

# Maintenance Rating Program

Triangle Expressway

February 2025

2024 Fourth 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 Fourth Quarter Assessment of the Triangle Expressway.

The overall 2024 fourth quarter maintenance rating of the Triangle Expressway was **96.2**, 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 Fourth Quarter Assessment**

| Element                               | MRP Rating  | Target Rating |
|---------------------------------------|-------------|---------------|
| Road Surface                          | 98.0        | 85.0          |
| Unpaved Shoulders and Ditches         | 100.0       | 85.0          |
| Drainage                              | 97.0        | 85.0          |
| Roadside                              | 96.9        | 85.0          |
| Traffic Control Devices               | 92.2        | 85.0          |
| <b>Overall MRP Performance Rating</b> | <b>96.2</b> | <b>90.0</b>   |

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 95.1.

**Table 2: MRP Rolling Element Results**

| Element                               | Q1 2024 Rating | Q2 2024 Rating | Q3 2024 Rating | Q4 2024 Rating | Rolling Rating |
|---------------------------------------|----------------|----------------|----------------|----------------|----------------|
| Road Surface                          | 96.7           | 98.9           | 100.0          | 98.0           | 98.3           |
| Unpaved Shoulders and Ditches         | 95.2           | 98.8           | 100.0          | 100.0          | 97.8           |
| Drainage                              | 89.6           | 93.9           | 92.5           | 97.0           | 94.4           |
| Roadside                              | 92.6           | 94.4           | 96.7           | 96.9           | 94.0           |
| Traffic Control Devices               | 87.2           | 93.3           | 87.8           | 92.2           | 92.3           |
| <b>Overall MRP Performance Rating</b> | <b>91.9</b>    | <b>95.7</b>    | <b>94.6</b>    | <b>96.2</b>    | <b>95.1</b>    |



In addition, the report provides findings of the Green Level Historic District signs inspection. This quarter, two signs were inspected. One of the signs was in good physical condition, while the other has been struck and is down. 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.

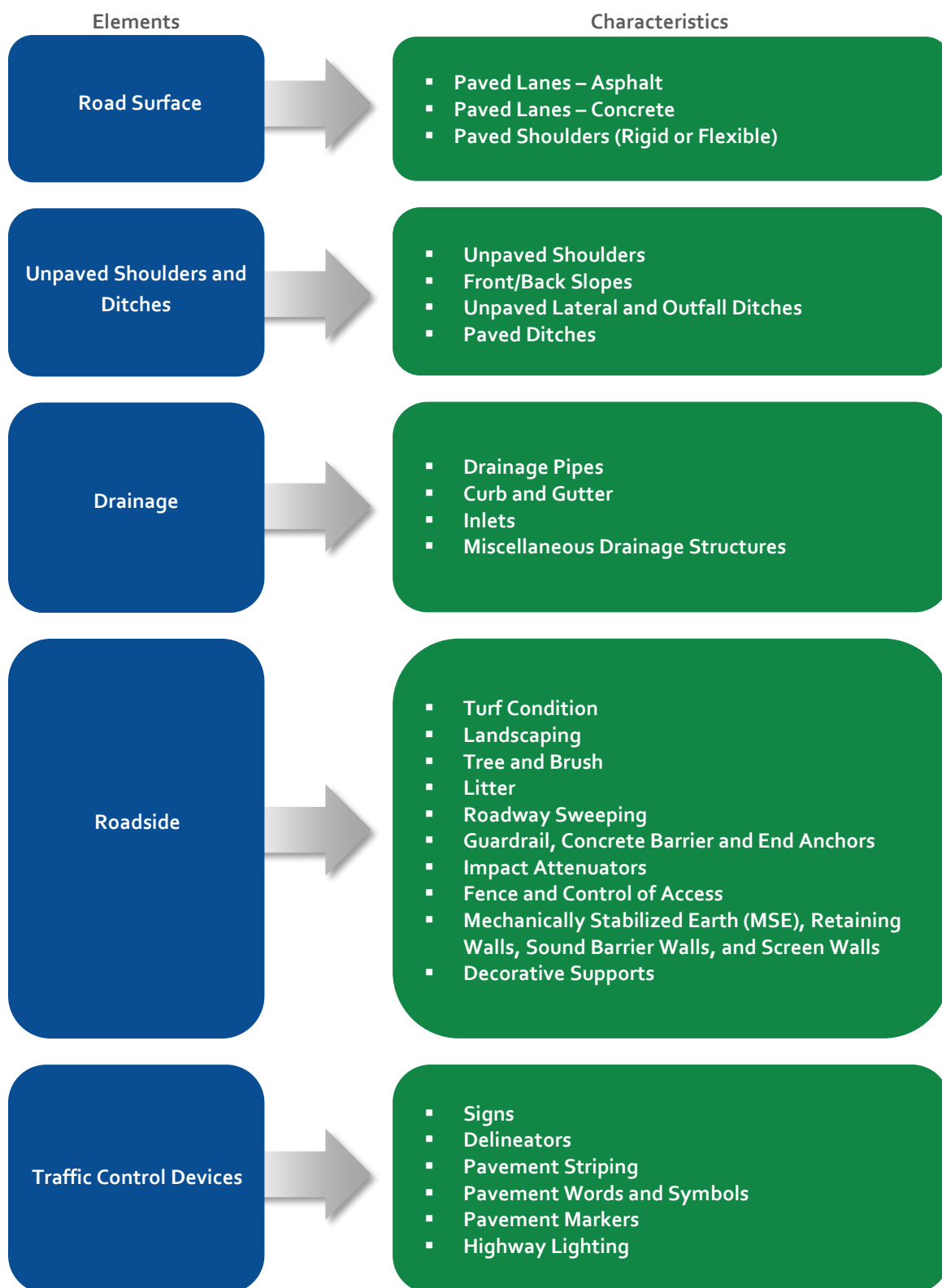
The NCTA performance standards, threshold criteria, and maintenance rating program were developed through a collaborative effort by NCTA managers, NCDOT maintenance staff, and consultants.

