

1. Crash Analysis

As part of the traffic analysis, HNTB conducted a section crash analysis along the I-85 corridor from 3,500 feet west of US 321 (Chester Street) in Gaston County to I-485 (Western Loop) in Mecklenburg County. The analysis included mainline crashes and excluded crashes that occurred on ramps, on side streets, or at ramp intersections. The following section provides a summary of crash analysis statistics for the entire study corridor, as well as for the section between US 321 (Chester Street) and NC 7 (Ozark Avenue).

1.1. Section Crash Analysis

There were 5,237 total crashes reported along the I-85 corridor between the designated study limits over the five-year analysis period (6/1/2016 to 5/31/2021). In this 13.85-mile section, crash types were primarily rear-end crashes (2,656) or lane departure crashes (1,341), which include run-off road and sideswipe crashes. There were 12 fatal crashes and 25 serious injury crashes (Class A) reported. This section also experienced one (1) head-on collision involving a wrong way drivers resulting in a fatal injury. **Table 1** below presents a summary of crash severity and conditions for the study area section crash analysis.

Table 1 – Study Area Section Crash Summary

| Crash Type | Total Crashes (#) | Total Crashes (%) |
|------------------------------|-------------------|-------------------|
| Total Crashes | 5,237 | 100% |
| Fatal Crashes | 12 | <1% |
| Non-Fatal Injury Crashes | 1,007 | 19% |
| Total Injury Crashes | 1,019 | 19% |
| Property Damage Only Crashes | 4,218 | 81% |
| Night Crashes | 1,320 | 25% |
| Wet Crashes | 1,085 | 21% |

HNTB calculated critical crash rates from the crash analysis to compare against the latest North Carolina statewide crash rates for comparable facilities. Critical crash rates are crash rates that have been statistically adjusted, based on other roads with similar characteristics, to remove the elements of chance and randomness. This method can be used to determine if the rate at a particular location is significantly higher than a predetermined average rate for locations with similar characteristics.

Table 2 on the following page presents a comparison between the I-85 corridor study area crash rates to the latest North Carolina statewide average crash rates for the five-year period 2016-2020 (compiled by NCDOT Traffic Safety Unit) for urban interstate facilities. The crash rates along I-85 in the project study area are all higher than the statewide critical crash rates except for fatal crashes.

Table 2 – Study Area Section Crash Rate Comparison

| Crash Type | Total Crashes (#) | Crash Rate | 2016-2020 Statewide Crash Rates for Urban Interstate Facilities | |
|--------------------------|-------------------|---------------|---|---|
| | | | 4+ Lanes Divided with Full Control Access Crash Rate | 4+ Lanes Divided with Full Control Access Critical Crash Rate |
| Total Crashes | 5,237 | 158.34 | 127.51 | 130.76 |
| Fatal Crashes | 12 | 0.36 | 0.41 | 0.61 |
| Non-Fatal Injury Crashes | 1,007 | 30.45 | 28.61 | 30.16 |
| Night Crashes | 1,320 | 39.91 | 31.46 | 33.08 |
| Wet Crashes | 1,085 | 32.80 | 25.92 | 27.39 |

1.2. Curve Section Crash Analysis

Three (3) curves between the interchanges of US 321 (Chester Street) and NC 7 (Ozark Avenue) were identified as potentially having horizontal stopping sight distance (HSSD) deficiencies. A special analysis of the section between these two interchanges was conducted to identify if any crash patterns existed that could possibly be attributed to the HSSD in the curves.

There were 652 total crashes reported along the I-85 segment between US 321 and NC 7 over the five-year analysis period (6/1/2016 to 5/31/2021). In this 1.98-mile segment, 204 crashes (31%) occurred in one of the three (3) curves. Of the 204 identified curve crashes, crash types were primarily lane departure crashes (160) or rear end crashes (34). The head-on crash involving a wrong way driver that resulted in a fatal injury mentioned previously occurred in the curve just east of US 321 (Chester Street).

Table 3 below presents a summary of total crashes based on direction of travel and the specific curve that they occurred in. Red denotes the direction of travel of concern for that particular curve. As shown in the results, the direction of concern for each curve produced the higher crash total.

Table 3 – Total Crash Summary

| Crash Location | Eastbound | Westbound | Total |
|------------------------------|-----------|-----------|-------|
| Curve #1 (East of US 321) | 37 | 17 | 54 |
| Curve #2 (West of Modena St) | 34 | 90 | 124 |
| Curve #3 (West of NC 7) | 17 | 9 | 26 |

The crash types most likely to be affected by a HSSD concern are lane departure crashes (avoidance maneuvers) and rear end crashes. **Table 4** on the following page presents a summary of these crash types based on direction of travel and the specific curve that they occurred in. Red denotes the direction of concern for that particular curve. As shown in the results, the direction of travel of concern for each curve produced the higher crash total.

Table 4 – Target Crash Summary

| Crash Location | Eastbound | Westbound | Total |
|------------------------------|-----------|-----------|-------|
| Curve #1 (East of US 321) | 33 | 16 | 49 |
| Curve #2 (West of Modena St) | 34 | 85 | 119 |
| Curve #3 (West of NC 7) | 17 | 9 | 26 |

Based on the results, it appears crash patterns do exist in the curves, as 31% of total crashes are occurring in one of the three curves and 19% are occurring specifically in the curve just west of Modena Street. It also appears that HSSD does impact the curves as well, as each of the curves sees approximately twice as many crashes or more in the direction of concern.