Whitfield County 2020 Local Road Safety Plan

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Introduction

The Engineering Department of Whitfield County has developed a Local Road Safety Plan (LRSP) to identify road hazards and countermeasures for County maintained roads. The report incorporates the "4 Safety E's"- Engineering, Education, Enforcement, and Emergency Services who are the potential stakeholders in roadway safety and can help plan, implement and evaluate the progress of achieving the safety goals outlined in the LRSP.

Figure 1: 4 Safety E's

The state of Georgia has approximately 104,300 miles of roadways, of which 940 miles of roadway are in Whitfield County. The County is responsible for maintaining nearly 711 miles of roadway. The LRSP sets goals to make the roadways maintained by the County as safe as possible. The primary goal of Whitfield County is to reduce and eliminate safety hazards on county-maintained roads. It is driven to achieve this goal by making the roadways safer and taking measures to have zero crashes with fatalities and severe injuries.

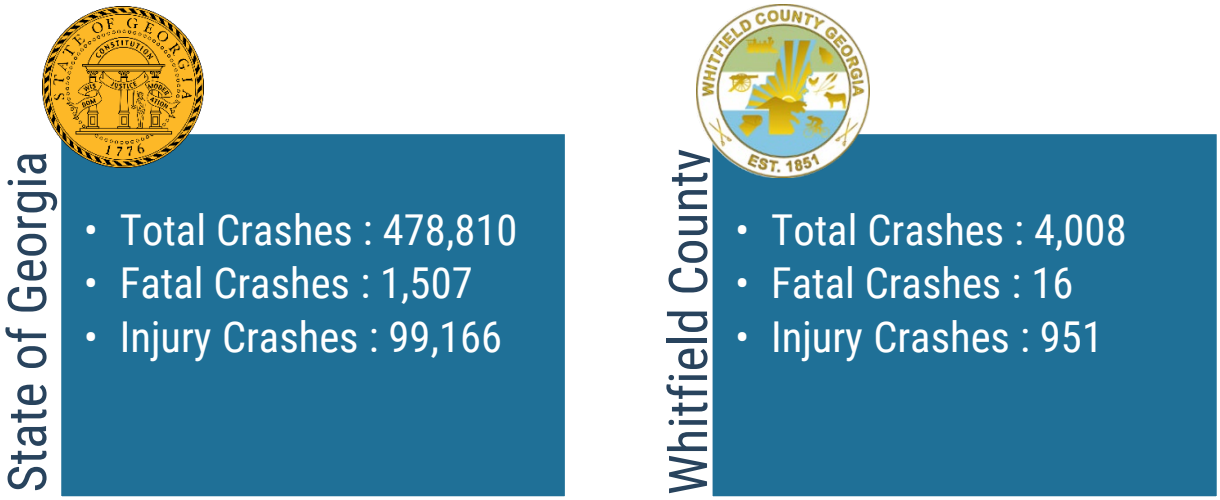


Figure 2: Crash Data Summary **Crash Numbers for the year 2018*

Vision and Goal

Whitfield County's vision is to reduce and eliminate the safety hazards from the roads and reduce the number of fatalities and injuries from vehicular crashes. The long-term goal is to have zero deaths and injuries from vehicular crashes. The short-term goal is to reduce the fatality rate and injury rate by 50% in 2025. A fatality and injury rate is expressed in the number of crashes per 100 million vehicle miles traveled (VMT).

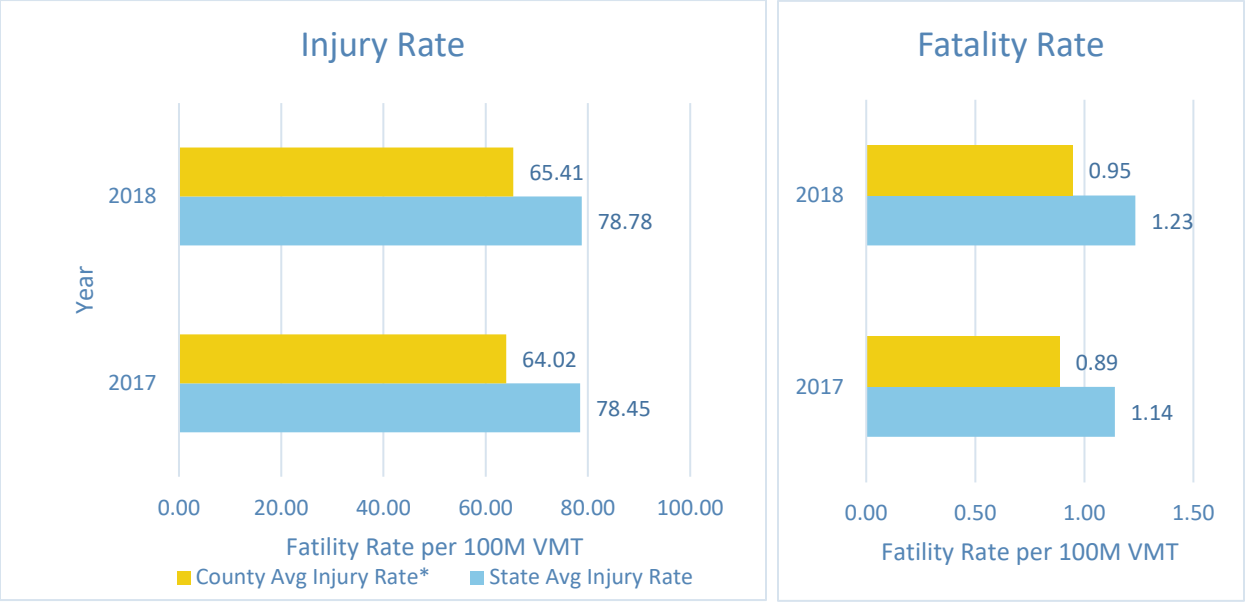


Figure 3: Fatality and Injury Rate **County average rate includes City of Dalton fatalities*

The fatality and injury rate for the county is lower than the average rate for the State of Georgia, as shown in **Figure 3**. But there is an increase in the fatality and injury rate from the year 2017 to 2018. The initial goal for Whitfield County is to keep the fatality rate under 1.00 per 100M VMT for the year 2020. And work toward the target 2025 goal of reducing fatality and injury crashes. The final goal which Whitfield County strives to achieve is zero fatality and severe injury crashes, as shown in **Figure 4**.

Figure 4: Vision, Mission, and Goal

Safety Partners

The safety partners for the LRSP were selected based on the 4 Safety E's- engineering, education, enforcement, and emergency medical service. Different stakeholders in roadway safety can help plan, implement, and evaluate the progress of achieving the safety goals. **Figure 5** shows the stakeholders for 4 Safety E's.

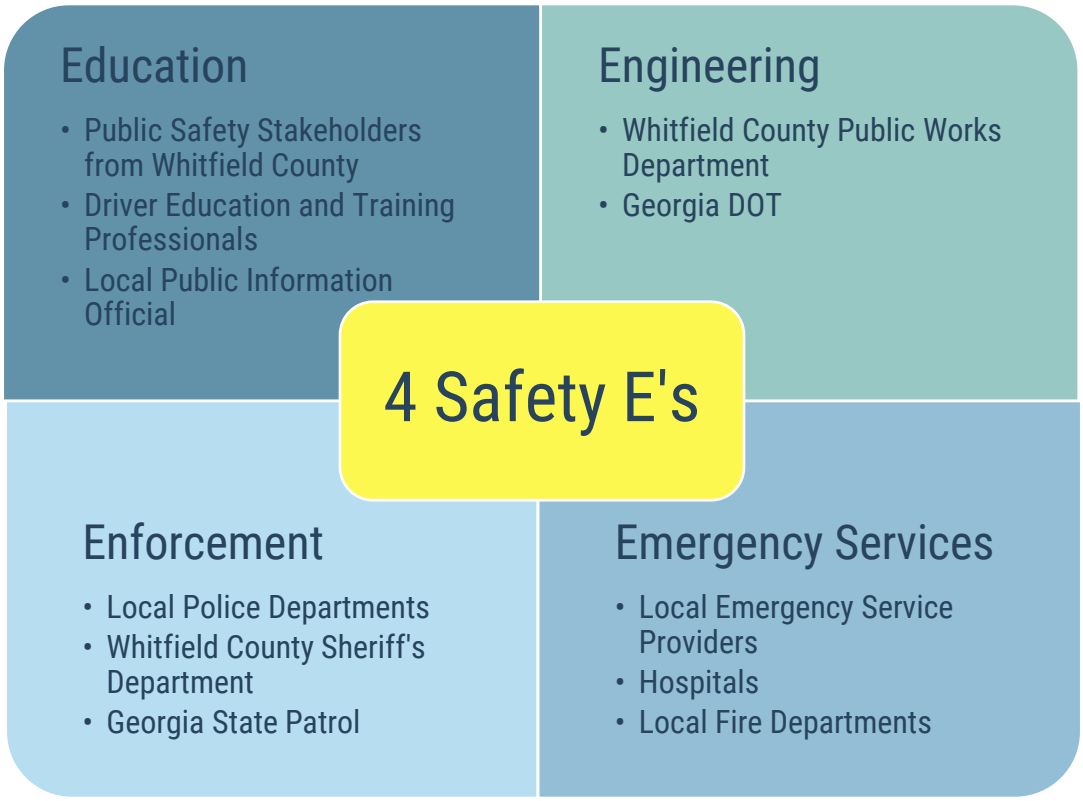


Figure 5: 4 Safety E's

Data Collection and Summary

Crash data from 2016 to 2019 for Whitfield County maintained roads was collected using the Georgia Department of Transportation's (GDOT) Georgia Electronic Accident Reporting System (GEARS) website. The GEARS data consisting of crashes from interstates, state routes, and City of Dalton roads are excluded from the study. Whitfield County maps showing crash locations are attached in **Appendix B**.

Crashes were categorized into three levels of severity:

1. **Property Damage Only (PDO):** A property damage only crash is where no one was injured or killed in the crash.
2. **Injury:** An injury crash is where at least one person was injured but not killed.
3. **Fatal:** A fatal crash is when at least one person dies in a collision.

Crashes based on the severity from 2016 to 2019 are shown in **Figure 6**.

