



ACTION PLAN

MONTGOMERY COUNTY

Safe Streets for All

November 2023

ACKNOWLEDGMENTS

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EXECUTIVE SUMMARY

From 2018-2022, there were 5,838 crashes in the unincorporated communities of Montgomery County. These crashes yielded 48 fatalities and 278 serious injuries. Historical crash data along with the county's growth in population and development over the past twenty years has created a need for the prioritization of roadway safety and efficiency. The Montgomery County Commission has produced this Comprehensive Safety Action Plan (CSAP) to combat increases in vehicular crashes, traffic congestion, and inaccessibility to safe roads. The goal of this plan is to identify steps that will bring the county closer to zero roadway fatalities and serious injuries. This goal upholds Tennessee's dedication to the Towards Zero Deaths (TZD) vision which uses education, enforcement, engineering, and emergency response initiatives to reduce the amount and severity of crashes on Tennessee roadways. To achieve this goal, Montgomery County will incorporate the following components into this plan:



**Leadership Commitment,
Goal Setting & Goal Timeline**



Policy & Process Changes



Safety Analysis



**Strategy & Project
Selections**



**Engagement & Collaboration
with the Public**



**Progress & Transparency
Methods**



Equity Considerations

This CSAP is the county's initial step towards eligibility for the Safe Streets and Roads for All (SS4A) discretionary program, funded by the Bipartisan Infrastructure Law (BIL). The SS4A program funds regional, local, and tribal initiatives through grants to prevent roadway deaths and serious injuries. This plan is dedicated to the safety and well-being of all Montgomery County residents and visitors but will focus primarily on improving transportation safety in the unincorporated communities.

Following in-depth data analysis and community engagement, a High Injury Network (HIN) was defined, and various locations were identified as top priorities for investment. The HIN consists of fifteen roadway segments and three precise locations that have demonstrated fatal and/or serious injury crash history.

In addition to the data-driven approach and public feedback, this CSAP is founded on extensive policy and process reviews, identification of insufficient and inequitable access to safe and reliable transportation, and the prioritization of locations that pose risks for further safety issues.

The physical, emotional, and economic impacts that result from traffic crashes serve as reminders for the necessity of this plan. The strategic recommendations presented here will benefit the communities in Montgomery County by addressing the most significant safety risks to both residents and visitors.



