

SR 162 (PELLISSIPPI PARKWAY EXTENSION)

CRASH ANALYSIS REPORT UPDATE

BLOUNT COUNTY, TENNESSEE
P.I.N. 101423.00

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1.0 SAFETY ANALYSIS

This document serves as an update to the original Crash Analysis Report, August 2007. Similar to the previous report, a review of crash data was performed for the roadway segments within the study area to determine if there are any sections or locations with a history of crashes or safety issues. The specific roadway sections analyzed include:

- Cusick Road (MP 0.0 – 1.76)
- Wildwood Road (MP 0.0 – 3.75)
- Pellissippi Parkway (MP 0.0 – 2.54)
- Lamar Alexander Parkway (SR 73/US 321) (MP 10.57 – 22.33)
- Hall Road (SR 35) (MP 0.00 – 7.93)
- Washington Street (SR 35/SR 447) (MP 2.02 – 0.16)
- SR 33 (Broadway Avenue) (MP 10.38 – 20.64)
- SR 115 (US 129) Bypass (MP 10.45 – 20.40)
- Lincoln Road (MP 0.42 – 2.14)

Crash data was originally provided by TDOT for a three-year period from January 1, 2003 through December 31, 2005. Subsequently, more recent data became available and the crash analysis was updated with the more recent information from TDOT. As data was not available consistently for a three-year period, the analysis was performed for a two-year period only, between January 1, 2006 and December 31, 2007. During this time period, there were a total of 1,969 crashes within the project limits, of which approximately 24.5 percent of the total crashes involved an injury (483 out of 1,969 crashes), and less than one percent (0.6 percent) resulted in a fatality (11 out of 1,969 crashes).

1.1 Crash Rate Analysis

A crash rate analysis was prepared to identify by segment any high crash locations. This is the first step toward identifying any locations with a history of crashes. The section crash rates are based on the number of crashes on a specified section, the average daily traffic on the roadway, the time frame of analysis, and the length of the section. They are expressed in terms of crashes per one million vehicle-miles. A section's crash rate was then compared to a critical crash rate based in part on the Tennessee statewide average crash rate. The comparison is expressed as a ratio of the section crash rate to the critical crash rate (critical crash rate factor). It is the threshold above which an analyst can be statistically certain (at a 99% confidence level) that the section crash rate exceeds the average crash rate and is not mistakenly shown as higher than the average due to randomly occurring crashes. In practical terms, sections with a critical crash rate factor greater than one can be considered to be statistically certain that the crash rate for that section exceeds the statewide average rate. Further comparison of the section crash rate to the statewide average crash rate indicates the severity of history of crashes at this location.

The section crash rate is also compared directly to the statewide average crash rate provided by TDOT. Section rates that exceed the statewide average crash rate but not the critical crash rate may be problem areas, but they are not statistically proven to be higher crash areas. Therefore, this second comparison is used to identify a second tier of highway sections that may have

crash problems and could be considered for safety improvements if warranted based on further analysis.

Table 1 shows the crash rate analysis for the study area. As shown in the table, sections of Lamar Alexander Parkway (SR 73/US 321), Hall Road (SR 35), and Broadway Avenue (SR 33) all have critical crash rate factors greater than one, indicating that sections of these routes have high crash locations. Additionally, Wildwood Road, a section of Lamar Alexander Parkway, a section of Hall Road, and a section of Lincoln Road have section crash rates that exceed the statewide average crash rate. This means that while these routes do not have a statistical certainty of high crash rate locations, they could be considered to have some safety and crash rate problems.

Cusick Road, Pellissippi Parkway, SR 115 (US 129) Bypass, and Washington Street (SR 35/SR 447) are the only routes within the study area that do not indicate a crash rate problem. However, further analysis is included in subsequent sections of this report to document crash types and the manner of collisions on these roadways. SR 115 in particular has a high number of crashes throughout the study area, and while the analysis does not indicate a high crash rate, there could be some safety issues related to the high volume of traffic and lack of access management on the northern portion of the highway.

The crash rate analysis is illustrated on a map of the study area in **Figure 1**.