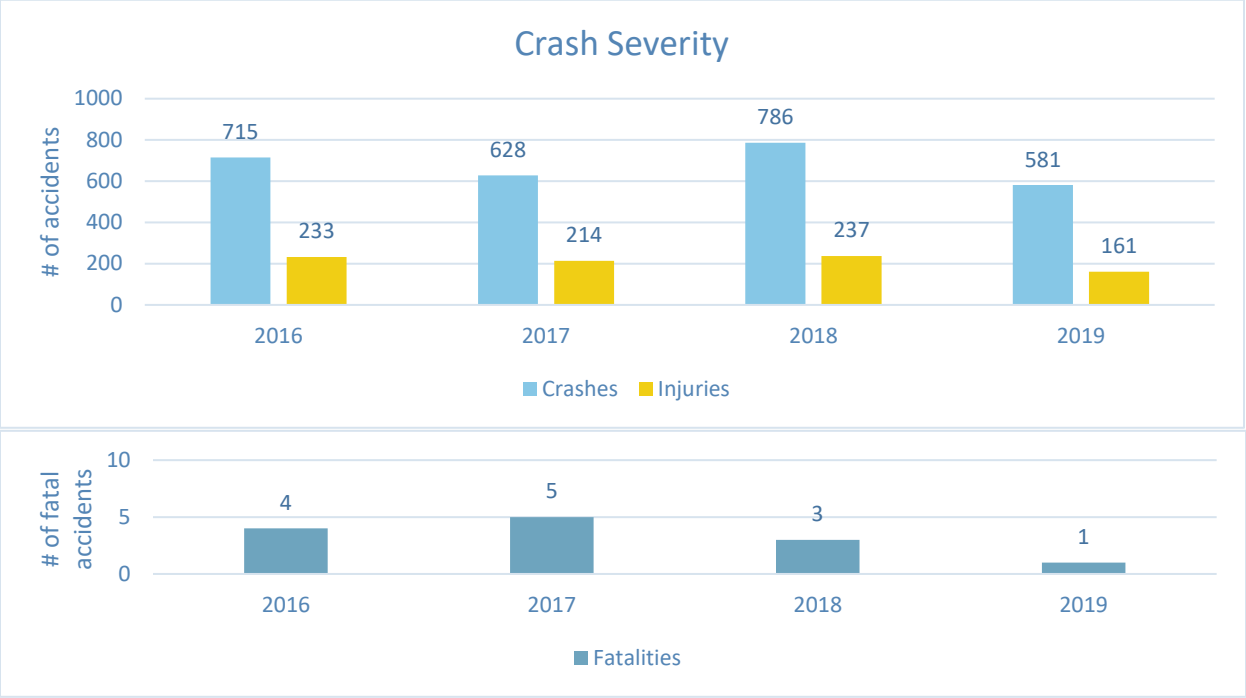


Figure 6: Crash Severity

Based on the trendline from the previous years, the crashes for all levels are expected to reduce for the upcoming year. To help continue the lowering trend, this report analyzes the crash data and identifies the emphasis areas/roadway segments for potential safety improvements. The County should focus to reduce crashes in the emphasis areas to achieve the goal of reducing injury crashes by 50% and have a fatality rate below 1.00 per 100M VMT.

Fatal Crash Summary

The number of fatal crashes in Whitfield County increased from 2018 to 2019. For county-maintained roads, the number of fatal crashes is reducing yearly, as shown in **Figure 6**.

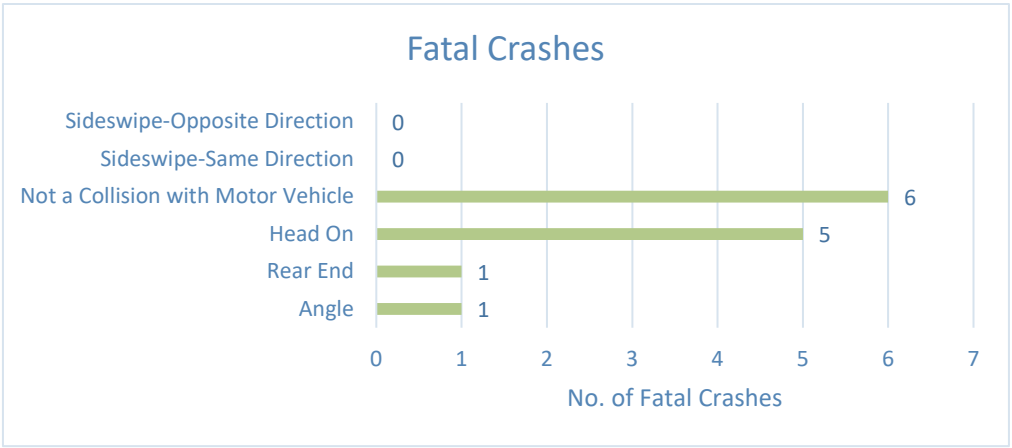


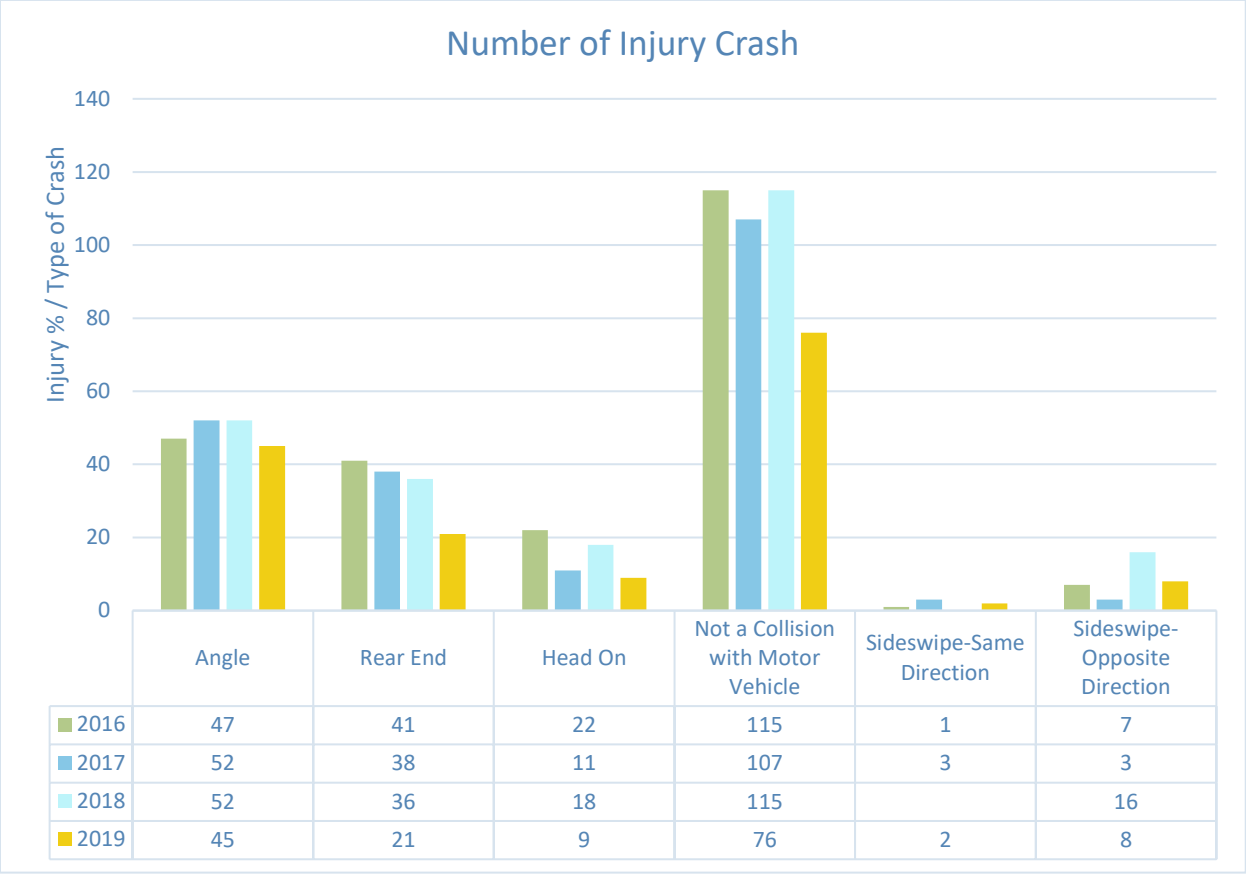
Figure 7: Fatal Crashes by Crash Type

Fatal crashes were studied to identify the hazards that caused the crashes. **Figure 7** shows fatal crashes per crash type.

The majority of fatal accidents on county-maintained roads are either 'not a collision with a motor vehicle' or 'head-on.' A few fatal crashes involving pedestrians and cyclists at non-intersection locations occurred on county-maintained roads but did not have a pattern making it challenging to target improvements that will make a difference for those crashes. The remaining fatal crashes were dispersed on county-maintained roads. There were three fatal crashes on Reed Road to the south of its intersection with Rauschenberg Road. The overlapping vertical and horizontal curve along with 50 miles per hour speed limit could be a reason for those crashes.

Injury Crashes Summary

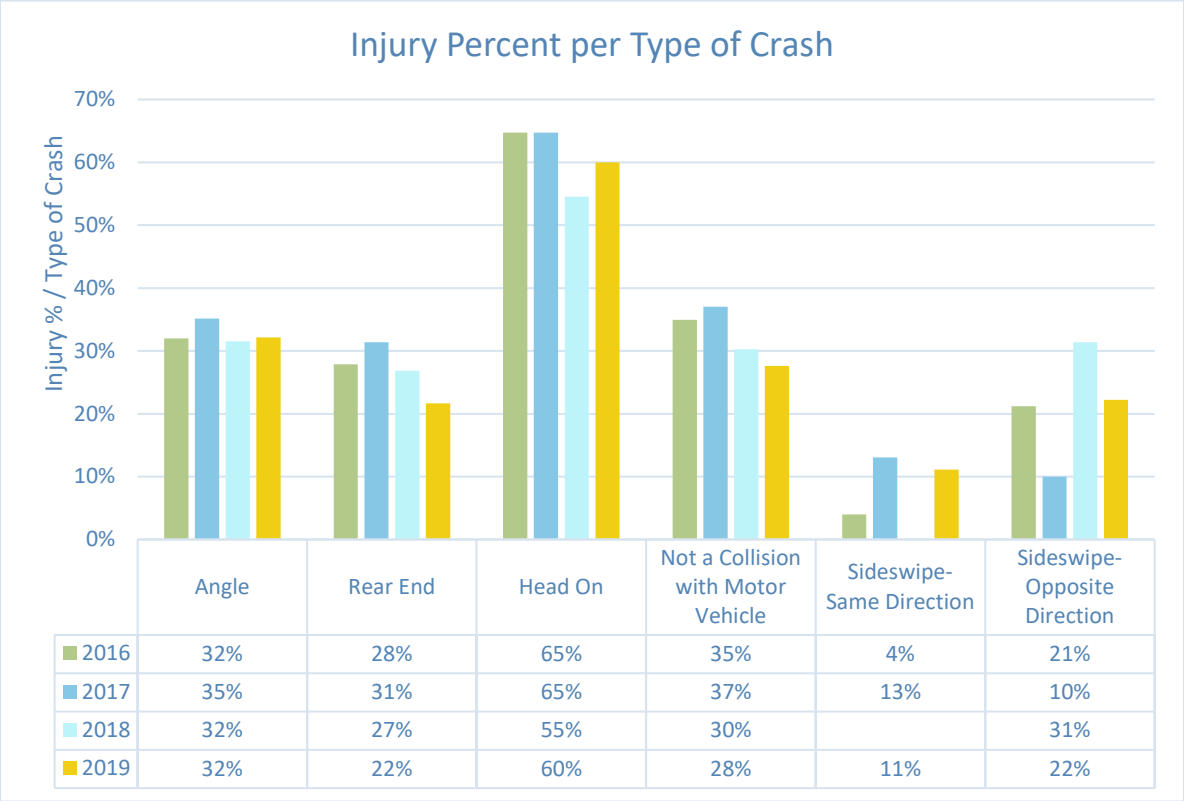
On average, 30% of the crashes occurring on county-maintained roads resulted in some type of injury to at least one person involved in the crash. The injury crashes were analyzed, and the number of injury crashes per crash type for the years 2016 through 2019 is shown in **Figure 8**.



	Angle	Rear End	Head On	Not a Collision with Motor Vehicle	Sideswipe-Same Direction	Sideswipe-Opposite Direction
2016	47	41	22	115	1	7
2017	52	38	11	107	3	3
2018	52	36	18	115		16
2019	45	21	9	76	2	8

Figure 8: Number of Injury Crashes by Crash Type

'Not a collision with a motor vehicle,' is the crash type with highest injuries. This type of crash could be due to sharp curves on roadway or narrow shoulders causing vehicles to leave the road among other reasons. The study area could also have higher collisions with wild animals like deer because of its rural properties. The chance a crash type results in an injury is shown in **Figure 9**.



