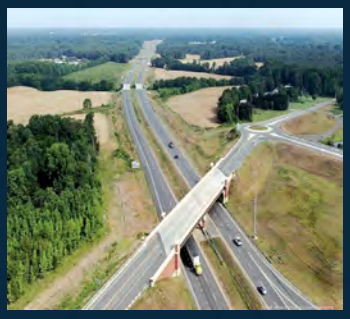
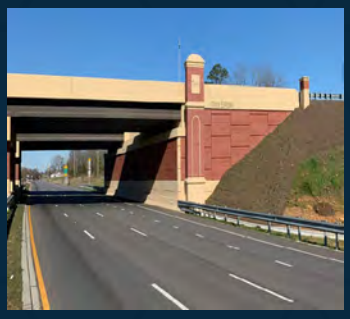
NORTH CAROLINA
Turnpike Authority

# Maintenance Rating Program Monroe Expressway

## Quarter 3 MRP Assessment


November 2022

# CONSULTANT CERTIFICATION OF COMPLETION

October 17, 2022

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

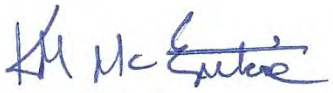
NCTA Monroe By-Pass Roadway Maintenance Performance Rating Program; Q3, FY 2022 Rating

This is to certify that I, Ken M. McEntire, 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 Monroe By-Pass 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*.

Sincerely,

Mott MacDonald I&E, LLC



Ken M. McEntire, PE
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# 1.0 Executive Summary

The North Carolina Turnpike Authority (NCTA) Maintenance Rating Program (MRP) is a maintenance evaluation program for all roadway features and toll facilities on the Monroe Expressway. This report presents results from the 2022 Third Quarter Assessment of the Monroe Expressway.

The overall 2022 third quarter rating of the Monroe Expressway was 97.0. This score is above the target rating score of 90 for the overall system. 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 2022 Third Quarter Assessment**

| Element | MRP Rating | Target Rating |
|---|---|---|
| Road Surface | 100.0 | 85.0 |
| Unpaved Shoulders and Ditches | 100.0 | 85.0 |
| Drainage | 98.5 | 85.0 |
| Roadside | 90.2 | 85.0 |
| Traffic Control Devices | 96.5 | 85.0 |
| **Overall MRP Performance Rating** | **97.0** | **90.0** |

This report also provides a rolling rating of the latest four quarterly inspections of the Monroe Expressway. As presented in ***Table 2***, the rolling maintenance rating of the Monroe Expressway was 96.4.

**Table 2: MRP Rolling Element Results**

| Element | Q4 2021 Rating | Q1 2022 Rating | Q2 2022 Rating | Q3 2022 Rating | Rolling Rating |
|---|---|---|---|---|---|
| Road Surface | 97.5 | 96.7 | 94.5 | 100.0 | 97.3 |
| Unpaved Shoulders and Ditches | 99.1 | 96.6 | 98.4 | 100.0 | 98.6 |
| Drainage | 94.7 | 100.0 | 98.8 | 98.5 | 98.4 |
| Roadside | 96.0 | 95.0 | 92.9 | 90.1 | 93.3 |
| Traffic Control Devices | 93.7 | 96.2 | 94.4 | 96.5 | 95.3 |
| **Overall MRP Performance Rating** | **95.9** | **96.7** | **95.4** | **97.0** | **96.4** |

All the element ratings were above the desired rating of 85, and one characteristic scored below the minimum 80 rating. It is important to note that these results are only representative of the third quarter sample, one of four quarterly surveys annually that provide an intermediate snapshot of seasonal conditions. Therefore, these results are not yet a statistically valid representation of the assets; only the total of all four quarterly inspections reported as a rolling rating, provides a 95% confidence level in statistical sampling.

# 2.0 Introduction

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. It 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 survey results are rated against established threshold criteria. The program analysis is accomplished by implementing 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.

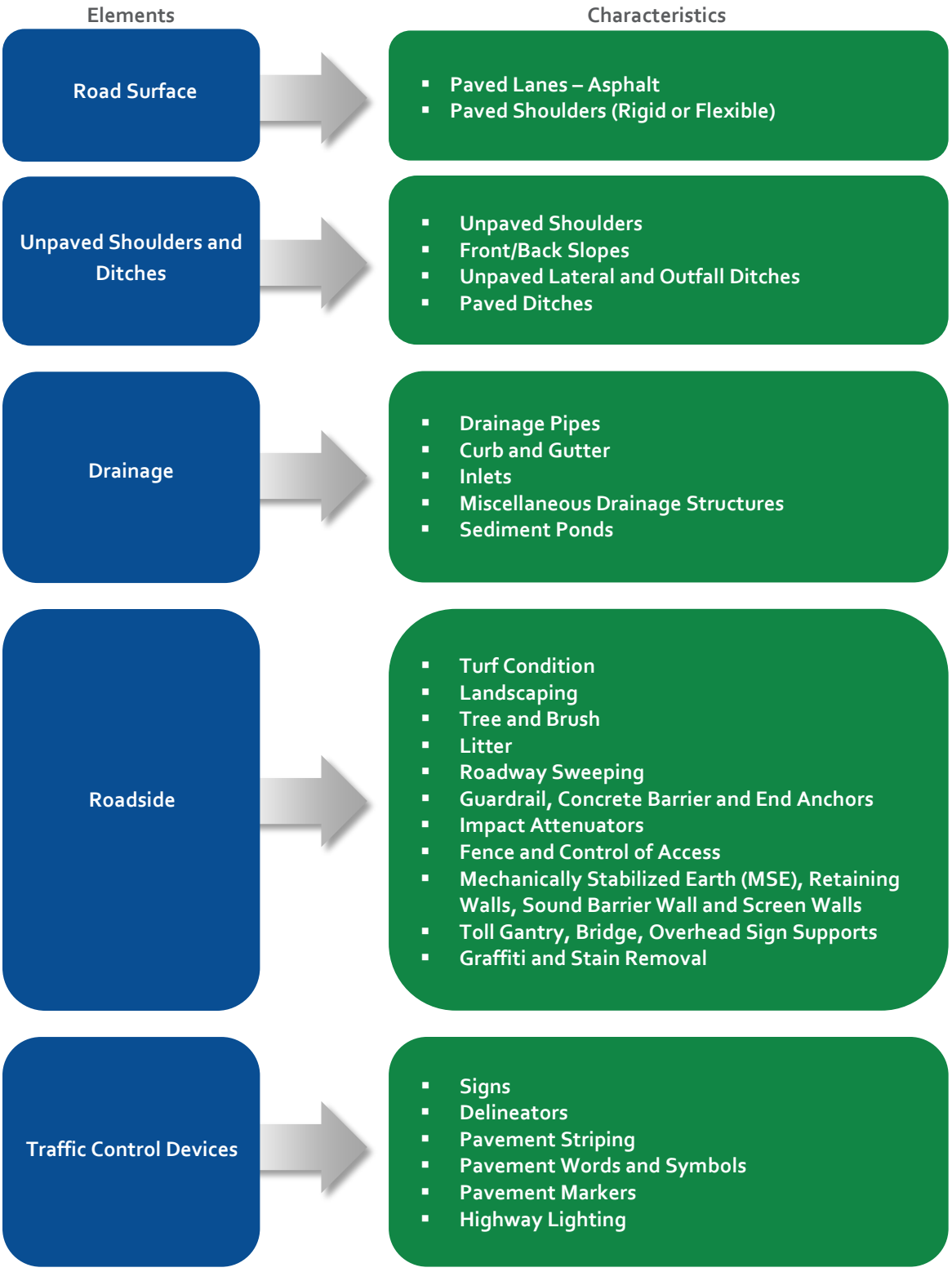
The NCTA performance standards, threshold criteria, and maintenance rating program were developed through a collaborative effort by NCTA managers, NCDOT maintenance staff, and consultants.

Using this field survey information, a maintenance matrix can be developed to show 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.

# 3.0 MRP Survey Procedure

Per the NCTA Roadway and Facility Maintenance Performance Standards, roadway assets on NCTA facilities have been grouped into characteristics which are categorized into 5 elements. These elements and their characteristics can be seen in ***Figure 1*** below:

**Figure 1: Maintenance Elements and Characteristics**



Because some roadway characteristics are of greater importance than others, a weighting system is applied to enable rational calculation of an overall level of service rating. Although one set of weighting factors for all characteristics could serve this purpose, a more useful system consists of two sets of weighting factors: one set that accounts for the importance of individual characteristics within a given maintenance element (1-9), and another set that accounts for the importance of the maintenance elements to the total rating (by % of score). This two-set system reveals deficiencies among characteristics and shows which maintenance elements are deficient.

The program analysis is accomplished using statistically valid, random sampling procedures that capture the level of service for individual assets with a 95% confidence level in sampling. Inspections are performed during the months of February, May, August, and November to account for dynamic changes in assets during the various seasons, such as vegetation growth. Each maintenance characteristic is evaluated and recorded according to the criteria developed by the NCTA performance standards. This inventory was completed with electronic data collection tablets and programs for accurate GPS coordinates of each transportation asset.

The evaluations are based on established "threshold" conditions that quantify the maximum defect allowed to exist for a characteristic before it is considered unacceptable. The ratings are done by comparing existing field conditions to the "threshold" value. If the characteristic meets or exceeds the "threshold", it is coded as YES to meeting the criteria. If it does not meet the criteria, it is coded as a NO. When the survey is complete, the number of YES's and NO's are totaled, and a composite number (using from 1 to 100 scale) is produced, which represents the level of maintenance currently being provided.

For any given asset, the number assigned as the target level of service represents the percentage of random samples in which the maintenance condition standard corresponding to the activity is to be met or exceeded. For instance, an activity with a level of service rating of 83 means that 83 percent of the sites met the condition standards.

The NCTA's overall target rating score is 90, with each element level scoring at or above 85 and every characteristic at or above 80.

# 4.0 Monroe Expressway Description

The Monroe Expressway extends for approximately 18.5 miles between the U.S. 74 interchange to the west and U.S. 74 near Marshville to the east. The Monroe Expressway consists of eight interchanges and seven all-electronic toll collection zones. A map of the Monroe Expressway can be seen in ***Figure 2*** below:

**Figure 2: Monroe Expressway Map**

# 5.0 Survey Results

**The overall Q3 2022 MRP rating for the Monroe Expressway is 97.0.** This score is above the target rating score of 90 for the overall system. All the element ratings were above the desired rating of 85, and one characteristic scored below the minimum 80 rating. Individual characteristic ratings will be discussed in detail in the analysis section of this report.

***Appendix A*** shows each of the individual assets that failed the MRP criteria. ***Appendix B*** includes maps of each of the individual asset locations that failed to meet the criteria displayed in the tables below. The MRP rating value designated to each element and feature refers to the percentage of elements or features that pass the asset's particular threshold criteria. After developing an inventory by recording the total number of instances of a particular feature, each feature is analyzed based on threshold criteria and a pass/fail result is designated and recorded for each to determine the percentage of the sample passed. The passing samples and sample totals are then multiplied by their weighted value, which are designated to each element based on importance to determine the actual and available rating points. Lastly, an MRP Performance Rating is calculated for each asset and element group based on the ratio of the actual points over the available points.

The overall MRP Performance rating results of the survey are presented in **Tables 3 and 4**.

**Table 3: Element Results for Q3 2022**

| Element | MRP Rating |
|---|---|
| Road Surface | 100.0 |
| Unpaved Shoulders | 100.0 |
| Drainage | 98.5 |
| Roadside | 90.1 |
| Traffic Control Devices | 96.5 |
| **Overall MRP Performance Rating** | **97.0** |

The overall score is determined by summing the elements multiplied by weighted factors as follows: Road Surface (25%), Unpaved Shoulders (13%), Drainage (15%), Roadside (17%), Traffic Control Devices (30%).

