July	2,180
August	2,510
September	2,820
October	2,820
November	2,740
December	2,510
AAWT	**2,610**

Month	AWT
January	34,610
February	36,210
March	38,510
April	38,540
May	39,790
June	39,450
July	37,170
August	40,470
September	41,000
October	42,120
November	40,010
December	36,910
AAWT	**38,780**

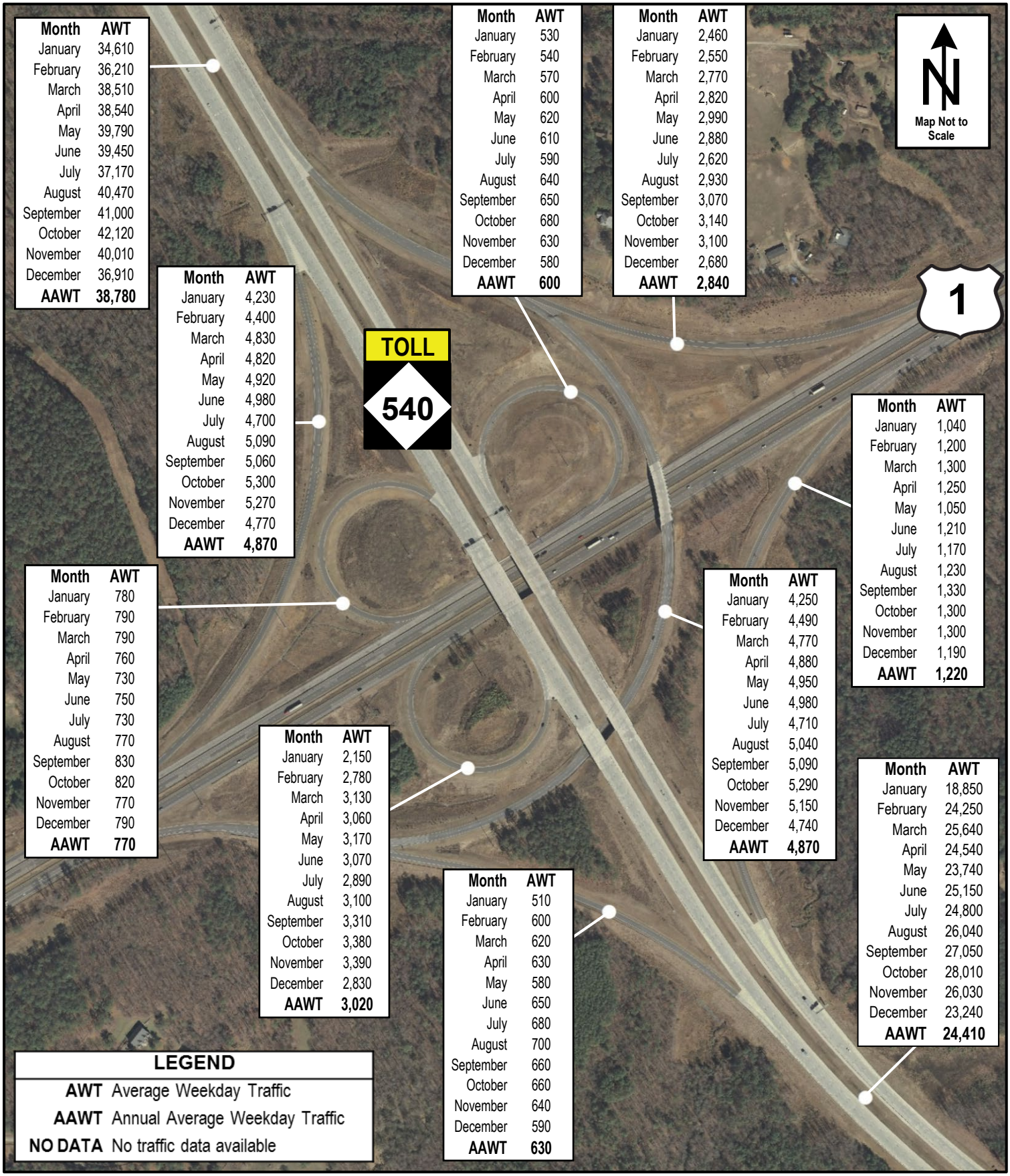
LEGEND

AWT	Average Weekday Traffic
AAWT	Annual Average Weekday Traffic
NO DATA	No traffic data available