	Angle	Rear End	Head On	Not a Collision with Motor Vehicle	Sideswipe-Same Direction	Sideswipe-Opposite Direction
2016	32%	28%	65%	35%	4%	21%
2017	35%	31%	65%	37%	13%	10%
2018	32%	27%	55%	30%		31%
2019	32%	22%	60%	28%	11%	22%

Figure 9: Injury Percent per Type of Injury Crashes

Based on **Figure 9**, it can be concluded that, on average, 60% of head-on collisions resulted in injuries. The higher percent of injuries for head-on collision is evident, and potential reasons for this could be high speeds, sharp curves, or poor sight distance at the intersection.

Crash Causes

A reduction in crashes will require safety partners to plan, implement, and evaluate the progress of achieving goals outlined to reduce crashes. The 2019 crash causes for the county-maintained roads are shown in **Figure 10**.

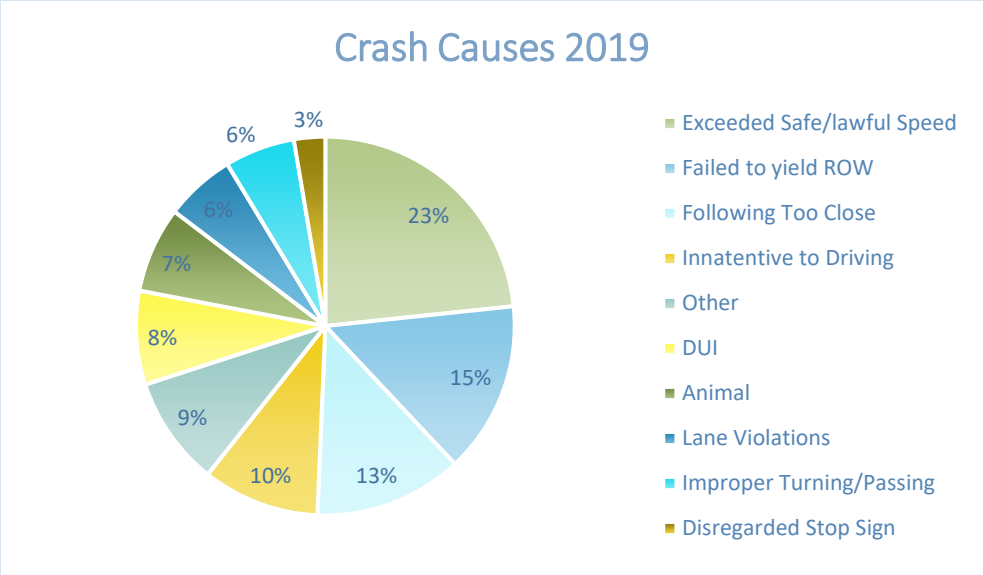


Figure 10: Crash Causes 2019

The crash data for the top 10 County roads with the highest crashes in the year 2019 shows that 35 (23%) crashes are due to vehicles exceeding speed limits. Collisions could be reduced by increasing enforcement targeting aggressive driving and changing the driving culture by conducting and supporting public education and outreach activities that elevate the awareness of the dangers of aggressive driving.

The next cause for crashes is failure to yield, which could be reduced by improving the signage, roadway geometry, or sight distance at intersections. Providing warning signs to alert drivers about the intersection could reduce these crashes. The problem could also be reduced by considering alternative forms of intersection traffic control. For example, installing a roundabout instead of a conventional stop sign at an intersection.

About 8% of crashes are due to impaired driving, which could be reduced by increasing the effectiveness of sobriety checkpoints and developing educational programs to target specific audiences of different age groups.

Methodology

To identify the emphasis areas on Whitfield County maintained roads, roadway segments with the highest collisions were selected for further analysis. This roadway crash data was used to determine intersections or non-intersection locations where most crashes were observed. Once the crash site was identified, the roadway geometry, visibility, posted speed limits, and environmental conditions were checked to see if any of these factors were the reason for the crashes. Based on this analysis, the emphasis area for each road will be identified, and goals will be set to help reduce crashes at the site location.

Low-Cost Safety Improvements

There are many ways to improve safety on a roadway segment with similar crash patterns. Low-cost improvements along the roadway segment should improve safety and reduce the crash rate. The countermeasures mentioned below are a few of the twenty proven countermeasures defined by FHWA. Implementing one or many of these countermeasures together can help improve the awareness of the driver and recognition of potential conflicts.

Enhanced Delineation and Friction for Horizontal Curve

Enhanced delineation treatment helps alert drivers in advance about the curve. Safety benefits of installing chevron signs are reduction in nighttime crashes by 25% and reduction in 16% of non-intersection fatal and injury crashes.

Figure 11: Chevron Sign

Longitudinal Rumble Strips and Stripes

Longitudinal rumble strips are raised or milled elements along the shoulder or centerline, which alert the driver through vibration and sound that their vehicle has left the travel lane. Rumble stripes are placed underneath the pavement marking, increasing the visibility of markings during nighttime and wet conditions. Centerline rumble strips reduce 44-64% of head-on, sideswipe, and opposite direction fatal and injury crashes.

Figure 12: Rumble Strip

Safety Edge

Safety Edge shapes the edge of the pavement approximately 30 degrees from the pavement cross slope to allow drifting vehicles to return to the roadway safely. Safety Edge can result in a reduction of fatal and injury crashes by 11%. Rural road crashes involving edge drop-offs are 2 to 4 times more likely to include a fatality than any other crashes on a similar road, and having this technology helps reduce those crashes.

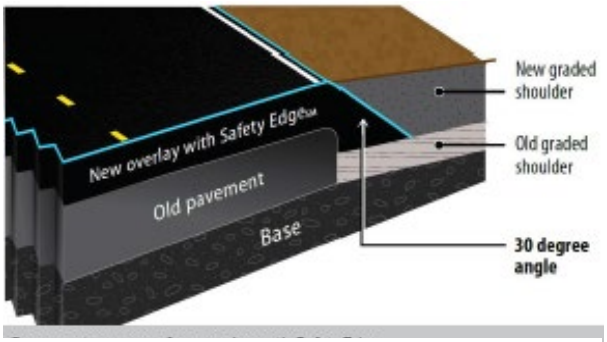


Figure 13: Cross-section of overlay Safety Edge

Roadside Design Improvements at Curves

This countermeasure is to reduce the injury and fatal accidents that occur along the outside of horizontal curves. This treatment allows vehicles to recover safely after roadway departure and by reducing crash severity. A clear zone can be provided beyond the edge of the pavement with no obstructions and traversable for vehicles to recover after leaving the roadway. Adding or widening shoulders to give drivers more recovery zone and having a physical barrier to shield cars from immovable objects or embankments can reduce crash severity.

Roundabouts

A roundabout can be installed at a signalized or unsignalized intersection as an effective way of managing speed and lowering crashes due to fewer conflict points. If a two-way stop-controlled or a traffic signal is replaced by a roundabout, it can reduce crashes by 82% and 78%, respectively. A roundabout is highly recommended in rural areas due to its substantial safety improvements and operational benefits compared to other intersection controls.

Figure 14: Roundabout

Walkways

Walkways are facilities used by pedestrians and may include sidewalk, shared-use paths, or roadway shoulders. By providing walkways for pedestrians, transportation agencies can reduce crashes involving pedestrians walking along roadways by 65-89%. A walkable shoulder should be considered along both sides of rural highways to reduce pedestrian fatalities.

Traffic Safety Mitigation 2020

The following section highlights some safety projects the Whitfield County Engineering Department will be focusing on in 2020.

- This report determines the emphasis areas on county-maintained roads based on observed crash data. The goal will be to provide mitigations and carry out safety audits to compare the before and after scenarios once a safety measure is installed.
- The department will work to conduct speed studies at curves mentioned in the emphasis area to determine the speed limit for the curves. Speed appears to be the main reason for loss of control.

- To improve the visibility of stop-controlled intersections, installing warning signs should be considered at study intersections mentioned in the emphasis area. Another countermeasure to reduce the rear ends at these intersections is to add turn lanes to provide physical separation between turning traffic that is slowing and adjacent through traffic.
- Locations with drainage issues should be improved to provide proper drainage and enough shoulder width and clear space so the vehicle leaving the travel lane can recover and avoid severe crashes.
- Emphasis will be made to improve crash data reporting by identifying best practices in crash reporting, standardize reporting policies and protocols and improving the accuracy of reporting.

Emphasis Areas

The emphasis areas include a brief description of intersection or non-intersection locations along the roadway segment where crashes occur due to a safety hazard. In this section, the hazard will be described, and a countermeasure will be recommended to prevent the crashes. Details for the emphasis area is included in **Appendix A**.

Nine locations on Whitfield County maintained roads where a pattern in crashes was observed were reviewed to recommend improvements for reducing crashes:

1. Reed Road at Poplar Springs Road
2. Reed Road at Reed Pond Road
3. Reed Road at Rauschenberg Road
4. Airport Road at Hill Road
5. Airport Road at Tibbs Bridge Road
6. Airport Road (From Brock Road to Gaines Road)
7. Rauschenberg Road (From Waring Road to Haven Drive)
8. Beaverdale Road at Boyles Mill Road/Good Hope Road
9. Houston Valley Road / East Nickajack Road

Reed Road Summary

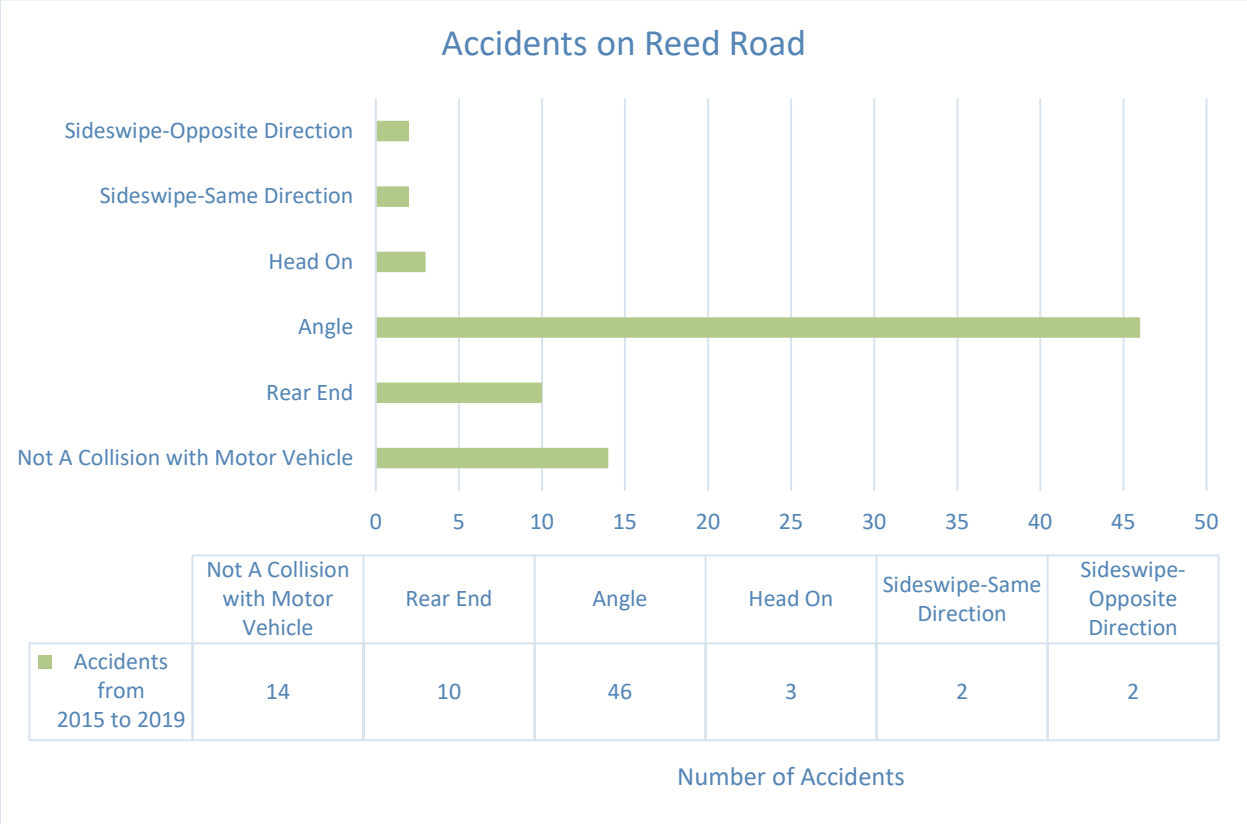


Figure 15: Accidents on Reed Road

The segment of Reed Road from Rauschenberg Road to Poplar Springs Road has a total of 77 crashes from 2015 to 2019, out of which three were fatal, 37 were injury crashes, and 37 were property damage crashes. The study area on Reed Road is rolling terrain and has a speed limit of 45 miles per hour. Three intersections identified as accident hotspots observed through data are explained below. **Figure 15** shows the accidents reported by crash type on Reed Road from 2015-2019.