**Table 4: Characteristic Results for Q3 2022**

| Road Surface | Sample Passed | Sample Total | Weighted Values | Actual PTS | Available PTS | Quarter Rating |
|---|---|---|---|---|---|---|
| Paved Lanes Asphalt | 34 | 34 | 9 | 306 | 306 | 100 |
| Paved Shoulder | 34 | 34 | 5 | 170 | 170 | 100 |
| **Element Total** | | | | **476** | **476** | **100.0** |
| **Unpaved Shoulders & Ditches** | **Sample Passed** | **Sample Total** | **Weighted Values** | **Actual PTS** | **Available PTS** | **Quarter Rating** |
| Unpaved Shoulder | 34 | 34 | 9 | 306 | 306 | 100 |
| Front/Back Slopes | 34 | 34 | 6 | 204 | 204 | 100 |
| Lateral and Outfall Ditches, Unpaved | 34 | 34 | 6 | 204 | 204 | 100 |
| Ditches, Paved | 9 | 9 | 5 | 45 | 45 | 100 |
| **Element Total** | | | | **759** | **759** | **100.0** |
| **Drainage** | **Sample Passed** | **Sample Total** | **Weighted Values** | **Actual PTS** | **Available PTS** | **Quarter Rating** |
| Drainage Pipes | 35 | 35 | 7 | 245 | 245 | 100 |
| Curb and Gutter | 27 | 27 | 6 | 162 | 162 | 100 |
| Inlets | 34 | 35 | 7 | 238 | 245 | 97 |
| Misc. Drainage Structure | 18 | 19 | 4 | 72 | 76 | 95 |
| Sediment Pond | 2 | 2 | 7 | 14 | 14 | 100 |
| **Element Total** | | | | **731** | **742** | **98.5** |
| **Roadside** | **Sample Passed** | **Sample Total** | **Weighted Values** | **Actual PTS** | **Available PTS** | **Quarter Rating** |
| Turf Condition | 31 | 48 | 7 | 217 | 336 | 65 |
| Landscaping | 13 | 15 | 4 | 52 | 60 | 87 |
| Trees and Brush | 15 | 15 | 4 | 60 | 60 | 100 |
| Litter | 34 | 34 | 4 | 136 | 136 | 100 |
| Roadway Sweeping | 34 | 34 | 5 | 170 | 170 | 100 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Guardrail, Concrete Barrier and End Anchors | 31 | 33 | 9 | 279 | 297 | 94 |
| Impact Attenuators | 6 | 6 | 9 | 54 | 54 | 100 |
| Fence, Control Access | 35 | 37 | 7 | 245 | 259 | 95 |
| Retaining Walls and Sound Barrier Walls | 14 | 14 | 5 | 70 | 70 | 100 |
| Toll Gantry Supports | 9 | 9 | 5 | 45 | 45 | 100 |
| Graffiti and Stain Removal | 30 | 30 | 4 | 120 | 120 | 100 |
| **Element Total** | | | | **1448** | **1607** | **90.1** |

| **Traffic Control Devices** | **Sample Passed** | **Sample Total** | **Weighted Values** | **Actual PTS** | **Available PTS** | **Quarter Rating** |
|---|---|---|---|---|---|---|
| Signs | 60 | 66 | 7 | 420 | 462 | 91 |
| Object Markers and Delineators | 34 | 34 | 3 | 102 | 102 | 100 |
| Pavement Striping/Marking | 34 | 34 | 8 | 272 | 272 | 100 |
| Words and Symbols | 33 | 34 | 7 | 231 | 238 | 97 |
| Pavement Markers | 34 | 34 | 9 | 306 | 306 | 100 |
| Highway Lighting | 3 | 3 | 6 | 18 | 18 | 100 |
| **Element Total** | | | | **1349** | **1398** | **96.5** |

# 6.0 Analysis & Recommendations

## MRP Elements

All elements exceeded the NCTA minimum threshold criteria of 85.

## MRP Characteristics

Most characteristics exceeded the NCTA minimum threshold criteria of 80. This section identifies characteristics that did not achieve the minimum targeted score.

### Turf

Turf scored a 65 in the survey. Deficiencies of the turf were directly related to bare ground. The MRP Maintenance and Evaluation Standards V7 are below.

Roadside Mowing – This characteristic is the control of planted or natural grasses and vegetation for protection of soil shoulders and slopes, safety, and aesthetics purposes.

Turf Condition – Turf is grass or other vegetation considered desirable for the particular roadside location. Properly maintained and desired vegetation provides a pleasing appearance but primarily presents less chance of shoulder and slope defects (ruts, washouts, wash boarding), providing a safe recovery area for motoring traffic.

Undesirable Vegetation - The presence of broadleaf weeds in roadside turfgrass can be aesthetically undesirable and can also prevent the desired turfgrass from becoming readily established.

Noxious Weeds – Noxious weeds can be any plant in any stage of development, including parasitic plants, whose presence, whether direct or indirect, is detrimental to crops or other desirable plants, livestock, land, or other property, or is injurious to the public health. The top noxious weeds are as follows:

1) Blessed Thistle Cornflower (Ragged Robin)
2) Cocklebur Texas Panicum
3) Spurred Anoda Bracted Plantain
4) Velvetleaf Buckhorn Plantain
5) Corn Cockle Curly Dock
6) Wild Radish Dodder
7) Purple Nutsedge Giant Foxtail
8) Yellow Nutsedge Horsenettle
9) Canada Thistle Quackgrass
10) Field Bindweed Wild Mustard
11) Hedge Bindweed

Maintenance and Evaluation Standards: Turf Grass does not meet the maintenance standards when any of the following criteria is observed:

1) More than 2% of the vegetation exceeds a uniform height of 12 inches. Minimum height of no less than 4 inches. (Performance standard may not apply once the mowing frequency and patterns have been established as meeting the threshold condition on a routine basis)
2) Noxious weeds are present.

3) More than 50 continuous square feet (SF) of any one area or 10% of the cumulative turf evaluation area has bare ground.

Seeding and fertilizing efforts were last performed in the Spring of 2022. Seeding and fertilizer applications are conducted biannually in both the spring and fall months. It is recommended that the maintenance provider continue with a consistent application of this schedule along with spot seeding as needed.

# 7.0 Current Rolling MRP Rating

The rolling maintenance rating of the Monroe Expressway was 96.4, exceeding NCTA's overall target rating of 90. All elements exceeded NCTA's rolling rating threshold criteria of 85. All but one of the characteristic rolling ratings met or exceeded the target rating of 80.

The 2021/2022 results are presented in ***Exhibit 1*** and ***Table 5***. These results are a collection of the latest four quarterly inspections.

**Exhibit 1: MRP Element Results for 2021/2022**

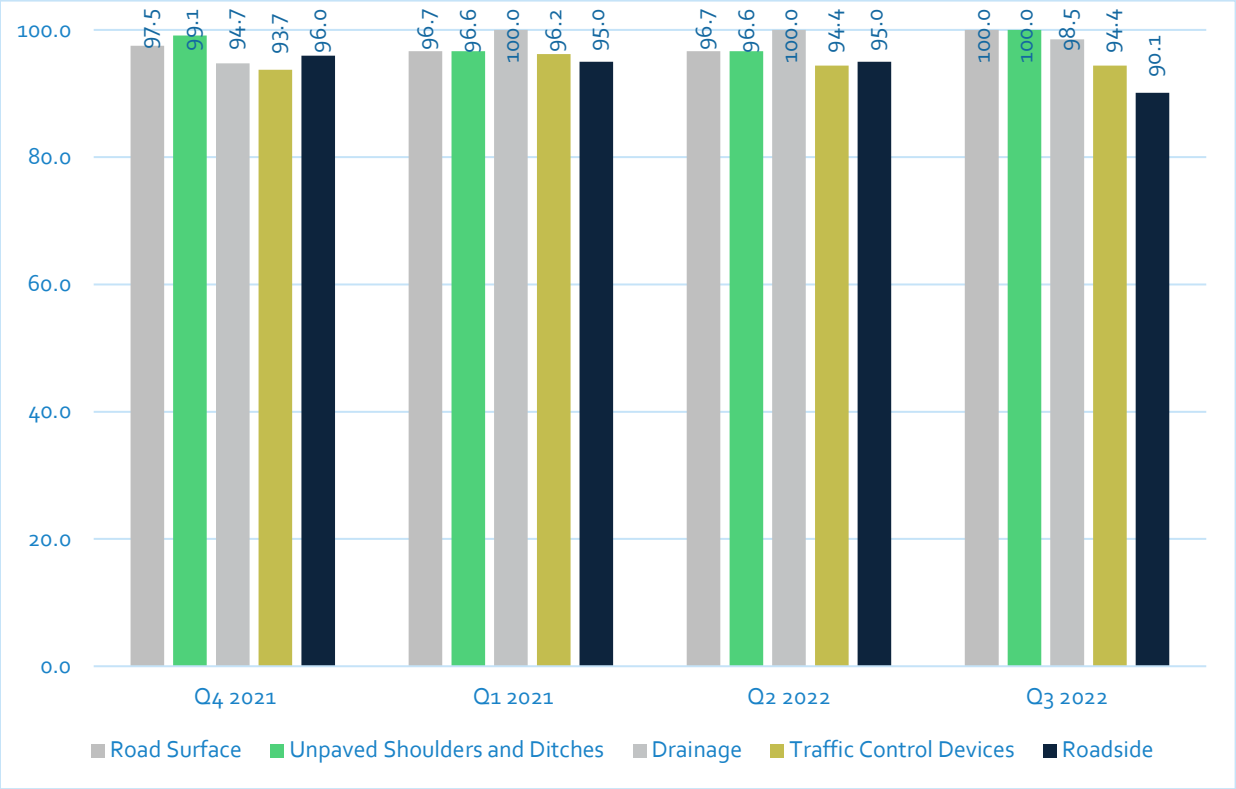


**Table 5: MRP Rolling Element Results**

| Road Surface | Q4 2021 Rating | Q1 2022 Rating | Q2 2022 Rating | Q3 2022 Rating | Rolling Rating |
|---|---|---|---|---|---|
| Paved Lanes Asphalt | 96 | 97 | 93 | 100 | 97 |
| Paved Shoulder | 100 | 97 | 97 | 100 | 98 |
| **Element Total** | | | | | **97.3** |
| **Unpaved Shoulders and Ditches** | **Q4 2021 Rating** | **Q1 2022 Rating** | **Q2 2022 Rating** | **Q3 2022 Rating** | **Rolling Rating** |
| Unpaved Shoulder | 100 | 93 | 100 | 100 | 97 |
| Front/Back Slopes | 100 | 100 | 97 | 100 | 99 |
| Lateral and Outfall Ditches, Unpaved | 100 | 100 | 100 | 100 | 100 |
| Ditches, Paved | 86 | 91 | 92 | 100 | 93 |
| **Element Total** | | | | | **98.6** |
| **Drainage** | **Q4 2021 Rating** | **Q1 2022 Rating** | **Q2 2022 Rating** | **Q3 2022 Rating** | **Rolling Rating** |
| Drainage Pipes | 100 | 100 | 100 | 100 | 100 |
| Curb and Gutter | 91 | 100 | 100 | 100 | 99 |
| Inlets | 94 | 100 | 100 | 97 | 98 |
| Sediment Basins | 100 | 100 | 100 | 100 | 100 |
| Misc. Drainage Structure | 93 | 100 | 89 | 95 | 94 |
| **Element Total** | | | | | **98.4** |
| **Roadside** | **Q4 2021 Rating** | **Q1 2022 Rating** | **Q2 2022 Rating** | **Q3 2022 Rating** | **Rolling Rating** |
| Turf Condition | 89 | 77 | 74 | 65 | 76 |
| Landscaping | 93 | 100 | 100 | 87 | 95 |
| Trees and Brush | 100 | 100 | 100 | 100 | 100 |
| Litter | 100 | 100 | 100 | 100 | 100 |
| Roadway Sweeping | 100 | 100 | 100 | 100 | 100 |
| Guardrail, Concrete Barrier, and End Anchors | 100 | 100 | 100 | 94 | 100 |
| Impact Attenuators | 100 | 100 | 100 | 100 | 100 |
| Fence, Control Access | 96 | 97 | 92 | 95 | 95 |
| Retaining Walls and Sound Barrier Walls | 92 | 100 | 86 | 100 | 94 |
| Decorative Supports | 100 | 100 | 100 | 100 | 100 |
| Graffiti and Stain Removal | 100 | 100 | 100 | 100 | 100 |
| **Element Total** | | | | | **93.3** |
| **Traffic Control Devices** | **Q4 2021 Rating** | **Q1 2022 Rating** | **Q2 2022 Rating** | **Q3 2022 Rating** | **Rolling Rating** |
| Signs | 65 | 90 | 90 | 91 | 88 |
| Delineators | 100 | 100 | 93 | 100 | 98 |
| Pavement Striping/Marking | 100 | 100 | 93 | 100 | 98 |
| Words and Symbols | 97 | 97 | 100 | 97 | 98 |
| Pavement Markers | 100 | 100 | 97 | 100 | 99 |
| Highway Lighting | 100 | 100 | 100 | 100 | 100 |
| **Element Total** | | | | | **95.3** |

# 8.0 Conclusion

This report presents the 2022 third quarter assessment of the Monroe 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 third quarter 2022 overall rating was **97.0** and the rolling rating was **96.4**. Both ratings met the target rating of 90.

All element ratings were above the target ratings for the quarter and rolling assessment. During the third quarter assessment, all but one characteristic met or exceeded the target rating of 80.

The maintenance provider is encouraged to continue using asset management principles and a performance management approach to work planning.

# Appendix A

## Monroe Expressway 2022 Third Quarter Table Results of Assets Failing MRP

**Appendix A: Monroe Expressway 2022 Third 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 of 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.

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_244 | Damage |  | B4 |
| 2 | Guardrail | BR_415 | Twisted Post |  | B11 |

## Curb and Gutter (CG)

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

This asset did not produce any failures.

.

## Toll Gantry Supports (GN)

| # | 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 (MDD)

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---|---|---|---|---|
| 1 | Concrete | MDD_98 | Part Missing |  | B9 |

## Fence and Control of Access (FN)

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---|---|---|---|---|
| 1 | Woven | FN_421 | Hole |  | B7 |
| 2 | Woven | FN_470 | Hole |  | B22 |

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

This asset did not produce any failures.

