NORTH CAROLINA
Turnpike Authority

Maintenance Rating Program

Triangle Expressway

August 2024

2024 Second Quarter Report

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1.0 Executive Summary

The North Carolina Turnpike Authority (NCTA) Maintenance Rating Program (MRP) is a maintenance evaluation program for roadway features and toll facilities on the NCTA system. This report presents results from the 2024 Second Quarter Assessment of the Triangle Expressway.

The overall 2024 Second quarter maintenance rating of the Triangle Expressway was **95.7,** above the NCTA target rating of 90. As shown in ***Table 1***, all five elements assessed achieved a rating greater than the target rating of 85.

Table 1: MRP Element Results for the 2024 Second Quarter Assessment

Element	MRP Rating	Target Rating
Road Surface	98.9	85.0
Unpaved Shoulders and Ditches	98.8	85.0
Drainage	93.9	85.0
Roadside	94.4	85.0
Traffic Control Devices	93.3	85.0
Overall MRP Performance Rating	**95.7**	**90.0**

This report also provides a rolling rating of the latest four quarterly inspections of the Triangle Expressway. As presented in ***Table 2***, the rolling maintenance rating of the Triangle Expressway was **94.8**.

Table 2: MRP Rolling Element Results

Element	Q3 2023 Rating	Q4 2023 Rating	Q1 2024 Rating	Q2 2024 Rating	Rolling Rating
Road Surface	98.9	98.0	96.7	98.9	98.2
Unpaved Shoulders and	96.5	97.4	95.2	98.8	97.2
Drainage	96.9	94.9	89.6	93.9	93.9
Roadside	92.0	91.3	92.6	94.4	92.7
Traffic Control Devices	96.2[1]	93.5	87.2	93.3	92.6[2]
Overall MRP Performance	**96.3[1]**	**95.0**	**91.9**	**95.7**	**94.8[2]**

[1]Excludes concrete surface pavement markers, striping, and symbols on mainline NC-540 and asphalt surface markers on mainline NC-885.
[2]Excludes quarter ratings for elements listed above.

In addition, the report provides findings of the Green Level Historic District signs inspection. This quarter, two signs were inspected. Both signs were found to be in good physical condition. The landscaped area around the two signs was maintained in accordance with NCTA MRP standards.

2.0 Introduction

The NCTA 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 assets. The evaluation procedure is based on the establishment of threshold conditions that quantify the maximum defect allowed on assets. Over time, the results can be charted to identify work needs and subsequent necessary actions.

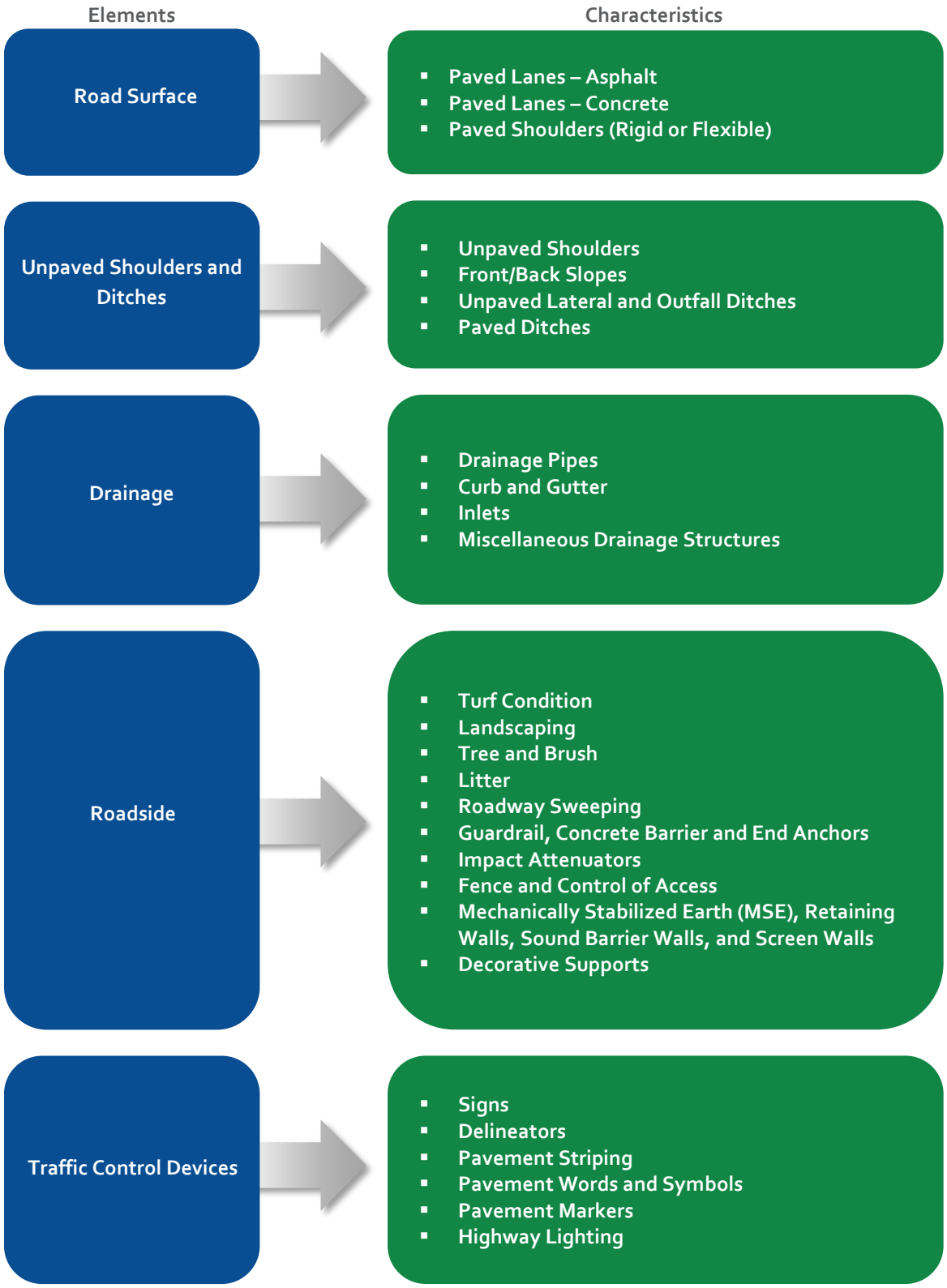
The NCTA performance standards, threshold criteria, and maintenance rating program were developed through a collaborative effort by NCTA managers, NCDOT maintenance staff, and consultants.

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 can be used to schedule and prioritize routine maintenance activities and provide uniform maintenance conditions that meet established objectives.

3.0 MRP Procedure

Per the *NCTA Roadway and Facility Maintenance Performance Standards V7*, roadway assets or characteristics on NCTA facilities have been grouped into elements. These elements and corresponding characteristics are shown in ***Figure 1:***

Figure 1: Maintenance Elements and Characteristics



A weighting system has been established to identify the importance of each element and characteristic. This system consists of two weighting factors: one that accounts for the importance of individual characteristics within a given maintenance element (1-9), and one that accounts for the importance of the maintenance elements to the total rating (by % of score). This two-factor system reveals deficiencies among characteristics and elements.

The program analysis is accomplished using statistically valid, random sampling procedures that capture the level of service for individual characteristics, with a 95% confidence level in sampling. The sample characteristics selected are evaluated during quarterly inspections, which are performed during the months of February, May, August, and November to account for dynamic changes in assets during the various seasons. The evaluation process is completed using electronic data collection tablets and is based on established threshold conditions described in the NCTA Roadway and Facility Maintenance Standards V7. Those characteristics that meet or exceed the threshold are coded as PASSING; those that do not meet the threshold are coded as NOT PASSING.