1. Reed Road at Poplar Springs Road

This intersection is a conventional minor street stop-controlled, four-legged intersection. The intersection approaches are sloped for both Reed Road and Poplar Springs Road. The horizontal curve on Poplar Springs Road westbound reduces the visibility along with a downhill slope and has few warning signs for a curve and approaching intersection. The visibility from Poplar Springs Road is an issue at this intersection as there were approximately 27 angle crashes at this intersection. Improvements for this intersection include additional warning signs on all approaches and increasing visibility at the intersection by improving roadway geometry. Another improvement would be installing a roundabout or all-way stop control.

2. Reed Road at Reed Pond Road

The intersection is a conventional minor street stop-controlled, four-legged intersection. Fifteen crashes were observed at and near this intersection, out of which eleven occurred during wet/rainy conditions. The improvements could include better signs indicating a slippery when wet road surface and warning signs to recommend a reduced speed limit near the intersection. Rumble strips can be installed to reduce the departure crashes occurring while negotiating the curve to the south of the intersection.

3. Reed Road at Rauschenberg Road

The intersection is a conventional minor street stop-controlled, four-legged intersection. The intersection approaches are sloped and near a vertical curve crest, causing sight distance issues for vehicles from Rauschenberg Road. Fourteen collisions were observed on this intersection, including four injury crashes. The low-cost improvement for the intersection includes installing flashing beacon. Two fatal crashes were reported to the south of Reed Road at Rauschenberg Road intersection. Both fatal crashes occurred on a horizontal curve. To prevent future fatal crashes, chevron signs, and recommended speed limit sign for curve should be installed to alert the drivers. A speed study is recommended in this area to determine if high speed is a reason for crashes.

Airport Road Summary

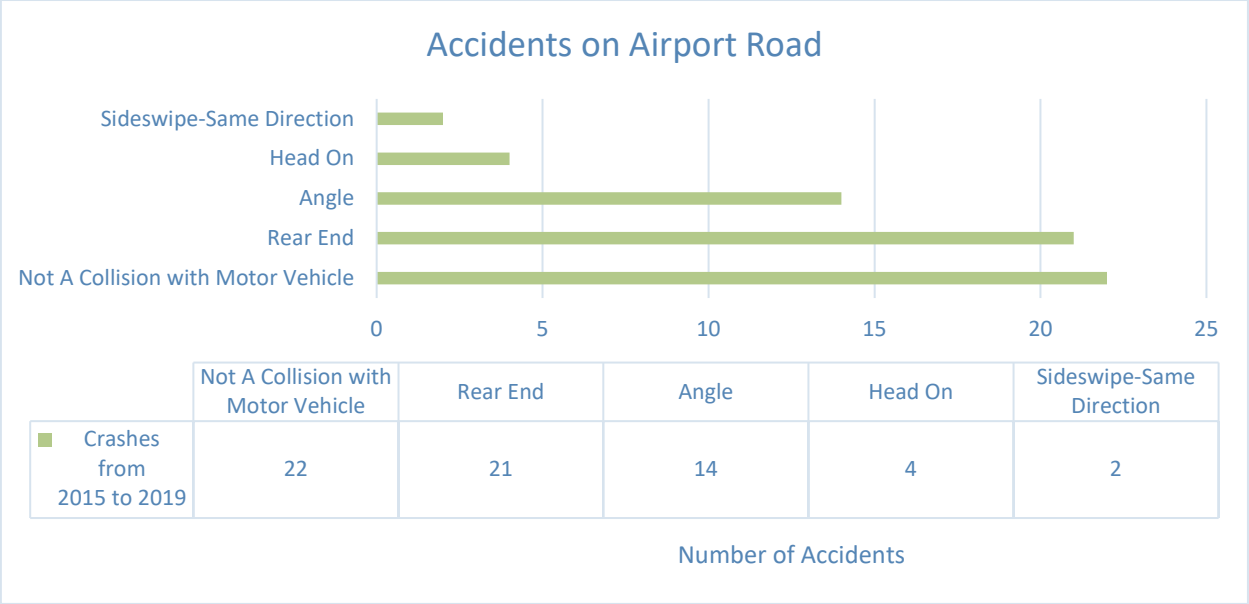


Figure 16: Accidents on Airport Road

The segment on Airport Road from Hill Road to Gaines Road has a total of 63 crashes from 2015-2019. Out of 63 crashes, 21 crashes were injury crashes, and 2 were fatal crashes. Three locations identified as accident hotspots observed through data are explained below. **Figure 16** shows the accidents reported by crash type on Airport Road from 2015-2019.

4. Airport Road at Hill Road

The intersection is a signalized, T-intersection where nine collisions were observed and out of which six resulted in injury. All the crashes at this intersection were either angle or rear-end crashes. Most of the crashes involve vehicles turning left onto Hill Road or making a right onto Hill Road. Improvements to reduce crashes at this intersection could be installing backplates with retroreflective borders to improve visibility of signal heads and reviewing yellow and red time change intervals. Adding a right turn lane on Airport Road may reduce the rear-end crashes at the intersection.

5. Airport Road at Tibbs Bridge Road

The intersection is a signalized, 4-legged intersection, which intersects at an angle of 35°. The intersection has multiple private driveways nearby. The geometry and intersection control devices used may be confusing, causing 11 rear-end accidents for the right turn from Tibbs Bridge Road and a total of 6 angle crashes on Airport Road. Additional signage and markings could assist drivers navigate the intersection. Low-cost improvements are lane markings and enhanced delineation of the signalized intersection by adding flashing beacons on warning signs. Improvements like installing a roundabout could be considered or realignment of Tibbs Bridge Road.

6. Airport Road (From Brock Road to Gaines Road)

For this section of Airport Road, 37 crashes were observed with two fatal crashes and 11 injury crashes. **Figure 17** shows the number of crashes by crash type. The study area is located near Dalton Municipal Airport and is a two-lane facility with narrow shoulder width. Low-cost improvements for this road include installing enhanced delineation treatment by providing chevron signs and clear zone along horizontal curves. If providing clear zones is not possible, then rumble stripes could be installed to alert drivers when they depart travel lanes in addition to increasing the visibility of pavement marking.

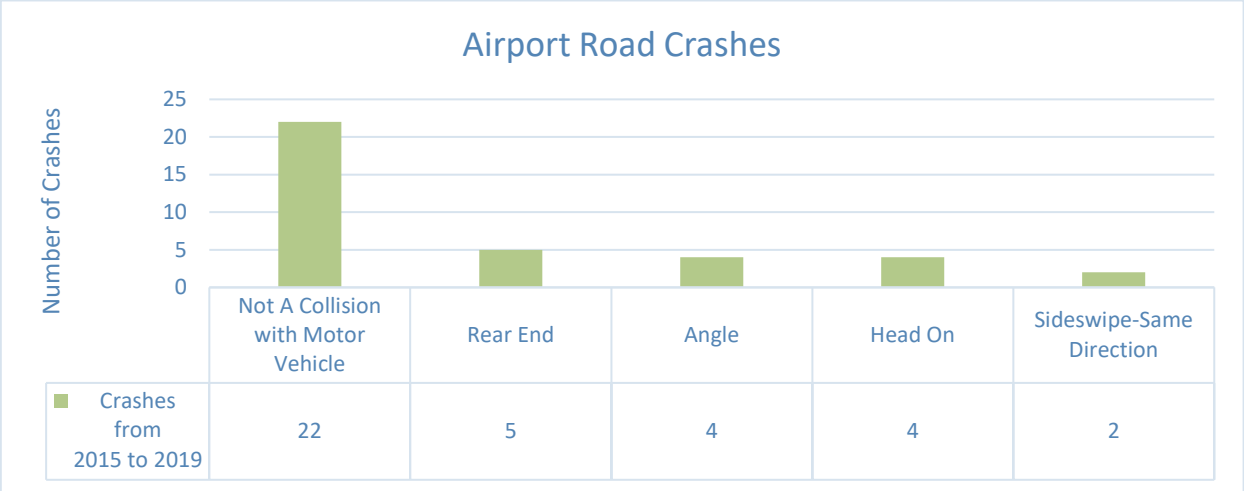


Figure 17: Crashes on Airport Road (From Brock Road to Gaines Road)

Rauschenberg Road, Beaverdale Road, and Houston Valley Road Summary

7. Rauschenberg Road (From Waring Road to Haven Drive)

The intersection at Rauschenberg Road and Waring Road is near an at grade railroad crossing; the study area is to the east of this intersection and to the west of the intersection at Rauschenberg Road and Haven Drive. The speed limit in the study area is 35 miles per hour. Thirty crashes with 13 injury crashes were observed in the study area. Twenty-three accidents were 'not a collision with motor vehicle,' and most occurred in wet conditions on a curve. Low-cost improvements include enhanced delineation of the curve with chevron signs, a reduced speed limit sign, and rumble strips. Providing guardrail or clear zones along horizontal curves could reduce crash severity. Drainage issues, if any, in the study area should be improved or pavement friction should be increased to minimize crashes.

8. Beaverdale Road at Boyles Mill Road/Good Hope Road

This intersection is a conventional minor-street stop-controlled, 4-legged intersection. The intersection is approximately 100 feet from the intersection at Beaverdale Road and Dawnville Beaverdale Road, a minor street stop-controlled 3-legged intersection. A total of 14 crashes were reported at this intersection, which includes eleven angle crashes with seven resulting in injury. A low-cost improvement includes pavement markings at the intersection. Another is to enhance the delineation of the intersection with flashing beacons. Also, consideration should be given to realignment of Dawnville Beaverdale Road as the distance between the right turn lane at this intersection from the study

intersection is less than 100 ft. and might be the reason for angle crashes at study intersection.

9. Houston Valley Road / East Nickajack Road

This non-intersection crash aera is located on the border of Whitfield and Catoosa Counties. The crash site is on an uphill and a sharp horizontal curve. There were 20 accidents reported at the crash site. Crashes were angle, sideswipe-opposite direction, head-on, and not a collision with a motor vehicle. Low-cost improvements include enhanced delineation of the curve, installing rumble strips, and providing clear zones at the curve could reduce the number of crashes. Most of the crashes occurred in wet conditions. Drainage issues, if any, should be fixed or pavement friction should be increased. Wider lanes with proper embankment could reduce the number of crashes. **Figure 18** shows the number of crashes by crash type.