## 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 | Concrete | IN_665 | Blockage |  | B2 |

## Landscaping (PB)

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---|---|---|---|---|
| 1 | Plant Bed | PB_31 | Health |  | B11 |
| 2 | Plant Bed | PB_36 | Weeds |  | B9 |

## Paved Lanes – Asphalt (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 |
|---|---|---|---|---|---|

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 | Symbol | PS_89 | Visibility |  | B7 |

## Signs (SN)

| # | Sign Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---|---|---|---|---|
| 1 | Airport | SN_289 | Leaning |  | B9 |
| 2 | Yield | SN_466 | Leaning |  | B9 |
| 3 | Road Sign | SN_493 | Sign Support |  | B10 |

## Signs (SN)

| # | Sign Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---|---|---|---|---|
| 4 | Do Not Enter | SN_504 | Sign Support & Leaning |  | B11 |
| 5 | Road Sign | SN_535 | Sign Support |  | B13 |
| 6 | Road Sign | SN_1220 | Sign Support |  | B25 |

## Tree and Brush (TB)

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

This asset did not produce any failures.

## Turf Condition (TF)

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---|---|---|---|---|
| 1 | Turf | TF_113 | Bare Ground |  | B1 |
| 2 | Turf | TF_163 | Bare Ground |  | B2 |
| 3 | Turf | TF_239 | Bare Ground |  | B4 |

## Turf Condition (TF)

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---|---|---|---|---|
| 4 | Turf | TF_255 | Bare Ground |  | B5 |
| 5 | Turf | TF_267 | Bare Ground |  | B7 |
| 6 | Turf | TF_378 | Bare Ground |  | B21 |

## Turf Condition (TF)

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---|---|---|---|---|
| 7 | Turf | TF_397 | Bare Ground |  | B24 |
| 8 | Turf | TF_407 | Bare Ground |  | B25 |
| 9 | Turf | TF_455 | Bare Ground |  | B7 |

## Turf Condition (TF)

| # | Material Type | Object ID | Failure Type | Photo | GIS Reference Page |
|---|---|---|---|---|---|
| 10 | Turf | TF_478 | Bare Ground |  | B6 |
| 11 | Turf | TF_523 | Bare Ground |  | B8 |
| 12 | Turf | TF_563 | Bare Ground |  | B9 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 13 | Turf | TF_624 | Bare Ground | |  | B14 |
| 14 | Turf | TF_680 | Bare Ground | |  | B17 |
| 15 | Turf | TF_727 | Bare Ground | |  | B19 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 16 | Turf | TF_754 | Bare Ground | |  | B21 |
| 17 | Turf | TF_811 | Bare Ground | |  | B23 & B24 |

## 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.

## Sediment Basins(SB)

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

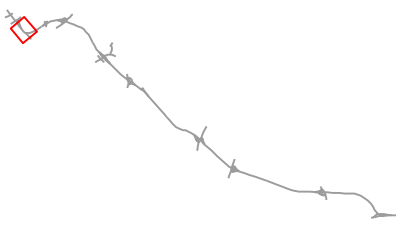
This asset did not produce any failures.

# Appendix B: Monroe Expressway Q3 2022 Assessment Locations


## Legend

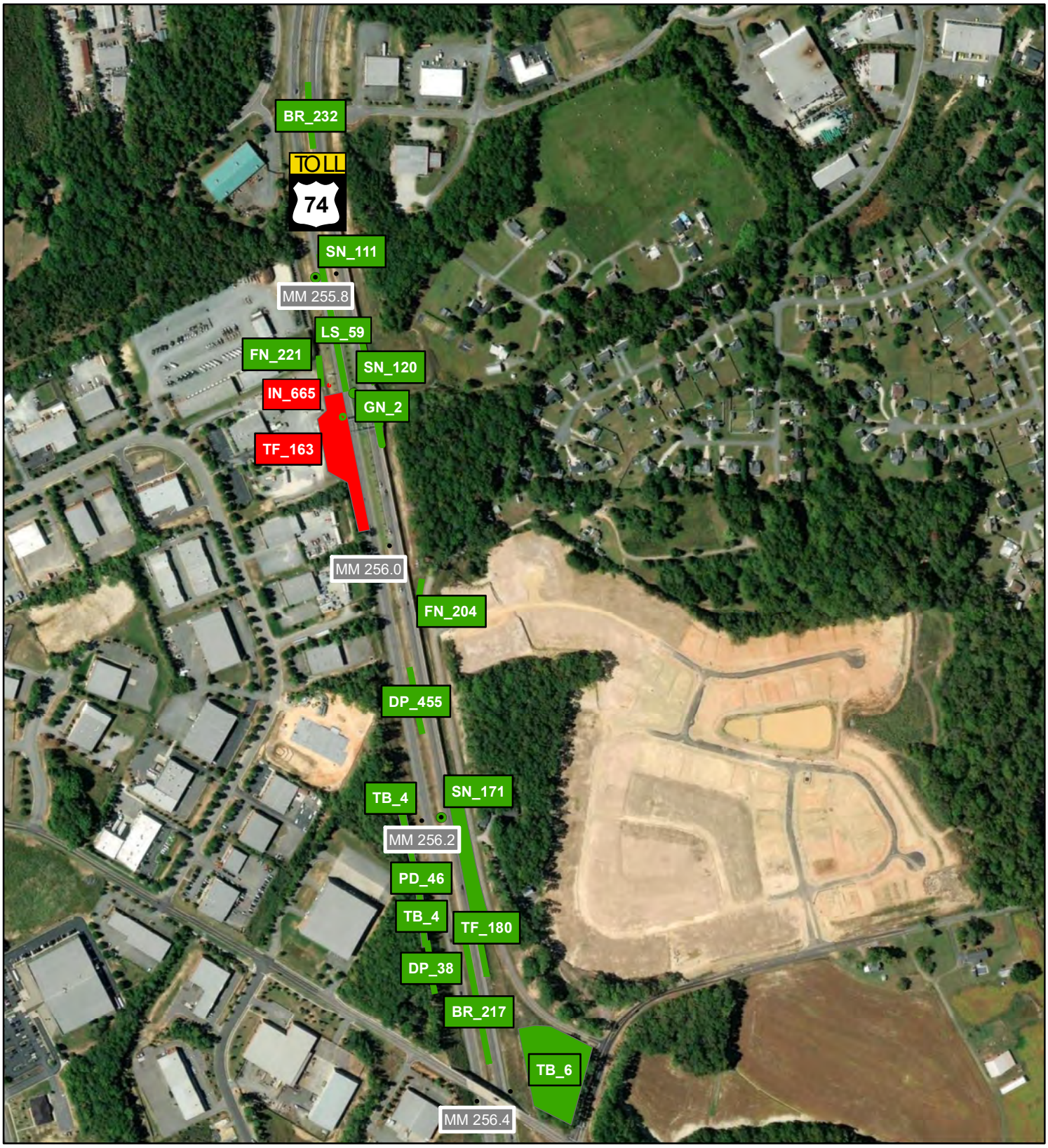
Failing Asset

Passing Asset



NORTH CAROLINA Turnpike Authority

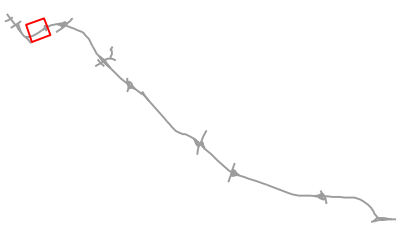
# Appendix B: Monroe Expressway Q3 2022 Asset Assessment Locations




## Legend

Failing Asset

Passing Asset



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# Appendix B: Monroe Expressway Q3 2022 Asset Assessment Locations


## Legend

Failing Asset

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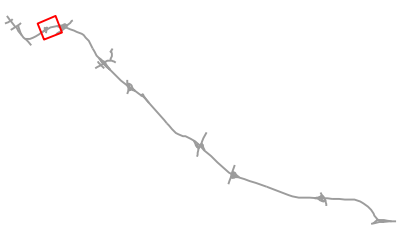
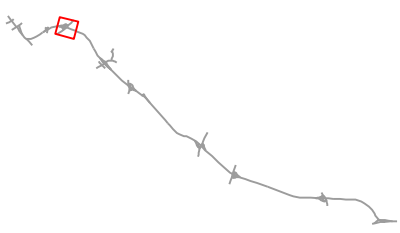


NORTH CAROLINA Turnpike Authority

# Appendix B: Monroe Expressway Q3 2022 Asset Assessment Locations


## Legend

- Failing Asset
- Passing Asset



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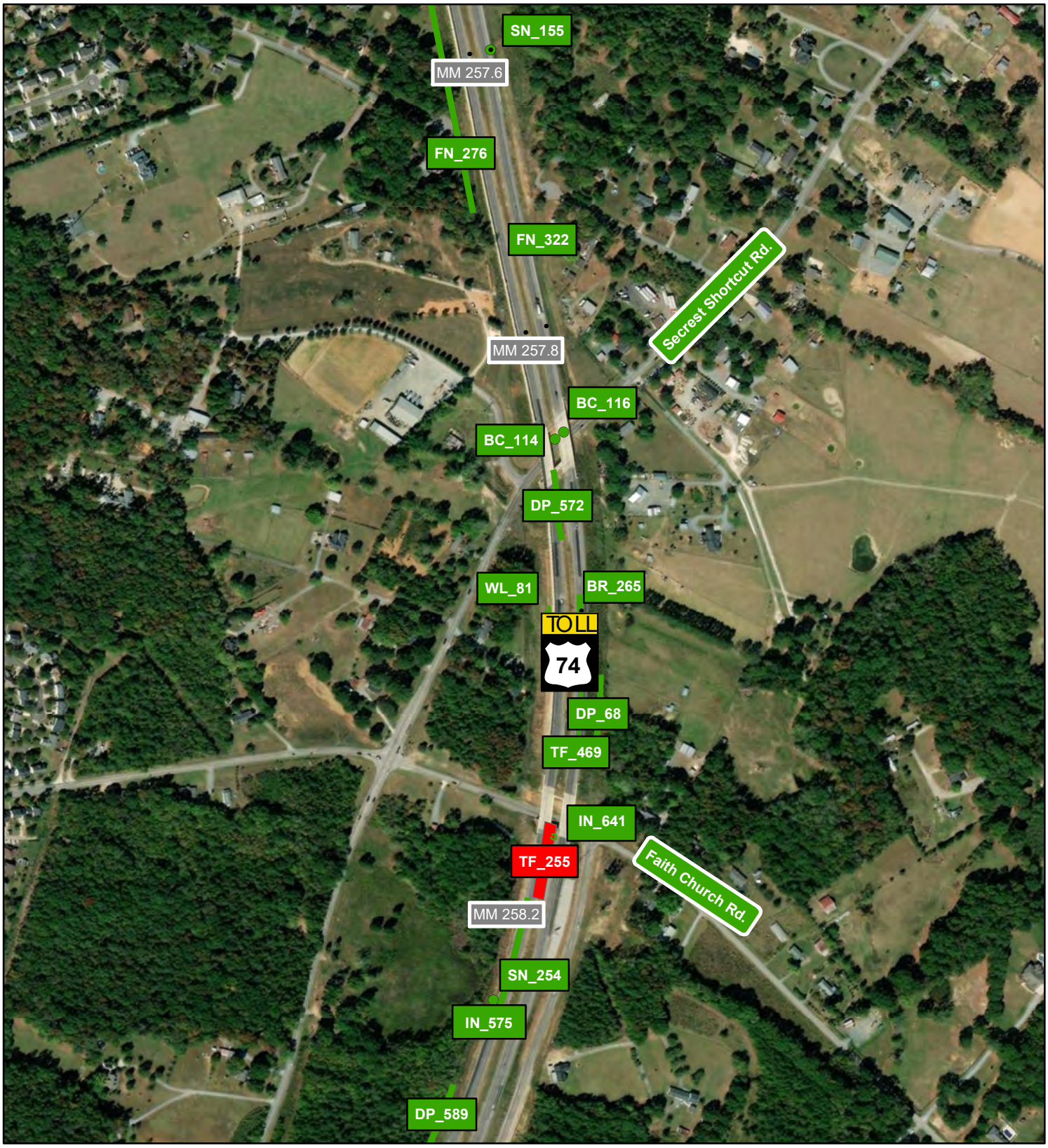


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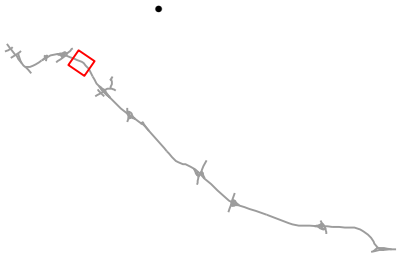

