NORTH CAROLINA
Turnpike Authority

Monroe Expressway

Operations Statistics Report

2024 First Quarter
January - March

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Introduction

Purpose

The North Carolina Turnpike Authority (NCTA) presents the operations statistics for the Monroe Expressway during the first quarter (January - March) of 2024. 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 Monroe Expressway is a 20-mile toll road that extends from US 74 near I-485 in Mecklenburg County to US 74 between the towns of Wingate and Marshville in Union County. The four-lane, controlled-access toll facility relieves congestion on US 74, which serves as an important commercial corridor for residents and businesses in Union and Mecklenburg counties as it gives retail, commercial and employment centers in the area direct access to and from the route.

The Monroe Expressway utilizes an all-electronic, non-stop tolling system that does not require drivers to stop at toll plazas 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 Monroe Expressway are located on the mainline between all interchanges. An illustration of the Monroe Expressway can be seen in *Figure 1*.

Figure 1: Monroe Expressway System Map

Traffic Statistics

Traffic Statistics

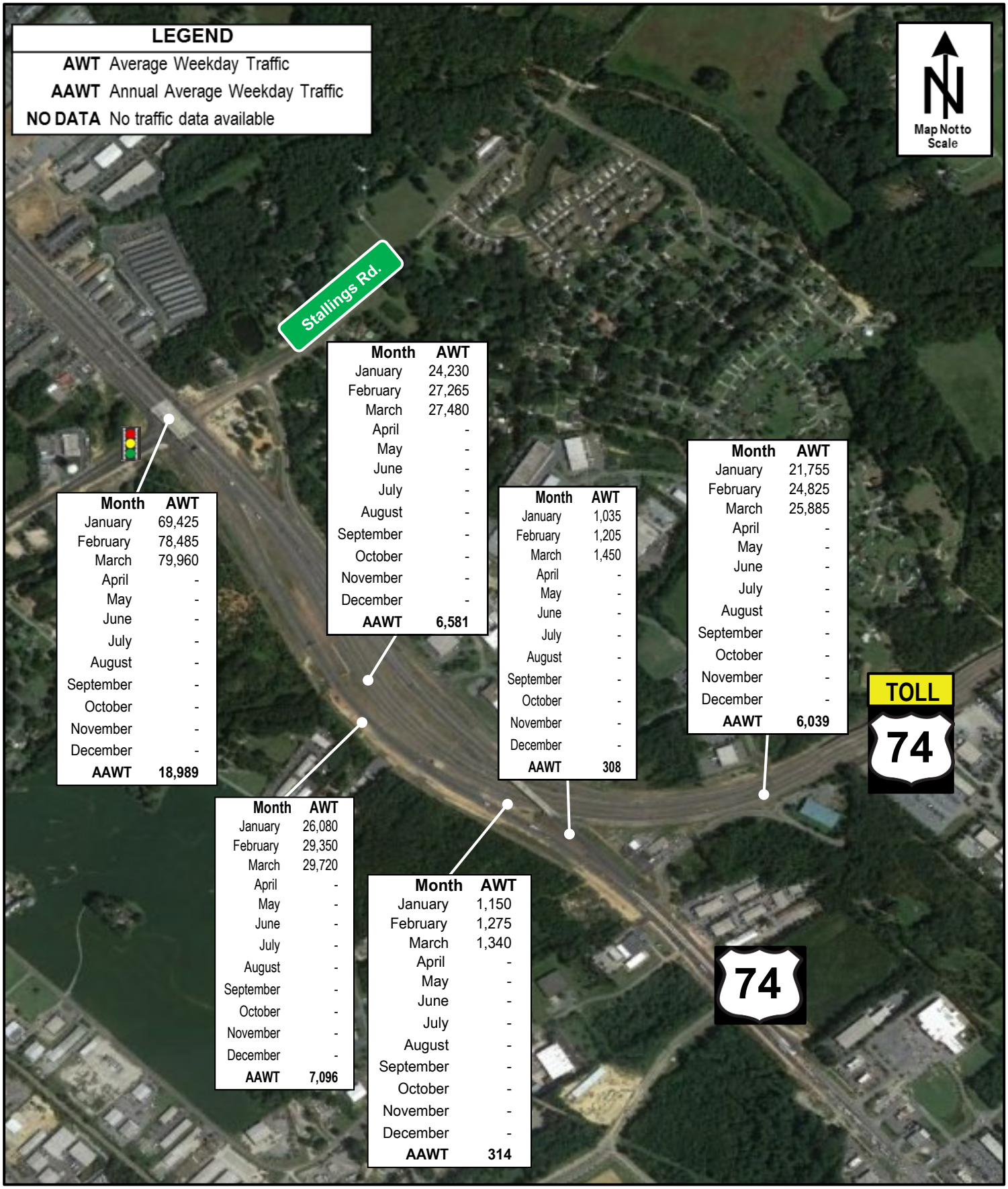
Traffic data is collected and stored using roadside inductive loops installed throughout the Monroe Expressway. The data provides an overview of the roadway's current utilization. The data can also be analyzed to identify trends that could more accurately predict future utilization.

It should be noted that the Monroe Expressway opened in November 2018. Traffic volumes increase significantly as the customers become more familiar with the facility.

Average Weekday Traffic (AWT)

Traffic volume data is collected at all ramps and mainline segments between interchanges. The location of interchanges along the Monroe Expressway can be seen in *Figure 1*. 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.

Figures 2 - 9 contain visual representations of AWT along the facility which are representative of NCTA's loop detector data. It should be noted that if a loop detector fails to provide reliable data (meeting the established threshold) for at least five days in a month then "NO DATA" is reported for that loop detector.