Table 1: Summary of Crash Rate Analysis for 2006 - 2007

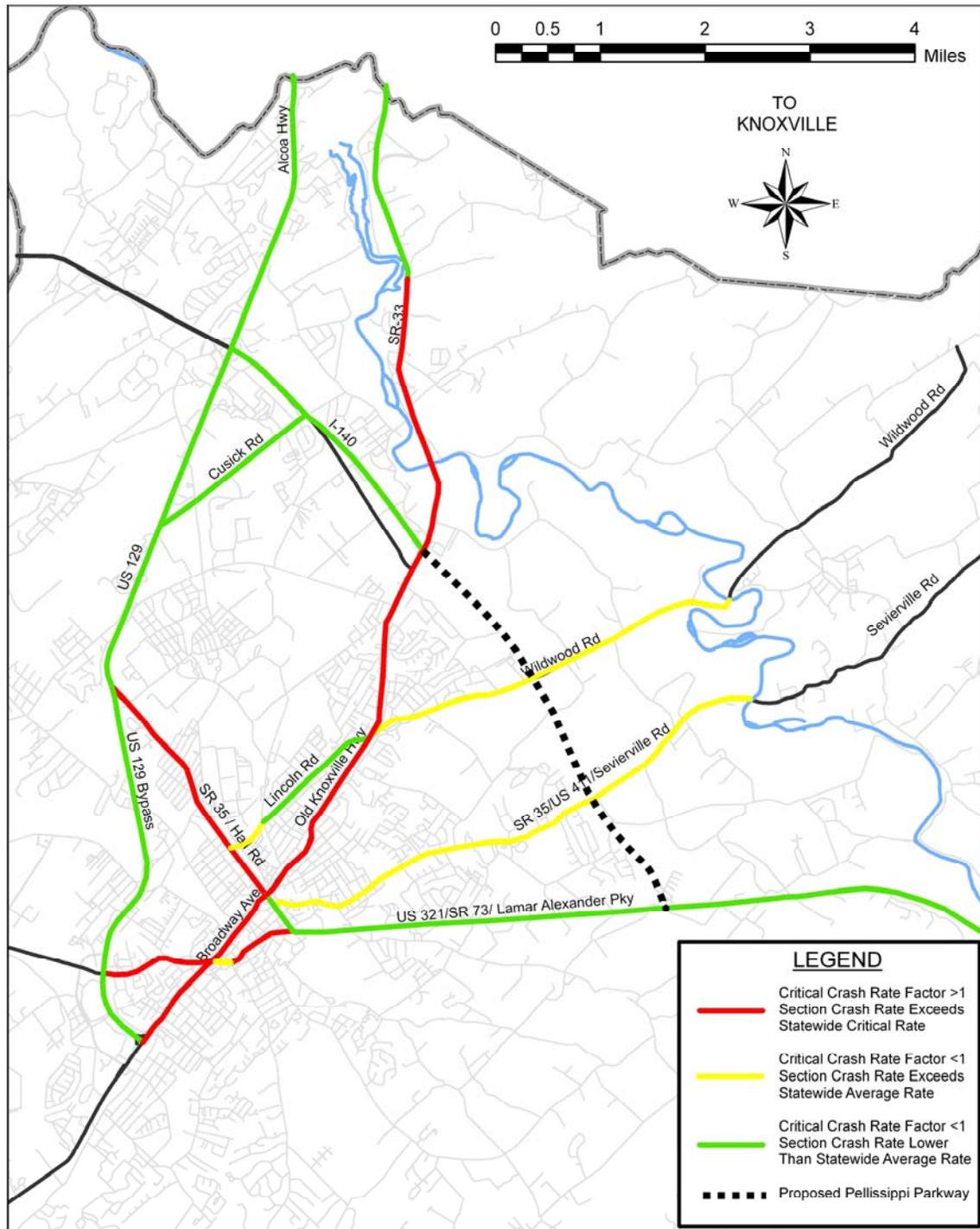
| Route | Section | Begin Log Mile | End Log Mile | Total Crashes | Average Daily Traffic | Section Length (Miles) | Exposure "M" (1 MVM) | Statewide Average Crash Rate | Section Crash Rate (A) | Statewide Critical Crash Rate (C) | Critical Crash Rate Factor (A/C) |
|--|---------|--|---|---------------|-----------------------|------------------------|----------------------|------------------------------|------------------------|-----------------------------------|----------------------------------|
| Cusick Road | 1 | 0.0 Airport Hwy (SR 115) | 1.76 Pellissippi Prkwy | 8 | 5,714 | 1.76 | 7,341 | 2.51 | 1.09 | 3.94 | 0.28 |
| Wildwood Road | 1 | 0.0 E. Broadway/Old Knoxville Hwy (SR 33) | 3.75 Bridge - Little River | 32 | 3,336 | 3.75 | 9,132 | 2.51 | 3.50 | 3.78 | 0.93 |
| Pellissippi Parkway | 1 | 0.00 Alcoa Hwy (SR 115/US 129) | 2.54 Old Knoxville Hwy (SR 33) | 0 | 35,959 | 2.54 | 59,063 | 1.06 | 0.00 | 1.38 | 0.00 |
| Lamar Alexander Parkway (SR 73/US 321) | 1 | 10.57 Alcoa Hwy (SR 115/US129 Bypass) | 11.65 W. Broadway Av (SR 33) | 142 | 23,555 | 1.08 | 18,571 | 2.07 | 7.65 | 2.87 | 2.66 |
| | 2 | 11.66 W. Broadway Av (SR 33) | 11.83 Montvale Rd | 11 | 24,519 | 0.17 | 3,043 | 2.82 | 3.62 | 5.22 | 0.69 |
| | 3 | 11.84 Montvale Rd | 12.52 Washington St (SR 73) | 90 | 24,003 | 0.68 | 11,915 | 2.07 | 7.55 | 3.08 | 2.45 |
| | 4 | 12.53 Washington St (SR 73) | 17.21 Knoxville Urban Boundary | 181 | 21,225 | 4.68 | 72,513 | 2.82 | 2.50 | 3.29 | 0.76 |
| | 5 | 17.22 Knoxville Urban boundary | 22.33 Foothills Parkway | 42 | 19,747 | 5.11 | 73,662 | 0.80 | 0.57 | 1.05 | 0.54 |
| Hall Road (SR 35) | 1 | 0.00 Alcoa Hwy (SR 115/US129 Bypass) | 2.02 Lincoln Rd | 109 | 22,240 | 2.02 | 32,795 | 2.07 | 3.32 | 2.67 | 1.24 |
| | 2 | 2.03 Lincoln Rd | 2.97 Sevierville Rd | 69 | 22,949 | 0.94 | 15,748 | 2.82 | 4.38 | 3.84 | 1.14 |
| | 3 | 2.98 Sevierville Rd | 7.93 Little River Bridge | 103 | 9,815 | 4.95 | 35,467 | 2.51 | 2.90 | 3.14 | 0.92 |
| Washington St (SR 35/SR 447) | 1 | 2.02 Lincoln Rd | 0.16 Lamar Alexander Pkwy (SR 35/US 321) | 38 | 22,949 | 0.96 | 16,083 | 2.82 | 2.36 | 3.83 | 0.62 |
| SR 33 | 1 | 10.38 SR 115 (US 129) | 10.67 Just north of Henry St | 25 | 16,699 | 0.29 | 3,535 | 2.07 | 7.07 | 3.99 | 1.77 |
| | 2 | 10.68 Just north of Henry St | 12.34 SR 35 Washington St. / Hall Rd. | 161 | 12,576 | 1.66 | 15,240 | 2.51 | 10.56 | 3.49 | 3.03 |
| | 3 | 12.35 SR 35 Washington St. / Hall Rd. | 13.16 Everett High Rd. | 56 | 9,895 | 0.81 | 5,851 | 2.51 | 9.57 | 4.12 | 2.32 |
| | 4 | 13.17 Everett High St. | 14.18 Wildwood Rd. / Lincoln Rd. | 61 | 11,597 | 1.01 | 8,550 | 2.51 | 7.13 | 3.83 | 1.86 |
| | 5 | 14.19 Wildwood Rd. / Lincoln Rd. | 15.47 SR 335 (Hunt Rd.) | 51 | 11,597 | 1.28 | 10,836 | 2.51 | 4.71 | 3.68 | 1.28 |
| | 6 | 15.48 SR 335 (Hunt Rd.) | 15.86 Pellissippi Prkwy (SR 162) | 42 | 11,617 | 0.38 | 3,223 | 2.51 | 13.03 | 4.72 | 2.76 |
| | 7 | 15.87 Pellissippi Prkwy (SR 162) | 18.75 Caney Branch Rd. | 68 | 9,172 | 2.88 | 19,283 | 2.51 | 3.53 | 3.38 | 1.04 |
| | 8 | 18.76 Caney Branch Rd. | 20.64 Knox County Line | 9 | 6,727 | 1.88 | 9,232 | 2.51 | 0.97 | 3.78 | 0.26 |
| SR 115 (US 129) Bypass | 1 | 10.45 W. Broadway Av (SR 33) | 20.40 Knox County Line | 642 | 43,254 | 9.95 | 314,175 | 2.07 | 2.04 | 2.26 | 0.90 |
| Lincoln Road | 1 | 0.42 Hall Rd (SR 35) | 0.84 Wright Rd | 9 | 10,033 | 0.42 | 3,076 | 2.51 | 2.93 | 4.77 | 0.61 |
| | 2 | 0.85 Wright Rd | 1.41 Harding St | 5 | 10,033 | 0.56 | 4,101 | 3.19 | 1.22 | 5.36 | 0.23 |
| | 3 | 1.42 Harding St | 2.14 Wildwood Rd | 7 | 10,033 | 0.72 | 5,273 | 2.51 | 1.33 | 4.21 | 0.32 |