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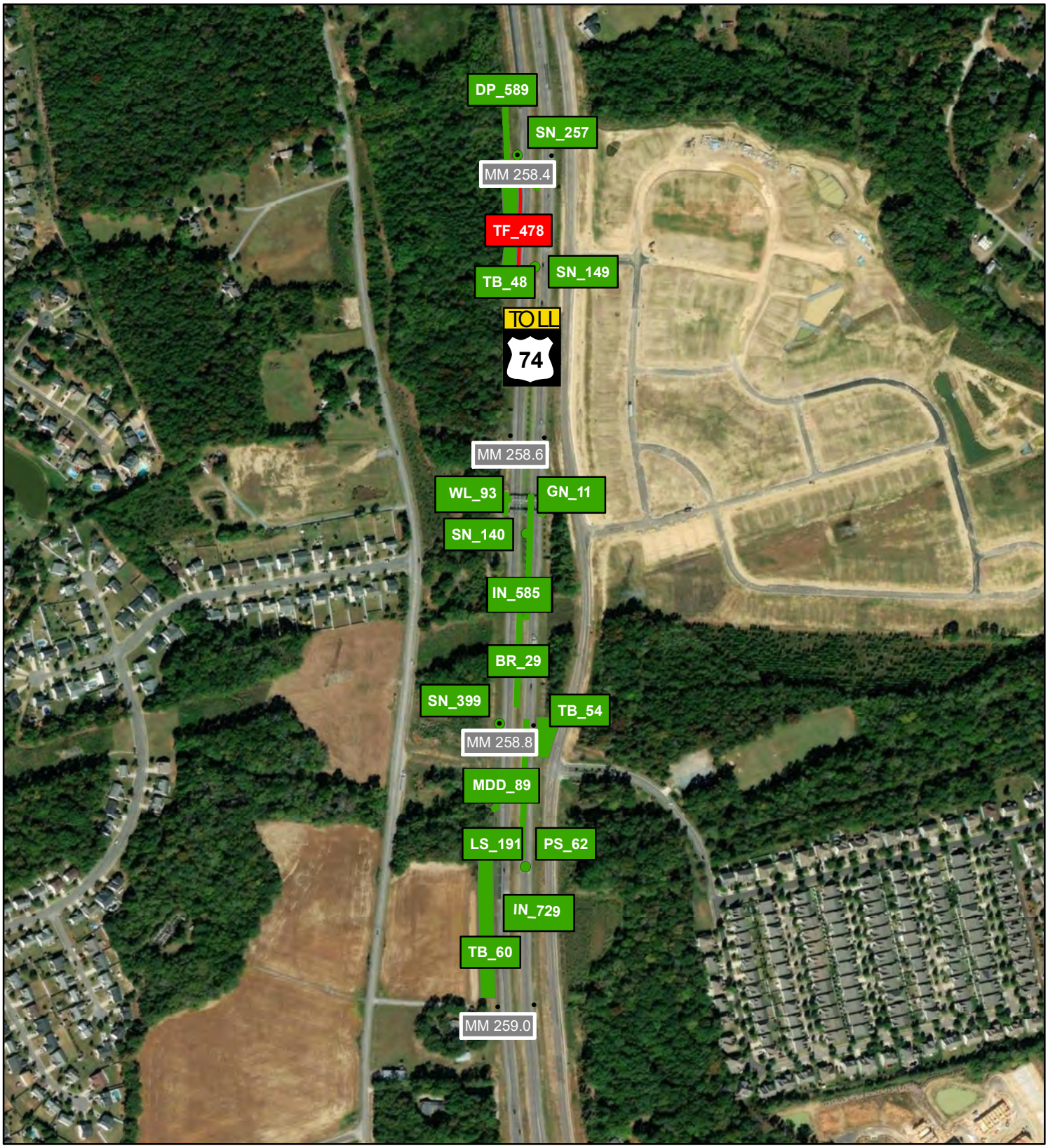
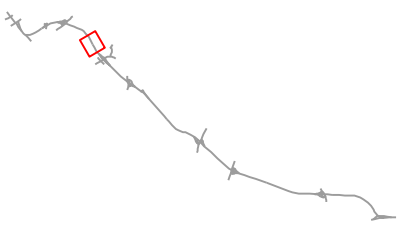



## Legend

Failing Asset

Passing Asset



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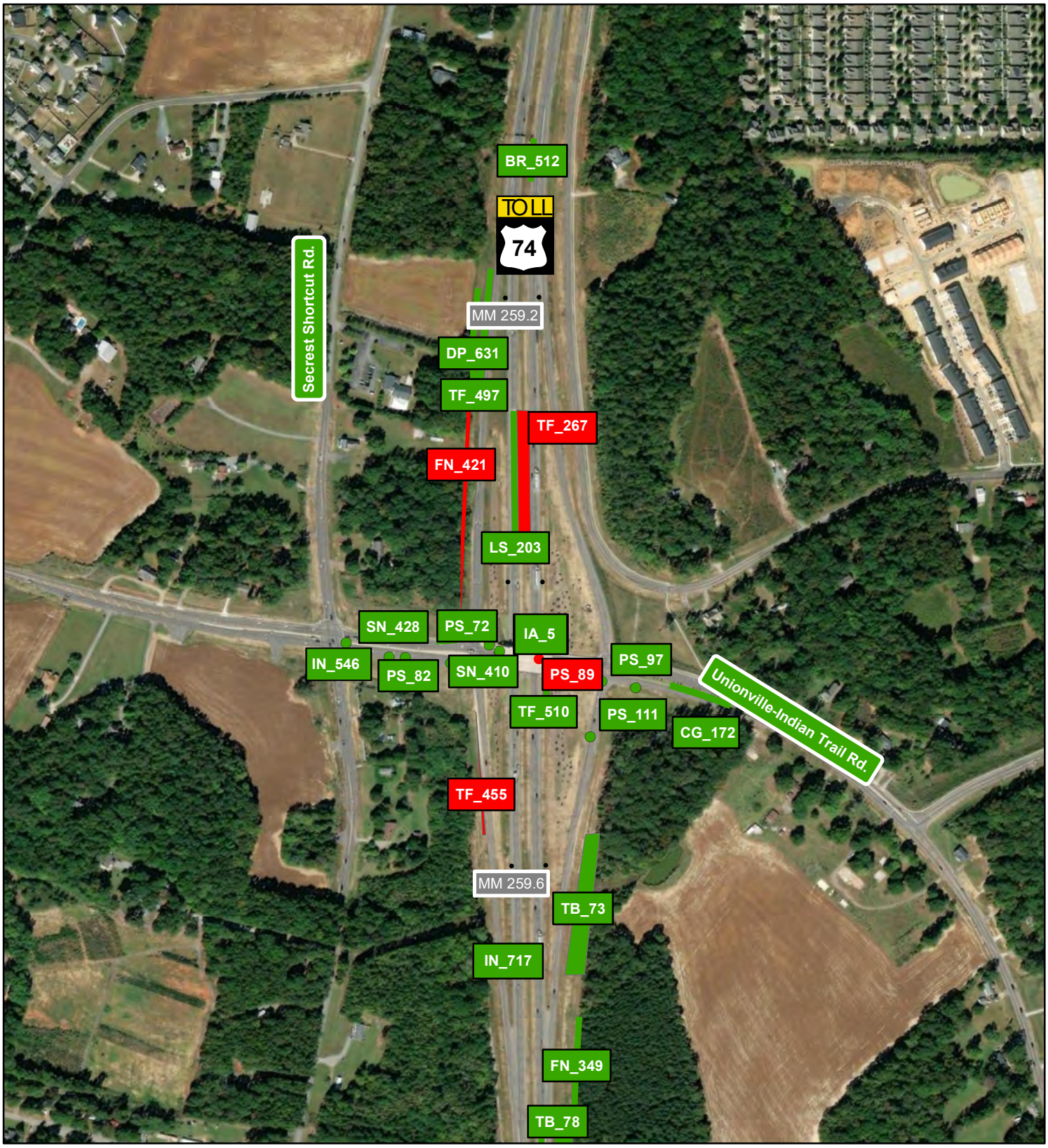


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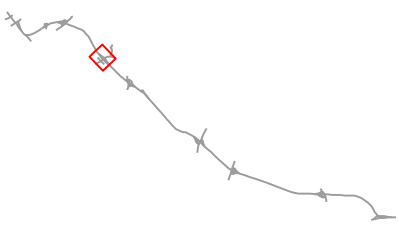

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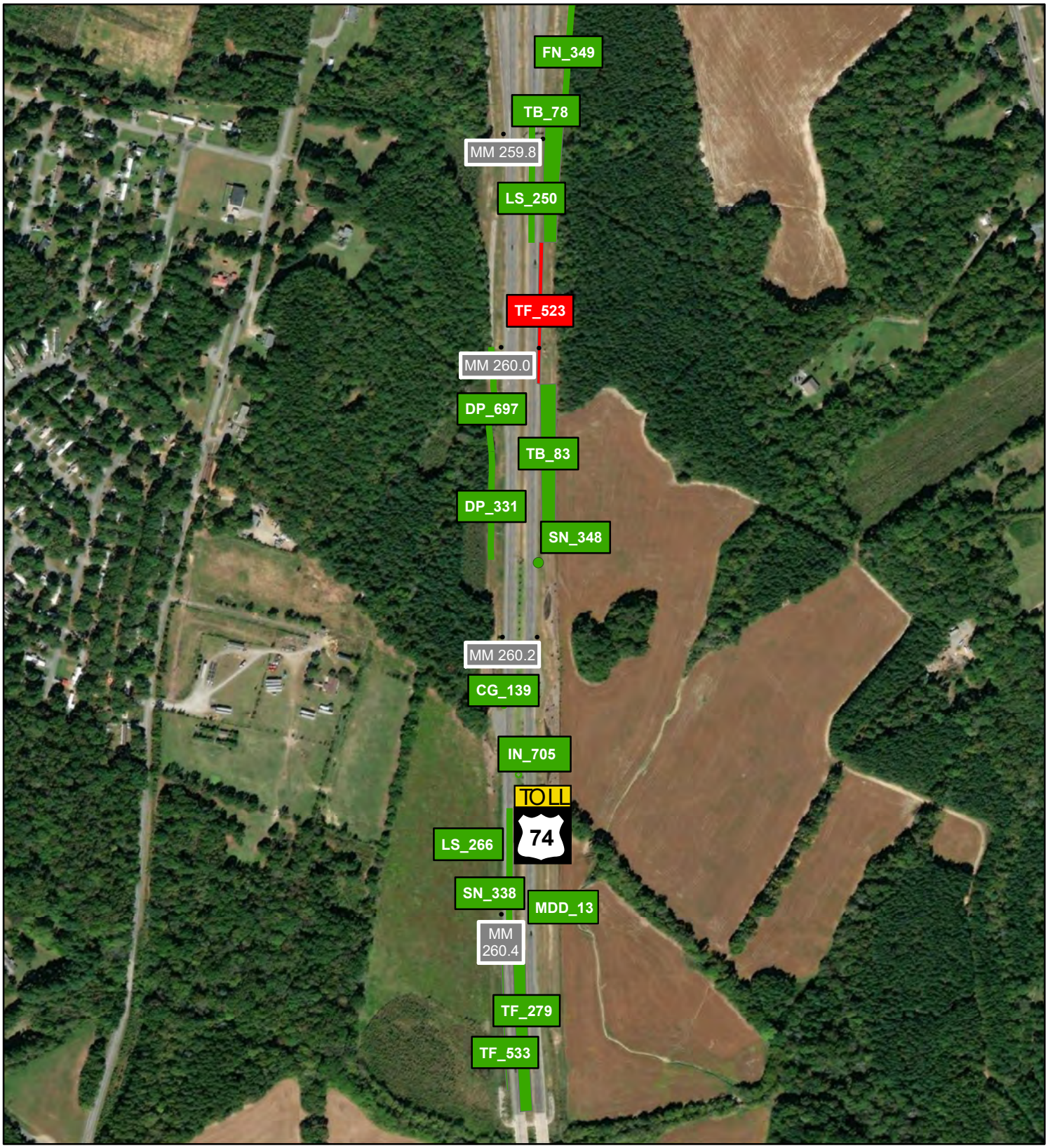


## Legend

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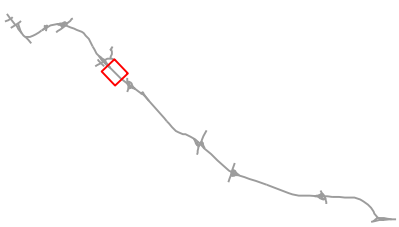
Passing Asset