When the evaluation process is completed, the number of PASSING samples and total sample are multiplied by the weighted values (1-9) to determine the actual and possible rating points for characteristics and elements. MRP ratings for elements and characteristics are then calculated as the ratio of the actual rating points to possible rating points. The MRP ratings represent the maintenance level of service currently being provided, as they define the percent of characteristics and elements that meet the maintenance condition standard. For instance, an MRP rating of 83 signifies that 83 percent of the inspected elements/characteristics met the standard.

The overall MRP rating is determined by calculating the sum of the elements' ratings multiplied by the following weighted factors:

Road Surface =	**25%**
Unpaved Shoulders =	**13%**
Drainage =	**15%**
Roadside =	**17%**
Traffic Control Devices =	**30%**
Total	**100%**

The NCTA's overall target rating is 90, with elements scoring 85 or higher, and characteristics 80 or higher. In addition to quarterly ratings, the cumulative rolling annual rating is calculated each quarter. This rating is obtained by adding the ratings of the latest four quarterly inspections to compensate for the likelihood of uneven sample sizes.

4.0 Triangle Expressway Description

The Triangle Expressway extends for approximately 18.8 miles from the interchange of I-40 and Toll NC-885 in Durham to the NC-55 Bypass near Holly Springs (***Figure 2***). It includes a one-mile segment on Toll NC-540 extending north from the Toll NC-540 / Toll NC-885 interchange to the NC-54 interchange. The Triangle Expressway consists of twelve interchanges and twenty-two all-electronic toll collection zones.

Figure 2: Triangle Expressway Map

5.0 Triangle Expressway Asset Inventory Update

Through normal day-to-day maintenance activities and the construction of special projects, roadside assets are continuously being added or modified on the roadway. NCTA coordinates closely with NCDOT Division 5 Maintenance and conducts routine field visits to maintain an accurate asset inventory and ensure the validity of the MRP survey.

During this quarter assets on Toll NC 540 exit ramps to and from NC-55 Bypass were removed from the inventory due to the Complete 540 construction project. ***Table 3*** presents the updated number of assets that are currently available for inspections.

Table 3: Asset Inventory

Assets	Total Inventory	2024 Eligible Inventory
Barriers	801	616
Curb and Gutter	428	391
Decorative Supports	305	298
Drainage	1179	1127
Misc. Drainage	218	202
Fences	508	483
Highway Lighting	435	430
Impact Attenuators	48	46
Inlets	1129	1075
Linear Segments	795	755
Plant Beds	266	257
Paved Ditches	2	2
Pavement Symbols	652	591
Signs	1224	1168
Tree and Brush	603	567
Turf	1074	1011
Walls	88	84

6.0 MRP Second Quarter Assessment

6.1 Quarterly Results

The overall 2024 Second quarter maintenance rating of the Triangle Expressway was 95.7, above NCTA's target overall rating of 90. All elements assessed achieved quarter ratings above the target rating of 85 established for element groups.

It is important to note that these results are only representative of the second quarter sample, one of the four surveys to provide an intermediate snapshot of seasonal conditions. Therefore, they are not a statistically valid representation of the assets; only the total of all four quarterly inspections, reported as the rolling rating, provides a 95% confidence level in statistical sampling. The Second quarter MRP performance ratings for elements and characteristics are presented in ***Table 4*** and ***Table 5***, respectively.

Table 4: MRP Element Results for Q2 2024

Element	MRP Rating
Road Surface	98.9
Unpaved Shoulders and Ditches	98.8
Drainage	93.9
Roadside	94.4
Traffic Control Devices	93.3
Overall MRP Performance Rating	**95.7**

Table 5: MRP Characteristics Results for Q2 2024

Road Surface	Sample Passed	Sample Total	Weighted Values	Actual Pts	Available Pts	Q2 Rating
Paved Lanes Asphalt	21	22	9	189	198	95
Paved Lanes Concrete	34	34	9	306	306	100
Paved Shoulder	57	57	5	285	285	100
Element Total				**780**	**789**	**98.9**
Unpaved Shoulders and Ditches	**Sample Passed**	**Sample Total**	**Weighted Values**	**Actual Pts**	**Available Pts**	**Q2 Rating**
Unpaved Shoulder	56	57	9	504	513	98
Front/Back Slopes	57	57	6	342	342	100
Lateral and Outfall Ditches, Unpaved	56	57	6	336	342	98
Ditches, Paved	2	2	5	10	10	100
Element Total				**1192**	**1207**	**98.8**
Drainage	**Sample Passed**	**Sample Total**	**Weighted Values**	**Actual Pts**	**Available Pts**	**Q2 Rating**
Drainage Pipes	48	52	7	336	364	92
Curb and Gutter	27	28	6	162	168	96
Inlets	33	34	7	231	238	97
Misc. Drainage Structure	22	25	4	88	100	88
Element Total				**817**	**870**	**93.9**
Roadside	**Sample Passed**	**Sample Total**	**Weighted Values**	**Actual Pts**	**Available Pts**	**Q2 Rating**
Turf Condition	46	51	7	322	357	90
Landscaping	24	25	4	96	100	96
Trees and Brush	29	31	4	116	124	94
Litter	57	57	4	228	228	100
Roadway Sweeping	57	57	5	285	285	100
Guardrail, Concrete Barrier, and End Anchors	28	31	9	252	279	90
Impact Attenuators	9	9	9	81	81	100
Fence, Control Access	41	45	7	287	315	91
Retaining Walls and Sound Barrier Walls	14	18	5	70	90	78
Decorative Supports	26	26	5	130	130	100
Graffiti and Stain Removal	44	44	4	176	176	100
Element Total				**2043**	**2165**	**94.4**
Traffic Control Devices	**Sample Passed**	**Sample Total**	**Weighted Values**	**Actual Pts**	**Available Pts**	**Q2 Rating**
Signs	43	44	7	301	308	98
Delineators	55	57	3	165	171	96
Pavement Striping/Marking	55	57	8	440	456	96
Words and Symbols	37	42	7	259	294	88
Pavement Markers	54	57	9	486	513	95
Highway Lighting	33	40	6	198	240	83
Element Total				**1849**	**1982**	**93.3**

Additionally, ***Appendix A*** includes maps that present the location of all assets assessed during the first quarter. ***Appendix B*** includes a list of the individual assets that did not achieve their target ratings.

6.2 Quarterly Analysis and Recommendations

Elements

During the Second quarter, all elements exceeded NCTA's quarter score threshold criteria of 85.

Road Surface (98.9) experienced a 2.2-point increase from the previous quarter's rolling rating. Paved Lanes Concrete (100) rolling rating increased by 7 points. All characteristics within this element continued scoring above 90 for last four quarters.

Unpaved Shoulders and Ditches (98.8) experienced an increase in rolling rating. The rating for this element was 3.6 points higher than the previous quarter's rolling rating. All characteristics within this element continued scoring above 90.

Drainage (93.9) rolling rating also increased by 4.3 points from the previous quarter rolling rating. Curb and Gutter (96) rolling rating stayed consistent from last quarter.

Roadside (94.4) rolling rating increased by 1.8 points from the previous quarter rolling rating. Litter (100) was an improved characteristic with a score increase of 9.0 points from the previous quarter's rolling rating. Fences (91) experienced great improvement also with an increase in rating of 9 points from the previous quarter rolling rating.

Traffic Control Devices (93.3) experienced an increase in rolling rating of 6.1 points from the previous quarter. Delineators (96) were the most improved characteristic with an increase in rolling rating of 21 points.

Recommendations to improve specific critical characteristic ratings are provided in the following sections.

Characteristics

This quarter, all but one characteristic, Retaining Walls and Sound Barrier Walls (78), met the NCTA target threshold criteria of 80. A description of the characteristic's conditions and future work planning recommendations are provided below. Pictures of all characteristic failures are included in ***Appendix B***.

Retaining Walls and Sound Barrier Walls (78 rating – 14 of the 18 assets passed): Each of the four of the wall sections that did not pass inspection either had unsealed cracks/joints or overgrown vegetation. Two of the sections that did not pass inspection are presented in ***Figure 3***.