 Critical Crash Rate Factor >1, Section Crash Rate Exceeds Statewide Critical Rate (High Crash Rate Section)
 Critical Crash Rate Factor <1, Section Crash Rate Exceeds Statewide Average Rate
 Critical Crash Rate Factor <1, Section Crash Rate Lower Than Statewide Average Rate

Notes:
 Analysis Period: 2 Years (1/1/2006 to 12/31/2007)
 Crash rates are expressed in crashes per 1 MVM (1 million vehicle miles traveled)
 $Exposure (M) = [(ADT) \times (365) \times (Time\ Frame\ of\ Analysis\ (Years)) \times (Section\ Length)] / 1,000,000$
 $Section\ Crash\ Rate = Total\ Crashes / Exposure$
 $Critical\ Crash\ Rate\ Factor = Section\ Crash\ Rate / Statewide\ Critical\ Crash\ Rate$
 ADT = Average Daily Traffic, MVM = Million Vehicle Miles

Sources:
 Crash data for 1/1/2006 to 12/31/2007 from TDOT Data
 Statewide Average Crash Rate provided from TDOT Data
 $Statewide\ Critical\ Crash\ Rate = Statewide\ Average\ Crash\ Rate + K(\sqrt{Statewide\ Average\ Crash\ Rate/M}) + 1/(2M)$; Where K = 2.327 which is equal to a probability of 0.99.

Figure 1: Crash Rate Locations



1.2 Crash Locations and Severity

The crash data were summarized for each route by crash type as shown in **Figure 2**. The crash type indicates whether the crash involved an injury, fatality, or property damage. As shown in this figure, the majority of crashes occurred on SR 115 (US 129) Bypass, Broadway Avenue (SR 33), Lamar Alexander Parkway (SR 73 / US 321), and Hall Road (SR 35). **Table 2** shows the total number of injury and fatality crashes for each route within the study area during the two-year period. Based on the length of each route and the number of crashes provided in **Table 2**, the highest number of crashes per mile occurred along SR 115 (US 129) Bypass.

Some of the crashes involved multiple injuries and fatalities. Therefore, in addition to reviewing the number of crashes that involved an injury and / or fatality, the data was also analyzed to determine the total number of injuries and fatalities (**Table 3**). The total number of injuries throughout the study area was 667 compared to the total number of crashes involving an injury (483). As for the crashes that involved a fatality, there were 11 crashes and 14 total fatalities throughout the study area during the two-year analysis period. Almost half (6) of the fatalities occurred on the SR 115 (US 129) Bypass.