NC-540 at S. Salem St. Interchange

2023 Average Weekday Traffic

Figure 12



Month	AWT
January	34,610
February	36,210
March	38,510
April	38,540
May	39,790
June	39,450
July	37,170
August	40,470
September	41,000
October	42,120
November	40,010
December	36,910
AAWT	**38,780**

Month	AWT
January	530
February	540
March	570
April	600
May	620
June	610
July	590
August	640
September	650
October	680
November	630
December	580
AAWT	**600**

Month	AWT
January	2,460
February	2,550
March	2,770
April	2,820
May	2,990
June	2,880
July	2,620
August	2,930
September	3,070
October	3,140
November	3,100
December	2,680
AAWT	**2,840**

Month	AWT
January	4,230
February	4,400
March	4,830
April	4,820
May	4,920
June	4,980
July	4,700
August	5,090
September	5,060
October	5,300
November	5,270
December	4,770
AAWT	**4,870**

Month	AWT
January	1,040
February	1,200
March	1,300
April	1,250
May	1,050
June	1,210
July	1,170
August	1,230
September	1,330
October	1,300
November	1,300
December	1,190
AAWT	**1,220**

Month	AWT
January	780
February	790
March	790
April	760
May	730
June	750
July	730
August	770
September	830
October	820
November	770
December	790
AAWT	**770**

Month	AWT
January	4,250
February	4,490
March	4,770
April	4,880
May	4,950
June	4,980
July	4,710
August	5,040
September	5,090
October	5,290
November	5,150
December	4,740
AAWT	**4,870**

Month	AWT
January	2,150
February	2,780
March	3,130
April	3,060
May	3,170
June	3,070
July	2,890
August	3,100
September	3,310
October	3,380
November	3,390
December	2,830
AAWT	**3,020**

Month	AWT
January	510
February	600
March	620
April	630
May	580
June	650
July	680
August	700
September	660
October	660
November	640
December	590
AAWT	**630**

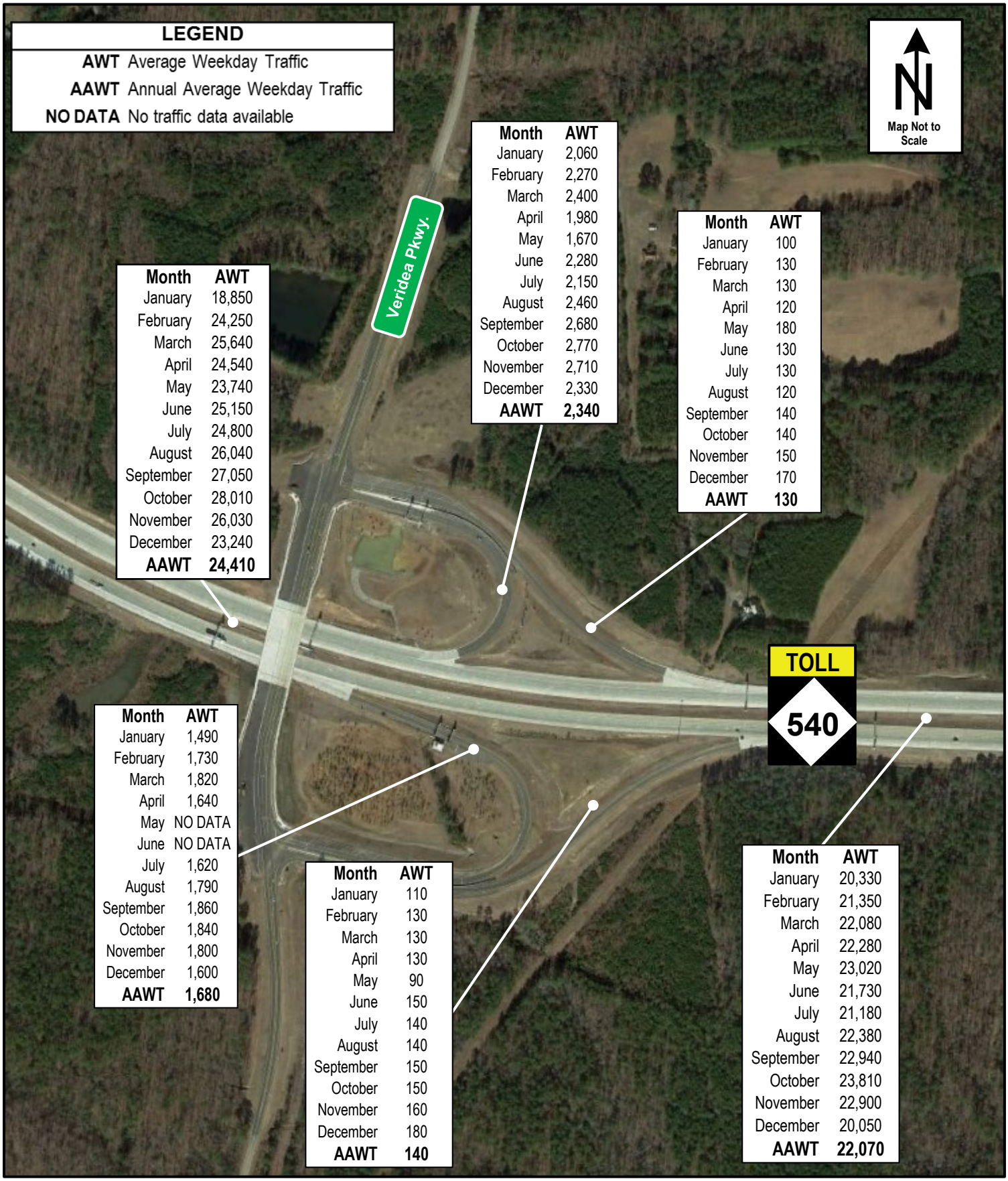
Month	AWT
January	18,850
February	24,250
March	25,640
April	24,540
May	23,740
June	25,150
July	24,800
August	26,040
September	27,050
October	28,010
November	26,030
December	23,240
AAWT	**24,410**