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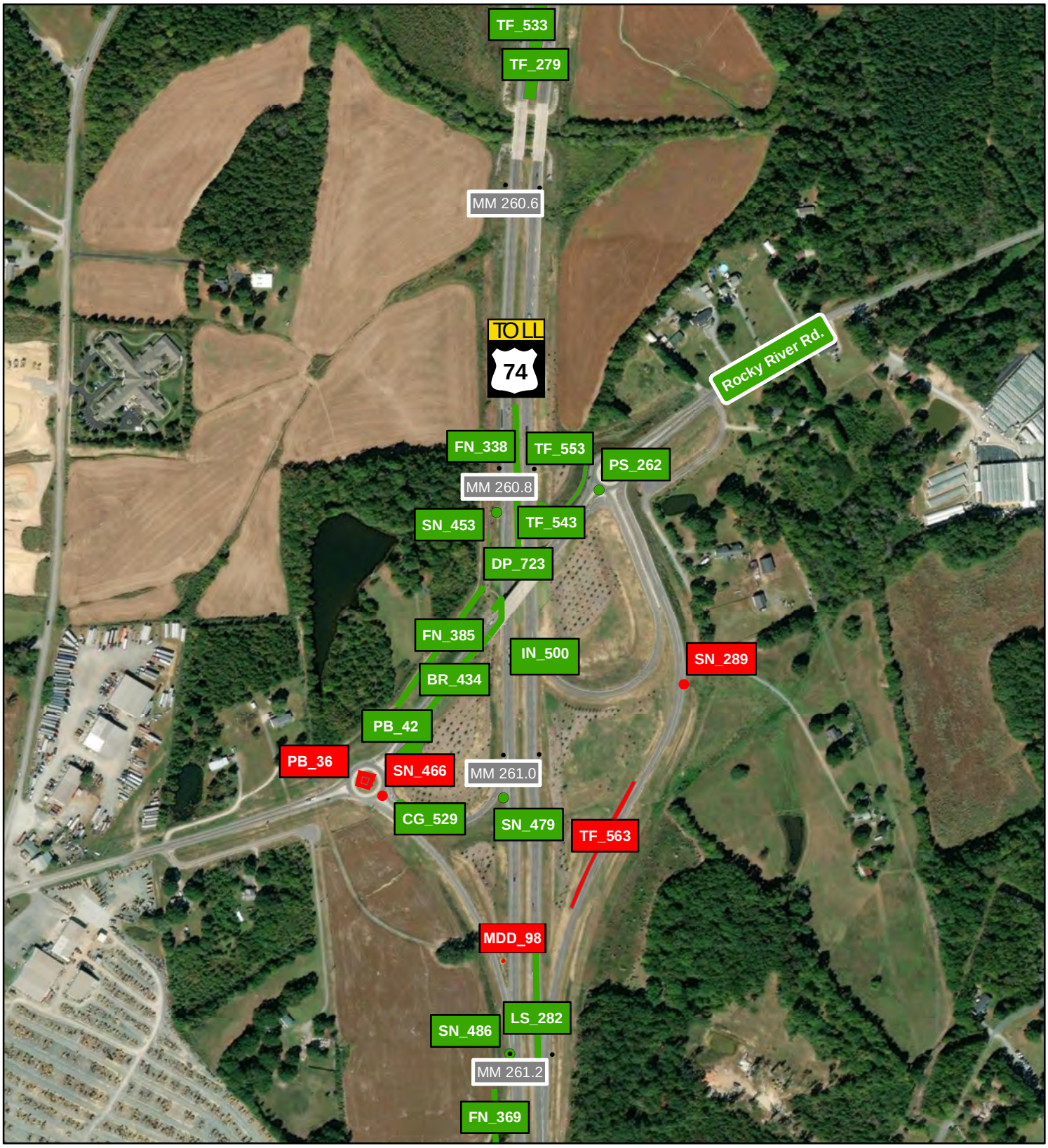


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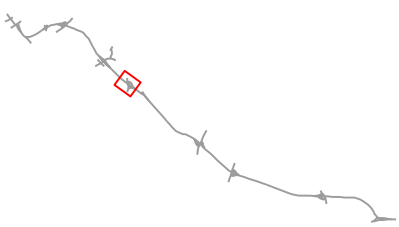
Passing Asset



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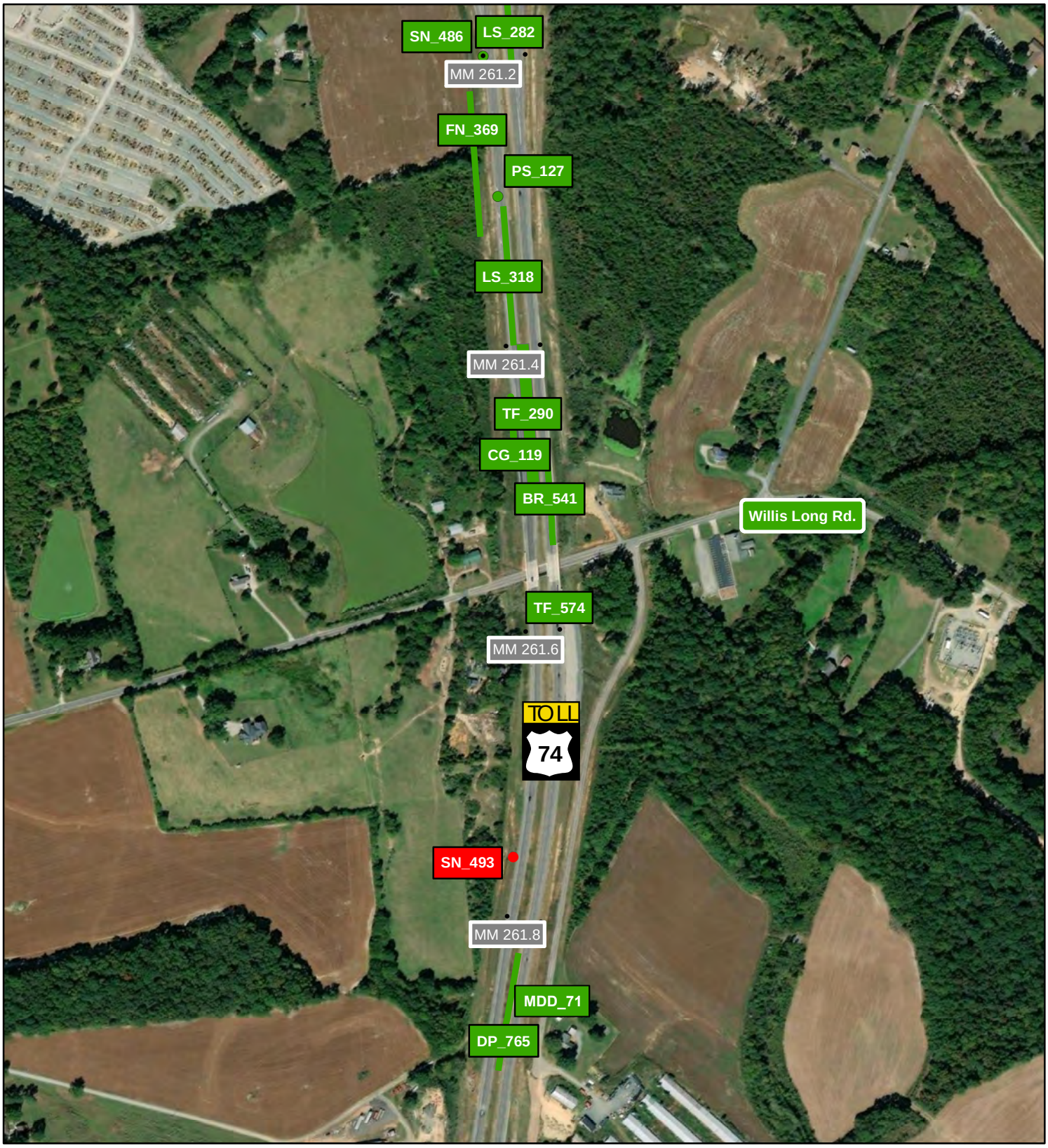


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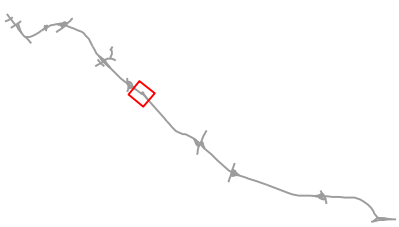

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# Appendix B: Monroe Expressway Q3 2022 Asset Assessment Locations


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Failing Asset

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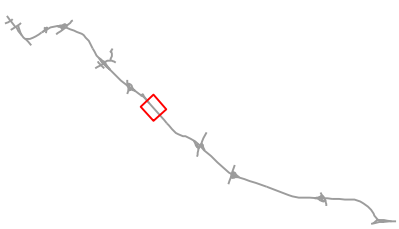

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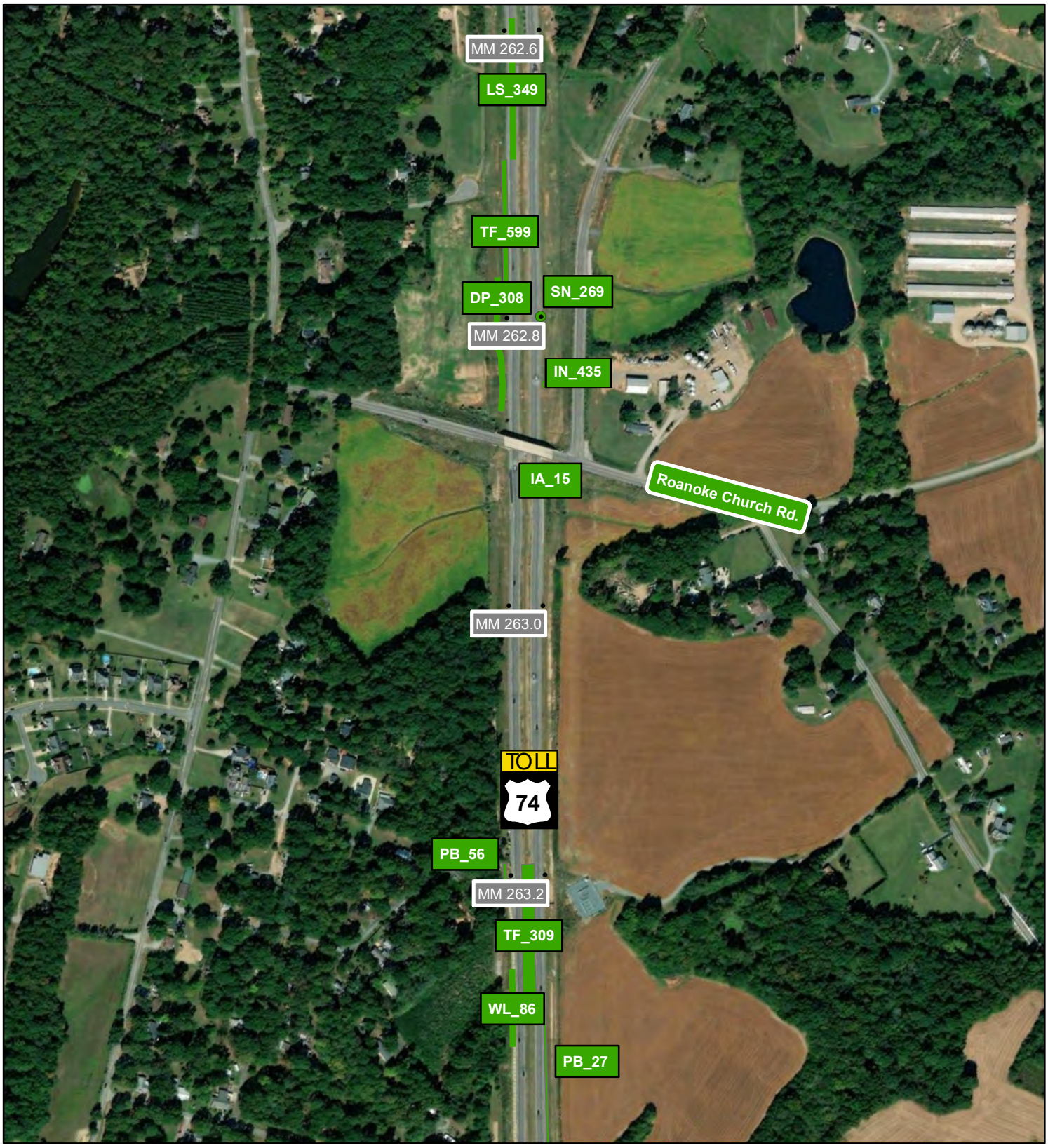
# Appendix B: Monroe Expressway Q3 2022 Asset Assessment Locations

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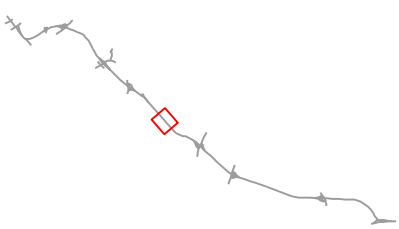
Passing Asset



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# Appendix B: Monroe Expressway Q3 2022 Asset Assessment Locations


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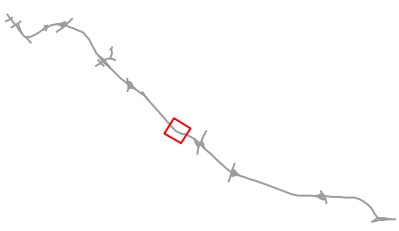

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# Appendix B: Monroe Expressway Q3 2022 Asset Assessment Locations


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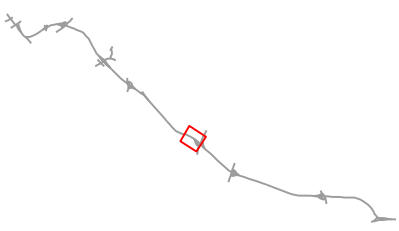