Month	AWT
January	69,425
February	78,485
March	79,960
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	**18,989**

Month	AWT
January	24,230
February	27,265
March	27,480
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	**6,581**

Month	AWT
January	1,035
February	1,205
March	1,450
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	**308**

Month	AWT
January	21,755
February	24,825
March	25,885
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	**6,039**

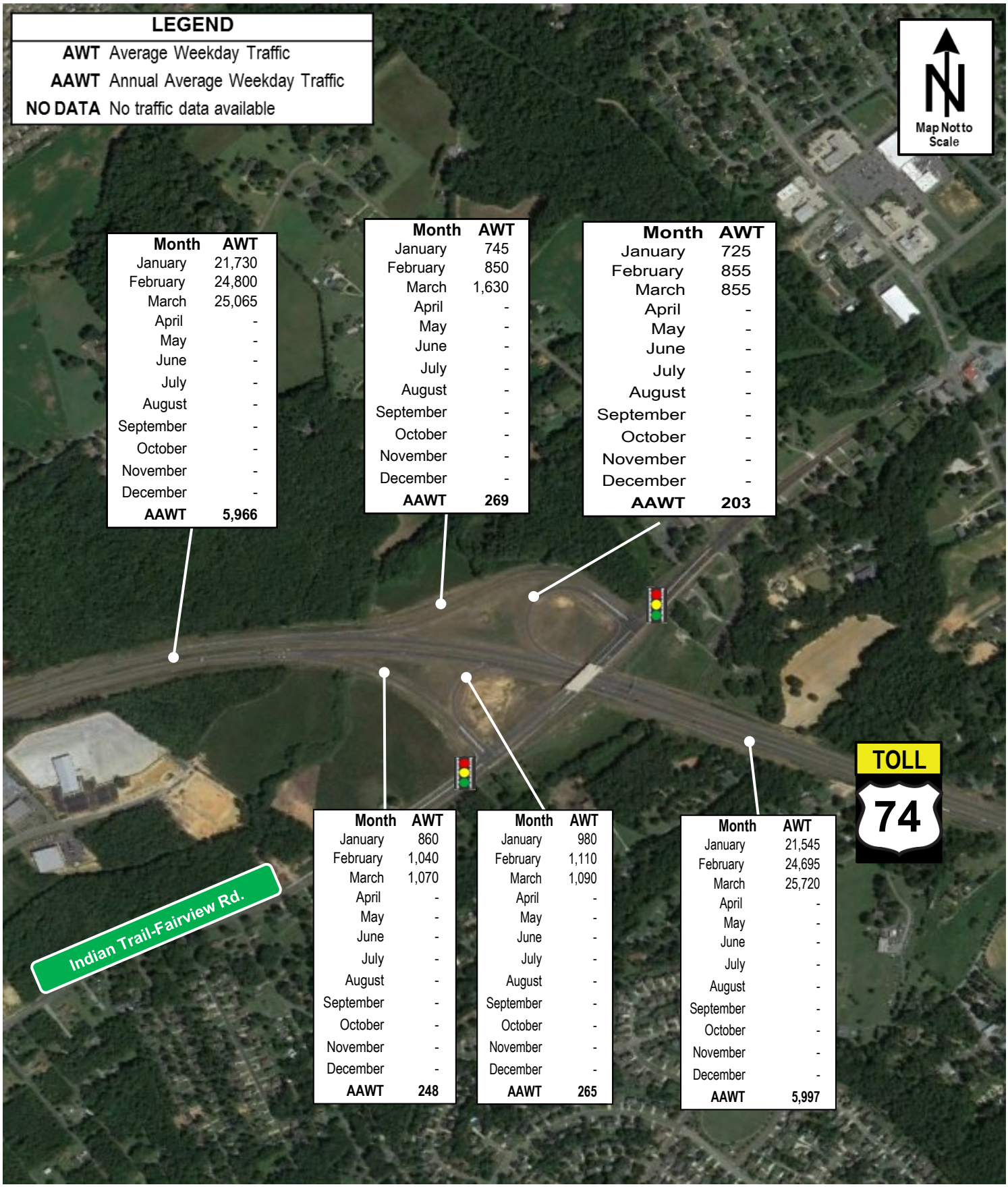
Month	AWT
January	26,080
February	29,350
March	29,720
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	**7,096**

Month	AWT
January	1,150
February	1,275
March	1,340
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	**314**

Toll US 74 Exp at US 74 West Interchange

2024 Average Weekday Traffic

Figure 2



Month	AWT
January	21,730
February	24,800
March	25,065
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	**5,966**

Month	AWT
January	745
February	850
March	1,630
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	**269**

Month	AWT
January	725
February	855
March	855
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	**203**

Month	AWT
January	860
February	1,040
March	1,070
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	**248**