LEGEND	
AWT	Average Weekday Traffic
AAWT	Annual Average Weekday Traffic
NO DATA	No traffic data available

NC-540 at US-1 Interchange

2023 Average Weekday Traffic

Figure 13



Month	AWT
January	18,850
February	24,250
March	25,640
April	24,540
May	23,740
June	25,150
July	24,800
August	26,040
September	27,050
October	28,010
November	26,030
December	23,240
AAWT	**24,410**

Month	AWT
January	2,060
February	2,270
March	2,400
April	1,980
May	1,670
June	2,280
July	2,150
August	2,460
September	2,680
October	2,770
November	2,710
December	2,330
AAWT	**2,340**

Month	AWT
January	100
February	130
March	130
April	120
May	180
June	130
July	130
August	120
September	140
October	140
November	150
December	170
AAWT	**130**

Month	AWT
January	1,490
February	1,730
March	1,820
April	1,640
May	NO DATA
June	NO DATA
July	1,620
August	1,790
September	1,860
October	1,840
November	1,800
December	1,600
AAWT	**1,680**

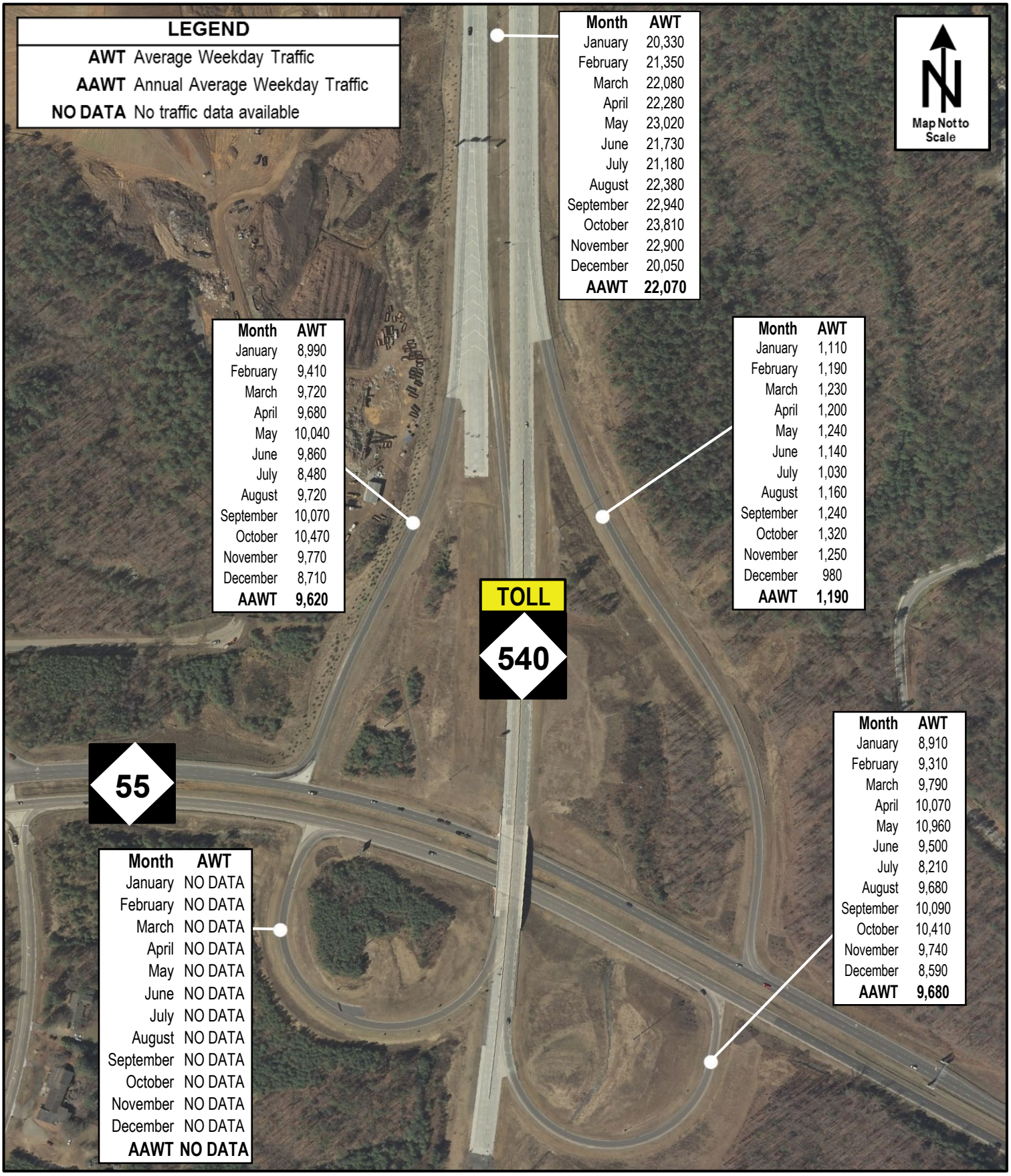
Month	AWT
January	110
February	130
March	130
April	130
May	90
June	150
July	140
August	140
September	150
October	150
November	160
