Mileposting
Mileposts

• Allows TEAAS to locate crashes and ordinances on a roadway in relation to the features (intersections, boundaries, etc.) on that roadway

• Allows TEAAS to check for ordinances overlaps (ordinance segments that are not allowed to coincide)

• Location information from crash reports, combined with feature mileposts, are used to calculate milepost values for crashes (high order milepost and/or on road milepost)

• Beginning and ending points from ordinances, combined with feature mileposts, are used to calculate milepost values for ordinances
Mileposts

- Means of specifying a location along a roadway (measured in miles)
- Mileposts are imaginary distance markers that follow the contour of the roadway
- They are specific to each county
- Each route has defined “beginning” and “ending” points
- Beginning milepost is usually 0.000 and ending milepost is usually equal to the total length of the route (added to the beginning milepost)
- Some local routes (i.e. Main Street) that occur several times in the same county will start with different beginning mileposts
- Feature mileposts are usually rounded to the nearest thousandths of a mile (three decimals)

Note that the current alignment of State Highway System roads (I, US, NC, and SR) always starts at 0.000, and any State Highway System road in the system that starts at a milepost other than 0.000 is an old alignment!
Milepost Types

**Feature Mileposts**
- Locates a feature along a route
- Mileposted features are intersections, mile markers, boundaries, at-grade railroad crossings, and structures
- The features report is a listing of all mileposted features along a route

**Crash Mileposts**
- Locates crashes along a route
- Directly dependant on feature mileposting
- Crashes will not milepost if they reference a feature that is not mileposted
- Crashes may be mileposted if the crash report references a loop feature
- Crashes receive an on road milepost and a high order route milepost

**Ordinance Mileposts**
- Locates ordinances along a route
- Directly dependant on feature mileposting
- Ordinances will not milepost if they reference a feature that is not mileposted
- Ordinances will not milepost if they reference a loop feature
- Ordinances get a milepost for their “begin” point and, if applicable, their “end” point
Features that get assigned a milepost value are:

- **Intersections**: intersection with another route
- **Boundaries**: political boundaries
- **Structures**: structures carrying the route (i.e. culvert)
- **Mile Markers**: route mileage values (not county specific)
- **Railroads**: at-grade railroad track crossings
**Mileposts (MP)** are specific to a county and are “imaginary” distance markers indicated on TEAAS feature reports.

**Mile markers (MM)** are green/white information signs posted along a road to indicate the mileage from the beginning of the route and are listed as features in TEAAS.
Mileposting Rules

• Based on NCDOT’s Linear Referencing System (LRS)
• $\text{MP}_{n+1} = \text{MP}_n + (\text{distance between feature}_n \text{ and feature}_{n+1})$
• Assign mileposts to all standard features
• Use all possible maps to identify features and distances
• If there are coinciding routes, they must also be checked and/or mileposted
• Provide ample documentation as needed
The terms “legs” and “approaches” mean the same thing and are used to identify types of at-grade (same level) intersections:

Examples:

- 2-leg
- 3-leg
- 4-leg
- 5-leg
Compass directions versus Engineering directions:

Compass

- N
- NW
- NE
- W
- SW
- S
- SE
- E

Engineering

- West to East
- South to North
The term “direction to next” is the compass direction from one feature to the next, along the direction of the route, and NOT the general direction of the route itself:
<table>
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<tr>
<th>County</th>
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<th>Segment Begin</th>
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• Used to search for and view location information for intersections on an inventoried route.

• Access the “Features - Intersections” screen by selecting the following:

  ➞ Intersections
To search for Intersections

- Click the “Search” icon
- Enter search criteria
- Leave any criteria blank if they are not part of the search
- Click the “GO” icon

Fields Not Allowed as search criteria:
- End Milepost
- Intersecting Route Name
- Intersecting Route Milepost
- Beyond Route Limits
- Loop Condition
• Click the “OK” button on the records retrieved dialog box to view the records retrieved.

• If no records are returned, verify that the search criteria are correct.

• A new search may be executed by adjusting the search criteria and clicking the “GO” icon.