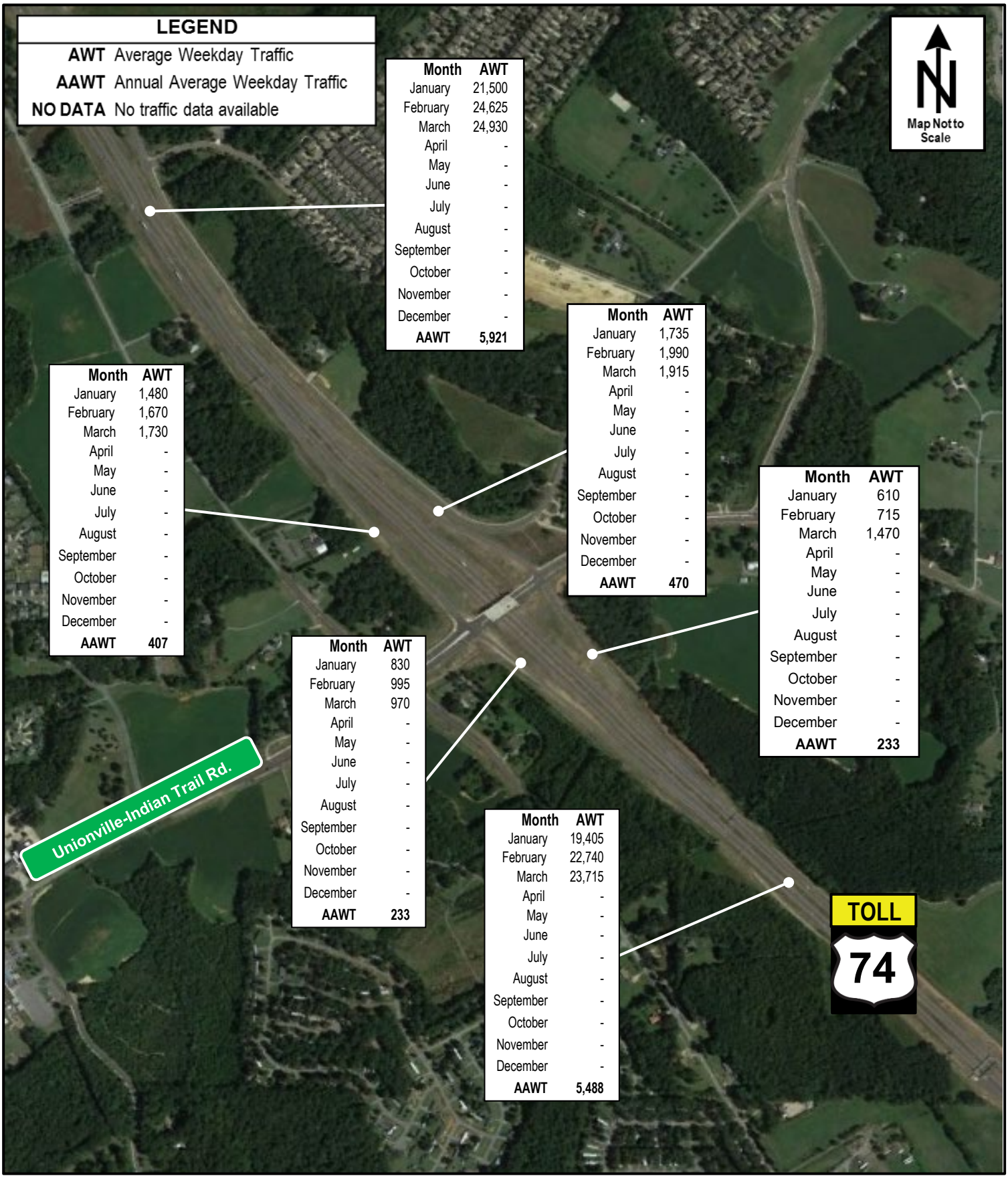
Month	AWT
January	980
February	1,110
March	1,090
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	**265**

Month	AWT
January	21,545
February	24,695
March	25,720
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	**5,997**

Toll US 74 Exp at IT-Fairview Interchange

2024 Average Weekday Traffic

Figure 3



Month	AWT
January	21,500
February	24,625
March	24,930
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	5,921

Month	AWT
January	1,480
February	1,670
March	1,730
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	407

Month	AWT
January	1,735
February	1,990
March	1,915
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	470

Month	AWT
January	610
February	715
March	1,470
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	233

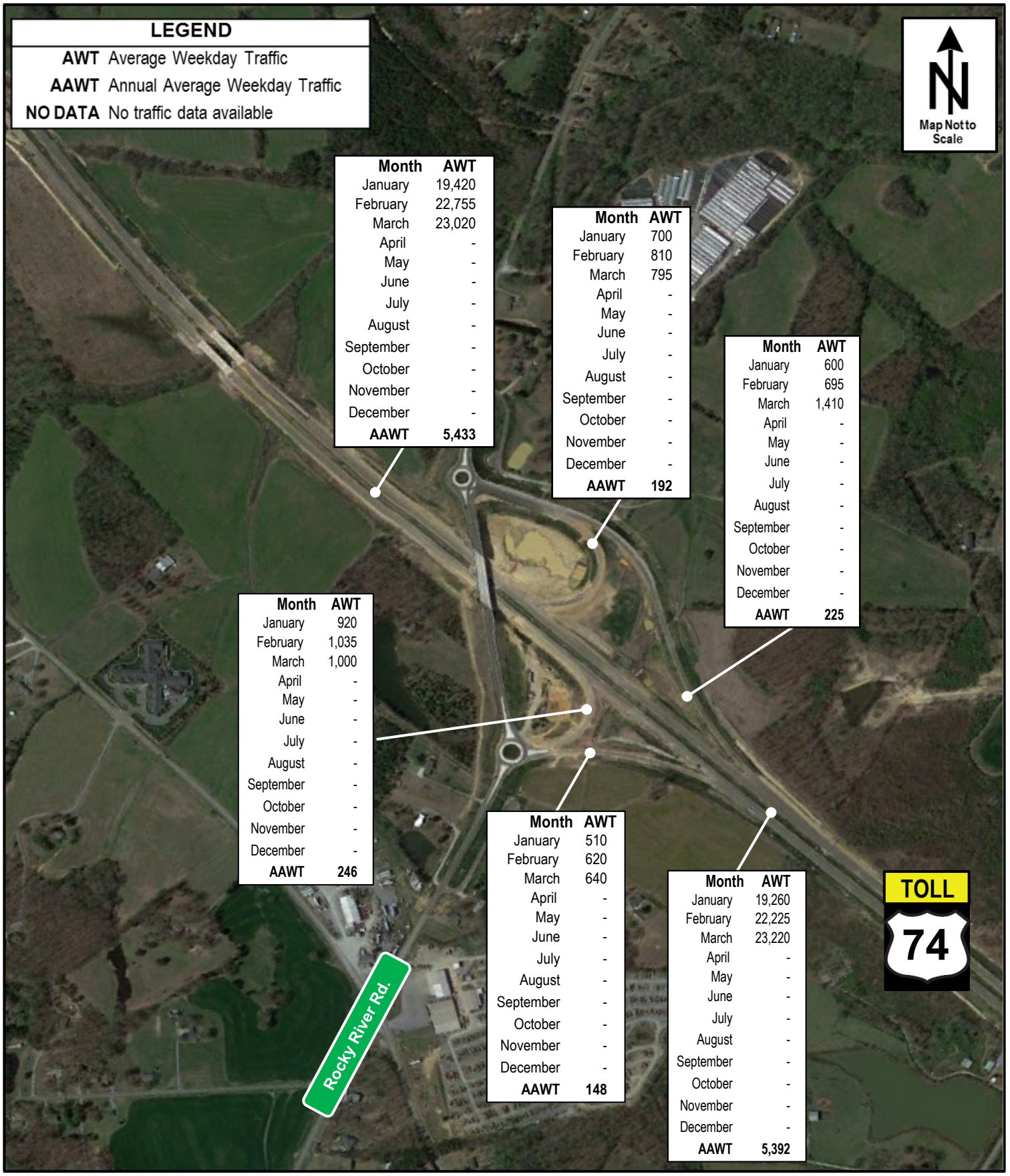
Month	AWT
January	830
February	995
March	970
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	233