December	180
AAWT	**140**

Month	AWT
January	20,330
February	21,350
March	22,080
April	22,280
May	23,020
June	21,730
July	21,180
August	22,380
September	22,940
October	23,810
November	22,900
December	20,050
AAWT	**22,070**

NC-540 at Veridea Pkwy. Interchange

2023 Average Weekday Traffic

Figure 14



Month	AWT
January	20,330
February	21,350
March	22,080
April	22,280
May	23,020
June	21,730
July	21,180
August	22,380
September	22,940
October	23,810
November	22,900
December	20,050
AAWT	**22,070**

Month	AWT
January	8,990
February	9,410
March	9,720
April	9,680
May	10,040
June	9,860
July	8,480
August	9,720
September	10,070
October	10,470
November	9,770
December	8,710
AAWT	**9,620**

Month	AWT
January	1,110
February	1,190
March	1,230
April	1,200
May	1,240
June	1,140
July	1,030
August	1,160
September	1,240
October	1,320
November	1,250
December	980
AAWT	**1,190**

Month	AWT
January	NO DATA
February	NO DATA
March	NO DATA
April	NO DATA
May	NO DATA
June	NO DATA
July	NO DATA
August	NO DATA
September	NO DATA
October	NO DATA
November	NO DATA
December	NO DATA
AAWT	**NO DATA**