Figure 3: Retaining Walls and Sound Barrier Walls Inspection Results Sample

To maintain/improve the condition ratings, it is recommended that walls and approach clearings be included with brush and overgrowth maintenance and completed as planned in the capital budget. Sealing any pre-existing cracks will help to alleviate future deterioration that may be exacerbated by the elements.

Maintenance Program:

1) Walls shall be inspected during daily patrols.

2) Unwanted vegetation and graffiti (see graffiti standard) shall be scheduled for removal.

3) Minor wall or column damage shall be scheduled for repair within the annual work program.

4) Staining damage shall be scheduled for repair within the annual work program.

5) Any structural damage that poses a safety risk shall be scheduled immediately upon observation. Mitigate any safety hazard upon observation.

Maintenance and Evaluation Standards: MSE/retaining walls, sound barrier walls, and screen walls do not meet the maintenance standards when any of the following criteria is observed:

1) More than 10% of exposed surface is covered with unwanted vegetation.

2) Any single spall 1 inch deep or greater or cumulative spalls covering an area over 5 SF on any single facing.

3) More than 25% of weep holes within the sample section are not functioning properly.

4) Unsealed cracks or joints greater than 0.25 inches in width.

5) Stained areas exhibit cumulative scaling in excess of 1 SF.

7.1 Annual Results

The 2024 annual rolling maintenance rating of the Triangle Expressway was **94.8**, exceeding NCTA's target overall rating of 90. All elements exceeded NCTA's rolling rating threshold criteria of 85. Twenty-seven of the twenty-eight characteristic ratings met or exceeded the target rating of 80.

The 2024 results are presented in ***Exhibit 1*** and ***Table 6***. These results are a collection of the four quarterly inspections conducted in the last year.

Exhibit 1: MRP Element Results for 2024

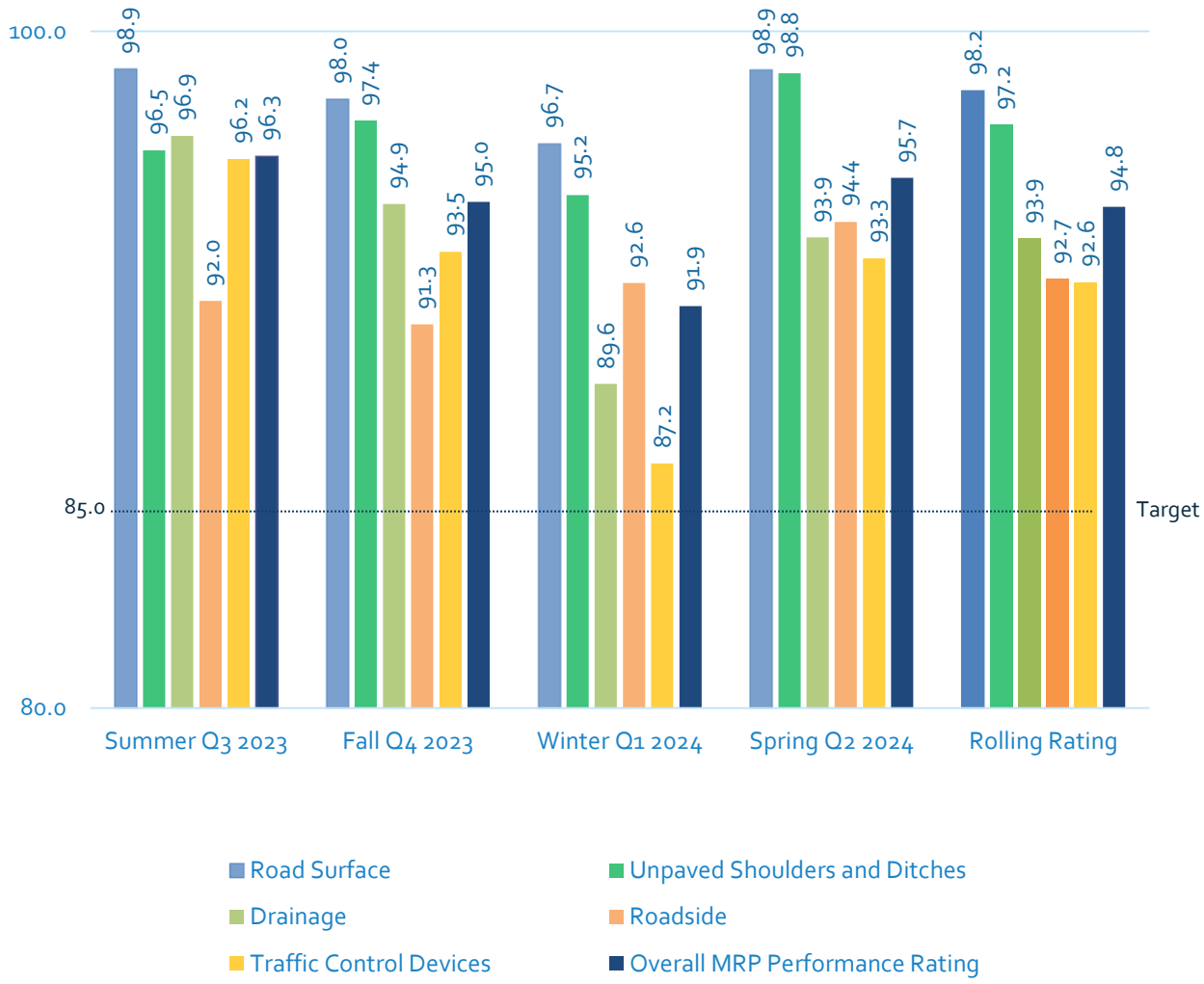


Table 6: MRP Rolling Element Results

Road Surface	Q3 2023 Rating	Q4 2023 Rating	Q1 2024 Rating	Q2 2024 Rating	Rolling Rating
Paved Lanes Asphalt	100	100	100	95	99
Paved Lanes Concrete	100	91	93	100	98
Paved Shoulder	97	100	97	100	99
Element Total	**98.9**	**98.0**	**96.7**	**98.9**	**98.2**
Unpaved Shoulders and Ditches	**Q3 2023 Rating**	**Q4 2023 Rating**	**Q1 2024 Rating**	**Q2 2024 Rating**	**Rolling Rating**
Unpaved Shoulder	94	94	91	98	95
Front/Back Slopes	97	100	97	100	99
Lateral and Outfall Ditches, Unpaved	100	100	100	98	99
Ditches, Paved	100	100	100	100	100
Element Total	**96.5**	**97.4**	**95.2**	**98.8**	**97.2**
Drainage	**Q3 2023 Rating**	**Q4 2023 Rating**	**Q1 2024 Rating**	**Q2 2024 Rating**	**Rolling Rating**
Drainage Pipes	97	97	82	92	92
Curb and Gutter	100	93	96	96	96
Inlets	100	97	94	97	97
Misc. Drainage Structure	84	88	88	88	87
Element Total	**96.9**	**94.9**	**89.6**	**93.9**	**93.9**
Roadside	**Q3 2023 Rating**	**Q4 2023 Rating**	**Q1 2024 Rating**	**Q2 2024 Rating**	**Rolling Rating**
Turf Condition	84	92	85	90	88
Landscaping	92	96	95	96	95
Trees and Brush	100	97	100	94	98
Litter	97	97	91	100	97
Roadway Sweeping	97	100	100	100	99
Guardrail, Concrete Barrier, and End Anchors	90	87	100	90	92
Impact Attenuators	100	89	100	100	97
Fence, Control Access	87	79	82	91	85
Retaining Walls and Sound Barrier Walls	72	72	72	78	74
Decorative Supports	100	96	96	100	98
Graffiti and Stain Removal	100	100	100	100	100
Element Total	**92.0**	**91.3**	**92.6**	**94.4**	**92.7**
Traffic Control Devices	**Q3 2023 Rating**	**Q4 2023 Rating**	**Q1 2024 Rating**	**Q2 2024 Rating**	**Rolling Rating**
Signs	93	97	91	98	95
Delineators	94[1]	94	75	96	91
Pavement Striping/Marking	100[1]	91	91	96	95[2]
Words and Symbols	97	97	87	88	92
Pavement Markers	100	86	88	95	93
Highway Lighting	90[1]	100	83	83	88
Element Total	**96.2[1]**	**93.5**	**87.2**	**93.3**	**92.6[2]**

[1] Excludes concrete surface pavement markers, striping, and symbols on mainline NC-540 and asphalt surface markers on mainline NC-885.