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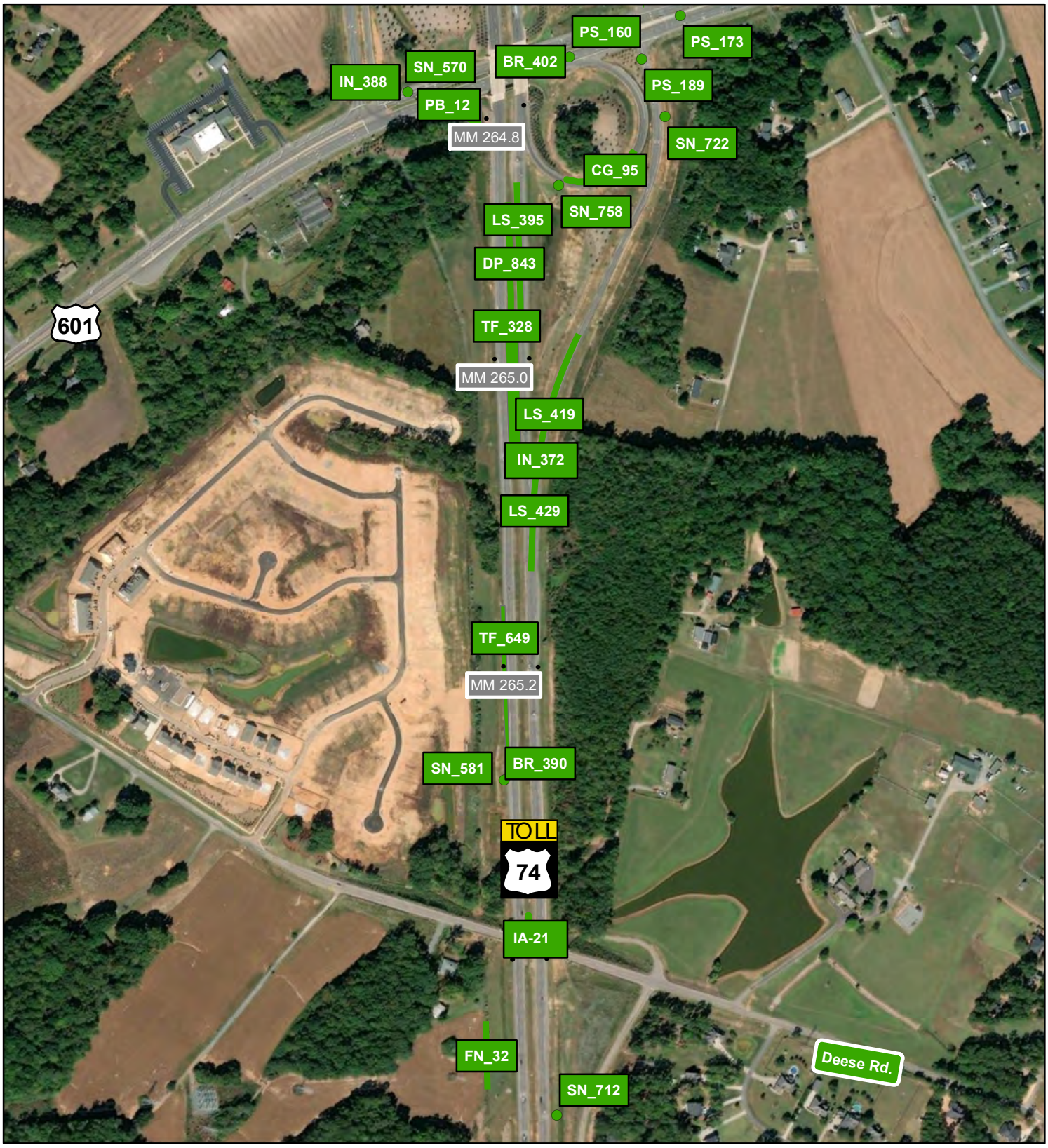


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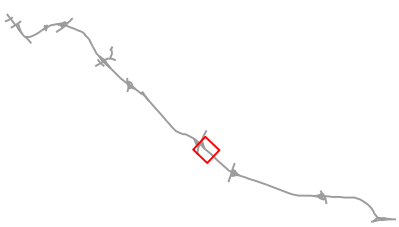

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# Appendix B: Monroe Expressway Q3 2022 Asset Assessment Locations


## Legend

Failing Asset

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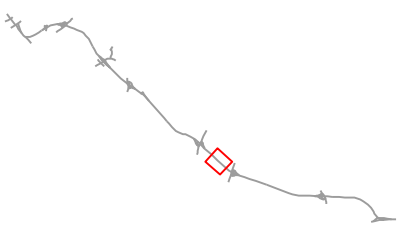

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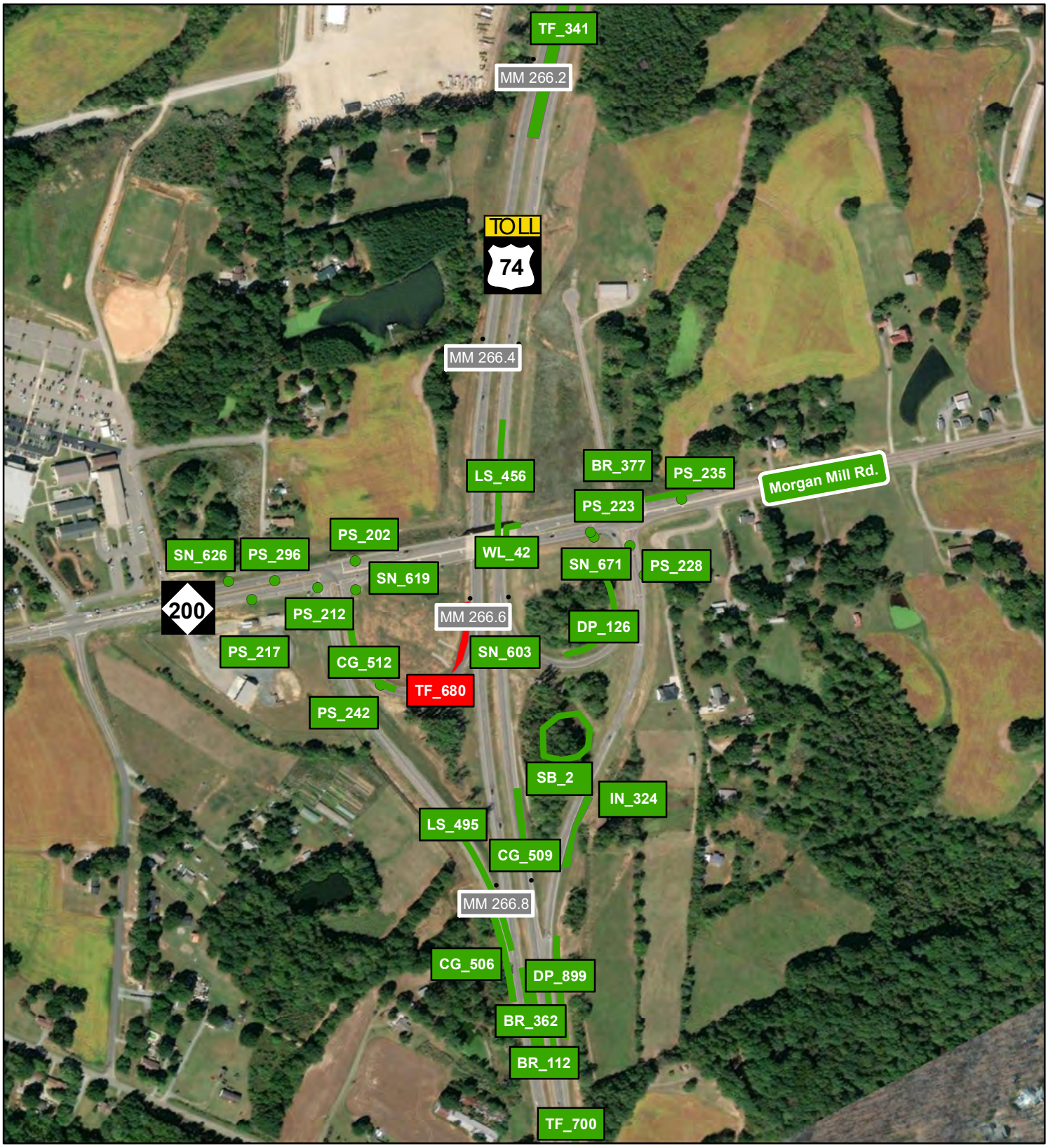


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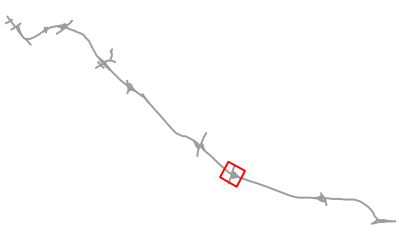

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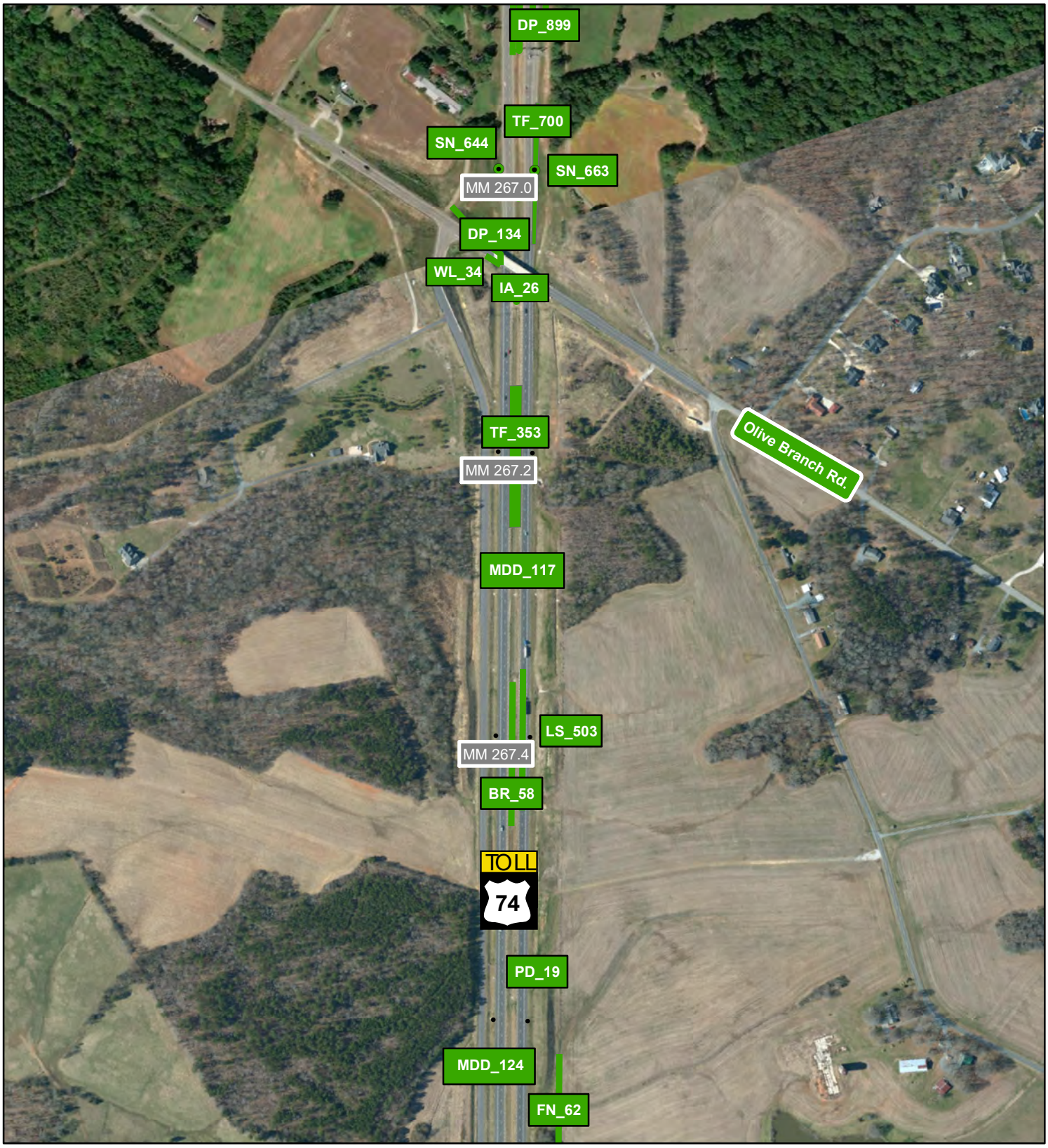


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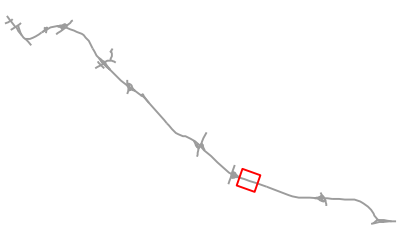