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%  |
| <hr/>                     |      |
| 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 37 miles from the interchange of I-40 and Toll NC-885 in Durham to an easternly connection with I-40 / U.S. 70 near Garner. 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. The newest section from N.C. 55 Bypass to I-40/US 70 near Garner opened to traffic and started toll collection on September 25, 2024. This section includes interchanges at Holly Springs Road, Bells Lake Road, U.S. 401, Old Stage Road, and N.C. 50 before connecting with I-40 and U.S. 70. While the newly opened extension is now open to traffic, this report will only summarize the data for the pre-existing roadway. (*Figure 2*).

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.

Prior to 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 Fourth Quarter Assessment

### 6.1 Quarterly Results

The overall 2024 Fourth quarter maintenance rating of the Triangle Expressway was 96.2, 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 fourth 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 Fourth quarter MRP performance ratings for elements and characteristics are presented in *Table 4* and *Table 5*, respectively.

**Table 4: MRP Element Results for Q4 2024**

| Element                        | MRP Rating |
|--------------------------------|------------|
| Road Surface                   | 98.0       |
| Unpaved Shoulders and Ditches  | 100.0      |
| Drainage                       | 97.0       |
| Roadside                       | 96.9       |
| Traffic Control Devices        | 92.2       |
| Overall MRP Performance Rating | 96.2       |

Table 5: MRP Characteristics Results for Q4 2024

| Road Surface                                 | Sample Passed | Sample Total | Weighted Values | Actual Pts  | Available Pts | Q4 Rating    |
|--|---------------|--------------|-----------------|-------------|---------------|--------------|
| Paved Lanes Asphalt                          | 9             | 9            | 9               | 81          | 81            | 100          |
| Paved Lanes Concrete                         | 23            | 24           | 9               | 207         | 216           | 96           |
| Paved Shoulder                               | 32            | 32           | 5               | 160         | 160           | 100          |
| <b>Element Total</b>                         |               |              |                 | <b>448</b>  | <b>457</b>    | <b>98.0</b>  |
| Unpaved Shoulders and Ditches                | Sample Passed | Sample Total | Weighted Values | Actual Pts  | Available Pts | Q4 Rating    |
| Unpaved Shoulder                             | 32            | 32           | 9               | 288         | 288           | 100          |
| Front/Back Slopes                            | 32            | 32           | 6               | 192         | 192           | 100          |
| Lateral and Outfall Ditches, Unpaved         | 32            | 32           | 6               | 192         | 192           | 100          |
| Ditches, Paved                               | 2             | 2            | 5               | 10          | 10            | 100          |
| <b>Element Total</b>                         |               |              |                 | <b>682</b>  | <b>682</b>    | <b>100.0</b> |
| Drainage                                     | Sample Passed | Sample Total | Weighted Values | Actual Pts  | Available Pts | Q4 Rating    |
| Drainage Pipes                               | 34            | 34           | 7               | 238         | 238           | 100          |
| Curb and Gutter                              | 28            | 28           | 6               | 168         | 168           | 100          |
| Inlets                                       | 32            | 34           | 7               | 224         | 238           | 94           |
| Misc. Drainage Structure                     | 21            | 23           | 4               | 84          | 92            | 91           |
| <b>Element Total</b>                         |               |              |                 | <b>714</b>  | <b>736</b>    | <b>97.0</b>  |
| Roadside                                     | Sample Passed | Sample Total | Weighted Values | Actual Pts  | Available Pts | Q4 Rating    |
| Turf Condition                               | 32            | 33           | 7               | 224         | 231           | 97           |
| Landscaping                                  | 23            | 25           | 4               | 92          | 100           | 92           |
| Trees and Brush                              | 29            | 31           | 4               | 116         | 124           | 94           |
| Litter                                       | 32            | 32           | 4               | 128         | 128           | 100          |
| Roadway Sweeping                             | 32            | 32           | 5               | 160         | 160           | 100          |
| Guardrail, Concrete Barrier, and End Anchors | 31            | 31           | 9               | 279         | 279           | 100          |
| Impact Attenuators                           | 8             | 9            | 9               | 72          | 81            | 89           |
| Fence, Control Access                        | 27            | 30           | 7               | 189         | 210           | 90           |
| Retaining Walls and Sound Barrier Walls      | 14            | 14           | 5               | 70          | 70            | 100          |
| Decorative Supports                          | 26            | 26           | 5               | 130         | 130           | 100          |
| Graffiti and Stain Removal                   | 44            | 44           | 4               | 176         | 176           | 100          |
| <b>Element Total</b>                         |               |              |                 | <b>1636</b> | <b>1689</b>   | <b>96.9</b>  |
| Traffic Control Devices                      | Sample Passed | Sample Total | Weighted Values | Actual Pts  | Available Pts | Q4 Rating    |
| Signs  | 33            | 34           | 7               | 231         | 238           | 97           |
| Delineators                                  | 32            | 32           | 3               | 96          | 96            | 100          |
| Pavement Striping/Marking                    | 32            | 32           | 8               | 256         | 256           | 100          |
| Words and Symbols                            | 23            | 31           | 7               | 161         | 217           | 74           |
| Pavement Markers                             | 32            | 32           | 9               | 288         | 288           | 100          |
| Highway Lighting                             | 23            | 29           | 6               | 138         | 174           | 79           |
| <b>Element Total</b>                         |               |              |                 | <b>1170</b> | <b>1269</b>   | <b>92.2</b>  |

Additionally, **Appendix A** includes maps that present the location of all assets assessed during the fourth 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 Fourth quarter, all elements exceeded NCTA's quarter score threshold criteria of 85.

Road Surface (98.0) experienced a 2.0-point decrease from the previous quarter's rolling rating. Paved Lanes Concrete (96.0) quarter rating decreased by 4 points. All characteristics within this element continued scoring above 90 for last four quarters.

Unpaved Shoulders and Ditches (100.0) experienced an increase in rolling rating. The rating for this element was on par with the previous quarter's rolling rating. All characteristics within this element continued scoring above 90.

Drainage (97.0) rolling rating increased by 4.5 points from the previous quarter rolling rating. Inlets (94) rolling rating showed great improvement with an increase of 9 points from last quarter.

Roadside (96.9) rolling rating increased by 0.2 points from the previous quarter rolling rating. Fence, Control Access (90) was an improved characteristic with a score increase of 2.0 points from the previous quarter's rolling rating.