Month	AWT
January	8,910
February	9,310
March	9,790
April	10,070
May	10,960
June	9,500
July	8,210
August	9,680
September	10,090
October	10,410
November	9,740
December	8,590
AAWT	**9,680**

NC-540 at NC-55 Bypass Interchange

2023 Average Weekday Traffic

Figure 15

Roadway Safety Statistics

Roadway Safety Statistics

Vehicle crashes are sometimes 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. 885, 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, 2020, through November 30, 2023, for each segment. The AADT used for this quarter analysis was calculated from Microwave Vehicle Detection (MVD) data collected in 2022. The Statewide Crash Rate (128.63 crashes per 100 MVMT) used for comparison purposes in this analysis was collected from the 2017-2021 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. Triangle Expressway continues to report a Total Crash Rate significantly lower than both the Statewide Crash Rate and Critical Crash Rate.

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

Table 1: Safety Statistics December 1, 2020 – November 30, 2023

Segment	Length	AADT [1]	Total Crashes	Vehicle Exposure (MVMT)	Total Crash Rate	Statewide Crash Rate [2]	Critical Crash Rate
Toll N.C. 885 I-40 to Toll N.C. 540	3.1	16,000	41	54.42	75.34	128.63	154.84
Toll N.C. 540 I-40 to N.C. 55	2.8	36,000	68	110.18	61.72	128.63	146.86
Toll N.C. 540 N.C. 55 to U.S. 64	6.7	33,000	90	241.35	37.29	128.63	140.85
Toll N.C. 540 U.S. 64 to N.C. 55 Bypass	5.9	25,000	74	160.44	46.12	128.63	143.67
Triangle Expressway	**18.4**	**28,500**	**273**	**567.43**	**48.11**	**128.63**	**136.55**

[1] AADT calculated from 2022 microwave vehicle detection data.
[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 a maintenance ticketing system. 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 2023. 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 2023. "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.

Table 2: 2023 SHP Chargeable Activities, YTD

Chargeable Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Speed Violations	33	37	25	26	25	43	46	36	24	37	26	24	**382**
Alcohol Violations	1	0	0	0	3	0	3	0	0	0	1	0	**8**
Seat Belt Violations	6	8	7	3	11	5	2	3	1	6	3	3	**58**
Child Restraint Violations	0	0	0	0	0	0	0	0	0	3	1	0	**4**
Reckless Driving	5	1	5	4	7	10	7	9	4	8	7	5	**72**
Drug Violations	0	0	0	0	0	2	0	0	0	0	0	0	**2**
Obstructed Plates	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Other Violations	35	17	53	19	43	41	11	59	29	56	35	26	**424**
Total Charges	**80**	**63**	**90**	**52**	**89**	**101**	**69**	**107**	**58**	**110**	**73**	**58**	**950**