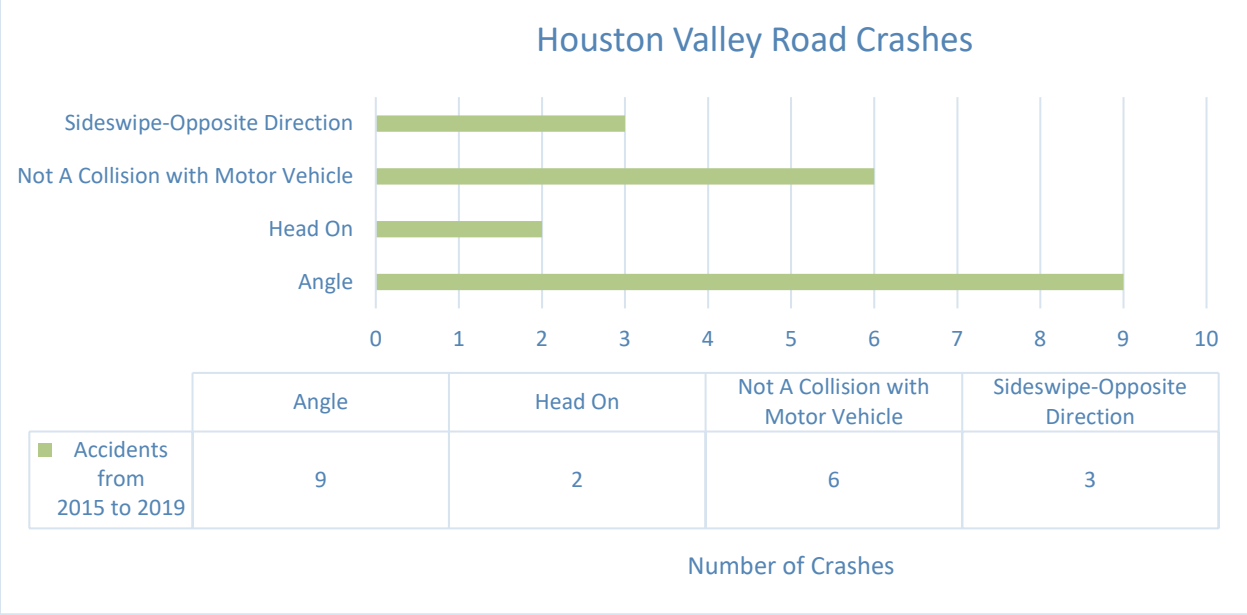


Figure 18: Crashes on Houston Valley Road.

Appendices

- Appendix A - Details for Emphasis Area
- Appendix B - Whitfield County Crashes

Appendix A - Details for Emphasis Area

Airport Road and Hill Road

Airport Road is a five-lane facility with a two-way left-turn lane in the center and is classified as a minor arterial. Hill Road is classified as a major collector and is a two-lane facility. The speed limit on Hill Road and Airport Road is 40 miles per hour. The study intersection is a signalized T-intersection. Based on GDOT's Traffic Analysis and Data Application (TADA) website, average annual daily traffic (AADT) is 3490 and 8990 vehicles per day on Hill Road and Airport Road, respectively.

From 2015 to 2019, nine collisions were reported on this intersection, out of which six resulted in injury crashes. Two major crash types angle and rear-end were observed on the intersection. Angle crashes were reported mostly between vehicles making a left turn from Airport Road and vehicles traveling southbound on Airport Road. The rear-end crashes were reported on the southbound approach of the intersection at Airport Road and involved vehicles turning right and vehicles traveling south.

To reduce the severity and number of crashes, the county can install new signal heads with retroreflective borders and have a four-section flashing yellow signal head for left turns on Airport Road as per the GDOT standards. The county can also consider adjusting the yellow change intervals to provide sufficient time for drivers to stop before the red light. To reduce the rear-end crashes, adding a right turn lane should reduce the number of rear-end crashes reported on the intersection. **Figure 19** shows the aerial of the study intersection.

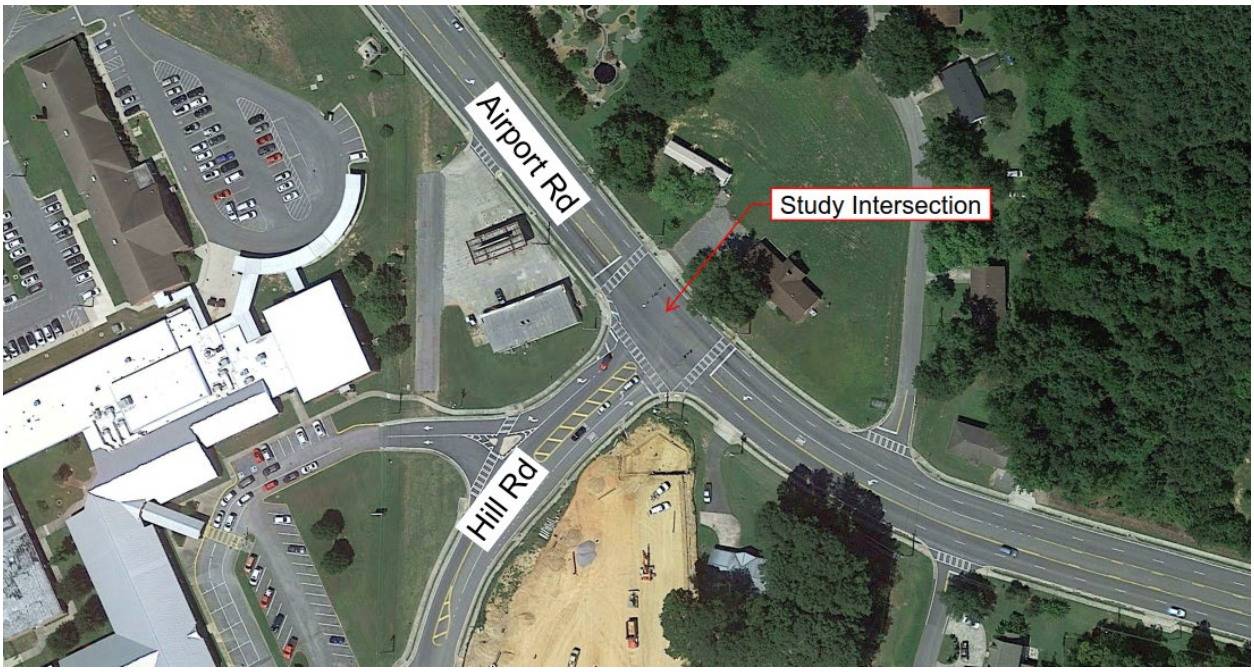


Figure 19: Airport Road and Hill Road

Airport Road and Tibbs Bridge Road

Airport Road is a minor arterial and a two-lane facility for this study intersection with a posted speed limit of 40 miles per hour. Tibbs Bridge Road is a two-lane facility classified as a local road with a posted speed limit of 45 miles per hour. The intersection is signalized and approximately 400 feet to the west of US 76 Bypass. There are a couple of issues with geometry at the intersection.

Tibbs Bridge Road meets Airport Road at an angle of 35°. There are multiple private driveways located at the intersection. The primary issue with the intersection is the channelized right turn on Tibbs Bridge Road. Due to these geometric issues, 11 rear-end crashes were reported in Tibbs Bridge Road right-turn lane, and six angle crashes were reported on Airport Road.

There are multiple ways to improve this intersection safety on this intersection, installing a roundabout would reduce the conflict points and potential crashes. Other improvement includes the realignment of Tibbs Bridge Road to meet Airport Road at an angle greater than 60°.

Low-cost improvements like enhanced delineation of the intersection by installing a flashing beacon with warning signs might reduce crashes. Other enhancements include lane markings and adding turn lanes. One potential change is to relocate the private driveway at the end of right-turn lane. **Figure 20** shows the intersections and the surrounding area.

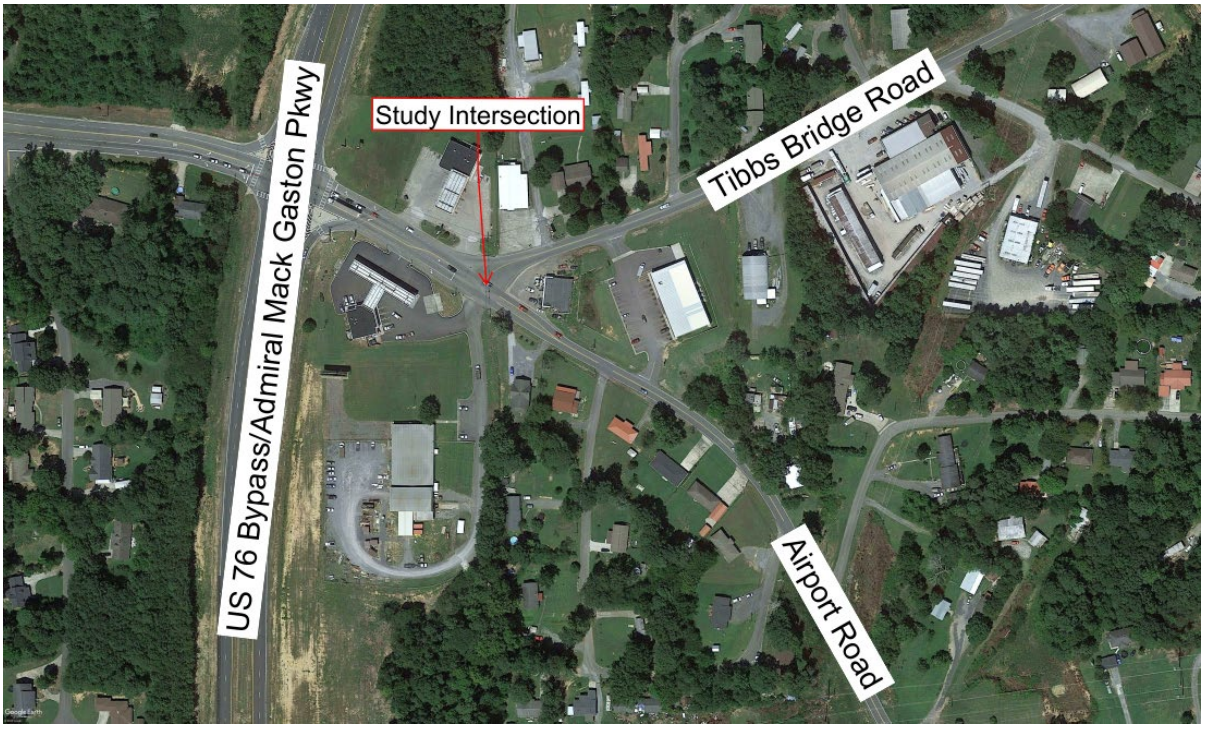


Figure 20: Airport Road at Tibbs Bridge Road

Airport Road (From Brock Road to Gaines Road)

Airport Road from Brock Road to Gaines Road is a two-lane facility and classified as a minor arterial. The posted speed limit in the area is 45 miles per hour between Brock Road and Sane Road, after which it changes to 50 miles per hour. The lanes are 11 feet wide and have narrow to no shoulder.

Thirty-seven crashes were reported in this area, two fatal crashes, and 11 injury crashes. The reason for the collisions could be no enhanced delineation treatment of the curve nor recommended speed limits on horizontal curves. The curves also have no clear zones.