Traffic Control Devices (92.2) experienced an increase in rolling rating of 4.4 points from the previous quarter. Highway Lighting (79) improved by 14 points in rolling rating but will still require attention with an element characteristic score below target of 80. Similarly, Word and Symbols (74) will need improvement with a decrease in rolling rating of 15 points.

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

### Characteristics

This quarter, all but two element characteristics, Words and Symbols (74) and Highway Lighting (79), exceeded NCTA's quarter score 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**.



Pavement Words and Symbols (74 rating – 23 of the 31 assets passed): Many of the pavement symbols that did not pass inspections were due to poor reflectivity and were not visible at night.

To maintain/improve the condition ratings, it is recommended that markings that are fading, chipping and/or showing signs of aging be prioritized for attention as appropriate in the capital budget.

Maintenance Program:

- 1) Words and symbols are observed daily and inspected every 4 months for compliance to the standard.
- 2) Worn or missing words or symbols are evaluated for compliance annually, and generally are scheduled on a 5-8 year replacement cycle depending on the material.

Maintenance and Evaluation Standards: Pavement symbols do not meet the maintenance standards when any of the following criteria is observed:

- 1) More than 30% of the symbol area is worn, missing or not visible.
- 2) More than 30% of symbol area is not reflective for a distance of 160 feet using low beam headlights during nighttime observation. (N)

Highway Lighting (79 rating – 23 of the 29 assets passed): Each of the highway lights that did not pass inspection either were not functioning properly (out at night) or were damaged/completely down.

To maintain/improve the condition ratings, it is recommended that highway lighting be regularly inspected for functionality after dark, and maintenance completed as planned in the capital budget. Solar and battery powered backup may help cover temporary down time between repairs.

Maintenance Program:

- 1) Perform night patrol once a month and identify any outages. A monthly "Lighting Outage Report" shall be submitted by the maintenance provider to the NCTA by the 30th of each month. All bulb outages must be replaced within 48 hours.
- 2) Perform cleaning of glassware at the same time as any routine maintenance function or diagnostic action is performed.
- 3) Replace any light poles damaged by traffic within 5 days or within 14 days if any foundations needed pouring.

Maintenance and Evaluation Standards: Highway and Sign Lighting do not meet the maintenance standards when any of the following criteria is observed:

- 1) Any electrical inspection plate, access panel cover, exposed electrical wire or pull box cover are not properly secured in place.
- 2) The luminaries are not functioning during nighttime observation. (N)
- 3) Any pole is damaged, leaning or missing.
- 4) Rodent screen protection is not in place, where applicable.

## 7.1 Annual Results

The 2024 annual rolling maintenance rating of the Triangle Expressway was **95.1**, exceeding NCTA's target overall rating of 90. All elements exceeded NCTA's rolling rating threshold criteria of 85. Twenty-six 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**