Table 3: 2023 SHP Non-Chargeable Activities, YTD

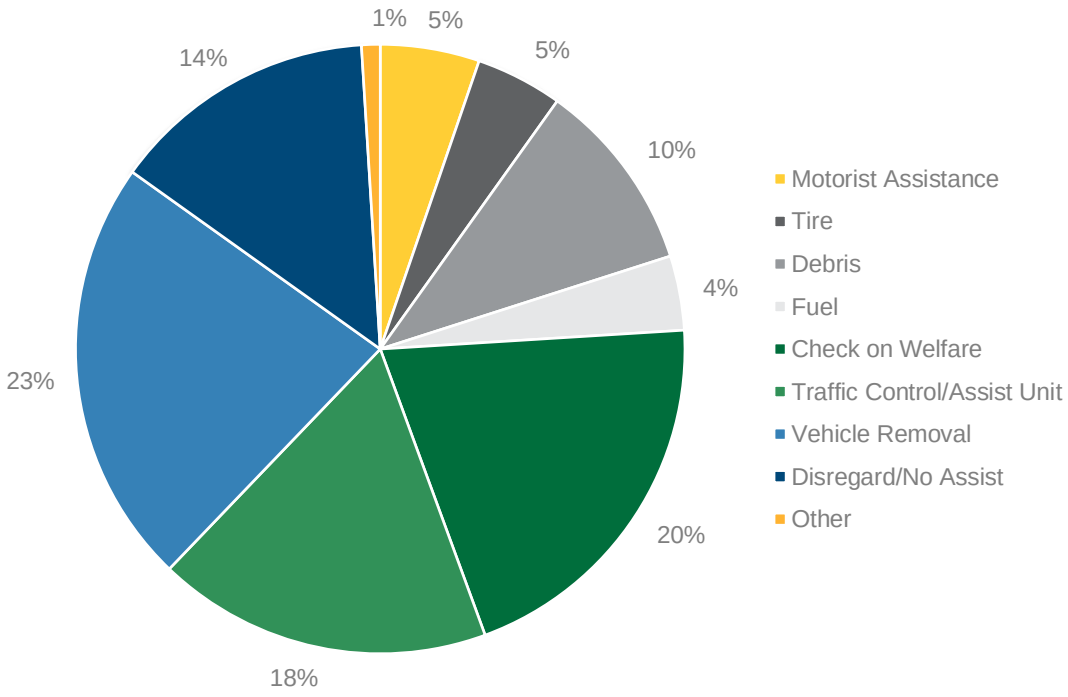
Non-Chargeable Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Warnings	60	47	59	45	20	52	26	52	44	41	19	17	**482**
Crashes Investigated	6	6	9	2	1	12	6	14	7	16	5	2	**86**
Calls for Service	15	18	25	17	13	6	21	12	27	17	19	11	**201**
Total	**81**	**71**	**93**	**64**	**34**	**70**	**53**	**78**	**78**	**74**	**43**	**30**	**769**

The IMAP assists with stranded motorists and incident clearance, thereby maintaining the flow of traffic along the roadway. *Table 4* and *Figure 16* present the monthly breakdown of IMAP services, by type, for the Triangle Expressway during 2023. The “other” category includes extinguish fire service, first aid service, and other rare miscellaneous services.

Table 4: 2023 IMAP Services, YTD

Assist Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Motorist Assistance	2	1	1	2	0	0	3	4	0	3	0	0	**16**
Tire	0	1	2	0	0	1	1	4	2	3	0	0	**14**
Debris	4	4	3	1	1	2	2	3	6	4	1	0	**31**
Fuel	0	0	1	0	1	1	1	2	3	1	1	1	**12**
Check on Welfare	7	3	8	2	1	1	4	12	12	6	4	2	**62**
Traffic Control / Assist Unit	2	3	3	2	5	3	4	9	3	9	3	8	**54**
Vehicle Removal	1	0	6	2	2	4	6	14	11	11	7	5	**69**
Disregard / No Assist	2	3	5	1	0	2	3	1	3	5	10	8	**43**
Other	0	0	0	0	0	0	0	2	0	0	0	1	**3**
Total Assists	**18**	**15**	**29**	**10**	**10**	**14**	**24**	**51**	**40**	**42**	**26**	**25**	**304**