Low-cost improvements for this road are to improve the delineation of horizontal curves and provide a clear zone. If providing clear zones is not possible, then rumble stripes should be installed to alert drivers when they leave travel lane and also to increase the visibility of pavement markings. Improving pavement friction along the curve might reduce the number of crashes. **Figure 21** shows an aerial view of the study area

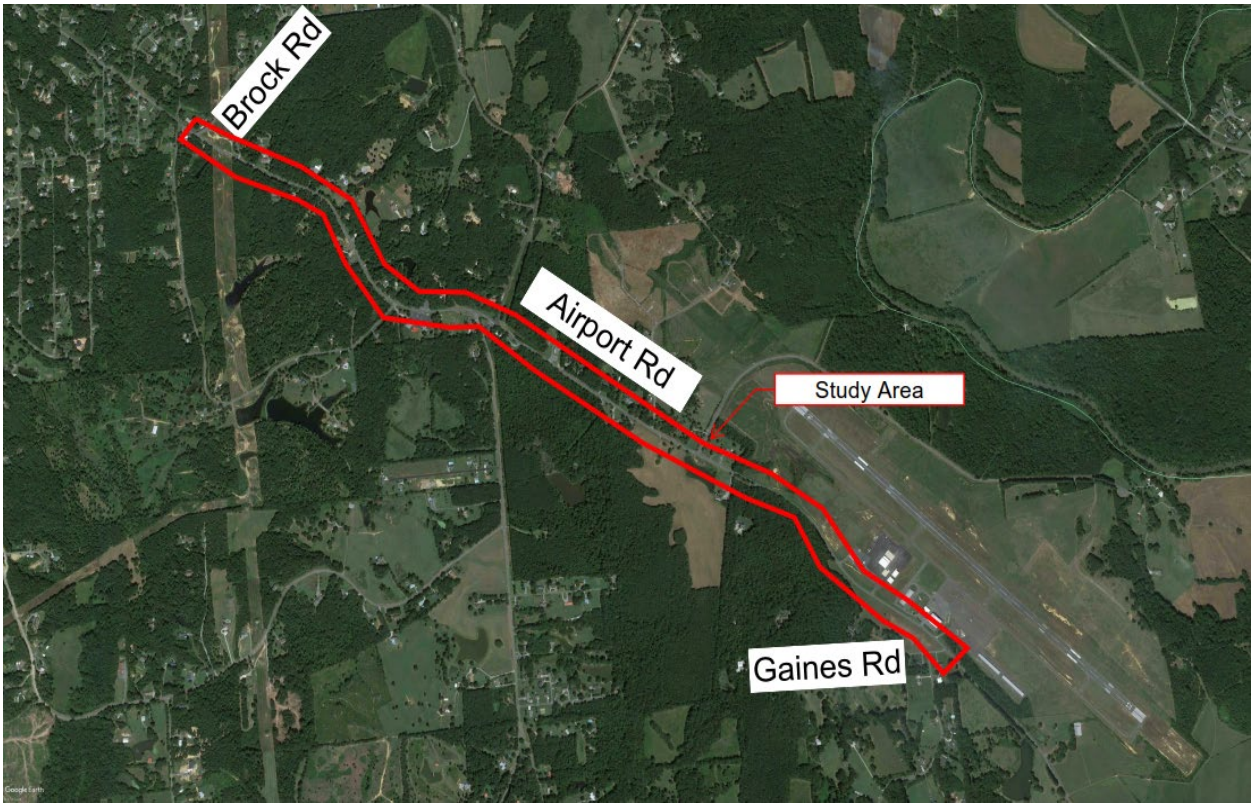


Figure 21: Airport Road from Brock Road to Gaines Road

Reed Road and Poplar Springs Road

The intersection at Reed Road and Poplar Springs Road is a conventional minor street stop-controlled intersection. Both Reed Road and Poplar Springs Road are classified as a minor collector with two-lanes. The speed limit on Reed Road is 45 miles per hour, and on Poplar Springs Road is 40 miles per hour. The intersection has a flashing yellow indication for Reed Road approach and a flashing red light for Poplar Springs Road approach. The intersection is located at a downward slope for north and east approaches of the intersection. The intersection is located just after a horizontal curve on Poplar Springs Road in the east. Sight distance from Poplar Springs Road is an issue at this intersection.

There were approximately 27 angle crashes at this intersection. Low-cost improvements include enhancing the delineation of the intersection with warning signs and flashing beacon to alert the drivers. Other enhancements can be changing the intersection to an all-way stop or installing a roundabout. **Figure 22** shows an aerial view of the intersection location.

Figure 22: Reed Road and Poplar Springs Road

Reed Road and Reed Pond Road

Reed Road is a two-lane facility with a posted speed limit of 45 miles per hour and classified as minor collector. Reed Pond Road is a two-lane facility classified as a local road and has a posted speed limit of 35 miles per hour. The study intersection is minor-street stop-controlled intersection and is located on a horizontal curve. The sight distance from the west approach is an issue at this intersection.

Fifteen crashes were observed at and near this intersection, out of which eleven occurred in wet/rainy conditions. Due to the horizontal curve, not a collision with motor vehicle type crashes near the intersection was due to the departure of vehicles from the travel lane.

To reduce the departure of vehicles from the road, friction of the pavement could be increased, and drainage can be improved at the intersection. Other improvements include having rumble stripes on the roadway to alert the driver and enhance the visibility of lane markings during wet and night conditions. Improvements like enhanced delineation of the curve at the intersection using flashing beacons for the intersection and chevron signs for the curve. **Figure 23** shows an aerial view of the intersection location.

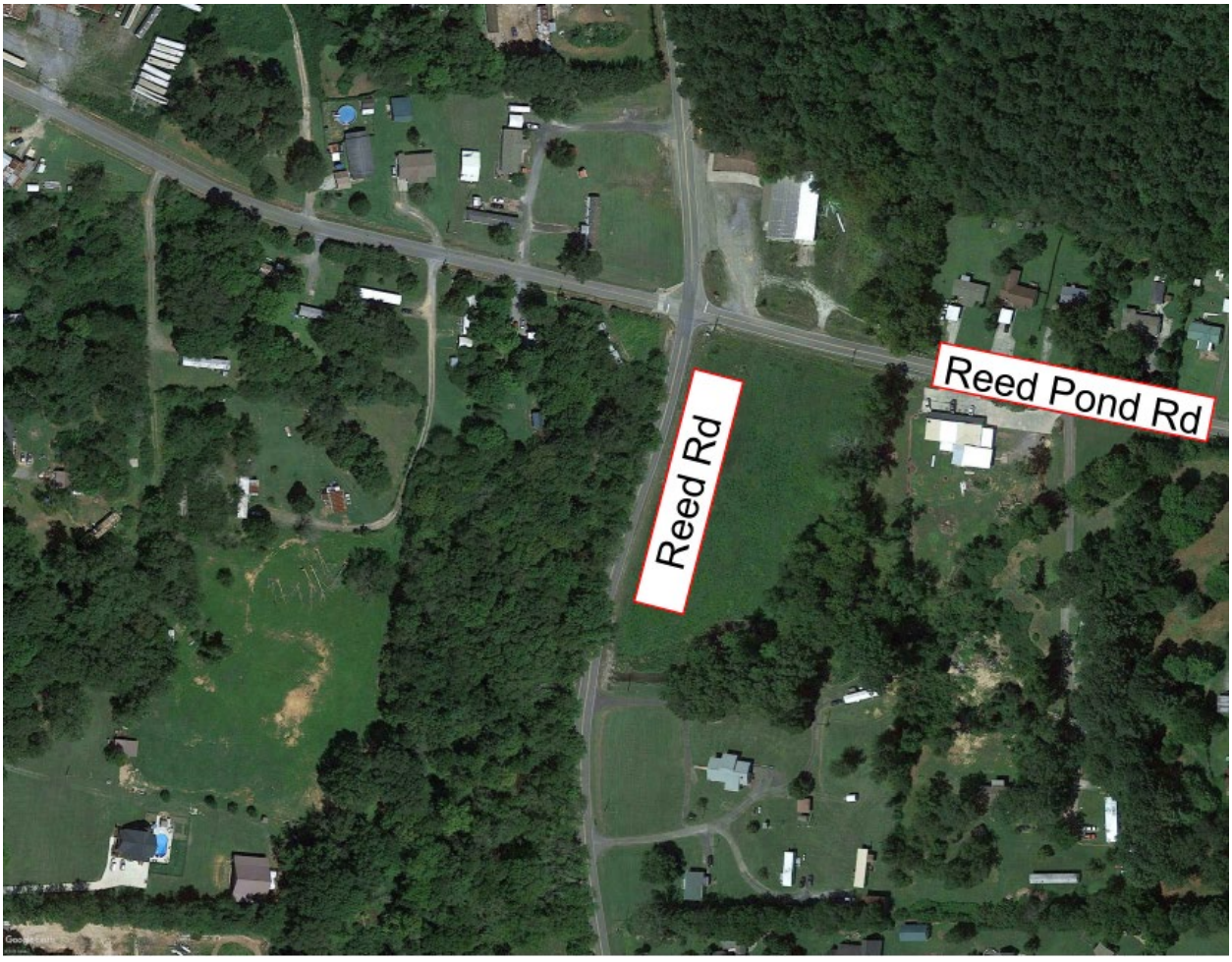


Figure 23: Intersection at Reed Road and Reed Pond Road

Reed Road and Rauschenberg Road

The intersection is a minor-street stop-controlled, 4-legged intersection. Rauschenberg Road is a local two-lane facility road with a posted speed limit of 35 miles per hour. Reed Road is a two-lane facility with a posted speed limit of 45 miles per hour and classified as minor collector. The geometric issues observed at this intersection were limited sight distance for the vehicles trying to make a through or left turn out of Rauschenberg Road. The intersection is located on a downhill slope and near a vertical curve crest.

Fourteen collisions were reported on this intersection, including four injury crashes. Six crashes at the intersection were angle crashes involving vehicles trying to exit out of Rauschenberg Road. Another major issue was the sideswipe crashes in wet conditions.

Two fatal crashes were reported to the south of the intersection on a horizontal curve. As the curve is located on a downhill slope, speed studies should be conducted to help understand the reasons for those deadly crashes. Low-cost improvements that can be installed to reduce the hazards on the intersection and curve are increasing delineation by chevron signs for curve and flashing beacon at the intersection. Increasing the pavement friction or adding clear zones on the curve might reduce the crashes. Another solution is to install rumble stripes to alert the driver as well as improve the visibility of pavement markings. **Figure 24** shows an aerial view of the intersection location and curve.

Figure 24: Reed Road and Rauschenberg Road

Rauschenberg Road (From Waring Road to Haven Drive)

The intersection of Rauschenberg Road and Waring Road has an at grade rail crossing. Waring Road is a major collector and changes to Dyer Drive to the north of the intersection. Rauschenberg Road is a major collector to the west of the intersection. Rauschenberg Road to the east of the intersection and Haven Drive are classified as local roads. All the roadways in the study area are two-lane facilities with a posted speed limit of 35 miles per hour.

Thirty crashes with 13 injury crashes were observed on Rauschenberg Road in the stretch between Waring and Haven Drive. Twenty-three accidents were 'not a collision with motor vehicle' type accidents, and most occurred in wet conditions while negotiating a curve.

To reduce the number of crashes, low-cost improvements like enhanced delineation of the curve with chevron signs and rumble stripes along the curve to improve pavement marking visibility and alert the driver when the vehicle departs travel lane. Another improvement could be providing guardrail or clear zones along horizontal curves to reduce crash severity. Drainage issues, if any, in the study area should be dealt with as it could be a cause for crashes. **Figure 25** shows an aerial view of the study area.