Figure 2: Summary of Crash Types by Location, 2006 - 2007

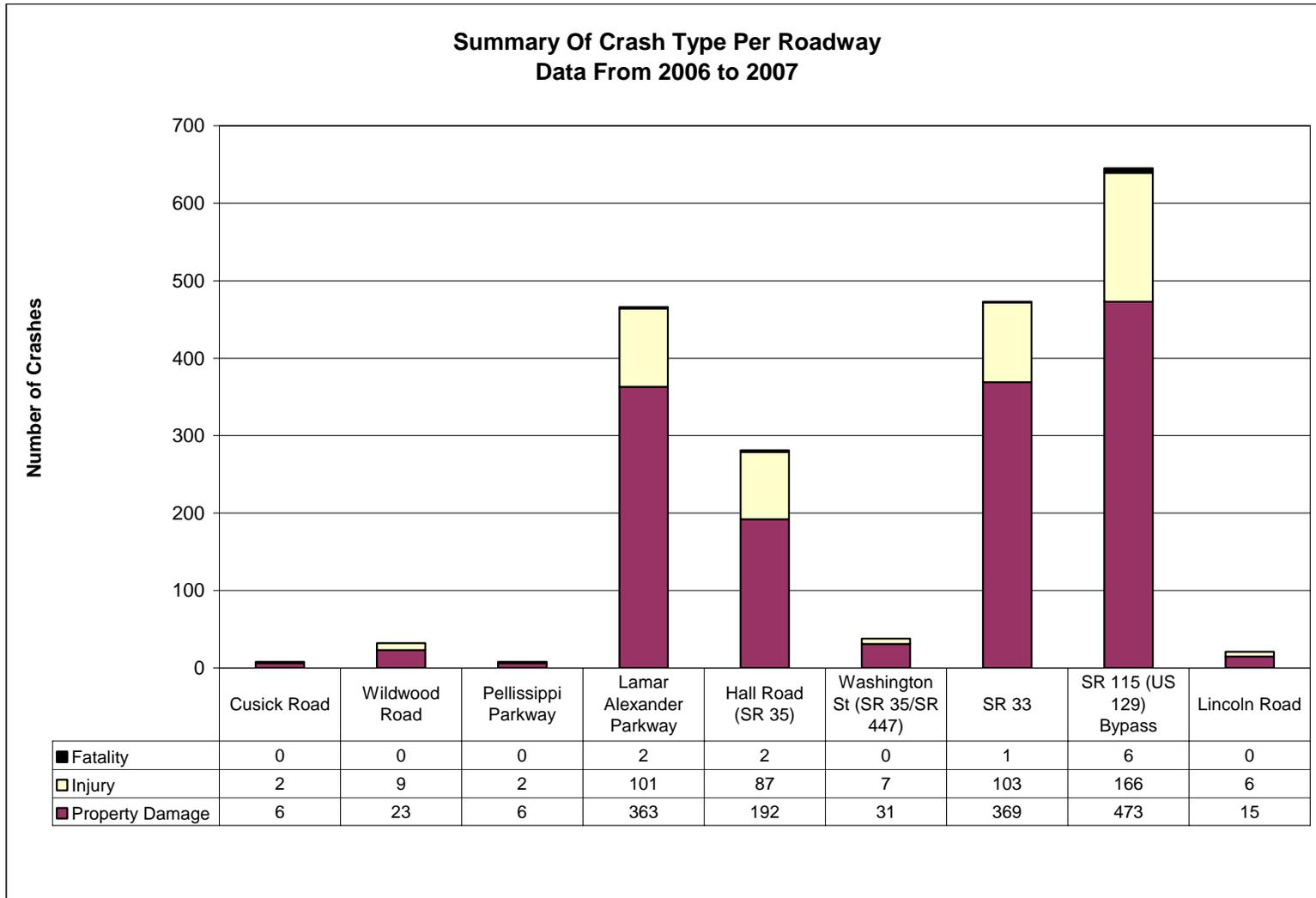


Table 2: Total Number of Crash Types per Roadway, 2006-2007

| Route | Begin Log Mile | End Log Mile | Number of Crashes | | | |
|--|--|---|-------------------|------------|-----------|-------------|
| | | | Property Damage | Injury | Fatality | Total |
| Cusick Road | 0.0 Airport Hwy (SR 115) | 1.76 Pellissippi Prkwy | 6 | 2 | 0 | 8 |
| Wildwood Road | 0.0 E. Broadway/Old Knoxville Hwy (SR 33) | 3.75 Bridge - Little River | 23 | 9 | 0 | 32 |
| Pellissippi Parkway | 0.00 Alcoa Hwy (SR 115/US 129) | 2.54 Old Knoxville Hwy (SR 33) | 6 | 2 | 0 | 8 |
| Lamar Alexander Parkway (SR 73/US 321) | 10.57 Alcoa Hwy (SR 115/US129 Bypass) | 22.33 Foothills Parkway | 363 | 101 | 2 | 466 |
| Hall Road (SR 35) | 0.00 Alcoa Hwy (SR 115/US129 Bypass) | 7.93 Little River Bridge | 192 | 87 | 2 | 281 |
| Washington St (SR 35/SR 447) | 2.02 Lincoln Rd | 0.16 Lamar Alexander Pkwy (SR 35/US 321) | 31 | 7 | 0 | 38 |
| SR 33 | 10.38 SR 115 (US 129) | 20.64 Knox County Line | 369 | 103 | 1 | 473 |
| SR 115 (US 129) Bypass | 10.45 W. Broadway Av (SR 33) | 20.40 Knox County Line | 473 | 166 | 6 | 642 |
| Lincoln Road | 0.42 Hall Rd (SR 35) | 2.14 Wildwood Rd | 15 | 6 | 0 | 21 |
| Total: | | | 1478 | 483 | 11 | 1969 |

Table 3: Injuries and Fatalities, 2006 - 2007

| Route | Begin Log Mile | End Log Mile | # of People Injured or Killed | | |
|--|--|---|-------------------------------|-----------|------------|
| | | | Injury | Fatality | Total |
| Cusick Road | 0.0 Airport Hwy (SR 115) | 1.76 Pellissippi Prkwy | 4 | 0 | 4 |
| Wildwood Road | 0.0 E. Broadway/Old Knoxville Hwy (SR 33) | 3.75 Bridge - Little River | 13 | 0 | 13 |
| Pellissippi Parkway | 0.00 Alcoa Hwy (SR 115/US 129) | 2.54 Old Knoxville Hwy (SR 33) | 2 | 0 | 2 |
| Lamar Alexander Parkway (SR 73/US 321) | 10.57 Alcoa Hwy (SR 115/US129 Bypass) | 22.33 Foothills Parkway | 134 | 2 | 136 |
| Hall Road (SR 35) | 0.00 Alcoa Hwy (SR 115/US129 Bypass) | 7.93 Little River Bridge | 113 | 3 | 116 |
| Washington St (SR 35/SR 447) | 2.02 Lincoln Rd | 0.16 Lamar Alexander Pkwy (SR 35/US 321) | 10 | 0 | 10 |
| SR 33 | 10.38 SR 115 (US 129) | 20.64 Knox County Line | 148 | 1 | 149 |
| SR 115 (US 129) Bypass | 10.45 W. Broadway Av (SR 33) | 20.40 Knox County Line | 235 | 8 | 243 |
| Lincoln Road | 0.42 Hall Rd (SR 35) | 2.14 Wildwood Rd | 8 | 0 | 8 |
| Total: | | | 667 | 14 | 681 |

1.3 Manner of Collision

The manner of collisions was examined for all of the crashes that occurred for each of the routes within the project limits to determine if there was a specific kind of crash that occurred more frequently than others. **Figures 3 through 11** show a breakdown of the crash types for each route. The most frequently occurring crash type was rear-end and angle crashes. Many of the rear-end crashes are likely due to the lack of access management along SR 115 (US 129) Bypass, Lamar Alexander Parkway (SR 73 / US 321), Broadway Avenue (SR 33), and Hall Road (SR 35). There are numerous driveways and businesses with direct access to these routes. This creates excessive vehicular conflict points at each of these intersections, which explains the many angle collisions. Without turn lanes or a center two-way left-turn lane along some of these routes, vehicles must slow down in the travel lane to turn off the roadway, thus causing the potential for rear-end collisions with vehicles traveling behind turning vehicles.