[2] Excludes the indicated quarter ratings for characteristics listed above.

7.0 Green Level Historic District Signs

Green Level Historic District signs and surrounding landscaped areas were installed as part of the Triangle Expressway construction project. Currently, NCDOT is maintaining the Green Level Historic District Signs and the Town of Cary is providing maintenance to the landscaped areas surrounding these signs.

8.1 Analysis and Recommendations

As part of each quarterly inspection, an assessment team visits the two remaining Green Level Historic District signs to conduct a visual inspection of each sign and ensure they are in good standing. The two signs included in the inspection inventory were found to be in good condition. ***Figure 4*** shows the two signs assessed.

Figure 4: Green Level West Historic District Signs, Landscape Areas

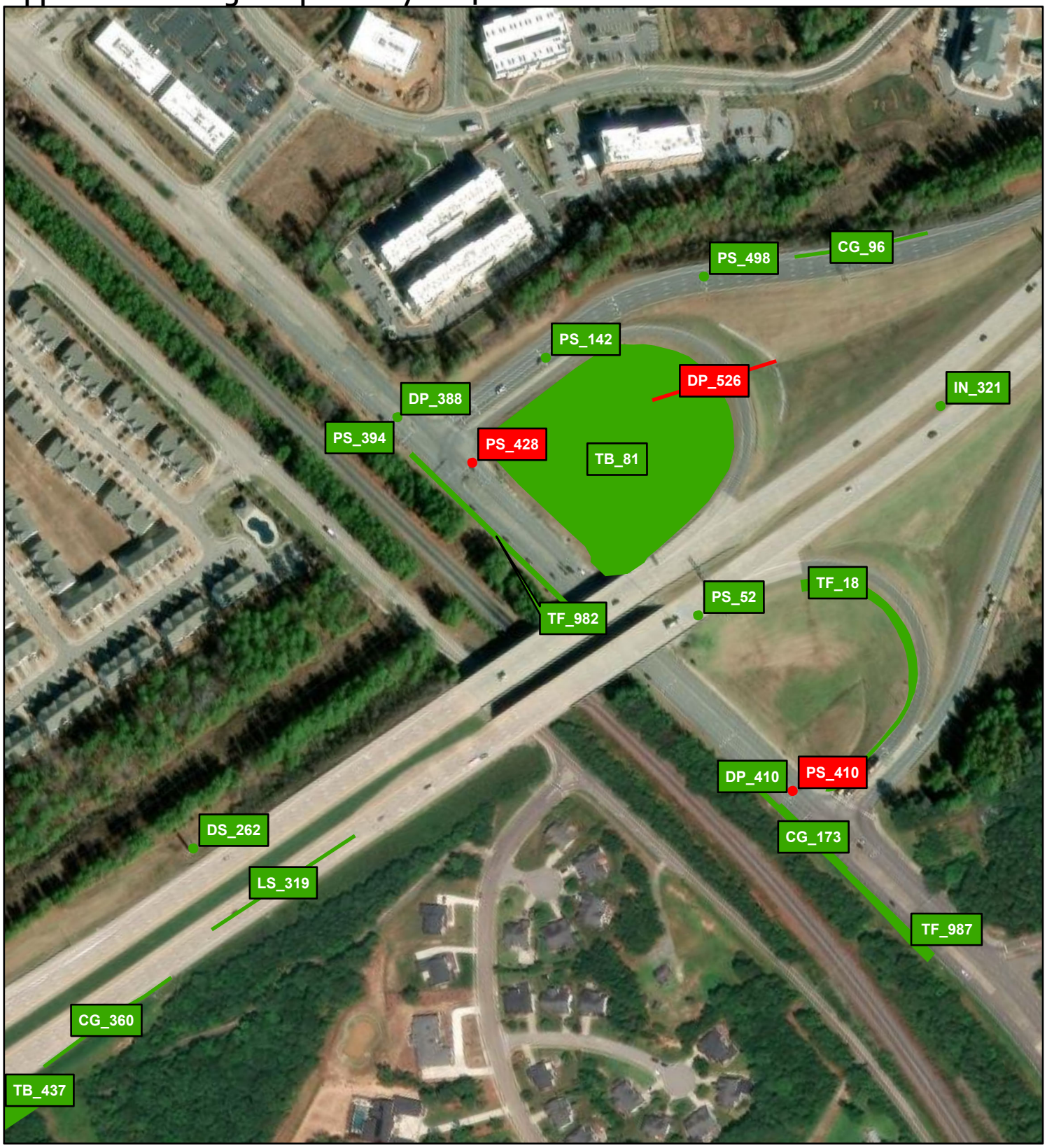
8.0 Conclusion

This report presents the 2024 Second quarter assessment of the Triangle Expressway. The NCTA's target ratings are 90 for the rolling rating, 90 for the overall quarter rating, 85 for elements, and 80 for characteristics. The Second quarter 2024 overall rating was **95.7** and the rolling rating was **94.8** , both ratings met the target rating of 90.

All element ratings were above the target ratings for the quarter and rolling assessment. During the Second quarter assessment, all but one characteristic met or exceeded the target rating of 80. The characteristic that received a quarter score less than 80 was Retaining Walls and Sound Barriers (78). To maintain/improve the condition ratings, it is recommended that walls and approach clearings be included with brush and overgrowth maintenance and completed as planned in the capital budget. Sealing any pre-existing cracks will help to alleviate future deterioration that may be exacerbated by the elements.

This quarter, the two Green Level Historic District signs inspected were found to be in good condition. Additionally, the landscaped areas surrounding the signs were found to be well maintained.

Appendix A: Triangle Expressway 2024 Second Quarter Asset Assessment Locations



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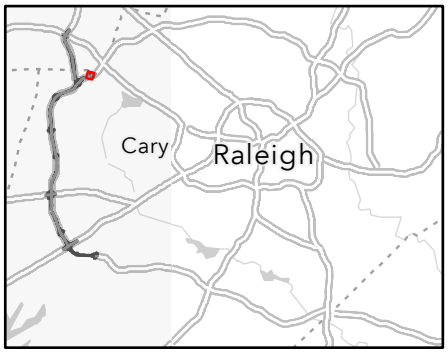

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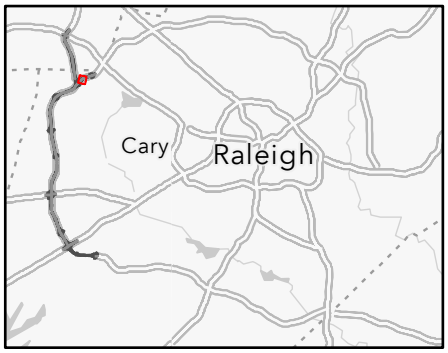

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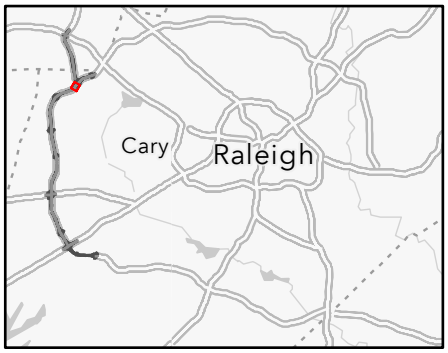