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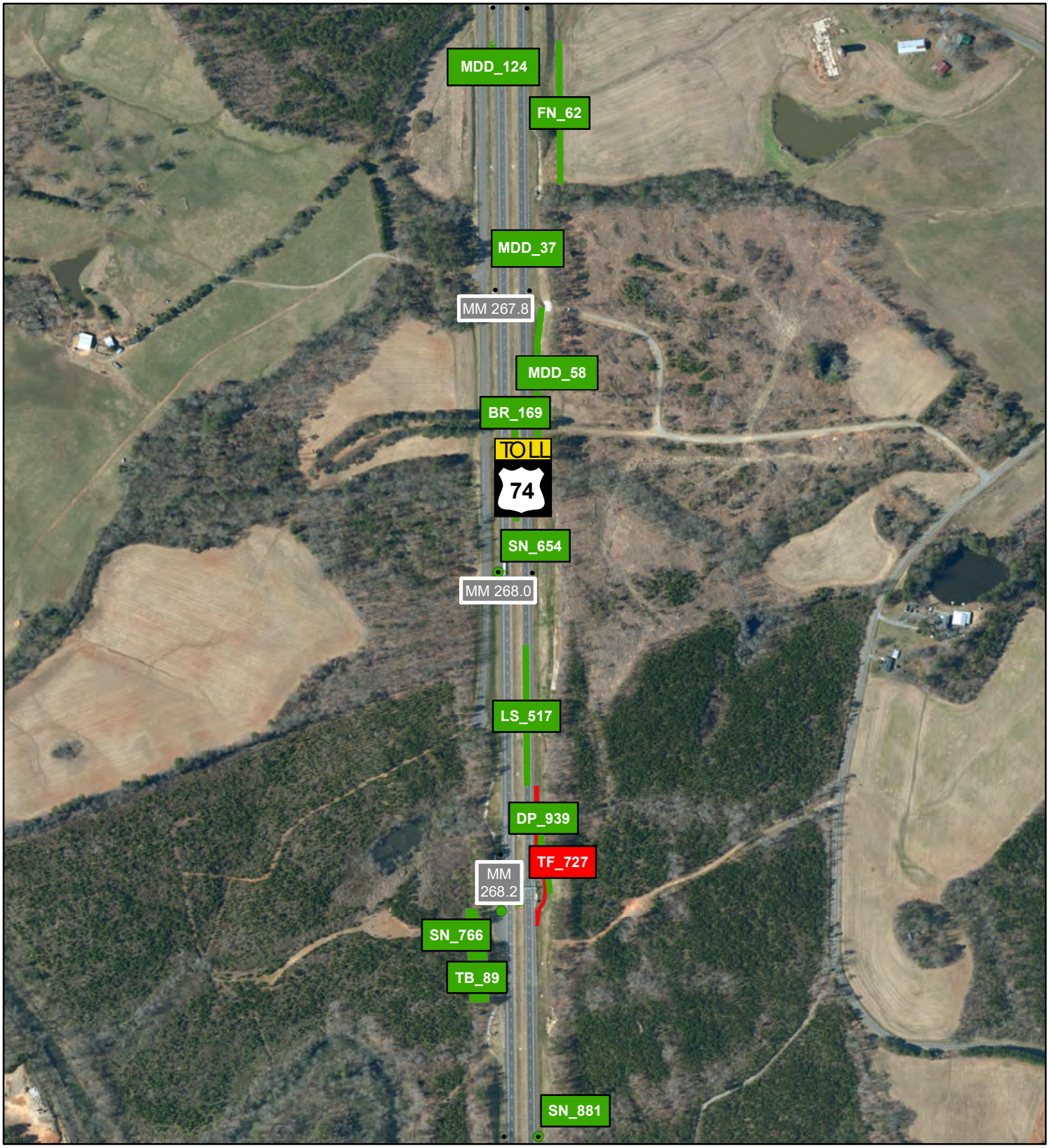


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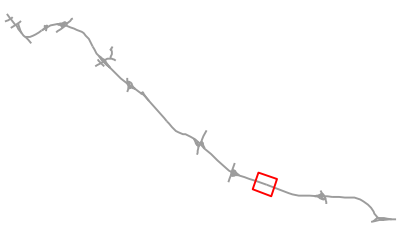
Passing Asset



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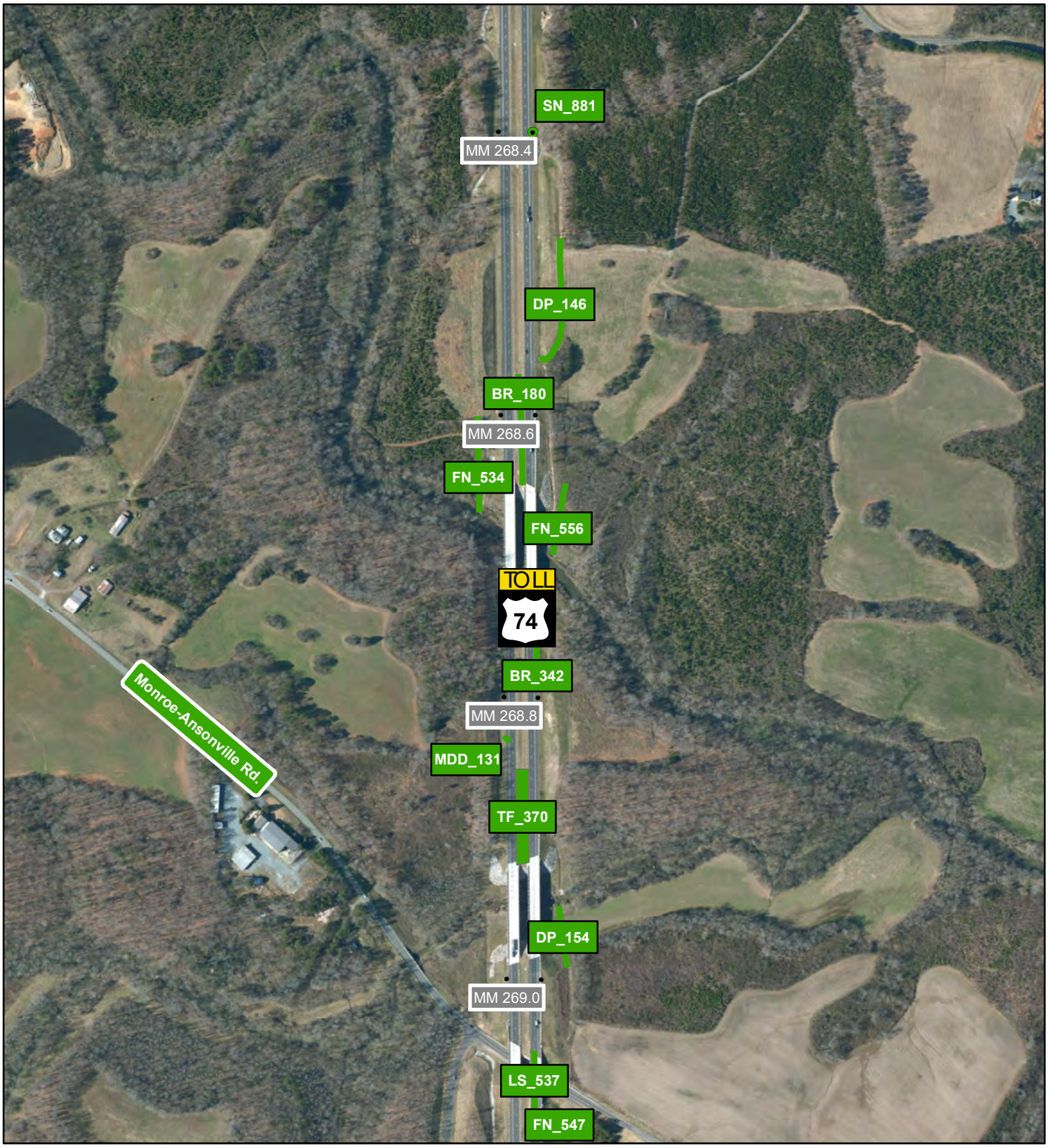


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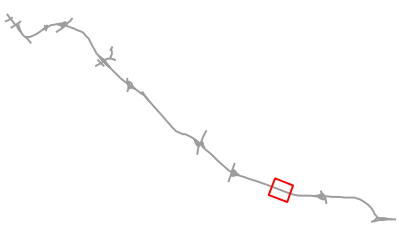

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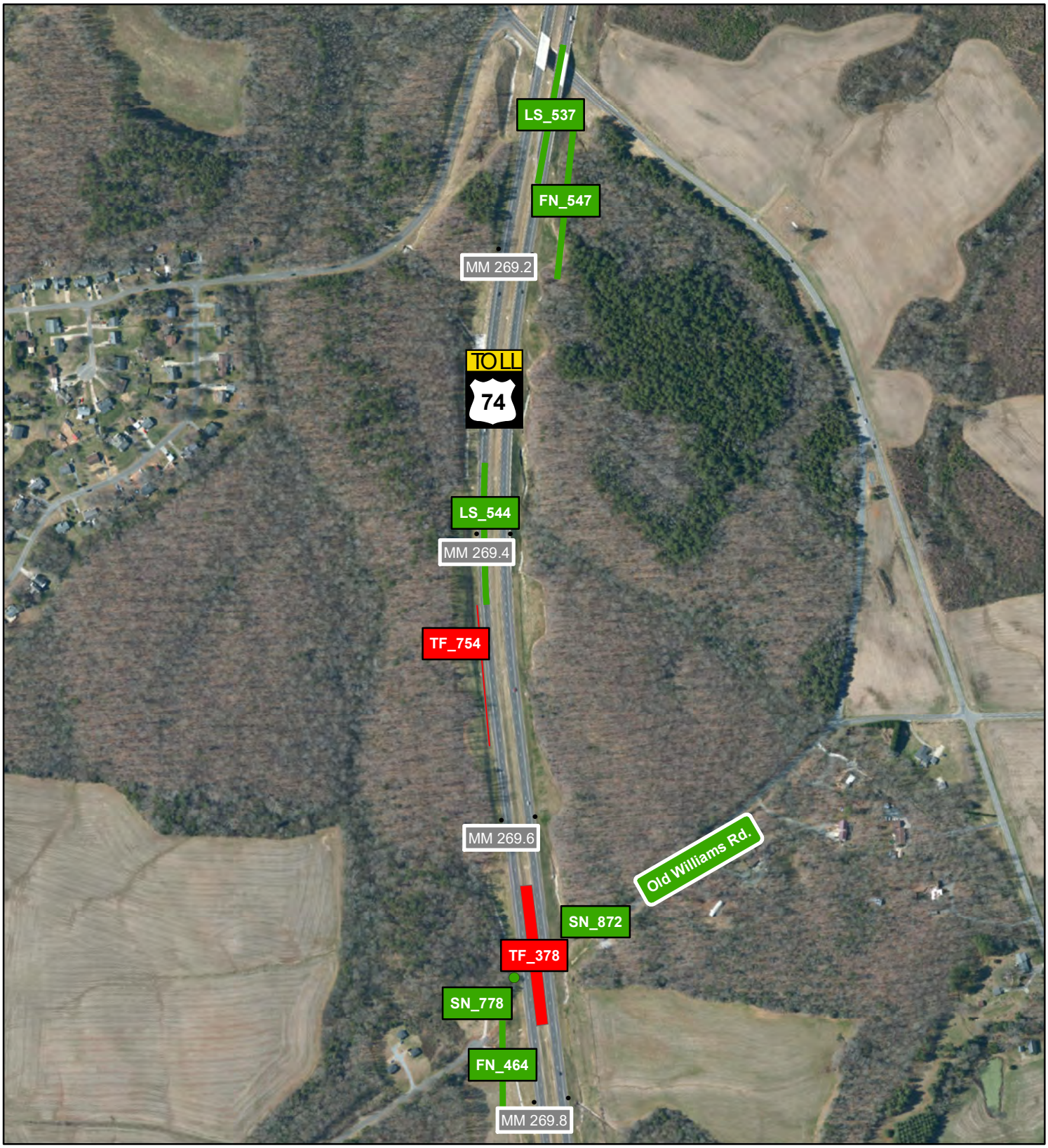


## Legend

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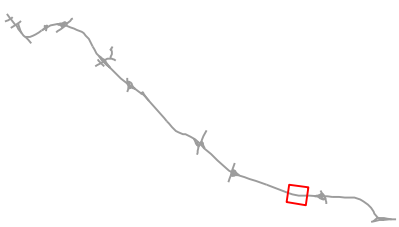