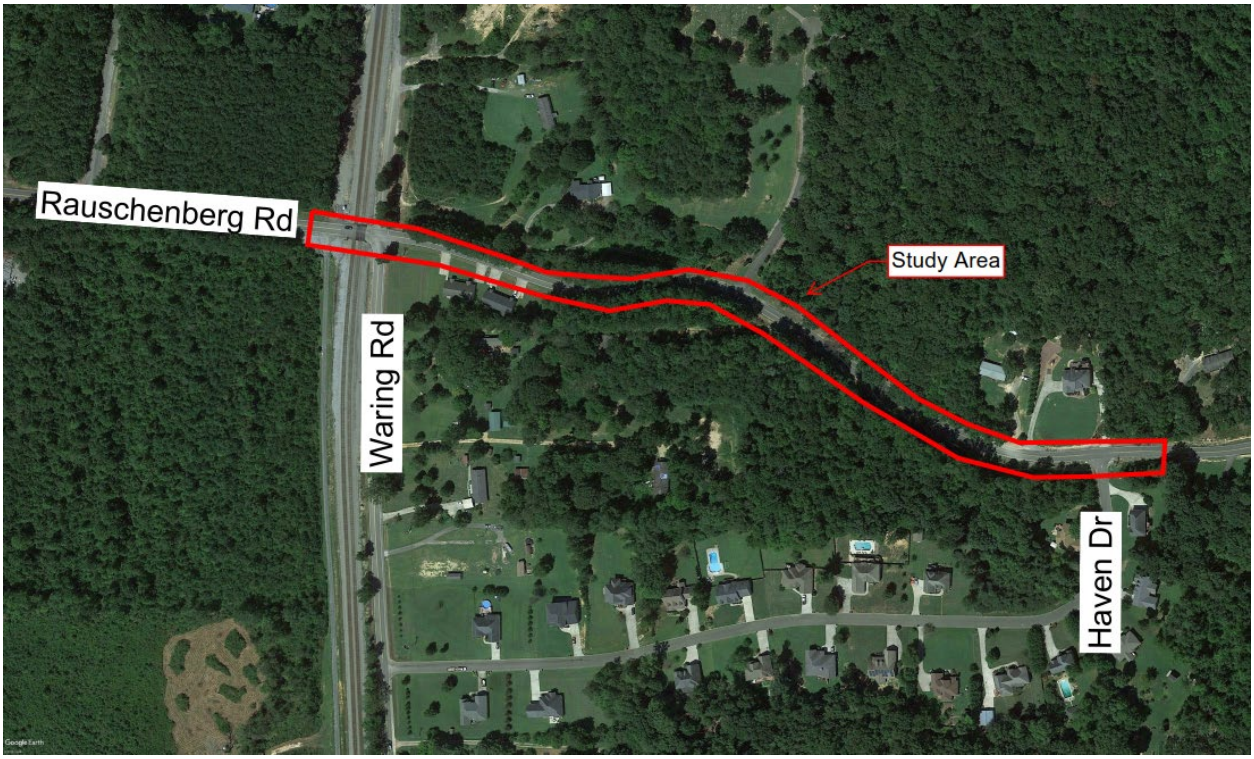


Figure 25: Rauschenberg Road Stretch Between Waring Road and Haven Drive

Beaverdale Road at Boyles Mill Road/Good Hope Road

Beaverdale Road is a major collector and two-lane facility with a posted speed limit of 50 miles per hour. Good Hope Road/Boyles Mill Road is a local two-lane facility. The study intersection is approximately 100 feet away from the intersection at Beaverdale Road and Dawnville Beaverdale Road. Dawnville Beaverdale Road is a two-lane facility classified as a minor collector.

A total of 14 crashes were reported at this intersection, and eleven crashes were angle crashes, out of which seven were in injury crashes. The intersection is approximately 100 feet from the intersection at Beaverdale Road and Dawnville Beaverdale Road, a minor street stop-controlled 3-legged intersection. To reduce the number of crashes, pavement markings at the intersection with a flashing beacon should be considered. Considerations to realign Dawnville Beaverdale Road should be given due to the short distance between the two intersections. **Figure 26** shows an aerial view of the study intersection.

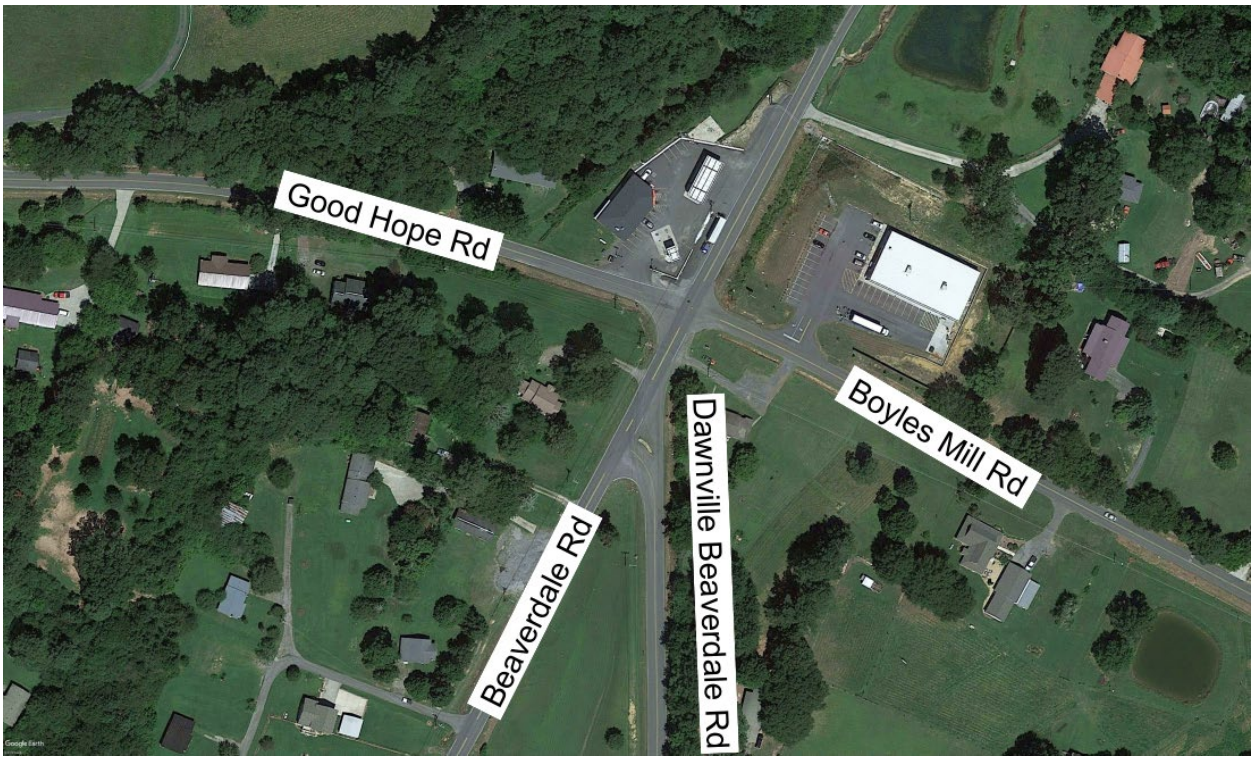


Figure 26: Beaverdale Road and Boyles Mill Road/Good Hope Road

Houston Valley Road / East Nickajack Road

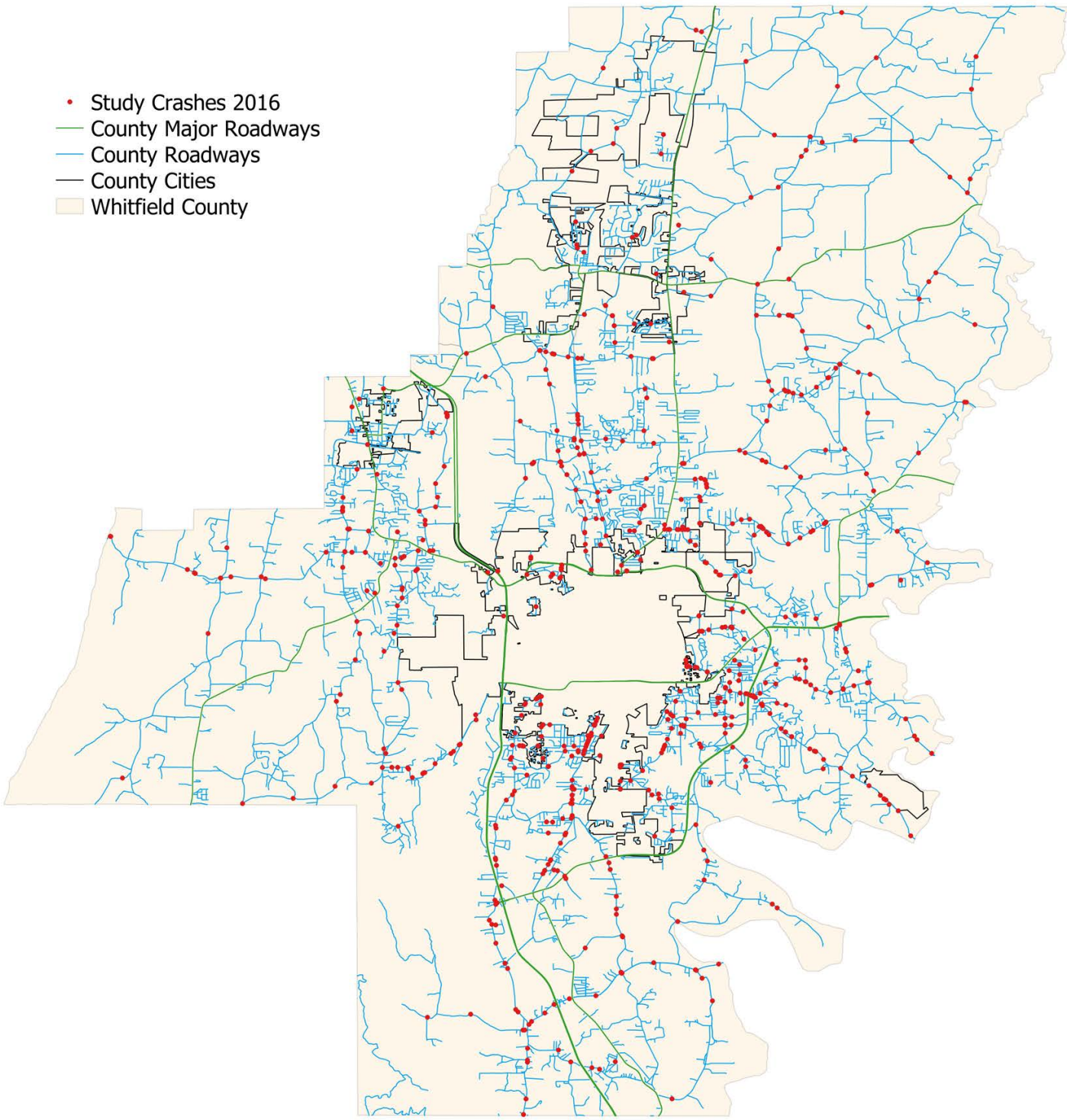
The crash site is located at the county border of Whitfield and Catoosa counties. The site is on Houston Valley Road / East Nickajack Road, which is a local two-lane facility road with a posted speed limit of 35 miles per hour. The crash site is on an uphill slope with a sharp horizontal curve.

There were 20 accidents on the crash site. The types of crashes were angle, sideswipe-opposite direction, head-on, and not a collision with a motor vehicle. Low-cost improvements to reduce crashes include enhanced delineation of the curve with chevron signs. Installing rumble stripes and providing clear zones at the curve will help reduce the number of crashes. Most of the crashes occurred in wet conditions. Drainage issues, if any, should be fixed or pavement friction should be increased. Wider lanes with proper embankment should also help reduce the number of crashes. The crash site location is as shown in **Figure 27**.