• TEAAS will display a maximum of 500 records for any given search, although more than 500 records may actually meet the search criteria.
Suppose you wanted to search the intersections on NC 39 in Wake county

Step A: Click on the “Search” icon
Step B: Enter the county (Wake)
Step C: Enter the inventoried route ID (30000039)
Step D: Click the “GO” icon.
If matches are found, a dialog box will indicate the number of matched records (note - wildcards and other criteria can return more than one record).

If no matches are found, try using other criteria, wildcards, etc.

Step E: Click on the “OK” button and view the records.
County searched
Route searched
Beginning milepost of the route searched
Ending milepost of the route searched
8-digit code of intersecting route
Name attached to the 8-digit code of the intersecting route
If the intersecting route is mileposted, the intersecting route’s milepost would be shown here
Milepost on the inventoried route where the intersecting route intersects NC 39
See Appendix C for a description of the last four items shown here

Click here to launch the Features Report
Other Roadway Feature Screens

Boundaries Screen ➞ Boundaries
Used to search for and view location information for political boundaries that cross an inventoried route

Structures Screen ➞ Structures
Used to search for and view location information for structures (bridges, culverts, tunnels, ferry landings, etc.)

Mile Markers Screen ➞ Mile Markers
Used to search for and view location information for mile markers.

Railroad Crossing Screen ➞ Railroad Crossing
Used to search for and view location information for at-grade railroad crossings
Milepost - the distance, in miles, from the beginning of an inventoried route to a feature on that route (i.e. SR 1002 on I 40 in Wake County is 2.21 miles from the beginning of I 40 in Wake County and, therefore, has a milepost of 2.21)

Mileage (1) - the distance, in miles, from one feature to another on an inventoried route (i.e. the distance on I 40 in Wake County between the Durham County Line and SR 1002 is 2.21 miles)

Mileage (2) - the total length of an inventoried route in a specific county (i.e. the total length of I 40 in Wake County is approximately 29.18 miles)

Mileage (3) - the total length of a route within the state (i.e. interstate 40 is approximately 420 miles long)

Mile Marker - sign indicating the distance, in miles, from the beginning of a route within the state to the sign (i.e. mile marker 145 on I 40 is approximately 145 miles from the Tennessee State Line)
Features Report

- Feature records are county specific

- The features report shows all mileposted features on an inventoried route

- Used in crash analyses to determine the location of a crash in relation to mileposted roadway features

- Used by ordinances to determine the location of the ordinanced segment in relation to mileposted roadway features

- There are several ways to run a features report within TEAAS
## North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Features Report

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<thead>
<tr>
<th>County</th>
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<th>Direction to Next</th>
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### North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Features Report

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Coinciding routes (same milepost number, but different 8-digit codes)
• County - county where mileposted route exists
• Inventoried Route ID - 8-digit route code
• Begin Milepost - beginning milepost of the route
• End Milepost - ending milepost of the route
• MP No - milepost value for the given feature
• FeatureID
  – 8-digit code for roads, boundaries, and mile markers
  – 6-digit code for structures
  – 7-digit code for at-grade railroad crossings
Features Report Example (cont.)

- **Feature Name/Type** - preferred name of the feature
- **Special Type** - intersection or structure type
- **Distance to Next** - distance from one feature to the next feature following the route’s direction
- **Direction to Next** - direction from one feature to the next feature
- **Loop** - flag to indicate if a feature intersects the route more than once ("Y" or blank)
- **Beyond Rte Limits** - flag to indicate if the feature is outside of the inventoried route limits ("Y" or blank)
Milepost the example route (SR 9999 in Wake County) shown below:

Note:
- Distance between the features is given in miles.
- Start at the Durham County line with Milepost 0.00
- Calculate rest of mileposting from west to east
Route Mileposting Exercise Answers

[Diagram of a road network with milepost distances marked.]
Non-Mileposted Routes

If a given route is not already mileposted there are two options:

1. Determine mileposts for route features and manually calculate the milepost for each crash or ordinance

2. Determine mileposts for route features and submit them to a Secondary DataMaintainer (SDM) to permanently enter into TEAAS. After the route mileposting is entered into TEAAS, mileposting for crashes along that route are automatically calculated within 24 hours (mileposting for ordinances must be manually initiated).
Crash Mileposting Information

- Crashes are mileposted (located) using location information on DMV-349 crash reports

- Location Information used:
  - **Road On** - Road name or route where the crash occurred
  - **From Road** - road name or route of an intersecting road near the crash
  - **Distance From** - Distance between crash and From Road
  - **Direction From** - Direction of crash from the From Road
  - **Towards Road** - Next intersecting road in the Direction From from the From Road

NOTE – Crashes are usually between the From Road and Towards Road
Example below could be described as:

Road On - **Capital Blvd**
From Road - **Best St**
Distance From - **400 ft**
Direction From - **East**
Towards Road - **Green Rd**
Example below could also be described as:
Road On - **Capital Blvd**
From Road - **Green Rd**
Distance From - **600 ft**
Direction From - **West**
Towards Road - **Best St**
• Assume Mileposted features on Capital Blvd are:
  – Best St = 1.05
  – Green Rd = 1.25
  – Bay Dr = 1.32

• The example crash would be mileposted as follows:
  – The crash occurred 400 feet (or 0.08 miles) east of Best Street (MP 1.05), so the milepost is calculated to be $1.05 + 0.08 = 1.13$
Given the following route mileposts for SR 9999:

<table>
<thead>
<tr>
<th>MP</th>
<th>Road</th>
<th>Dir to Next</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>Durham Co/Wake Co Line</td>
<td>North and East</td>
</tr>
<tr>
<td>0.25</td>
<td>SR 1005</td>
<td>North and East</td>
</tr>
<tr>
<td>0.34</td>
<td>Pine St</td>
<td>North and East</td>
</tr>
<tr>
<td>0.60</td>
<td>Creek Drive</td>
<td>North and East</td>
</tr>
<tr>
<td>0.92</td>
<td>SR 1667</td>
<td>North and East</td>
</tr>
<tr>
<td>1.28</td>
<td>SR 1667</td>
<td>North and East</td>
</tr>
<tr>
<td>1.73</td>
<td>NC 55</td>
<td>North and East</td>
</tr>
</tbody>
</table>
Crash Mileposting Exercise

What are the mileposts for the following crashes?

<table>
<thead>
<tr>
<th>Crash</th>
<th>On Road</th>
<th>From Road</th>
<th>Dist/Dir From</th>
<th>Toward Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SR 9999</td>
<td>SR 1005</td>
<td>0.02 mi. East</td>
<td>Pine Street</td>
</tr>
<tr>
<td>B</td>
<td>SR 9999</td>
<td>NC 55</td>
<td>0.08 mi. West</td>
<td>SR 1667</td>
</tr>
<tr>
<td>C</td>
<td>NC 55</td>
<td>SR 9999</td>
<td>0.01 mi. South</td>
<td>Jones Street</td>
</tr>
<tr>
<td>D</td>
<td>SR 9999</td>
<td>SR 1667</td>
<td>0.04 mi. West</td>
<td>SR 1667</td>
</tr>
<tr>
<td>E</td>
<td>SR 9999</td>
<td>SR 1667</td>
<td>0.01 mi. West</td>
<td>Creek Drive</td>
</tr>
</tbody>
</table>
What are the mileposts for the following crashes?