Figure 3: Cusick Road Collision Types, 2006 - 2007

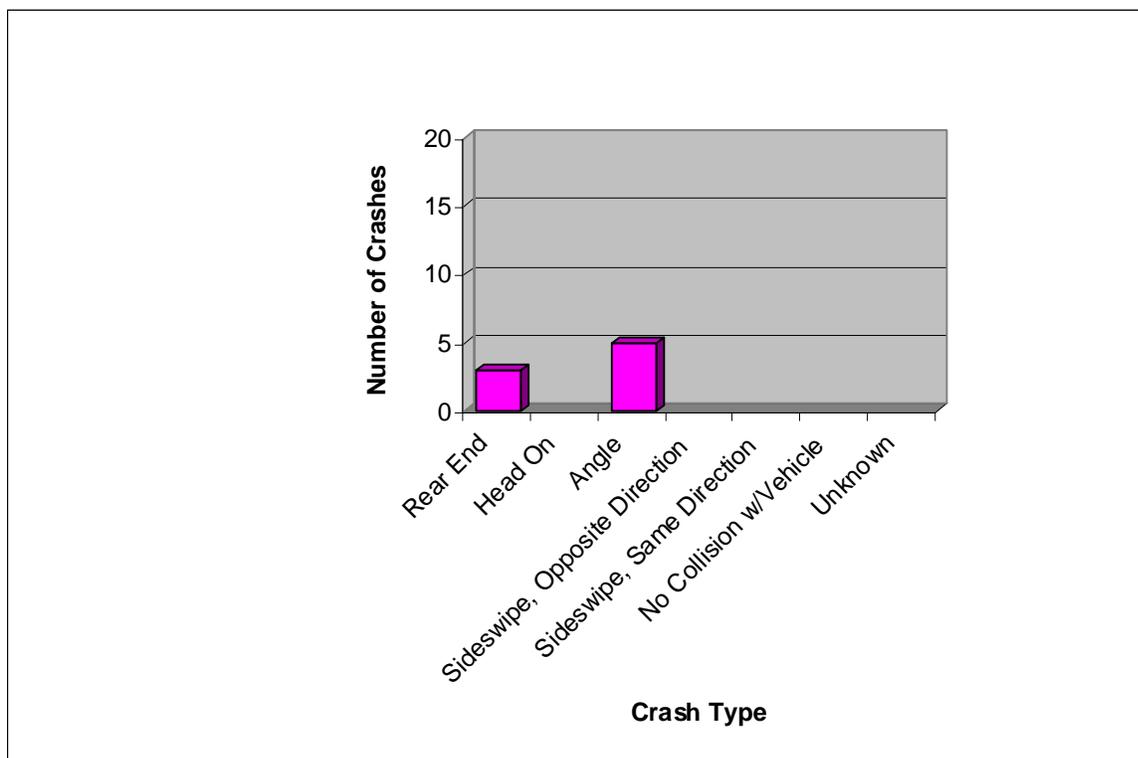


Figure 4: Wildwood Road Collision Types, 2006 - 2007

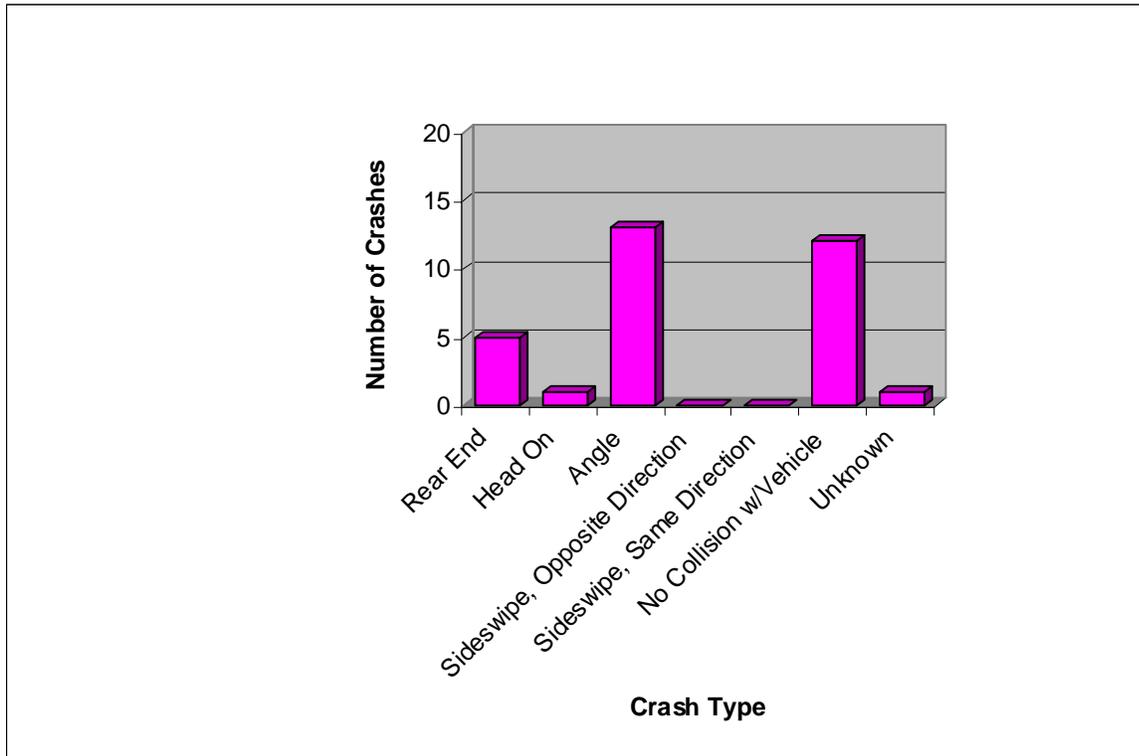


Figure 5: Pellissippi Parkway Collision Types, 2006 - 2007

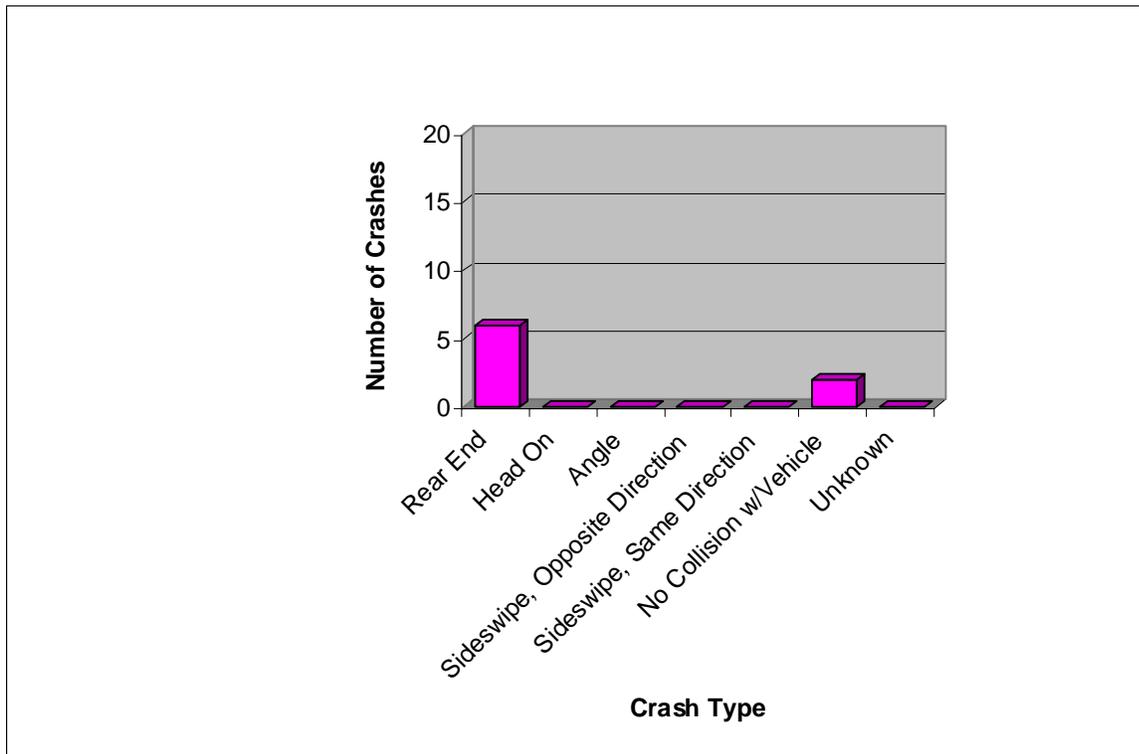


Figure 6: Lamar Alexander Parkway (SR 73 / US 321) Collision Types, 2006 – 2007

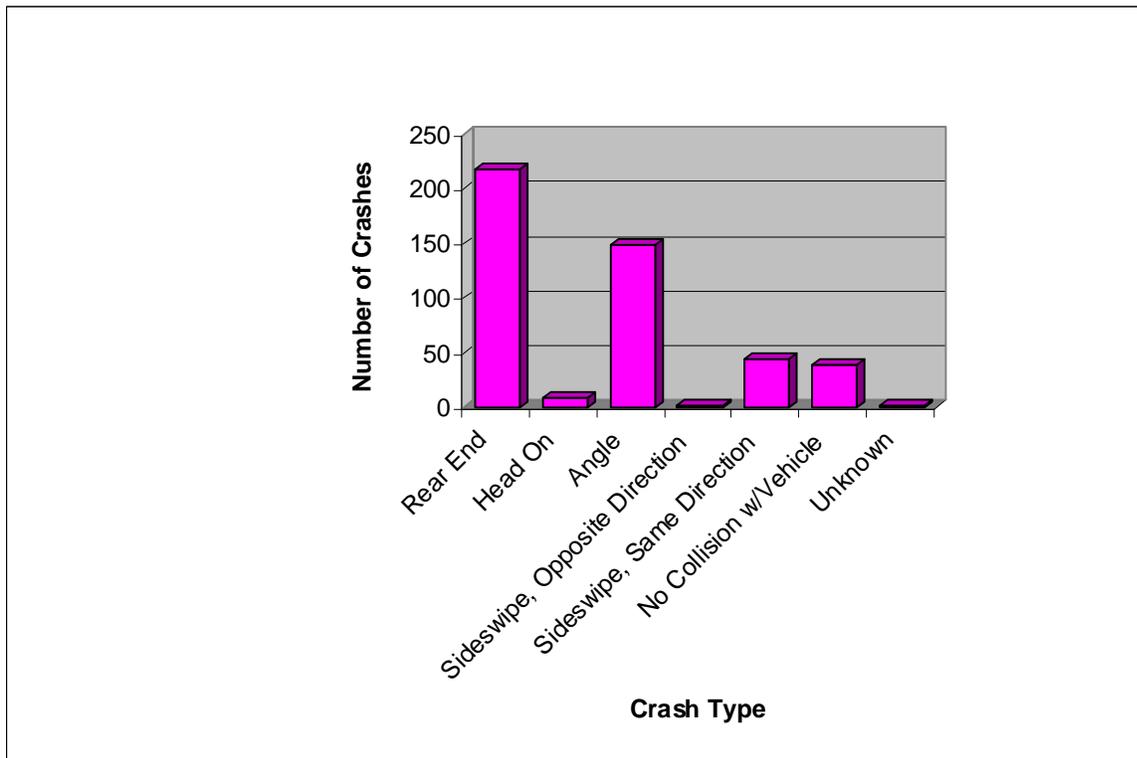


Figure 7: Hall Road (SR 35) Collision Types, 2006 – 2007

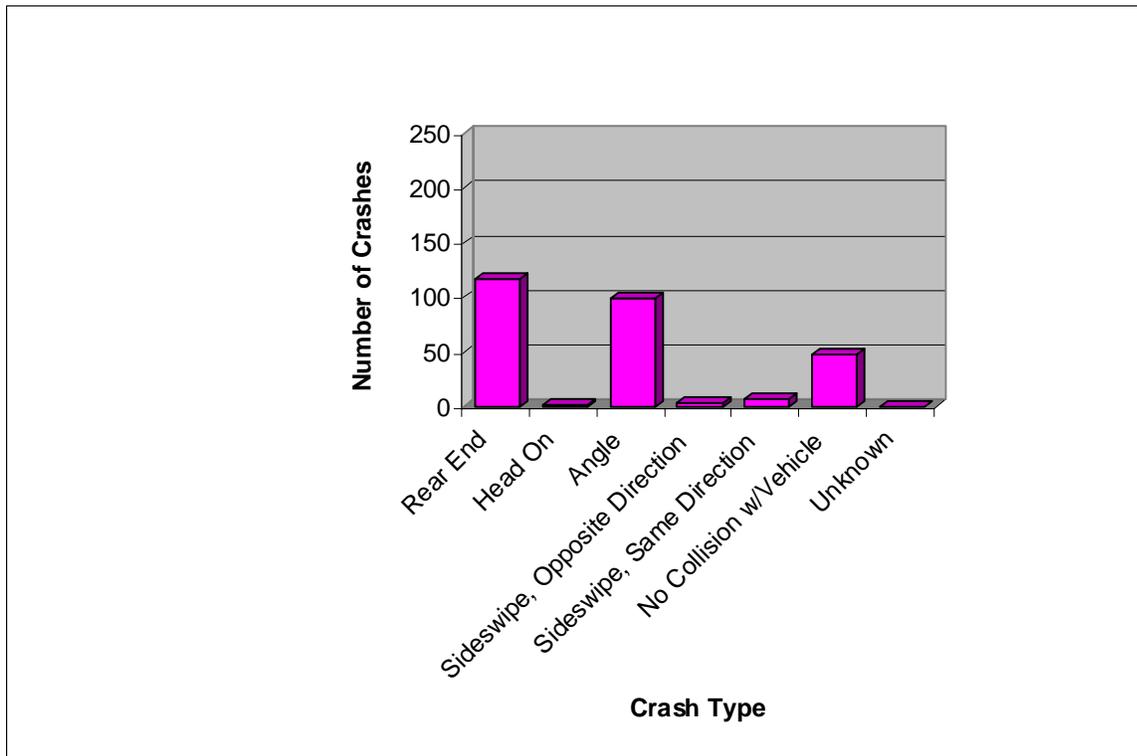


Figure 8: Washington Street (SR 35 / SR 447) Collision Types, 2006 – 2007

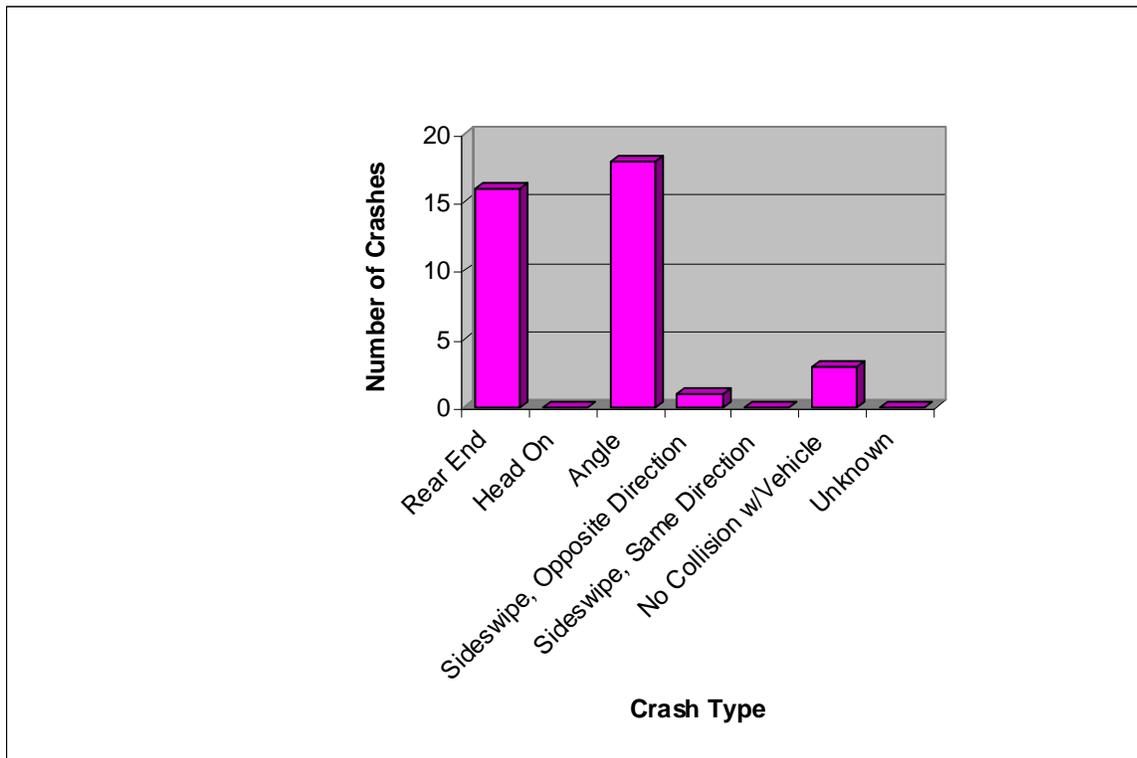


Figure 9: SR 33 Collision Types, 2006 – 2007

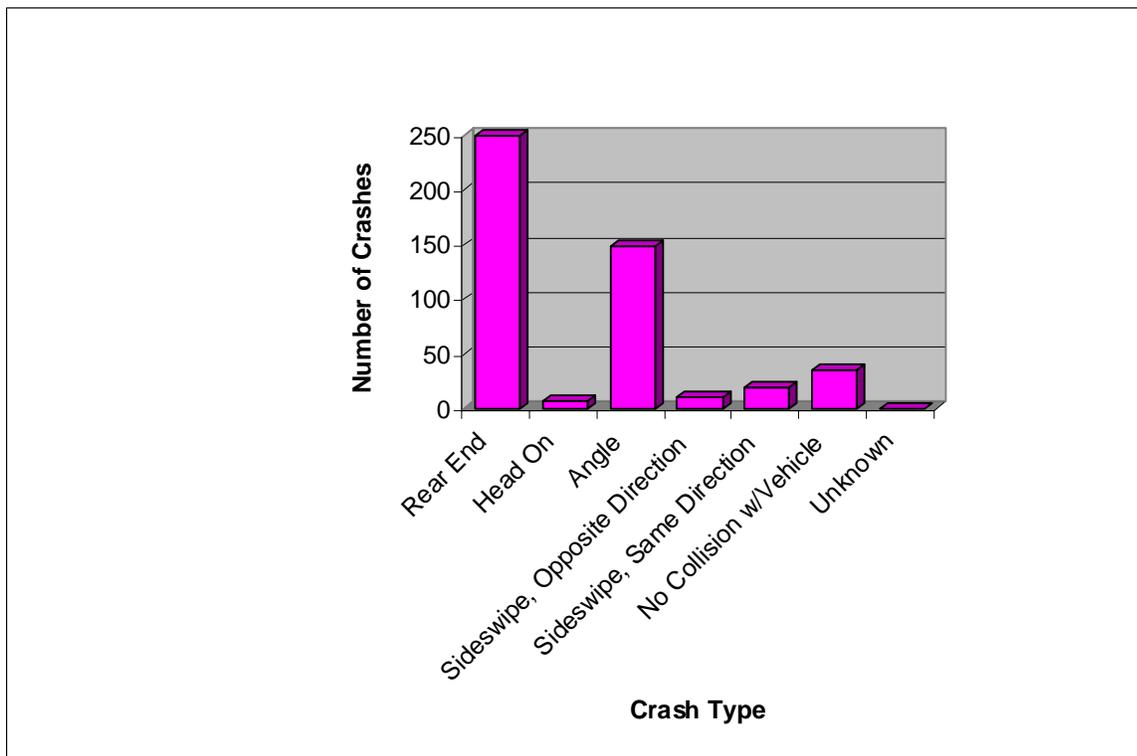


Figure 10: SR 115 (US 129) Bypass Collision Types, 2006 – 2007