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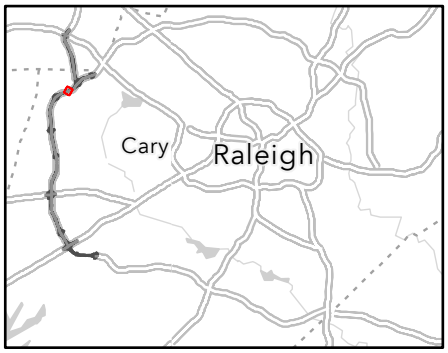

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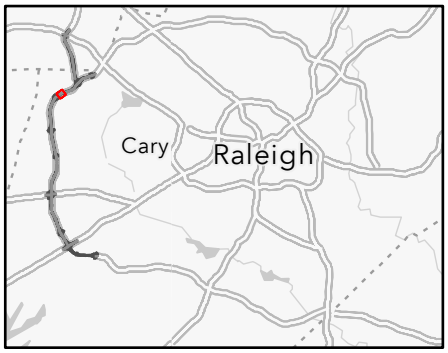

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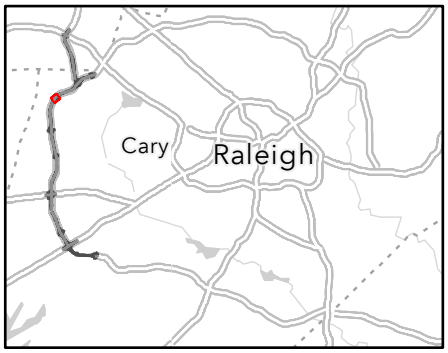

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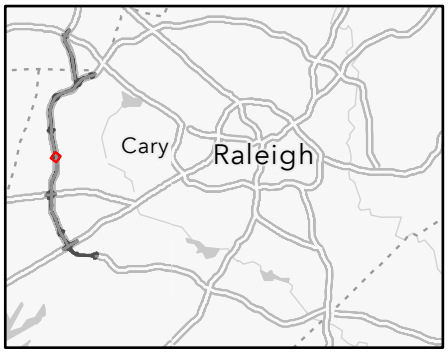

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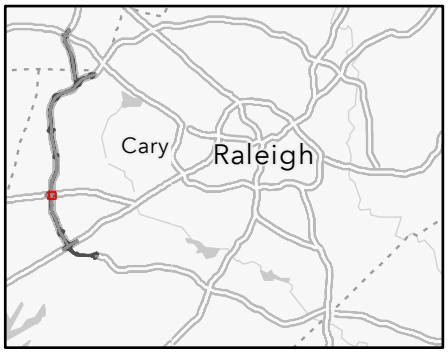

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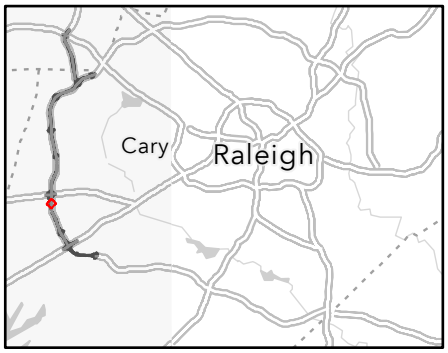

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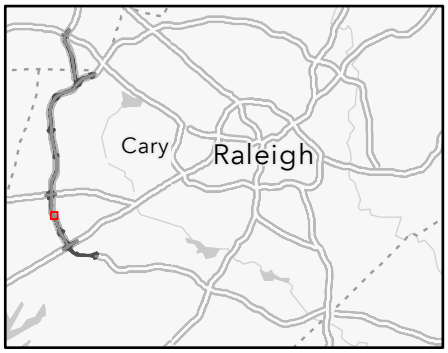

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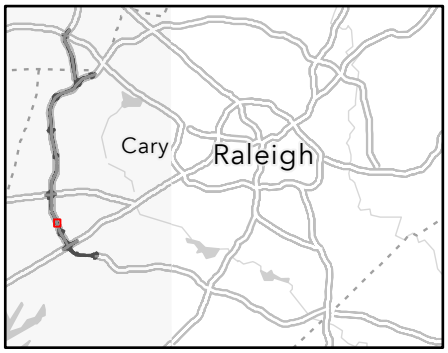

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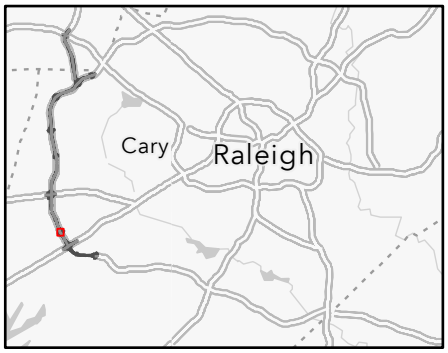

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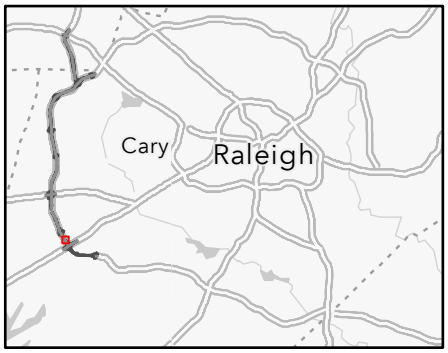