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<td>SR 1667</td>
<td>0.01 mi. West</td>
<td>Creek Drive</td>
</tr>
</tbody>
</table>
Example below could be described as:

Speed Limit – 45 MPH
On Road – SR 9999
Begin Reference Point – SR 1005 (Ray Road)
End Reference Point – 0.2 mile west of Smith Street
Example below could be described as:

**Speed Limit** – **45 MPH**
**On Road** – **SR 9999**
**Begin Reference Point** – **SR 1005 (Ray Road)**
**End Reference Point** – **0.2 mile west of Smith Street**
Loops

- Occur when a feature intersects a route more than once

- Create problems for locating crashes and ordinances properly, since two different locations can be specified with the same intersection combinations

- For crashes, towards roads are usually helpful in determining at which end of the loop the crash occurred

- If a crash study location includes loops, some crashes will have to be manually reviewed to determine where they actually occurred

- Ordinances will NOT milepost if referenced to loops
Loop Examples

Road that actually loops back onto another road

Both intersections can be referred to as Main Street and Birch Circle

Coinciding routes that converge and diverge

Both intersections can be referred to as US 70 and NC 50
Crash Location Near A Loop

Where did the following crash actually occur:

- Road On - Capital Blvd
- From Road - Vine Circle
- Distance From - 50 ft
- Direction From - East
- Towards Road - Jones St

Use the **Towards Road** to determine on which loop intersection the crash occurred.
Some crashes in TEAAS do not milepost because:

• The Road On is not an inventoried route
• The Road On is not mileposted
• The From Road is not a mileposted feature
  – Roads being built faster than records can be updated
  – Police officers reference features that are not mileposted
    (i.e. McDonald’s, Wal-Mart parking lot, PVA, etc.)
• The From Road is a loop
• The crash has not gone through the mileposting update program
Unmileposted Ordinances

Some ordinances in TEAAS do not milepost because:

- The On Road is not mileposted
- The Begin Reference Road and/or the End Reference Road is not a mileposted feature
- The Begin Reference Road and/or the End Reference Road is a loop
- The ordinance has not gone through the mileposting update program
Incorrect Mileposts - Crashes

Some crashes in TEAAS have incorrect mileposts because:

• Some (or all) of the features on the Road On are mileposted in the wrong direction
• The distance and direction of the crash put it outside of the Road On mileposting limits
• The crash has not gone through the mileposting update program
Some ordinances in TEAAS have incorrect mileposts because:

- Some (or all) of the features on the On Road are mileposted in the wrong direction
- The Begin Reference Distance and/or the Begin Reference Direction are incorrect
- The End Reference Distance and/or the End Reference Direction are incorrect
- The distance and direction of the ordinance reference point (Begin and/or End) put it outside of the On Road mileposting limits
- The ordinance has not gone through the mileposting update program
Mileposting Resources

TEAAS Resources and Information
Mileposting, TEAAS Links

TEAAS Mileposting
Mileposting is the process of determining the location of features on a road, in miles, from the beginning of the road, and is a fundamental requirement of the Traffic Engineering and Accident Analysis System (TEAAS) necessary for crash studies and analyses, crash rates, and ordinance overlap checks. Mileposts are based on information in NCDOT’s Linear Referencing System (LRS) maintained by the Geographic Information Systems (GIS) Unit, and are used to determine where crashes occurred, or where ordinances are located, in relation to roadway features. Features requiring mileposts are intersections and interchanges, at-grade railroad crossings, mile markers, structures (that carry the road), and political boundaries (municipal, county, and state lines).

Mileposting Links
- Exclusion List (LRS synchronization)
- Guidelines.pdf
- High Order Routes Sheet.zip
- List of County Information.zip
- Old Secondary Road Names (SECI).pdf
- Oracle Script (Non-Inventoried Route Names).txt
- Oracle Script (Unmileposted Crashes and Ordinances).txt
- Policies and Procedures.pdf
- Route Change Mileposting Guidelines.pdf
- Secondary Data Maintainer Certification.pdf
- Secondary Data Maintainer Requirements.pdf

Local City Crash Reports
- Charlotte Crash Reports
- Greensboro Police Reports
- Raleigh Crash Reports
- Wilmington Police Reports
- Winston-Salem Crash Reports

Links and Information
- Bridge Document Management System (BridgeDocs)
- County GIS Maps
- Crash Rates
- DMV CrashWeb
- DMV CrashWeb Access North Carolina Identity Management Service (NCID)
- DMV CrashWeb NCID New Account Instructions

https://connect.ncdot.gov/resources/safety/Pages/TEAAS%20Information.aspx