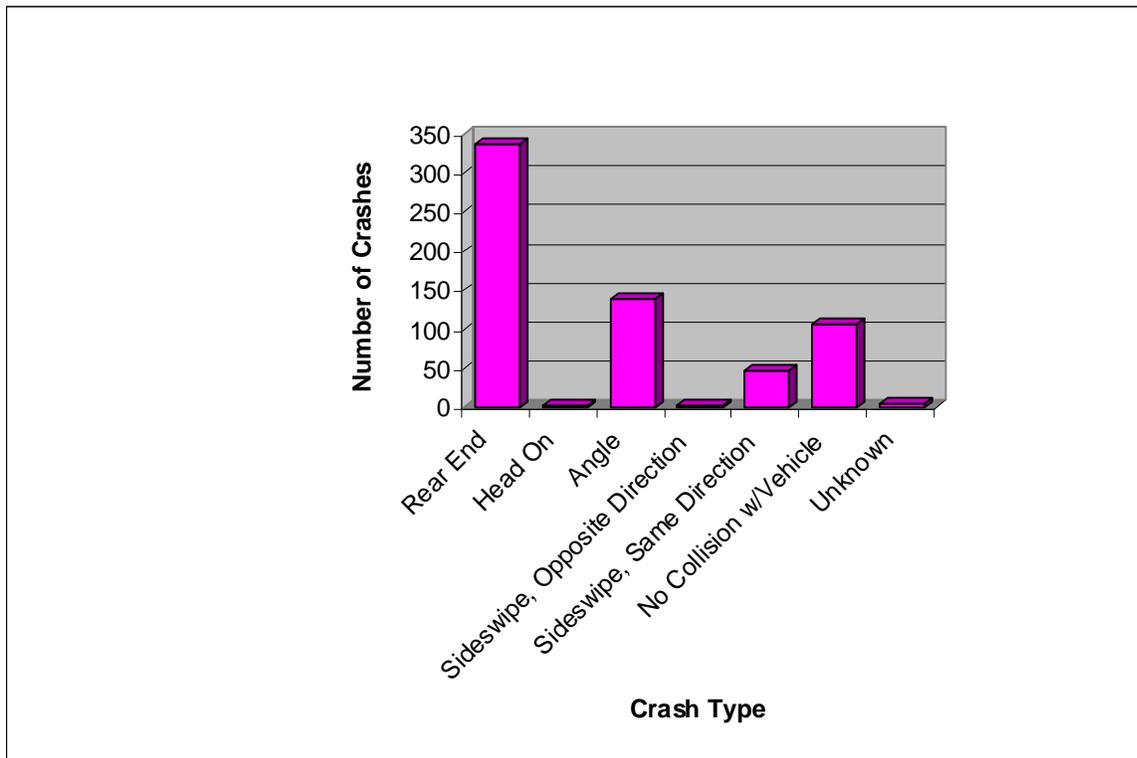
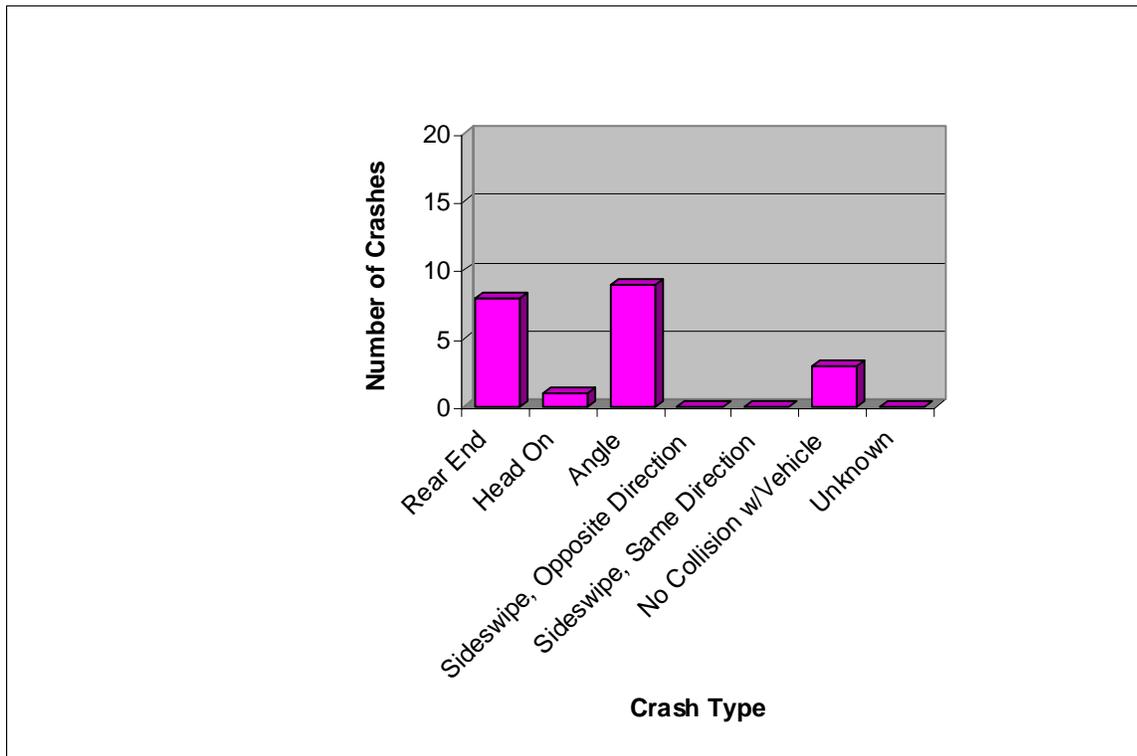


Figure 11: Lincoln Road Collision Types, 2006 – 2007



1.4 Safety Analysis Summary

Analysis of the crash data shows that there are safety concerns due to high numbers of crashes within the study area. Below is a summary of the key points from this analysis.

- Approximately one quarter (24.5%) of the crashes along the routes within the study area resulted in an injury crash (483 out of 1,969 crashes).
- Sections of Lamar Alexander Parkway (SR 73/US 321), Hall Road (SR 35), and Broadway Avenue (SR 33) all have critical crash rate factors greater than one, indicating that sections of these routes have high crash locations.