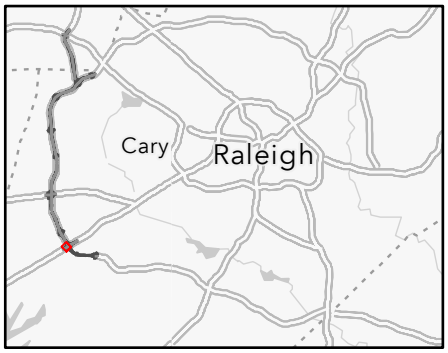
NORTH CAROLINA Turnpike Authority

Appendix A: Triangle Expressway 2024 Second Quarter Asset Assessment Locations

Legend

Failing Asset

Passing Asset



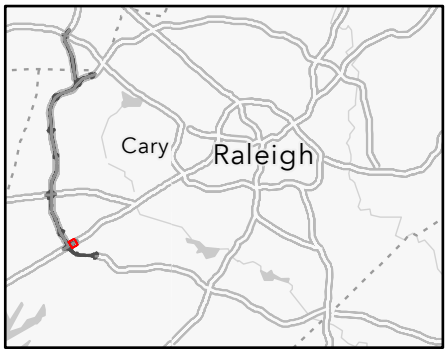
NORTH CAROLINA Turnpike Authority

Appendix A: Triangle Expressway 2024 Second Quarter Asset Assessment Locations

Legend

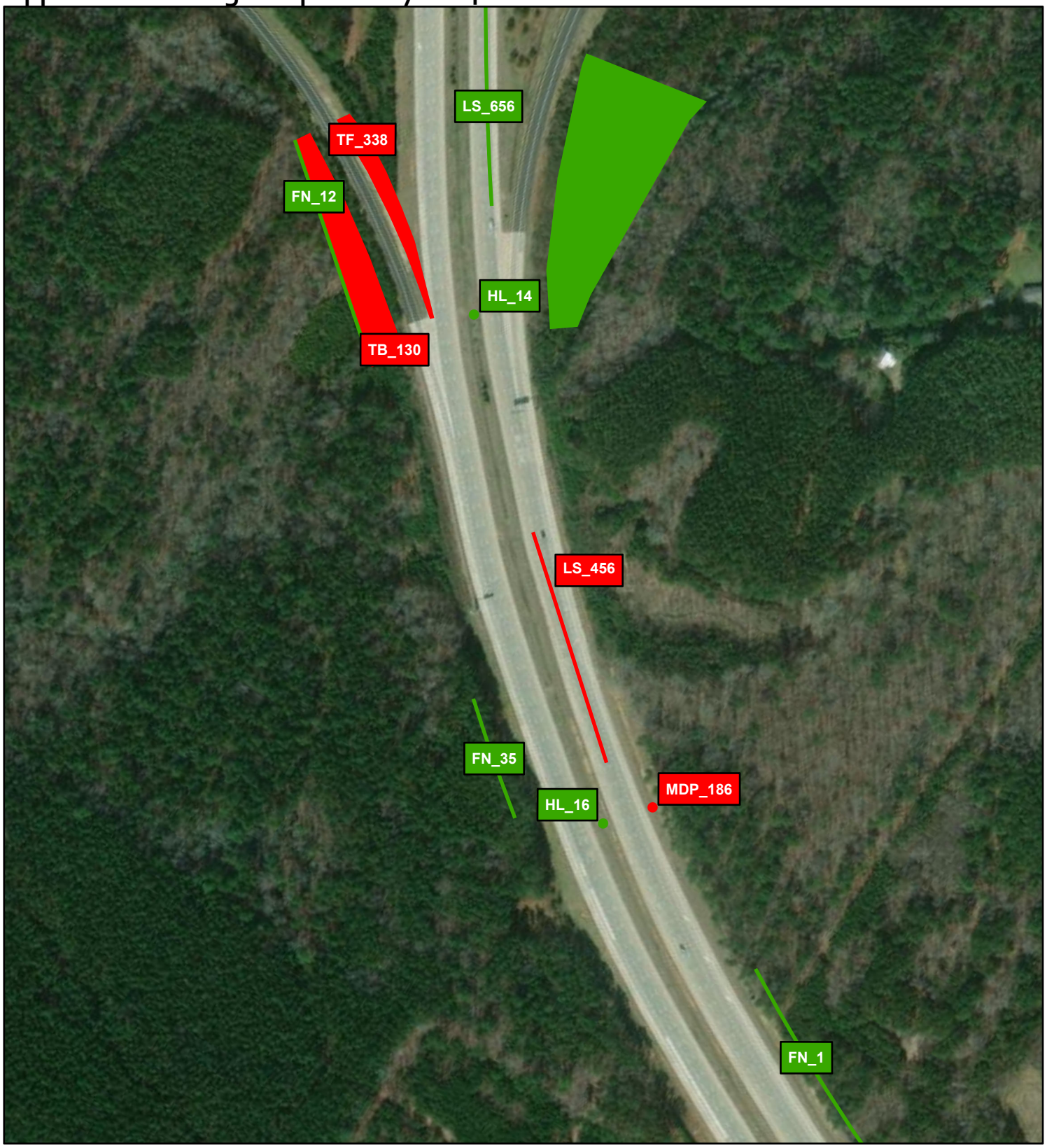
Failing Asset

Passing Asset



NORTH CAROLINA Turnpike Authority

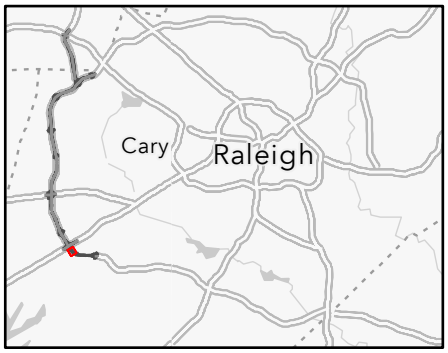
Appendix A: Triangle Expressway 2024 Second Quarter Asset Assessment Locations



Legend

Failing Asset

Passing Asset



NORTH CAROLINA Turnpike Authority

Appendix A: Triangle Expressway 2024 Second Quarter Asset Assessment Locations

Legend

Failing Asset

Passing Asset

NORTH CAROLINA Turnpike Authority

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Legend

- Failing Asset
- Passing Asset

NORTH CAROLINA Turnpike Authority

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NORTH CAROLINA Turnpike Authority

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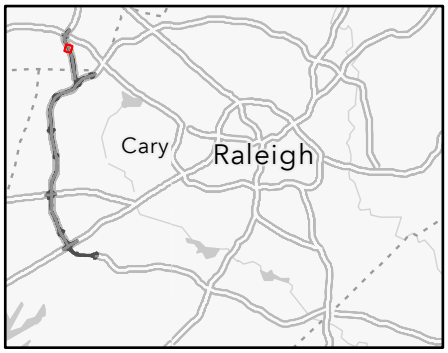
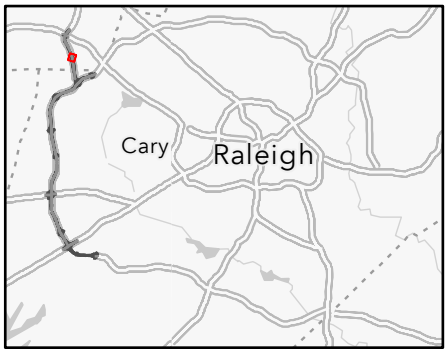