Month	AWT
January	19,405
February	22,740
March	23,715
April	-
May	-
June	-
July	-
August	-
September	-
October	-
November	-
December	-
AAWT	5,488

Toll US 74 Exp at Unionville-IT Interchange

2024 Average Weekday Traffic

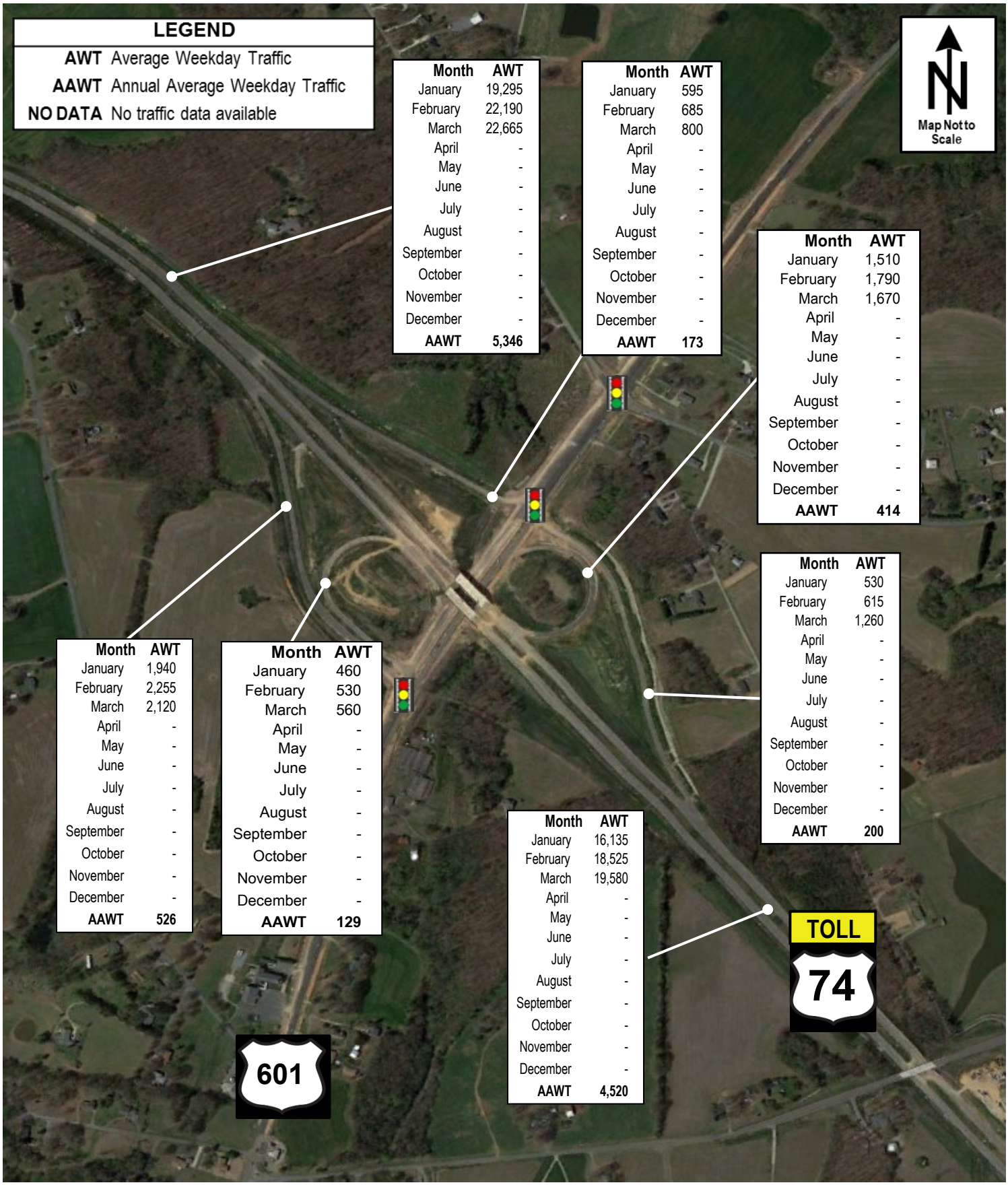
Figure 4



Toll US 74 Exp at Rocky River Interchange

2024 Average Weekday Traffic

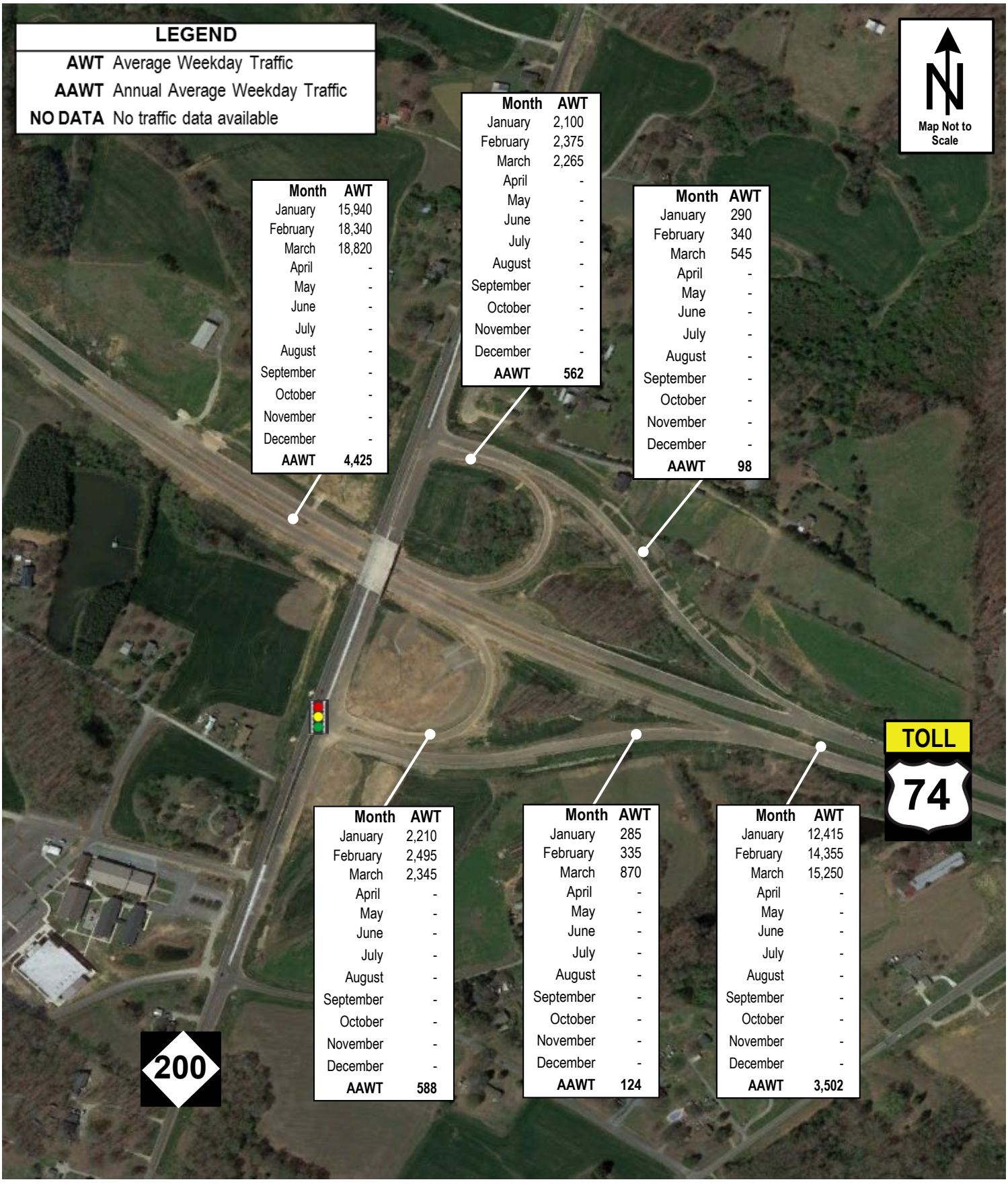
Figure 5



Toll US 74 Exp at US-601 Interchange

2024 Average Weekday Traffic

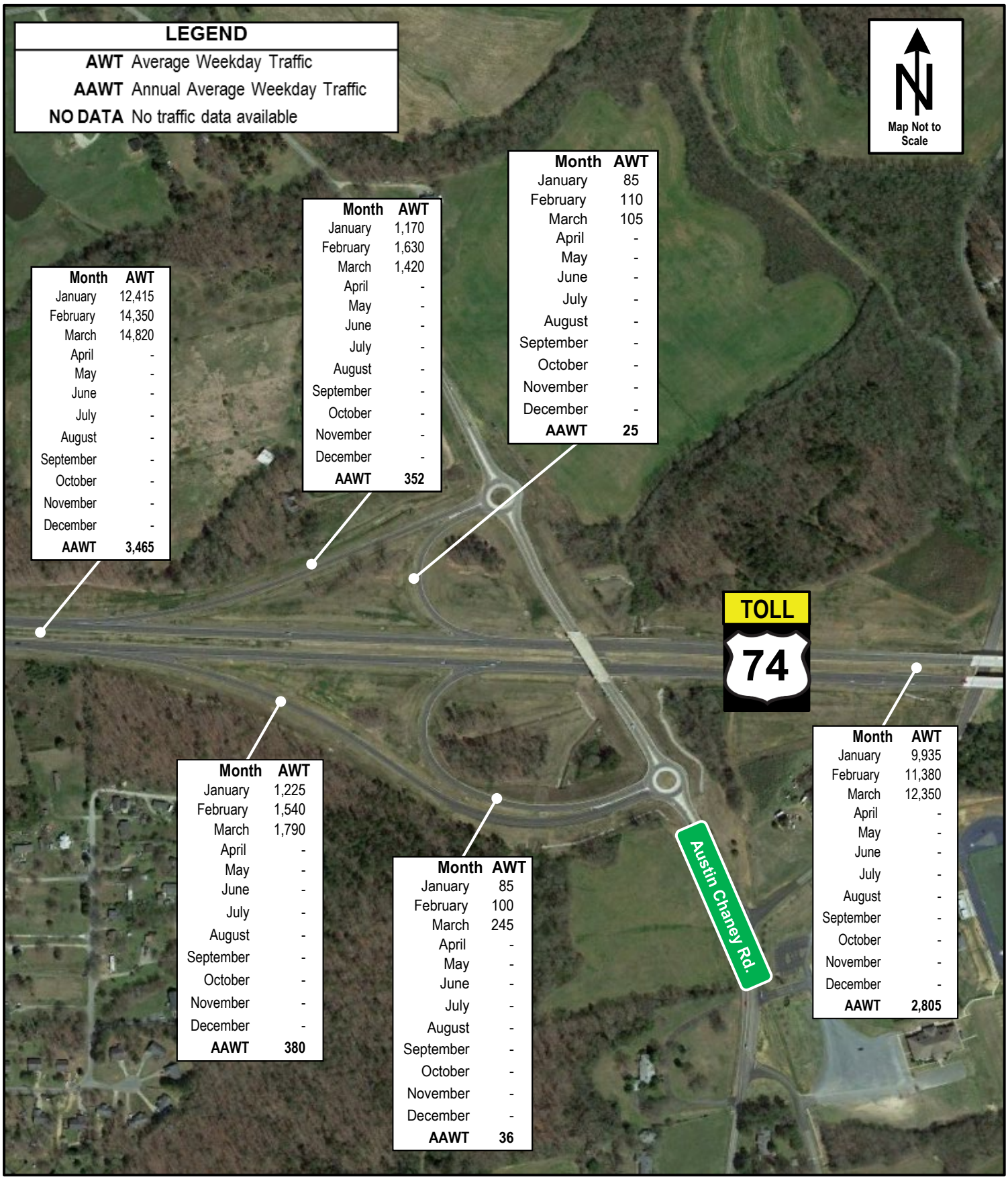
Figure 6



Toll US 74 Exp at NC-200 Interchange

2024 Average Weekday Traffic

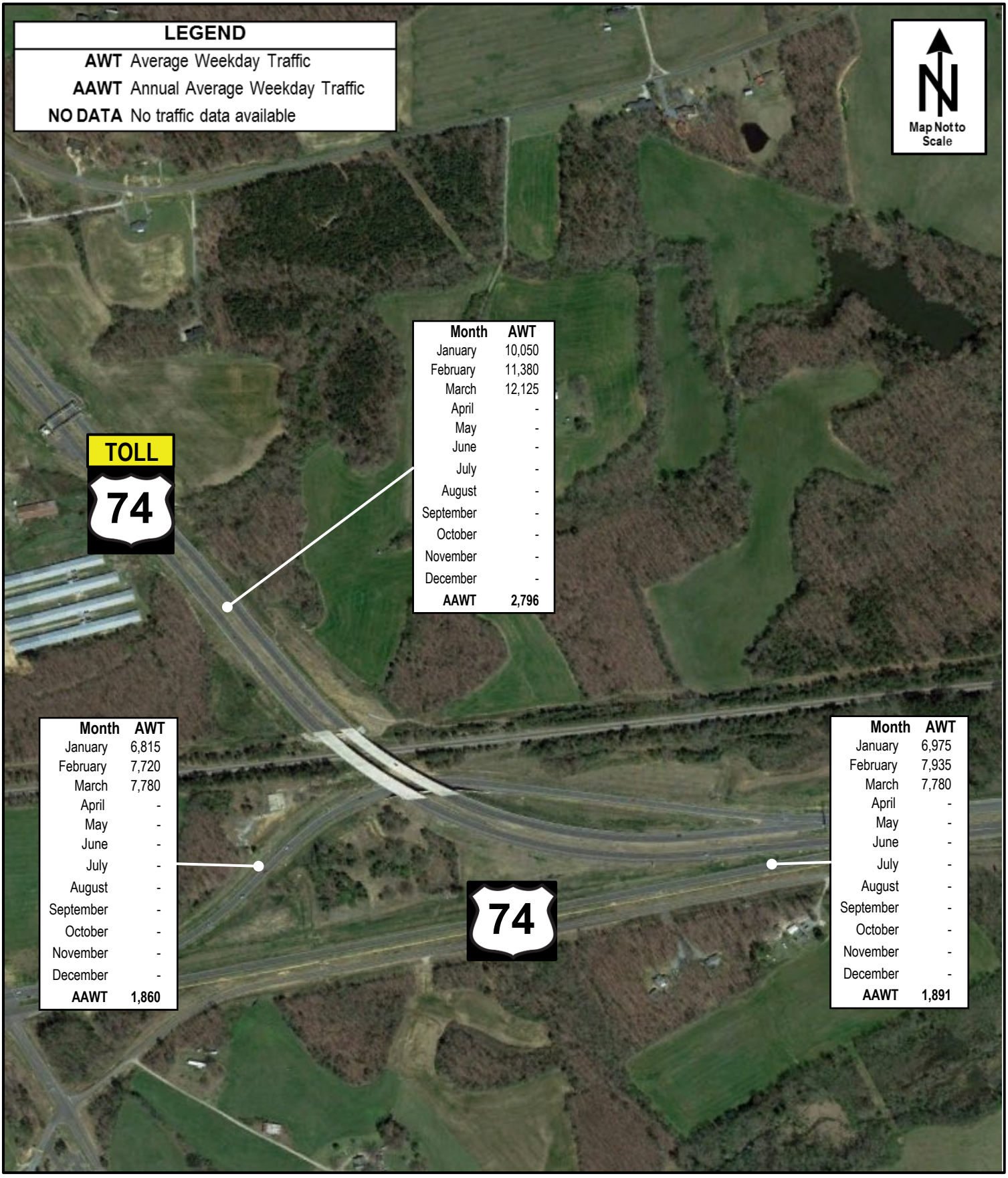
Figure 7



Toll US 74 Exp at Austin Chaney Interchange

2024 Average Weekday Traffic

Figure 8



Toll US 74 Exp at US 74 East Interchange

2024 Average Weekday Traffic

Figure 9

Roadway Safety Statistics

Roadway Statistics

Traffic crashes are often related to deficiencies in the safety and capacity characteristics of a transportation facility. To identify these deficiencies early and reduce the likelihood of crashes on the Monroe 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, which is separated into four (4) segments:

- Toll US 74, from Exit 255 (US 74) to Exit 259 (Unionville-Indian Trail Road)
- Toll US 74, from Exit 259 (Unionville-Indian Trail Road) to Exit 264 (US 601)
- Toll US 74, from Exit 264 (US 601) to Exit 266 (NC 200)
- Toll US 74, from Exit 266 (NC 200) to Exit 273 (US 74)

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. The Monroe Expressway opened to traffic in November 2018. Comparison to the statewide critical crash rate was performed for every quarter.

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 March 1, 2021 through February 29, 2024 for each segment. The AADT used for this quarter analysis was collected from the Vehicle Detection System (VDS) loops from 2021. 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 Monroe 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. Monroe 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.

Table 1: Safety Statistics, March 1, 2021 – February 29, 2024

Segment	Length	AADT	Total Crashes	Vehicle Exposure (MVMT)	Total Crash Rate	Statewide Crash Rate	Critical Crash Rate
Toll US 74 US 74 to Unionville-Indian Trail Rd	5.62	20,500	56	126.22	44.37	128.63	154.22
Toll US 74 Unionville-Indian Trail Rd to US 601	5.33	19,000	75	110.79	67.70	128.63	155.42
Toll US 74 US 601 to Austin Chaney Rd	5.74	14,500	73	91.07	80.16	128.63	157.40
Toll US 74 Austin Chaney Rd to US 74	3.00	11,500	23	37.82	60.82	128.63	169.30
Monroe Expressway	**19.69**	**17,000**	**223**	**366.47**	**60.30**	**128.63**	**146.88**

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 Monroe Expressway. These operators work at the Metrolina Regional Transportation Management Center (MRTMC) located in Charlotte. They are responsible for monitoring the facility from 5 AM to 9 PM. During non-working hours, monitoring is turned over to the Statewide Transportation Operations Center in Raleigh (STOC) and is monitored for 24 hours a day, 7 days a week, 365 days a year using closed-circuit television (CCTV) cameras, vehicle detectors (VDS), and toll zone security cameras. Additionally, STOC 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. Operators can also quickly dispatch toll technology technicians to address equipment failures via the Transportal maintenance ticket system. Additionally, in the event of incidents on the facility, operators 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 State Highway Patrol (SHP) and IMAP services provided on the Monroe Expressway. This program provides two SHP officers and two IMAP responders to the facility between the hours of 5 AM and 9 PM, Monday through Friday. During this time, the assigned SHP officers and IMAP drivers are responsible for patrolling the facility and responding to incidents reported by operators.

This section presents operations statistics reported by SHP and IMAP during the first quarter of 2024. 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 2024. "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: 2024 SHP Chargeable Activities, YTD

Chargeable Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Speed Violations	41	45	49										
Alcohol Violations	0	0	0										
Seat Belt Violations	6	6	3										
Child Restraint Violations	0	0	0										
Reckless Driving	14	12	12										
Drug Violations	0	0	0										
Obstructed Plates	0	0	0										
Other Violations	58	65	55										
Total Charges	**119**	**128**	**119**										