Figure 27: Houston Valley Road/East Nickajack Road

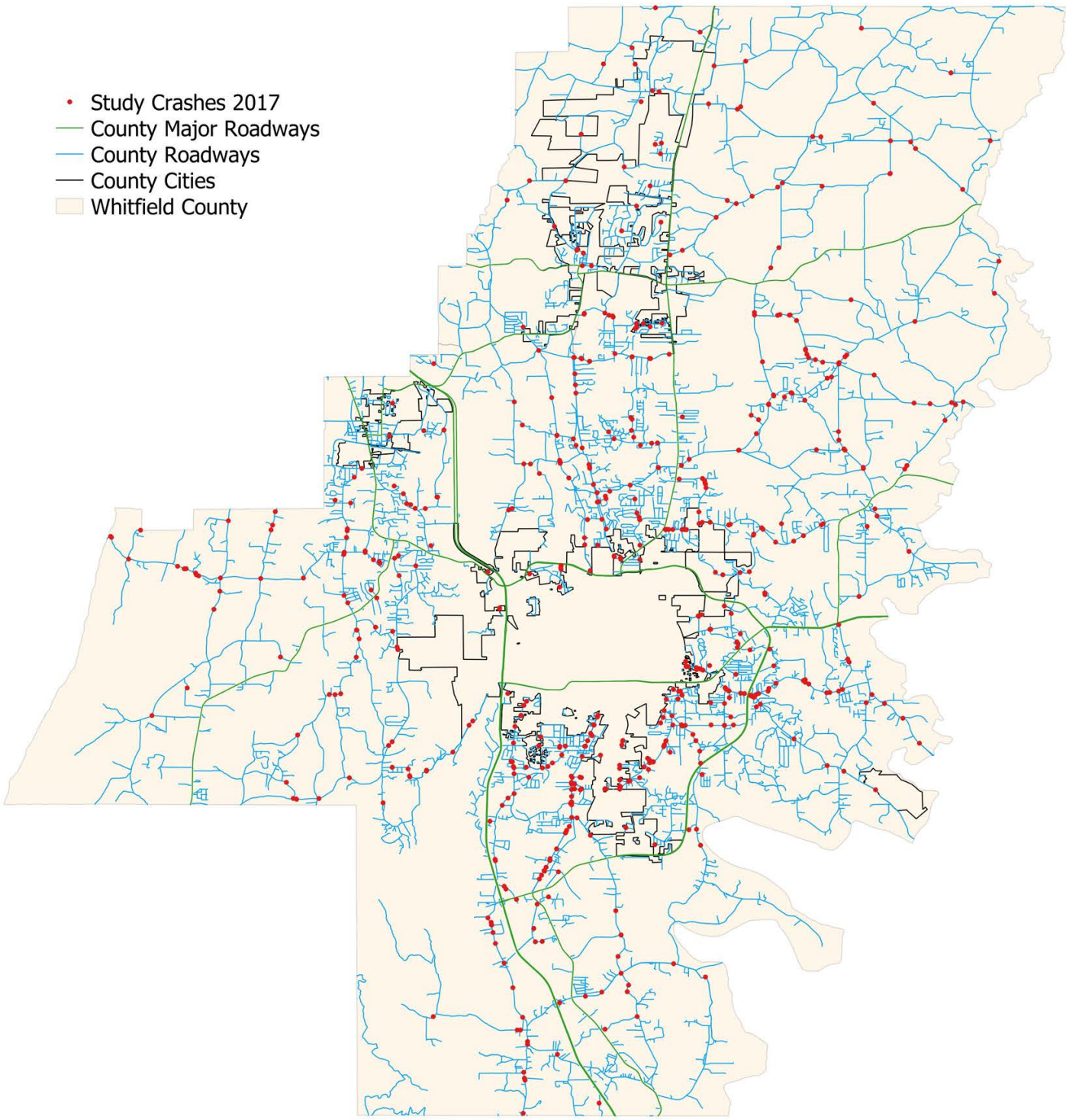
Appendix B - Whitfield County Crashes

Whitfield County Study Crashes 2016



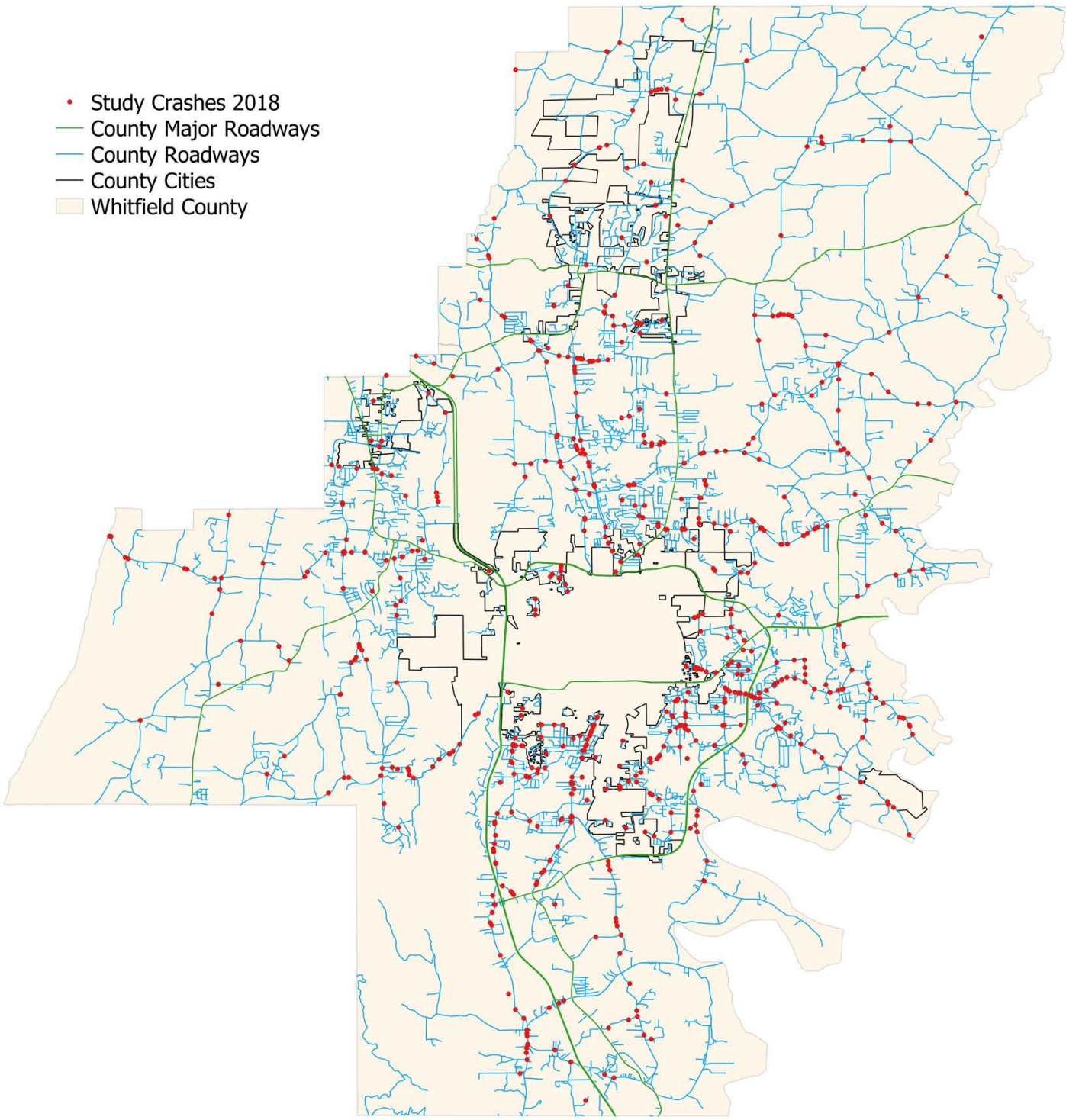
Not to Scale

Whitfield County Study Crashes 2017



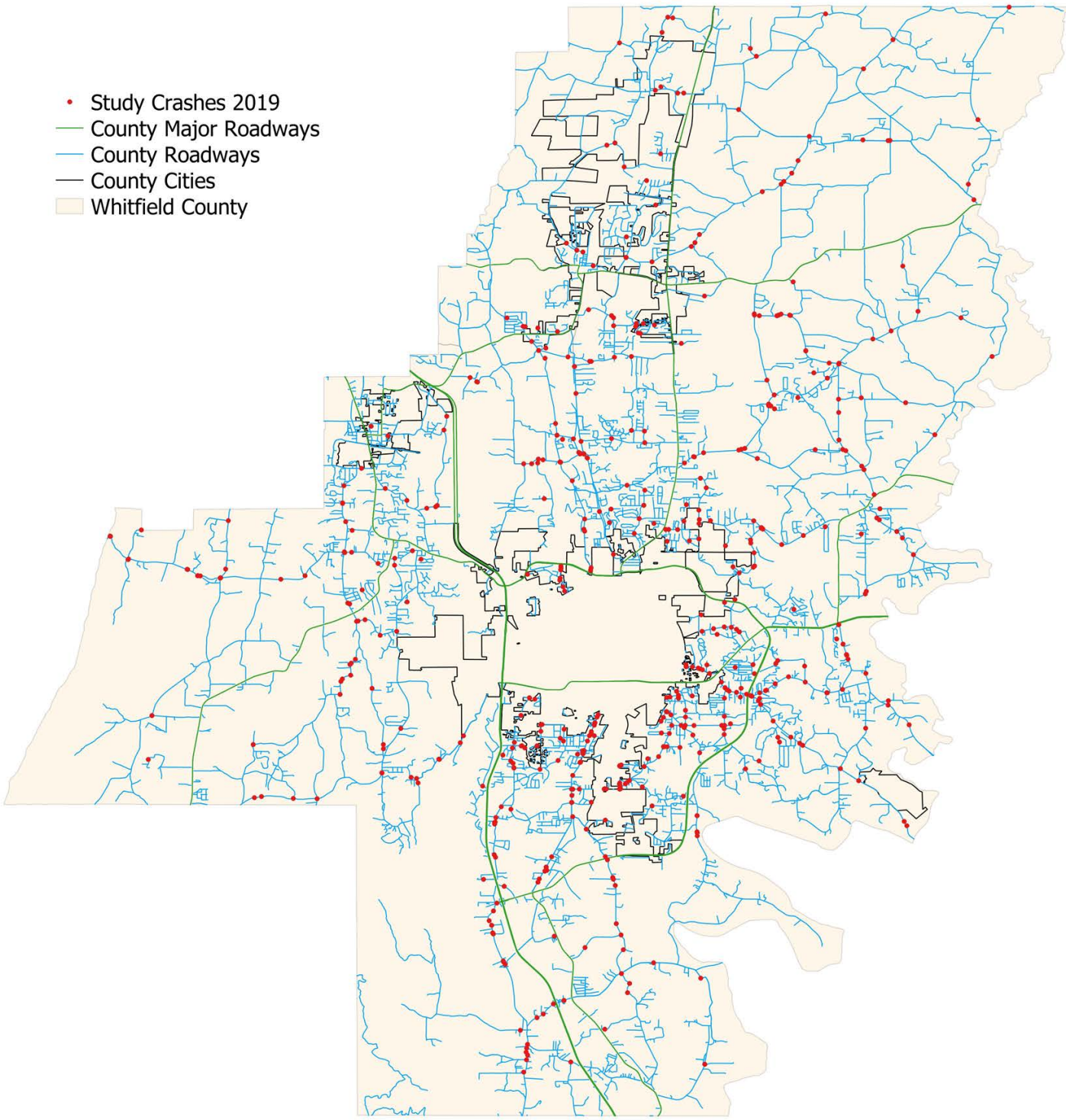
Not to Scale

Whitfield County Study Crashes 2018



Not to Scale

Whitfield County Study Crashes 2019



Not to Scale

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