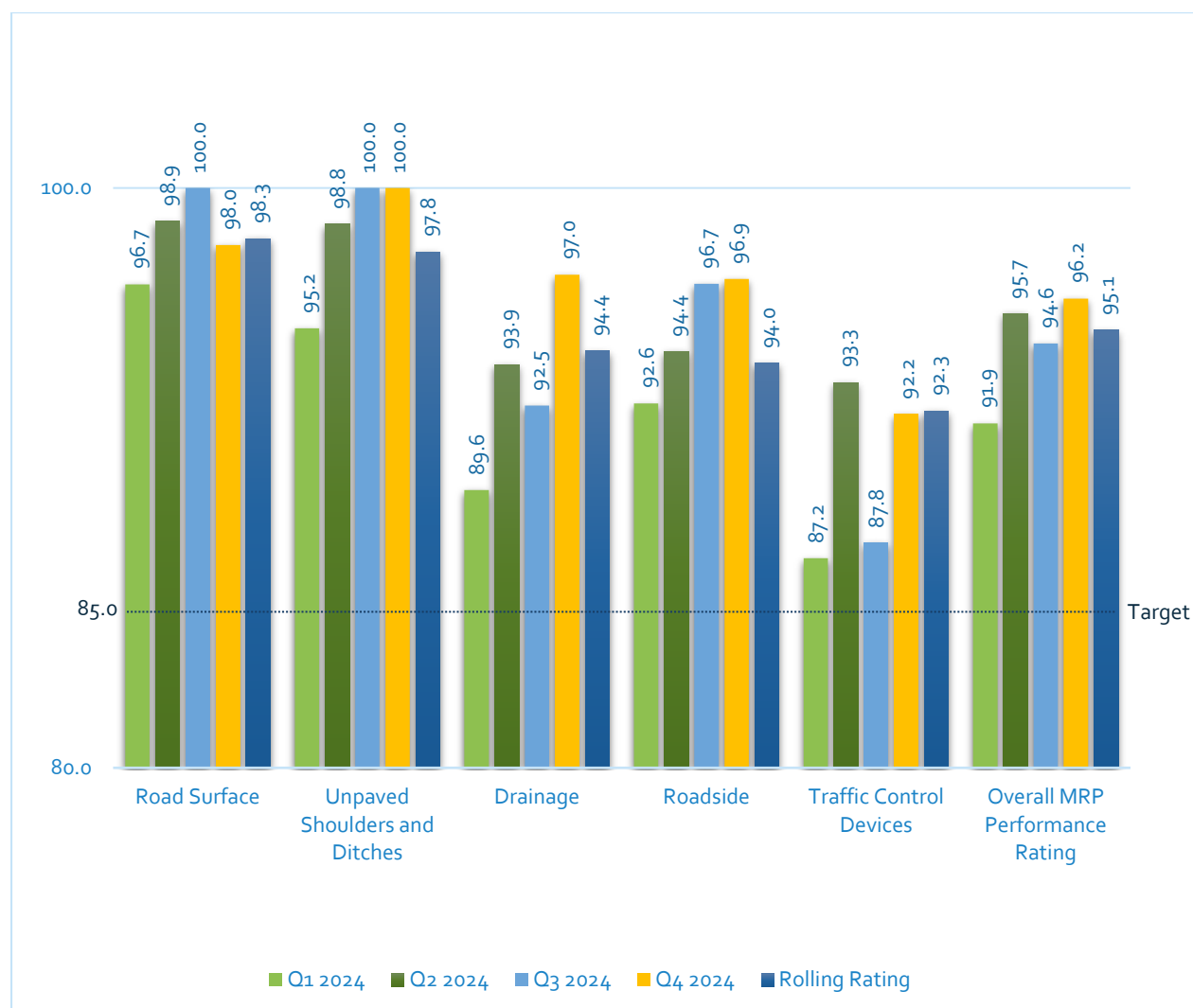


Table 6: MRP Rolling Element Results

| Road Surface                                 | Q1 2024 Rating | Q2 2024 Rating | Q3 2024 Rating | Q4 2024 Rating | Rolling Rating |
|--|----------------|----------------|----------------|----------------|----------------|
| Paved Lanes Asphalt                          | 100            | 95             | 100            | 100            | 98             |
| Paved Lanes Concrete                         | 93             | 100            | 100            | 96             | 98             |
| Paved Shoulder                               | 97             | 100            | 100            | 100            | 99             |
| <b>Element Total</b>                         | <b>96.7</b>    | <b>98.9</b>    | <b>100.0</b>   | <b>98.0</b>    | <b>98.3</b>    |
| Unpaved Shoulders and Ditches                | Q1 2024 Rating | Q2 2024 Rating | Q3 2024 Rating | Q4 2024 Rating | Rolling Rating |
| Unpaved Shoulder                             | 91             | 98             | 100            | 100            | 96             |
| Front/Back Slopes                            | 97             | 100            | 100            | 100            | 99             |
| Lateral and Outfall Ditches, Unpaved         | 100            | 98             | 100            | 100            | 99             |
| Ditches, Paved                               | 100            | 100            | 100            | 100            | 100            |
| <b>Element Total</b>                         | <b>95.2</b>    | <b>98.8</b>    | <b>100.0</b>   | <b>100.0</b>   | <b>97.8</b>    |
| Drainage                                     | Q1 2024 Rating | Q2 2024 Rating | Q3 2024 Rating | Q4 2024 Rating | Rolling Rating |
| Drainage Pipes                               | 82             | 92             | 98             | 100            | 93             |
| Curb and Gutter                              | 96             | 96             | 97             | 100            | 98             |
| Inlets                                       | 94             | 97             | 85             | 94             | 96             |
| Misc. Drainage Structure                     | 88             | 88             | 88             | 91             | 88             |
| <b>Element Total</b>                         | <b>89.6</b>    | <b>93.9</b>    | <b>92.5</b>    | <b>97.0</b>    | <b>94.4</b>    |
| Roadside                                     | Q1 2024 Rating | Q2 2024 Rating | Q3 2024 Rating | Q4 2024 Rating | Rolling Rating |
| Turf Condition                               | 85             | 90             | 91             | 97             | 89             |
| Landscaping                                  | 95             | 96             | 100            | 92             | 94             |
| Trees and Brush                              | 100            | 94             | 100            | 94             | 97             |
| Litter                                       | 91             | 100            | 100            | 100            | 97             |
| Roadway Sweeping                             | 100            | 100            | 100            | 100            | 99             |
| Guardrail, Concrete Barrier, and End Anchors | 100            | 90             | 100            | 100            | 95             |
| Impact Attenuators                           | 100            | 100            | 90             | 89             | 97             |
| Fence, Control Access                        | 82             | 91             | 88             | 90             | 88             |
| Retaining Walls and Sound Barrier Walls      | 72             | 78             | 100            | 100            | 79             |
| Decorative Supports                          | 96             | 100            | 100            | 100            | 99             |
| Graffiti and Stain Removal                   | 100            | 100            | 100            | 100            | 100            |
| <b>Element Total</b>                         | <b>92.6</b>    | <b>94.4</b>    | <b>96.7</b>    | <b>96.9</b>    | <b>94.0</b>    |
| Traffic Control Devices                      | Q1 2024 Rating | Q2 2024 Rating | Q3 2024 Rating | Q4 2024 Rating | Rolling Rating |
| Signs  | 91             | 98             | 89             | 97             | 95             |
| Delineators                                  | 75             | 96             | 100            | 100            | 92             |
| Pavement Striping/Marking                    | 91             | 96             | 97             | 100            | 97             |
| Words and Symbols                            | 87             | 88             | 89             | 74             | 87             |
| Pavement Markers                             | 88             | 95             | 97             | 100            | 95             |
| Highway Lighting                             | 83             | 83             | 65             | 79             | 83             |
| <b>Element Total</b>                         | <b>87.2</b>    | <b>93.3</b>    | <b>87.8</b>    | <b>92.2</b>    | <b>92.3</b>    |

## 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. One of the two signs included in the inspection inventory was found to be in good condition, while the other has been stuck, damaged and in need of repair. **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 fourth 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 Fourth quarter 2024 overall rating was 96.2 and the rolling rating was 95.1, both ratings met the target rating of 90.

All element ratings were above the target ratings for the quarter and rolling assessment. During the Fourth quarter assessment, all but two characteristics met or exceeded the target rating of 80. The characteristics that received a quarter score less than 80 were Words and Symbols (74) and Highway Lighting (79). To maintain/improve the condition ratings, it is recommended that both pavement words and symbols and highway lighting be routinely inspected for functionality after dark along with routine maintenance being completed as planned in the capital budget.

This quarter, one of the two Green Level Historic District signs inspected was found to be in good condition, and the other will need to be repaired. The landscaped areas surrounding the signs were found to be well maintained.



Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



### Legend

Failing Asset

Passing Asset





Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



**Legend**

Failing Asset

Passing Asset







# Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



## Legend

-  Failing Asset
-  Passing Asset





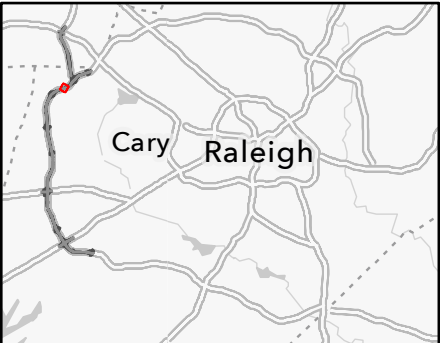
Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



### Legend

Failing Asset

Passing Asset





## Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



### Legend



Failing Asset



Passing Asset





# Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



## Legend

- Failing Asset
- Passing Asset





Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



# Legend

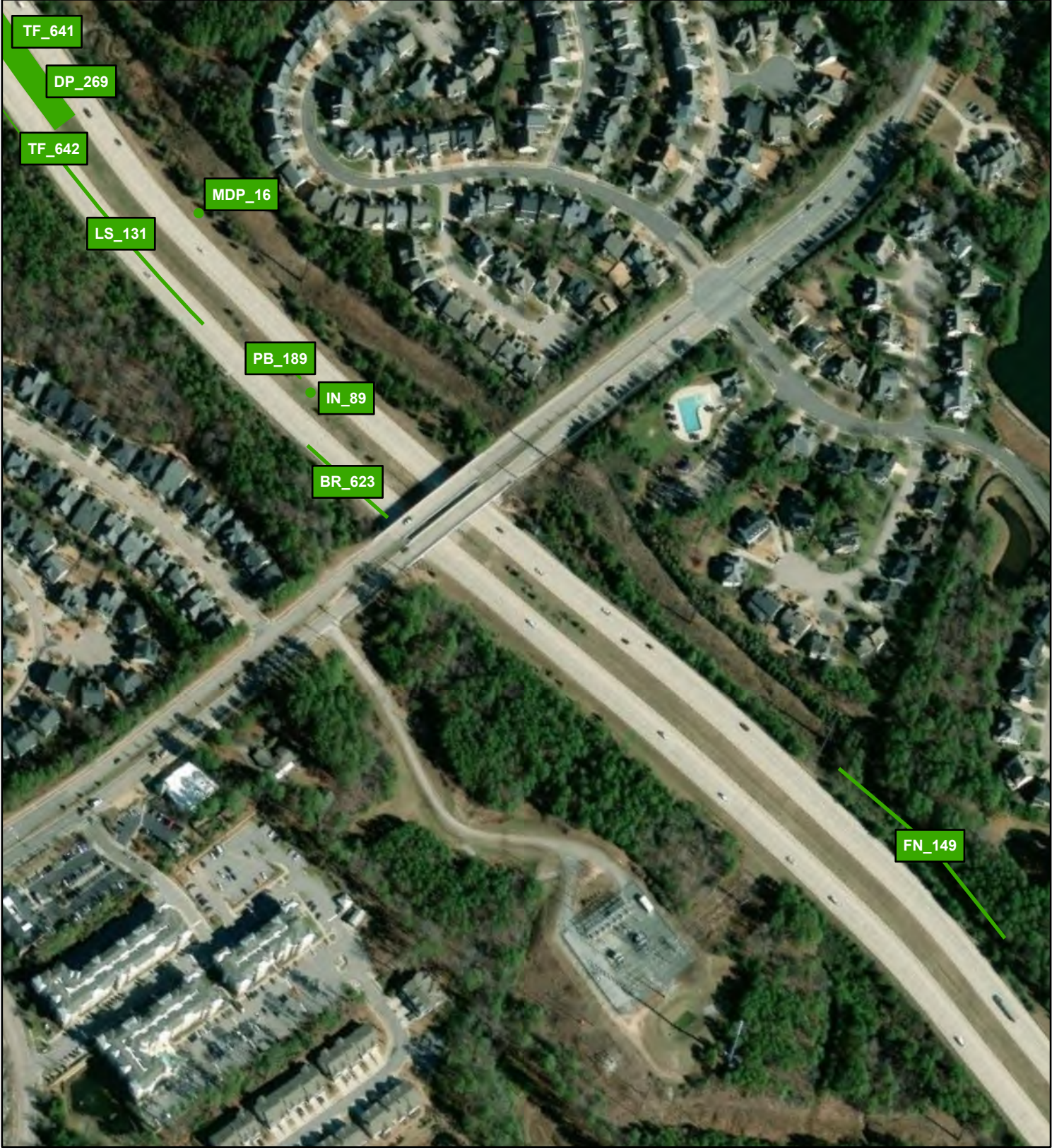
Failing Asset

Passing Asset





Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



# Legend

Failing Asset

Passing Asset





# Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



## Legend



Failing Asset



Passing Asset





# Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



## Legend



Failing Asset



Passing Asset





Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



# Legend

Failing Asset

Passing Asset







# Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



## Legend

-  Failing Asset
-  Passing Asset





Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



# Legend

Failing Asset

Passing Asset





Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



# Legend

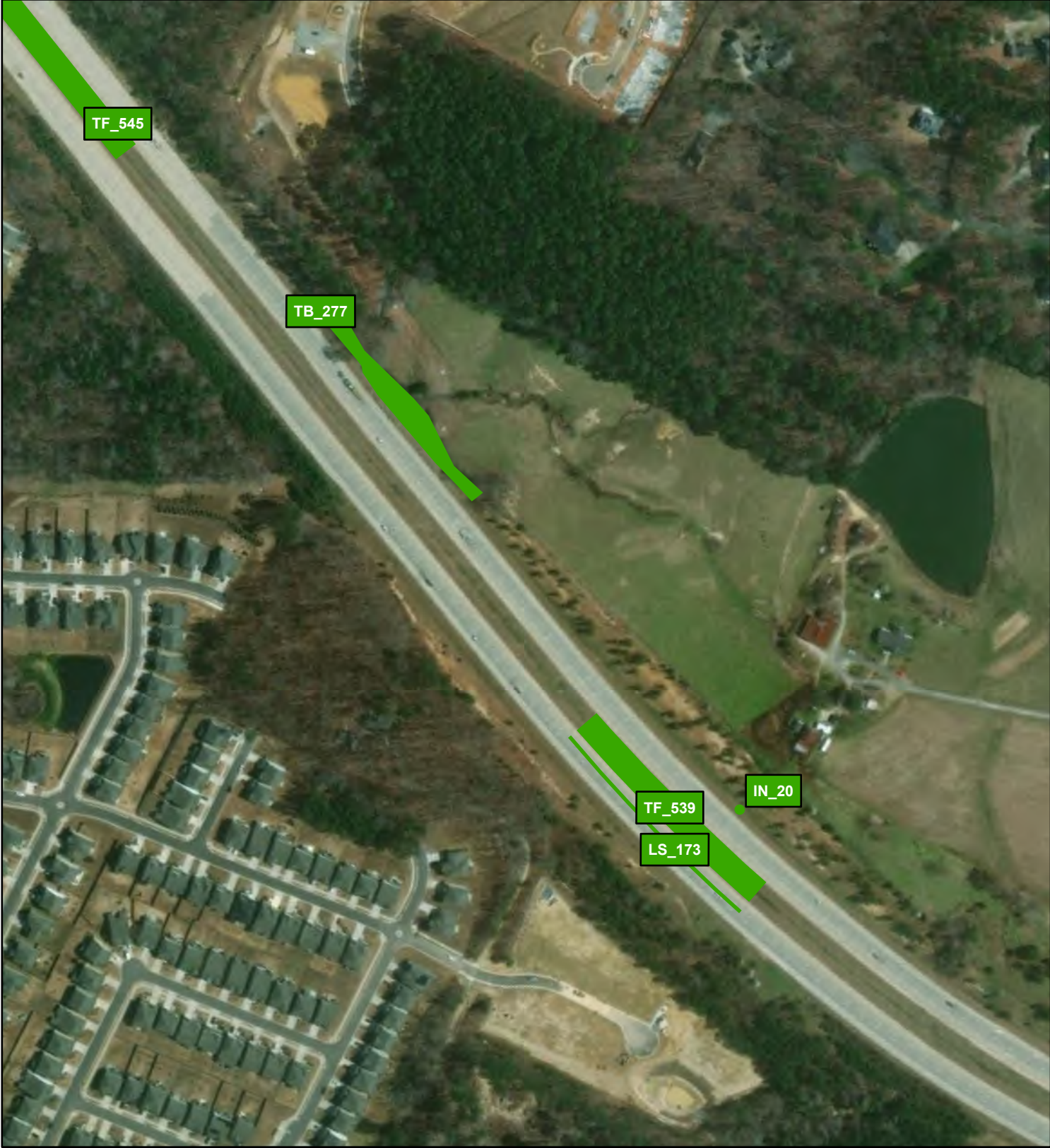
Failing Asset

Passing Asset

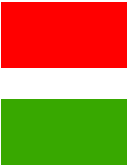




Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



Legend



Failing Asset

Passing Asset





Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



### Legend

Failing Asset

Passing Asset





Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



# Legend

Failing Asset

Passing Asset



NORTH CAROLINA

Turnpike Authority



Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



Legend



Failing Asset

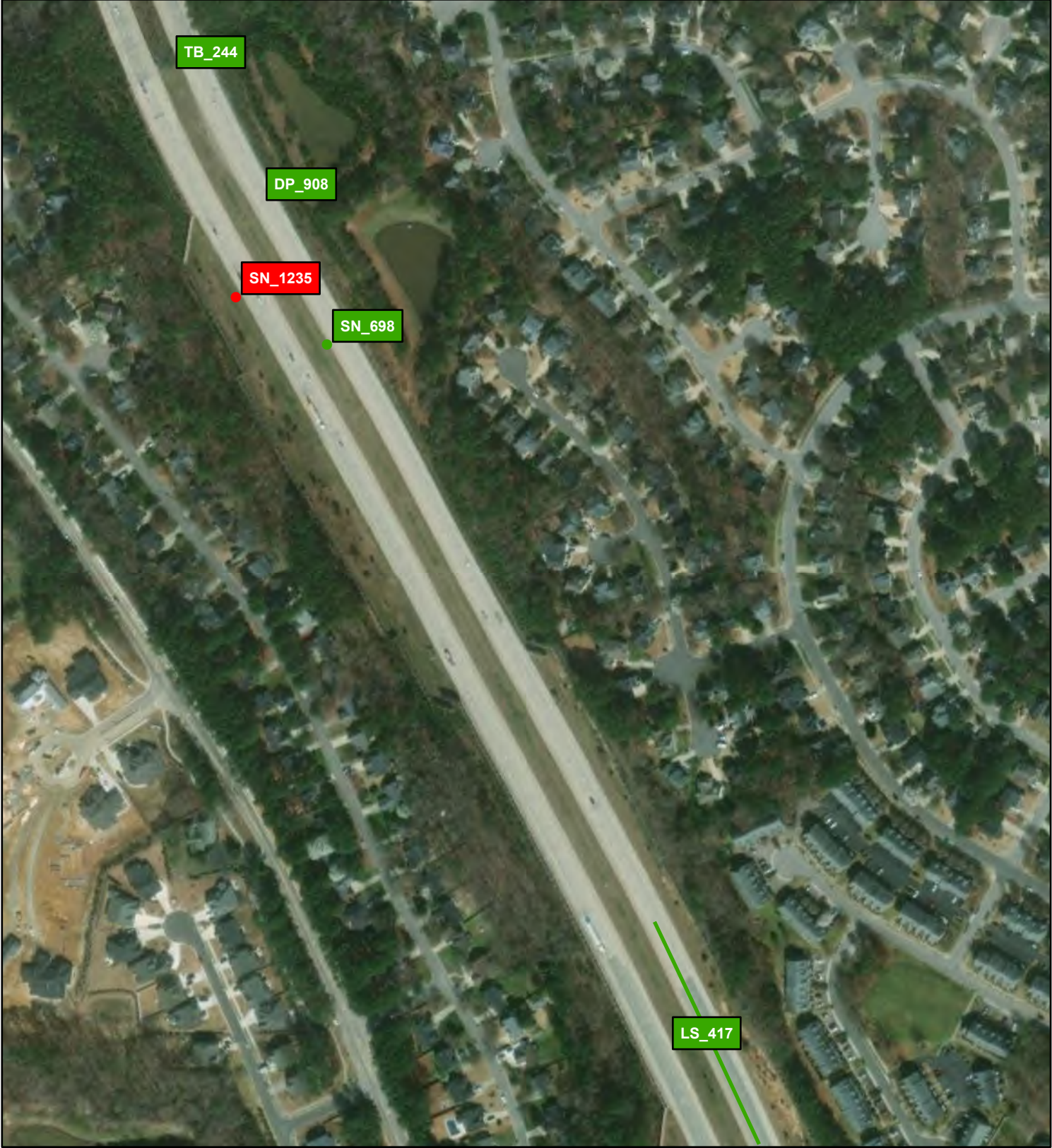


Passing Asset





Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



**Legend**

Failing Asset

Passing Asset



NORTH CAROLINA  
Turnpike Authority



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# Legend

Failing Asset

Passing Asset



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# Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