NORTH CAROLINA Turnpike Authority

Appendix A: Triangle Expressway 2024 Second Quarter Asset Assessment Locations

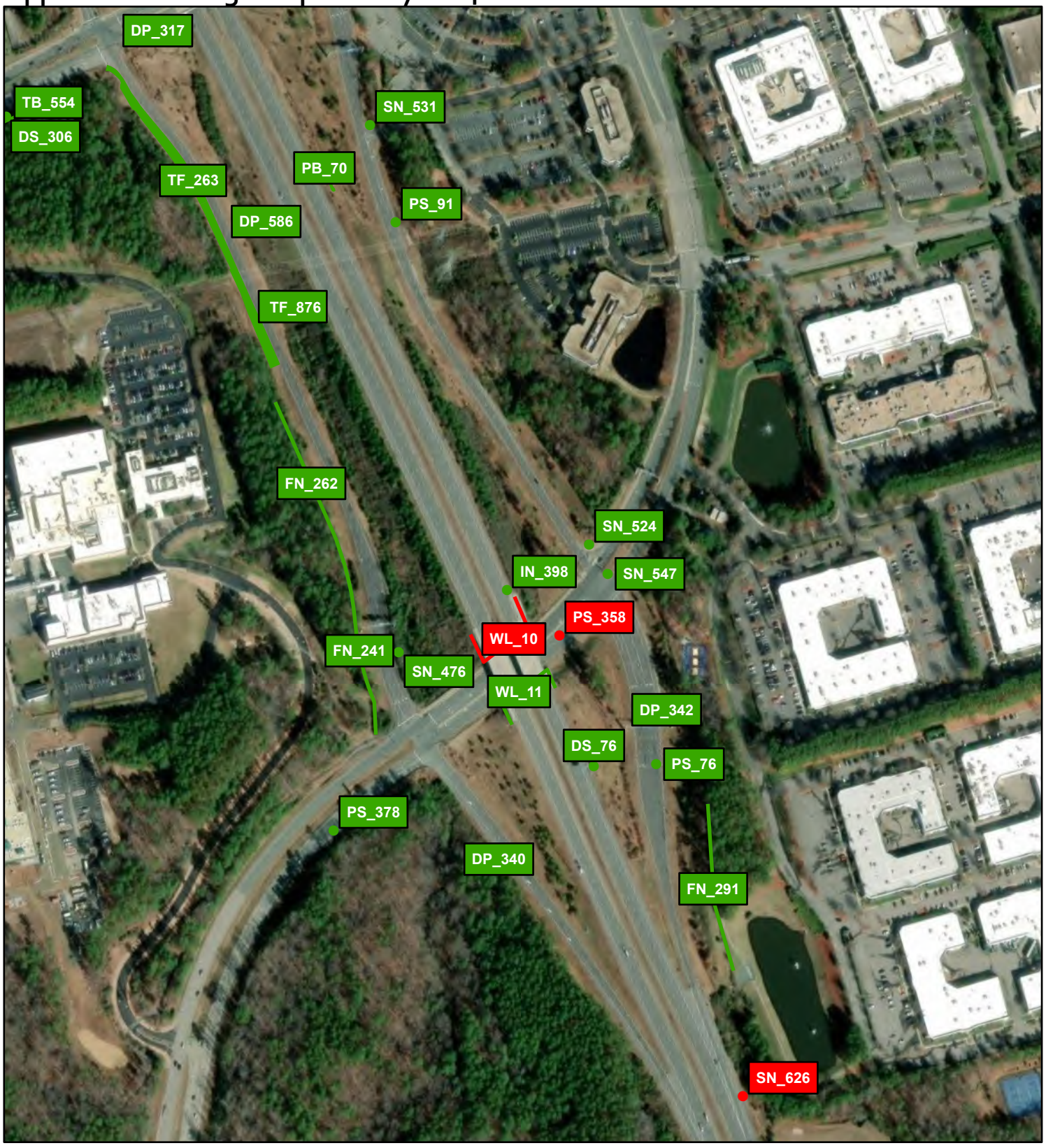
Legend

- Failing Asset
- Passing Asset



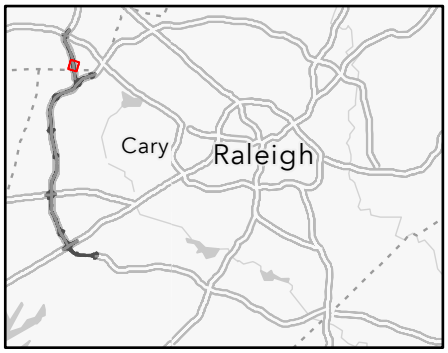
NORTH CAROLINA Turnpike Authority

Appendix A: Triangle Expressway 2024 Second Quarter Asset Assessment Locations



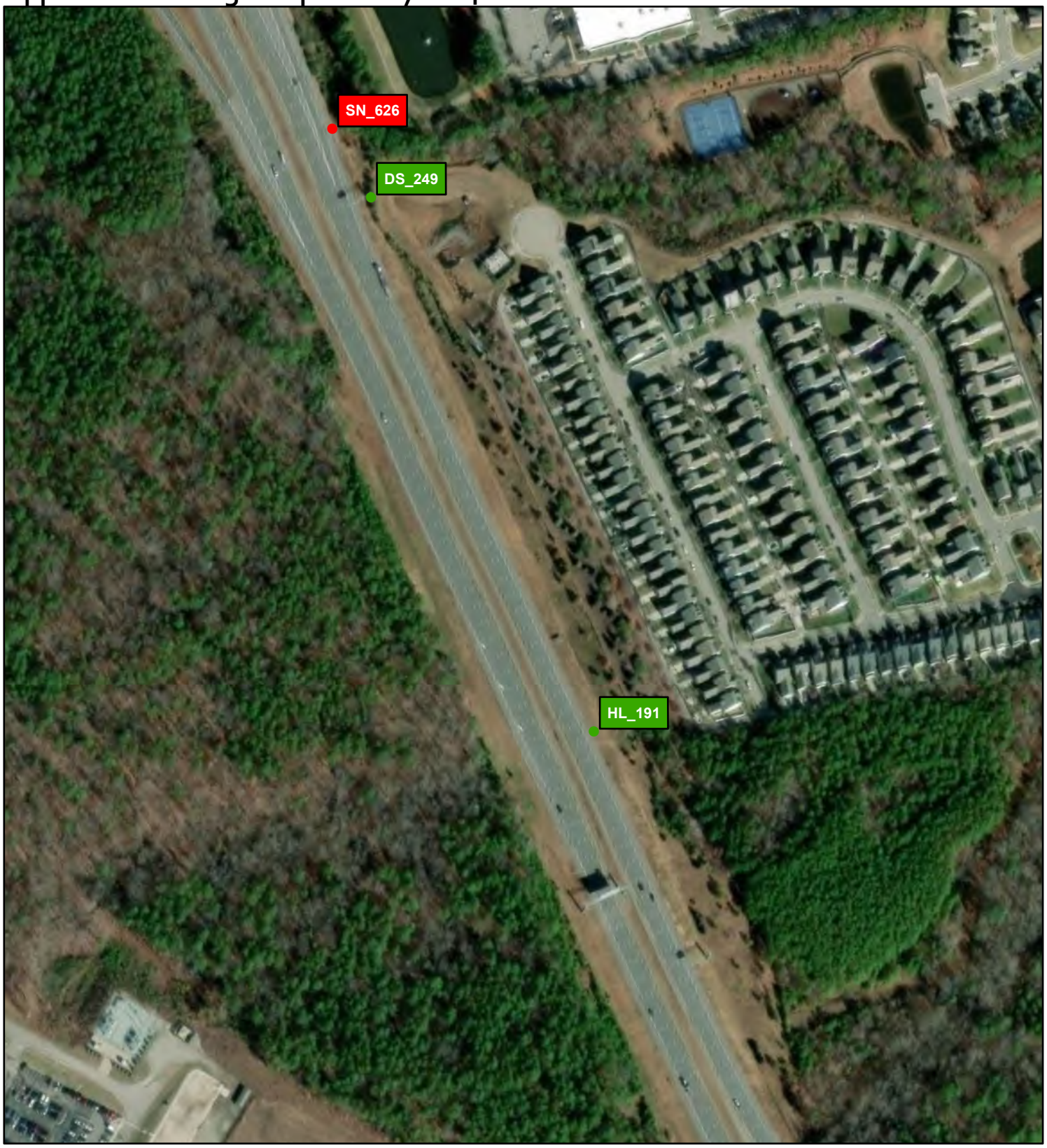
Legend

- Failing Asset
- Passing Asset



NORTH CAROLINA Turnpike Authority

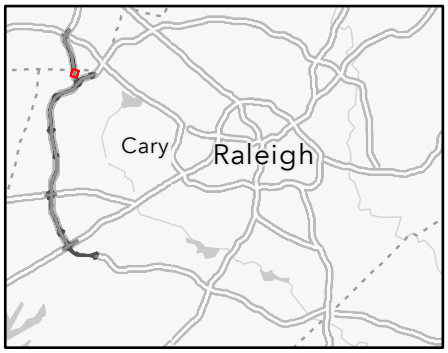
Appendix A: Triangle Expressway 2024 Second Quarter Asset Assessment Locations



Legend

Failing Asset

Passing Asset



NORTH CAROLINA Turnpike Authority

Appendix A: Triangle Expressway 2024 Second Quarter Asset Assessment Locations

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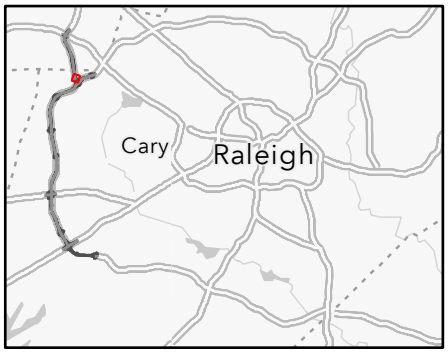


NORTH CAROLINA Turnpike Authority

Appendix B

Triangle Expressway 2024 Second Quarter Table Results of Assets Failing MRP

Appendix B: Triangle Expressway 2024 Second Quarter Table Results of Assets Failing MRP

Provided below are a series of tables outlining the existing failures that occurred throughout the facility. Assets are defined by an Inventory ID, which is a unique identifier given to each individual asset. The components that make up the Inventory ID are an asset specific prefix along with a number, such as LS_1. The Inventory ID and GIS Reference Page number correspond to the provided map packets and allow for quick location of particular asset failures. Photos of failures were provided when applicable.

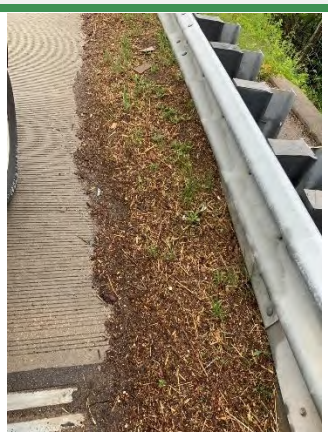
*ORA – Outside Recorded Area

All assets and their respective prefixes are listed below:

Guardrail, Concrete Barrier, and End Anchors (BR)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Guardrail	BR_33	Damaged End Cap/ Reflectivity		**A27**
2	Guardrail	BR_58	Missing Parts		**A8**
3	Guardrail	BR_86	Damaged End Cap		**A14**

Curb and Gutter (CG)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Curb	CG_78	Settlement		**A13**

Decorative Supports (DS)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page

This asset did not produce any failures.