Table 3: 2024 SHP Non-Chargeable Activities, YTD

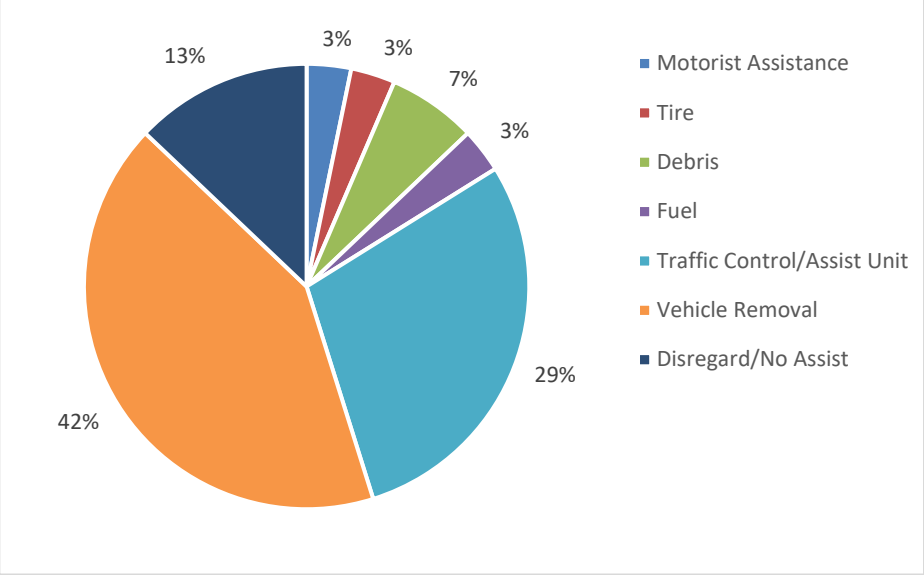
Non-Chargeable Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Warnings	8	15	14										
Crashes Investigated	4	1	2										
Calls for Service	26	24	22										
Total	**28**	**40**	**38**										

The IMAP assists with stranded motorists and incident clearance, thereby maintaining the flow of traffic along the roadway. *Table 4* and *Figure 10* present the monthly breakdown of IMAP services, by type, for the Monroe Expressway during 2024. The “other” category includes extinguish fire service, first aid service, and other rare miscellaneous services.

Table 4: 2024 IMAP Services, YTD

Assist Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Motorist Assistance	1	0	0										
Tire	1	1	1										
Debris	2	2	2										
Fuel	1	0	0										
Check on Welfare	0	0	0										
Traffic Control / Assist Unit	9	5	16										
Vehicle Removal	13	7	8										
Disregard / No Assist	4	3	1										
Other	0	0	2										
Total Charges	**31**	**18**	**30**										

Figure 10: 2024 IMAP Services by Type, YTD



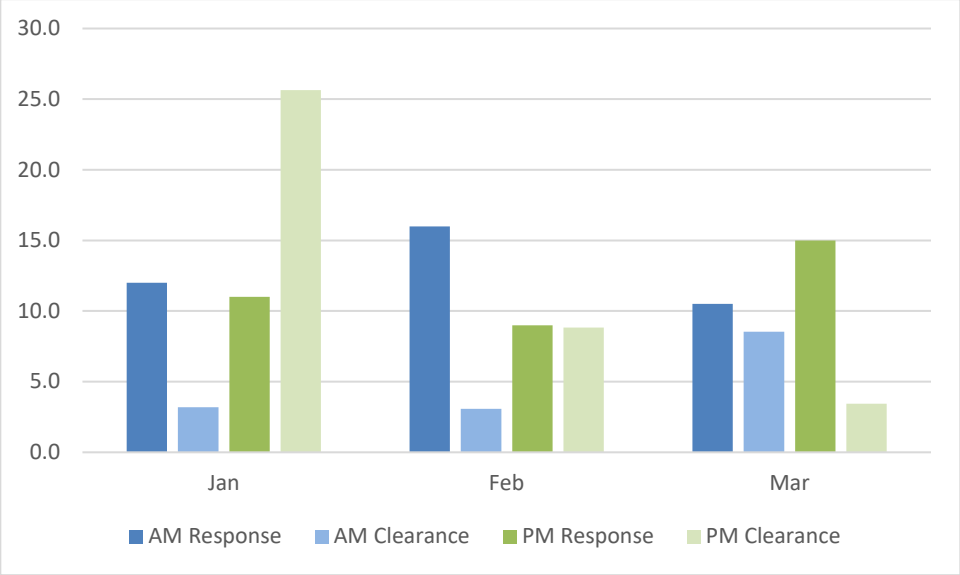
The response and clearance times for all IMAP assists are logged by IMAP and provided to the NCTA. Response time is the time from which a responder receives a call to the time they arrive on the scene. Clearance time is the time it takes the responder to clear the incident and return the roadway to normal operation. The IMAP staff's AM shift occurs from 6 AM to 1 PM, while the PM shift occurs from 1 PM to 9 PM. Shift response times may differ due to the number of drivers on duty and their coverage areas.

Table 5 and *Figure 11* present the average IMAP assistance response and clearance times, in minutes, for the Monroe Expressway.

Table 5: 2024 Average IMAP Response and Clearance Times (Minutes), YTD

Response Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2024 Average
A.M. Shift Response	12.0	16.0	10.5										**11.8**
A.M. Shift Clearance	3.2	3.1	8.5										**4.9**
P.M. Shift Response	11.0	9.0	15.0										**11.6**
P.M. Shift Clearance	25.6	8.8	3.4										**13.0**

Figure 11: Average IMAP Response and Clearance Times (Minutes), First 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 key 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 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.

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 2023/2024 quarterly and annual MRP Assessment rating. 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; only the annual rating will provide a 95% confidence level in statistical sampling.

Table 6: MRP Assessment Results

Element	Q2 2023 Rating	Q3 2023 Rating	Q4 2023 Rating	Q1 2024 Rating	Rolling Rating
Road Surface	95.7	97.9	95.7	98.5	**96.9**
Unpaved Shoulders and Ditches	98.7	100.0	97.0	96.5	**98.1**
Drainage	96.5	97.1	96.1	97.8	**96.9**
Roadside	95.3	94.5	96.5	96.5	**95.7**
Traffic Control Devices	96.7	100.0	96.0	95.5	**97.1**
Overall MRP Performance Rating	**96.4**	**98.1**	**96.2**	**96.9**	**96.9**