## Legend

-  Failing Asset
-  Passing Asset





# Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



## Legend

- Failing Asset
- Passing Asset





# Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



## Legend



Failing Asset



Passing Asset





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### Legend



Failing Asset



Passing Asset





Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



### Legend

Failing Asset

Passing Asset





Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



Legend



Failing Asset



Passing Asset





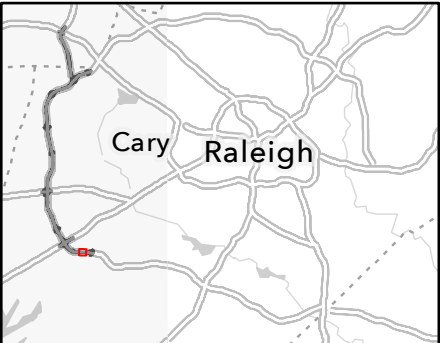
Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



# Legend

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Passing Asset





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-  Failing Asset
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Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



Legend



Failing Asset



Passing Asset





# Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



## Legend



Failing Asset

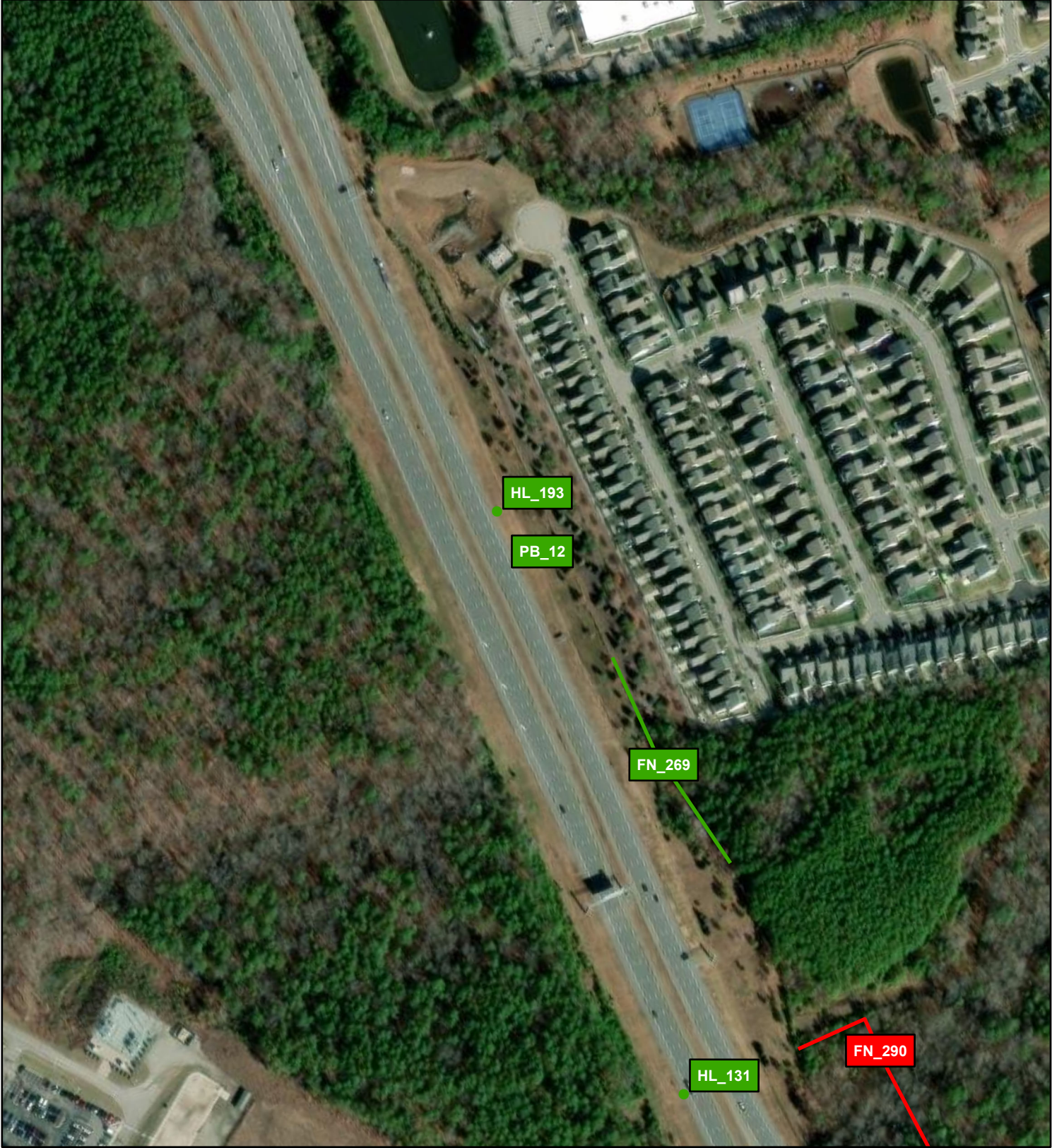


Passing Asset





Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



# Legend

Failing Asset

Passing Asset



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# Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



## Legend

- Failing Asset
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Appendix A: Triangle Expressway 2024 Fourth Quarter Asset Assessment Locations



# Legend

Failing Asset

Passing Asset





# Appendix B

## Triangle Expressway 2024 Fourth 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) .....                | B1  |
| Curb and Gutter (CG).....   | B2  |
| Decorative Supports (DS) .....  | B3  |
| Drainage Pipes (DP).....  | B4  |
| Misc. Drainage Structure (MDP) .....                                  | B5  |
| Fence and Control of Access (FN) .....                                | B6  |
| Graffiti (GR).....  | B7  |
| Highway Lighting (HL).....  | B8  |
| Impact Attenuators (IA).....  | B9  |
| Inlets (IN).....  | B10 |
| Landscaping (PB).....   | B11 |
| Paved Lanes – Asphalt (LS).....                                       | B12 |
| Paved Lanes – Concrete (LS).....                                      | B12 |
| Paved Shoulders (LS).....   | B13 |
| Unpaved Shoulders (LS) .....  | B13 |
| Front/Back Slopes (LS).....   | B14 |
| Unpaved Lateral and Outfall Ditches (LS) .....                        | B14 |
| Litter (LS).....  | B15 |
| Roadway Sweeping (LS) .....   | B16 |
| Pavement Striping (LS).....   | B17 |
| Pavement Markers (LS) .....   | B18 |
| Delineators (LS).....   | B19 |
| Paved Ditches (PD).....   | B20 |
| Pavement Words and Symbols (PS).....                                  | B21 |
| Signs (SN).....   | B23 |
| Tree and Brush (TB).....  | B24 |
| Turf Condition (TF) .....   | B25 |
| MSE/Retaining Walls, Sound Barrier Walls, and Screen Walls (WL) ..... | B26 |

## Guardrail, Concrete Barrier, and End Anchors (BR)

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

This asset did not produce any failures.