Drainage Pipes (DP)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Drain	DP_13	Obstruction		**A27**
2	Cross Pipe	DP_433	End Protection Damage		**A4**
3	Cross Pipe	DP_526	Obstruction		**A1**
4	Drain	DP_786	End Protection Damage		**A24**

Misc. Drainage Structure (MDP)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Shoulder Drain	MDP_4	Obstruction		**A6**
2	Shoulder Drain	MDP_81	Obstruction		**A16**
3	Shoulder Drain	MDP_186	Obstruction		**A25**

Fence and Control of Access (FN)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Woven	FN_28	Fence Hole		**A26**
2	Woven	FN_226	Hole Height		**A33**
3	Woven	FN_461	Fence Hole		**A3**
4	Woven	FN_523	Open Gate	No Photo Provided	**A9**

Graffiti (GR)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page

This asset did not produce any failures.

Highway Lighting (HL)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Single Roadway	HL_49	Functional Damage (Out at Night)	No Photo Provided	**A7**
2	Single Roadway	HL_60	Functional Damage (Out at Night)	No Photo Provided	**A12**
3	Single Roadway	HL_73	Functional Damage (Out at Night)	No Photo Provided	**A13**
4	Single Roadway	HL_83	Functional Damage (Out at Night)	No Photo Provided	**A14**

5	High Mast	HL_302	Functional Damage (Out at Night)		**A17**
6	Single Roadway	HL_316	Functional Damage (Out at Night)	No Photo Provided	**A17**
7	Underpass Lighting	HL_375	Functional Damage (Out at Night)	No Photo Provided	**A23**

Impact Attenuators (IA)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page

This asset did not produce any failures.

Inlets (IN)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Drop Inlet	IN_1	Eroded Area		**A6**

Landscaping (PB)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Plant Bed	PB_45	Health		**A30**

Paved Lanes – Asphalt (LS)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Asphalt	LS_14	Asphalt - Rutted		**A26**

Paved Lanes – Concrete (LS)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page

This asset did not produce any failures.

Paved Shoulders (LS)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page

This asset did not produce any failures.

Unpaved Shoulders (LS)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Asphalt	LS_187	Drop off		**A17**

Front/Back Slopes (LS)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page

This asset did not produce any failures.

Unpaved Lateral and Outfall Ditches (LS)

#	Material Type	Objec t ID	Failure Type	Photo	GIS Reference Page
1	Concrete	LS_456	Ditch Erosion		**A25**

Litter (LS)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page

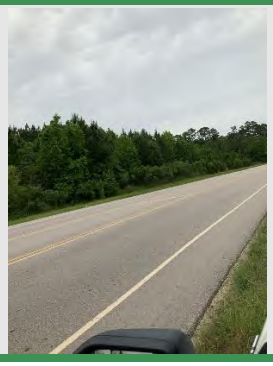
This asset did not produce any failures.

Roadway Sweeping (LS)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page

This asset did not produce any failures.

Pavement Striping (LS)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Asphalt	LS_10	Nighttime Reflectivity		**A26**
2	Asphalt	LS_695	Nighttime Reflectivity		**A26**

Pavement Markers (LS)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Asphalt	LS_394	Nighttime Visibility	Not available for nighttime failure	**A17**
2	Asphalt	LS_534	Nighttime Visibility	Not available for nighttime failure	**A23**
3	Asphalt	LS_546	Nighttime Visibility	Not available for nighttime failure	***ORA**

Delineators (LS)

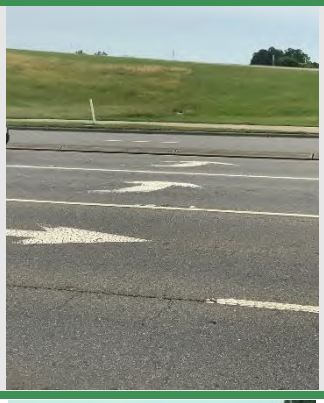
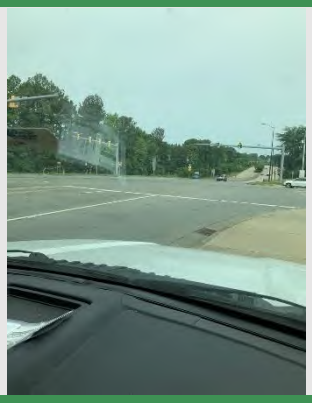
#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Concrete	LS_534	Nighttime Reflectivity	Not available for nighttime failure	**A23**
2	Concrete	LS_657	Nighttime Reflectivity	Not available for nighttime failure	**A25**

Paved Ditches (PD)

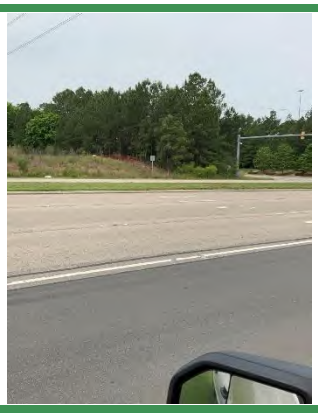
#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page

This asset did not produce any failures.

Pavement Words and Symbols (PS)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Only	PS_358	Nighttime Reflectivity		**A31**
2	Left Turn	PS_410	Daytime Assessment / Nighttime Reflectivity		**A1**
3	Left Turn	PS_426	Daytime Assessment / Nighttime Reflectivity		***ORA**
4	Stop Bar	PS_428	Daytime Assessment / Nighttime Reflectivity		**A1**

Pavement Words and Symbols (PS)

5	Thru Lane	PS_442	Daytime Assessment / Nighttime Reflectivity			**A6**

Signs (SN)

#	Sign Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Mile Post	SN_626	Height Requirement		**A31**

Tree and Brush (TB)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Tree & Brush	TB_130	Barrier Clearance		**A25**
2	Tree & Brush	TB_417	Barrier Clearance		**A3**

Turf Condition (TF)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Turf	TF_190	Bare Ground		**A23**
2	Turf	TF_338	Bare Ground		**A25**
3	Turf	TF_564	Bare Ground		**A13**
4	Turf	TF_645	Bare Ground		**A7**

Turf Condition (TF)

5	Turf	TF_1034	Bare Ground			**A26**

MSE/Retaining Walls, Sound Barrier Walls, and Screen Walls (WL)

#	Material Type	Object ID	Failure Type	Photo	GIS Reference Page
1	Bridge Wall	WL_10	Vegetation		**A31**
2	Bridge Wall	WL_11	Unsealed Cracks/Joints		**A31**
3	Bridge Wall	WL_21	Spalling		**A11**

MSE/Retaining Walls, Sound Barrier Walls, and Screen Walls (WL)

4	Bridge Wall	WL_39	Vegetation			**A17**

CONSULTANT CERTIFICATION OF COMPLETION

August 9, 2024

Dennis Jernigan, P.E.
Director of Highway Operations, NCTA
1 South Wilmington Street
Raleigh, NC 27601

NCTA Triangle Expressway Roadway Maintenance Performance Rating Program; Q4, FY 2023 Rating

This is to certify that I, Caroline Dickey, PE am an authorized official representative of the company Mott MacDonald I&E, LLC, a subconsultant to HNTB North Carolina, P.C. Collaboratively; we are working as the NCTA Roadway and Facility Maintenance Performance Rating Program Consultants.

I know of my own personal knowledge, and do hereby certify, that the work of the contract described above has been independently performed in accordance with, and in conformity to, the *NCTA Roadway and Facility Maintenance Performance Standards v.7*.

Sincerely,

Mott MacDonald I&E, LLC

Caroline Dickey, PE
Asset Management Engineer

1101 Haynes Street, Suite 101
Raleigh, NC 27604