Figure 16: 2023 IMAP Services by Type, YTD



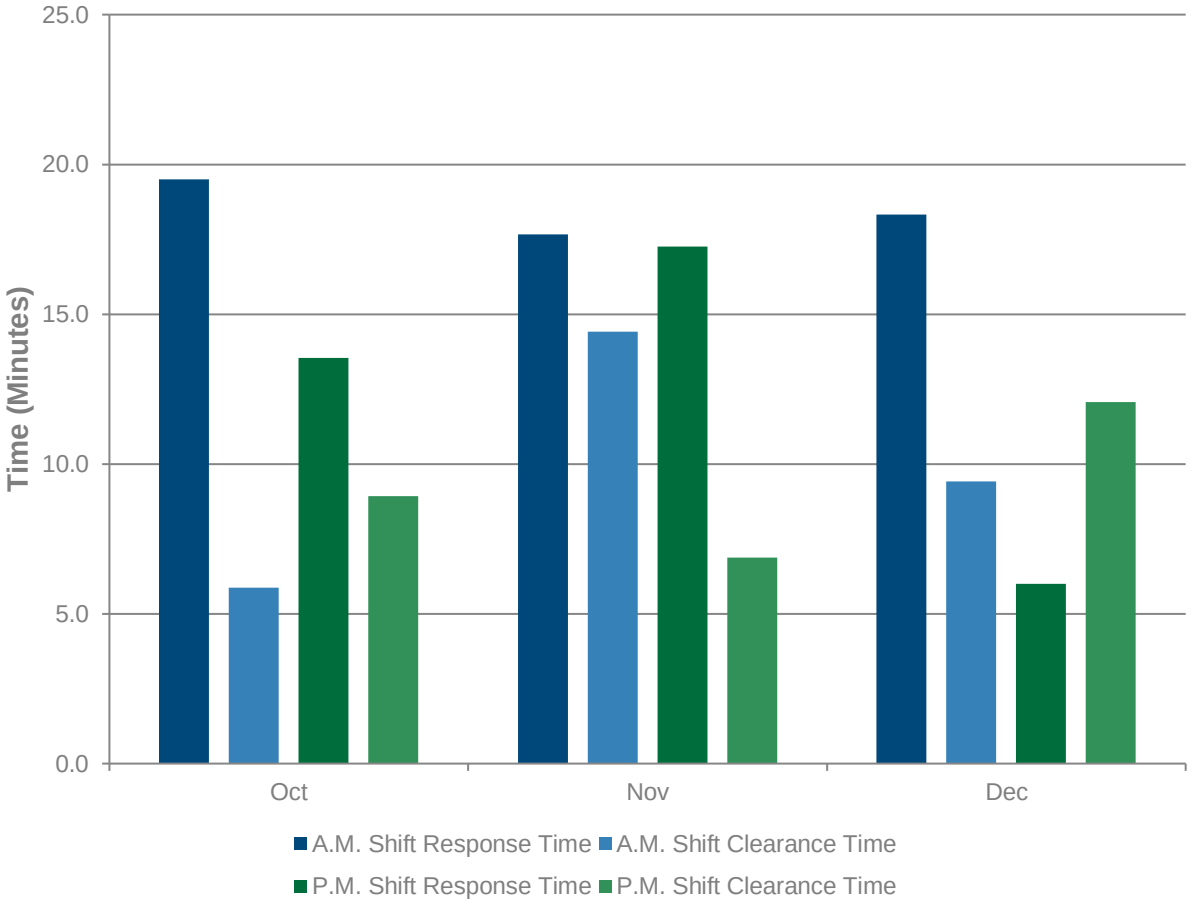
The response and clearance times for all IMAP assists are logged by IMAP and provided to the NCTA. Response time is the time from which a responder receives a call to the time they arrive on the scene. Clearance time is the time it takes the responder to clear the incident and return the roadway to normal operation. The IMAP staff's 1st shift occurs from 6AM to 2PM, while 2nd 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 17* present the average IMAP assistance response and clearance times, in minutes, for the Triangle Expressway.

Table 5: 2023 Average IMAP Response & Clearance Times (Minutes), YTD

Response Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2023 Average
AM Shift Response	10.7	8.0	23.3	13.5	20.0	13.7	10.8	13.3	10.2	36.0	17.7	18.3	15.5
AM Shift Clearance	20.8	9.6	6.3	7.0	5.5	4.2	3.3	15.5	6.0	5.9	14.4	9.4	9.3
PM Shift Response	13.0	14.0	12.2	11.0	26.5	20.3	19.8	14.1	11.1	13.5	17.3	6.0	13.7
PM Shift Clearance	7.2	10.2	3.7	35.0	9.0	3.8	3.6	7.9	5.9	8.9	6.9	12.1	8.1

Figure 17: Average IMAP Response & Clearance Times (Minutes), Fourth Quarter by Month



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 was similarly 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 2022/2023 quarterly and rolling 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, a single quarter is not a statistically valid representation of the assets' conditions; only the rolling rating provides a 95% confidence level in statistical sampling.

Table 6: MRP Assessment Results

Element	Q1 2023 Rating	Q2 2023 Rating	Q3 2023 Rating	Q4 2023 Rating	Rolling Rating
Road Surface	96.9	98.0	98.9	98.0	**97.9**
Unpaved Shoulders and Ditches	99.1	97.4	96.5	97.4	**97.6**
Drainage	93.3	95.7	96.9	94.9	**95.2**
Roadside	94.2	95.6	92.0	91.3	**93.4**
Traffic Control Devices	94.2	92.6	96.2	93.5	**94.8**
Overall MRP Performance Rating	**95.3**	**95.6**	**96.3**	**95.0**	**95.8**