- An analysis of crashes per mile showed that the highest number of crashes occurred along SR 115 (US 129) Bypass, although this roadway does not have a critical crash rate factor of greater than one.
- During the two-year period, 11 crashes involved a fatality. The highest number of fatal crashes occurred on SR 115 (US 129) Bypass, which resulted in six deaths during the two-year time period.
- An analysis of crash types for the entire project area showed that the most frequent type of crashes were rear-end and angle crashes. Factors that may cause this to be the highest crash type include lack of access management along the corridor, numerous curb cuts for the driveways and intersections as well as the lack of exclusive turn lanes and/or passing lanes.

The existing transportation system requires travelers moving between the northwestern portion of Blount County and the eastern portions of the county to use a route that includes sections of Lamar Alexander Parkway (SR 73 / US 321), Hall Road (SR 35), Washington Street (SR 35 / SR 447), SR 115 (US 129) Bypass, or SR 33. As evidenced by the data, a transportation option that would divert some through travelers away from Hall Road / Washington Street, portions of US 129, and portions of Lamar Alexander Parkway in the center of Maryville could help to reduce the number of crashes. Other opportunities to lower the crash rates would be improvements to US 129 (as part of the Relocated Alcoa Highway project); however, the Relocated Alcoa Highway project would not resolve the crash issues in the Maryville core.