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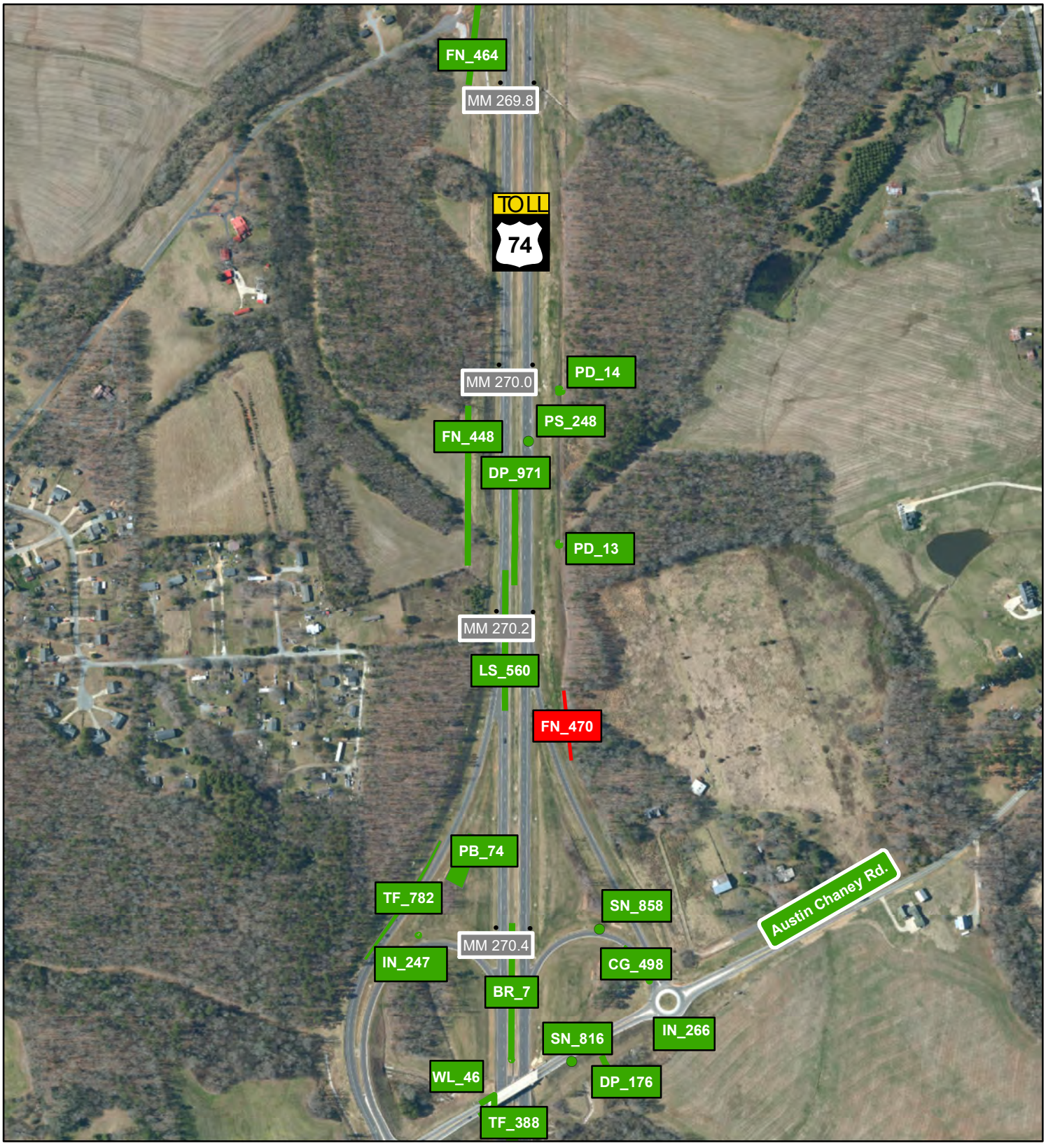
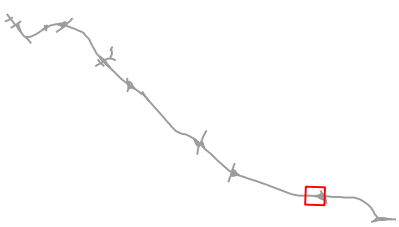



## Legend

Failing Asset

Passing Asset



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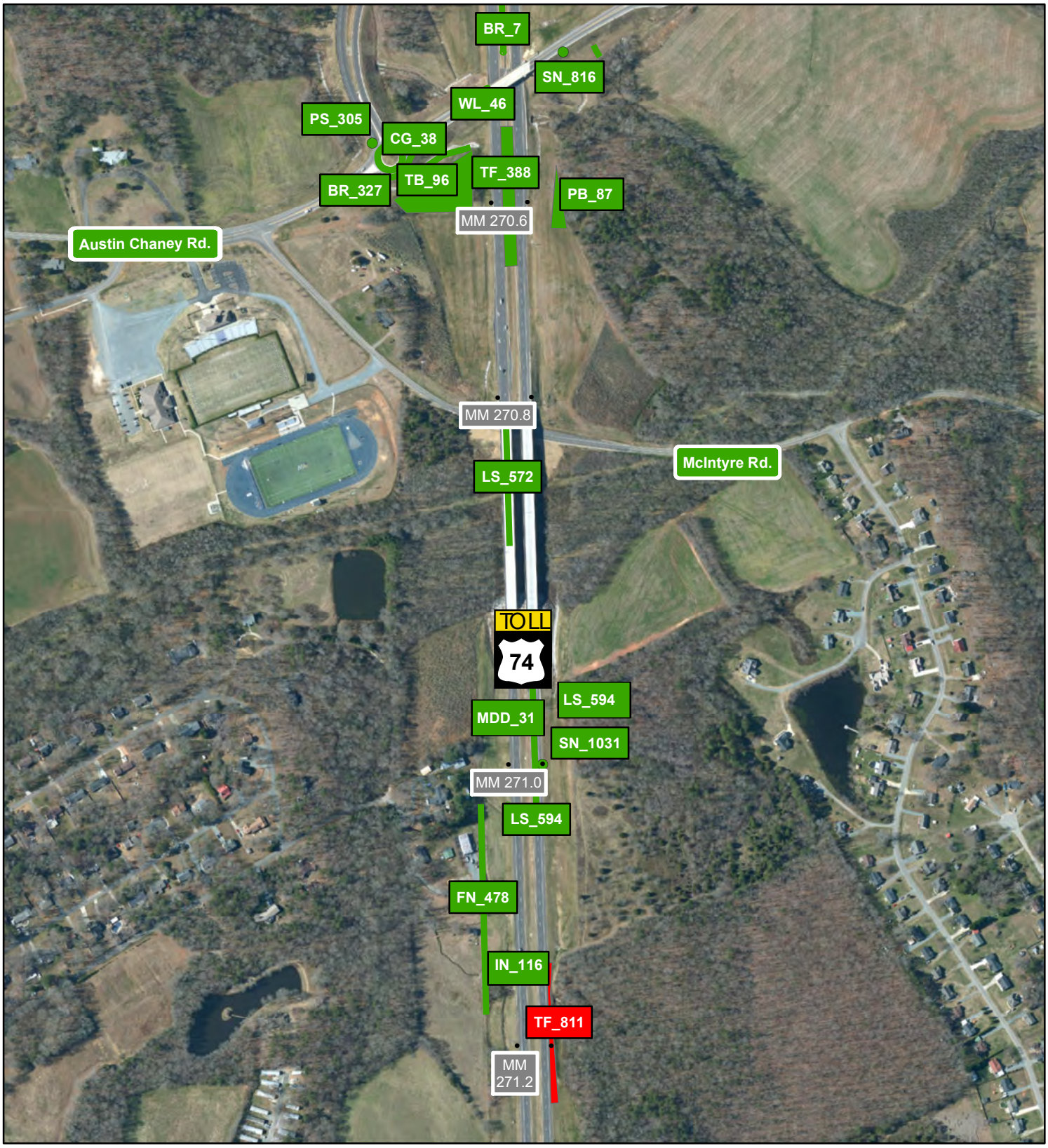
B22

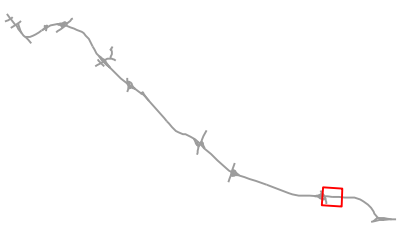
# Appendix B: Monroe Expressway Q3 2022 Asset Assessment Locations




## Legend

Failing Asset

Passing Asset



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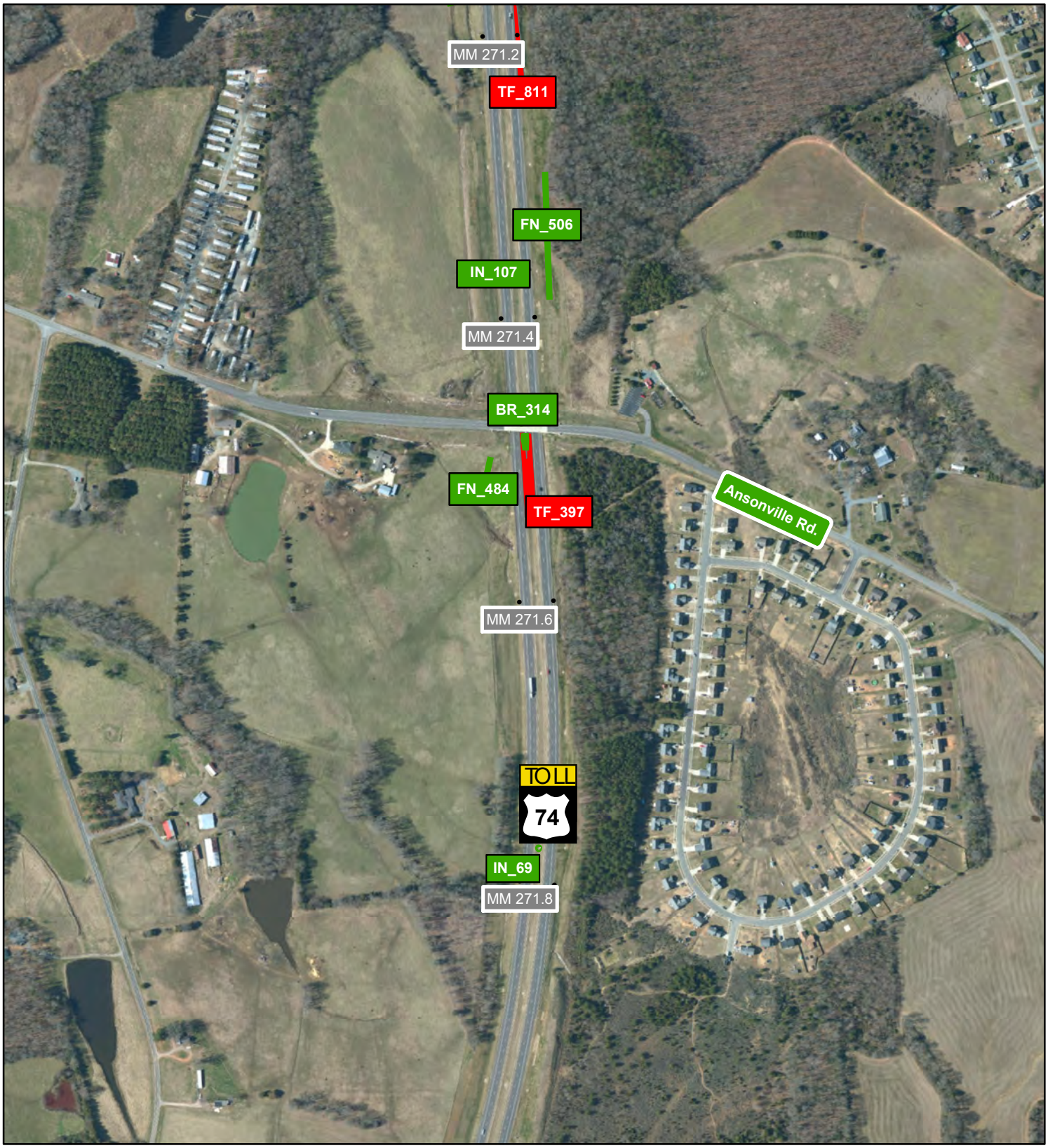
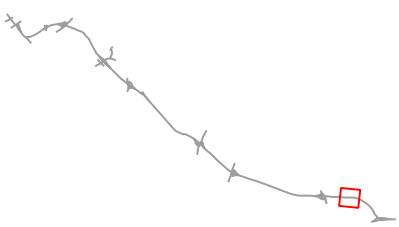



## Legend

- Failing Asset
- Passing Asset



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# Appendix B: Monroe Expressway Q3 2022 Asset Assessment Locations


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Failing Asset

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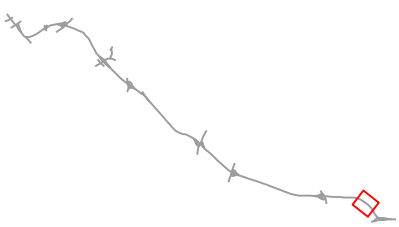

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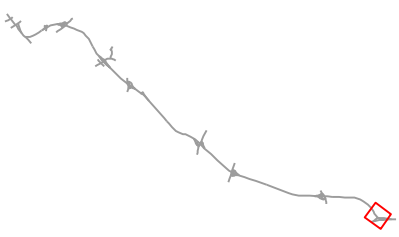

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