## Curb and Gutter (CG)

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

This asset did not produce any failures.

## 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 |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|




This asset did not produce any failures.

## Misc. Drainage Structure (MDP)

| # | Material Type  | Object ID | Failure Type  | Photo   | GIS Reference Page |
|---|----------------|-----------|---------------|---|--------------------|
| 1 | Shoulder Drain | MDP_70    | Rodent Screen |   | A14                |
| 2 | Shoulder Drain | MDP_93    | Rodent Screen |  | A18                |



## Fence and Control of Access (FN)

| # | Material Type | Object ID | Failure Type | Photo  | GIS Reference Page |
|---|---------------|-----------|--------------|--|--------------------|
| 1 | Woven         | FN_76     | Hole Height  |    | A14                |
| 2 | Woven         | FN_206    | Fence Hole   |   | A4                 |
| 3 | Woven         | FN_290    | Hole Height  |  | A32                |

## 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 | Double Roadway | HL_4      | Functional Damage (Out at Night) | No Photo Provided | *ORA               |
| 2 | Single Roadway | HL_53     | Functional Damage (Out at Night) | No Photo Provided | *ORA               |
| 3 | Single Roadway | HL_151    | Functional Damage (Out at Night) | No Photo Provided | A5                 |
| 4 | High Mast      | HL_202    | Rodent Screen                    | No Photo Provided | A30                |
| 5 | Single Roadway | HL_301    | Functional Damage (Down/Removed) | No Photo Provided | A16                |
| 6 | Single Roadway | HL_406    | Functional Damage (Out at Night) | No Photo Provided | A7                 |

## Impact Attenuators (IA)



| # | Material Type     | Object ID | Failure Type           | Photo             | GIS Reference Page |
|---|-------------------|-----------|------------------------|-------------------|--------------------|
| 1 | Gating Attenuator | IA_44     | Nighttime Reflectivity | No Photo Provided | A30                |



## Inlets (IN)

| # | Material Type | Object ID | Failure Type                 | Photo   | GIS Reference Page |
|---|---------------|-----------|------------------------------|---|--------------------|
| 1 | Drop Inlet    | IN_3      | Eroded Area / Surface Damage |   | A6                 |
| 2 | Drop Inlet    | IN_1066   | Obstruction                  |  | A6                 |

## Landscaping (PB)

| # | Material Type | Object ID | Failure Type | Photo   | GIS Reference Page |
|---|---------------|-----------|--------------|---|--------------------|
| 1 | Plant Bed     | PB_143    | Overgrown    |   | A12                |
| 2 | Tree          | PB_285    | Overgrown    |  | A11                |




## Paved Lanes – Asphalt (LS)

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

This asset did not produce any failures.

## Paved Lanes – Concrete (LS)

| # | Material Type       | Object ID | Failure Type | Photo   | GIS Reference Page |
|---|---------------------|-----------|--------------|---|--------------------|
| 1 | Pavement - Concrete | LS_478    | Pothole      |  | A27                |

### 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 |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

This asset did not produce any failures.



### 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 | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

This asset did not produce any failures.

## 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 |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

This asset did not produce any failures.



## Pavement Markers (LS)

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

This asset did not produce any failures.

## Delineators (LS)

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

This asset did not produce any failures.




## 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 | Merge Left    | PS_219    | Nighttime Reflectivity                      | No Photo Provided  | *ORA               |
| 2 | Thru Lane     | PS_254    | Daytime Assessment (Symbol Missing)         | No Photo Provided  | A21                |
| 3 | Thru Lane     | PS_444    | Daytime Assessment / Nighttime Reflectivity | No Photo Provided  | A6                 |
| 4 | Stop Bar      | PS_465    | Nighttime Reflectivity                      | No Photo Provided  | A6                 |
| 5 | Ped Xing      | PS_499    | Daytime Assessment / Nighttime Reflectivity |   | A1                 |
| 6 | Ped Xing      | PS_529    | Daytime Assessment / Nighttime Reflectivity |  | A30                |



## Pavement Words and Symbols (PS)


|   |           |        |  |   |     |
|---|-----------|--------|--|---|-----|
| 7 | Thru Lane | PS_546 | Daytime Assessment<br>(Symbol Missing)         |   | A34 |
| 8 | Thru Lane | PS_584 | Daytime Assessment /<br>Nighttime Reflectivity |  | A26 |

## Signs (SN)

| # | Sign Type | Object ID | Failure Type            | Photo  | GIS Reference Page |
|---|-----------|-----------|-------------------------|--|--------------------|
| 1 | NC Route  | SN_1235   | Missing Parts / Damaged |  | A19                |



## Tree and Brush (TB)

| # | Material Type  | Object ID | Failure Type               | Photo  | GIS Reference Page |
|---|----------------|-----------|----------------------------|--|--------------------|
| 1 | Tree and Brush | TB_32     | Vertical Clearance (15 ft) | No Photo Provided  | A21                |
| 2 | Tree and Brush | TB_325    | Barrier Clearance (10ft)   |  | A11                |

Turf Condition (TF)

| # | Material Type | Object ID | Failure Type | Photo  | GIS Reference Page |
|---|---------------|-----------|--------------|--|--------------------|
| 1 | Turf          | TF_343    | Bare Ground  |  | A23                |



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

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---------------|-----------|--------------|-------|--------------------|
|---|---------------|-----------|--------------|-------|--------------------|

This asset did not produce any failures.