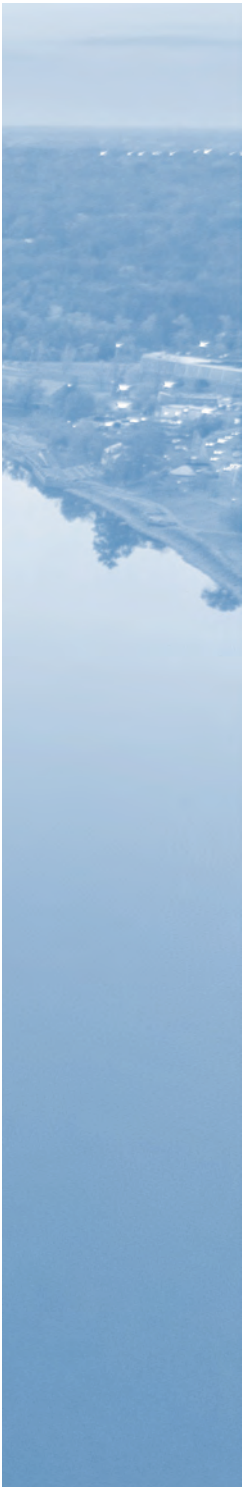
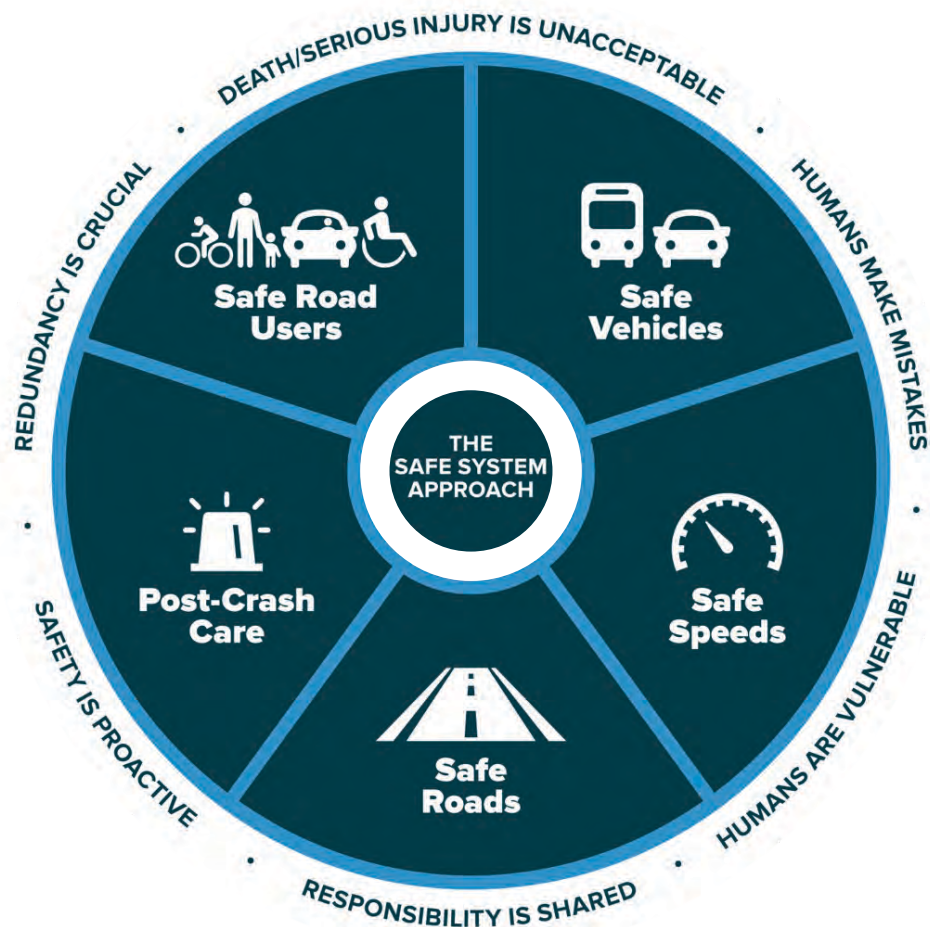


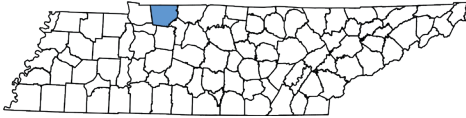
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OVERVIEW

Montgomery County is located in Northern Middle Tennessee and shares a border with the state of Kentucky.



The city of Clarksville serves as the county seat and the only incorporated municipality in the county. Additionally, there are fourteen unincorporated communities that make up the rest of the county. Since 2000, the population of Montgomery County has grown by 63%. To support its growth and prepare for further expansion, the county is committed to the safety of its residents and visitors. To ensure this, Montgomery County has a goal of eliminating fatal and serious injuries on its roadway network by 2045. This goal complies with the U.S. Department of Transportation's National Road Safety Strategy (NRSS) which states that "even one death on (our) transportation systems is unacceptable." The SS4A program supports this initiative by providing funding toward counties, cities, towns, transit agencies, and other special districts that are political subdivisions of a state.

The NRSS adopted the Safe System Approach which focuses on human error and vulnerability and then establishes a transportation system with excessive safety features designed to protect all transportation users. The following principles outline the **Safe System Approach**:

1. *Death and serious injuries are unacceptable.*
2. *Transportation systems should be designed to avoid fatal and serious injuries when crashes do occur and to prepare for inevitable human mistakes.*
3. *Transportation systems should be designed to accommodate the physical limits and vulnerabilities of humans.*
4. *All stakeholders of the transportation system share responsibility for keeping our roadways safe.*
5. *Safety issues in the transportation system should be addressed proactively.*
6. *A system with redundancy will reduce risks and strengthen the transportation system.*

This approach can be implemented using the **Five Complementary Objectives** that correspond with the previously defined principles:

- **Safer People** - *Encourage safe, responsible driving and behavior by people who use our roads and create conditions that prioritize their ability to reach their destination unharmed.*
- **Safer Roads** - *Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.*
- **Safer Vehicles** - *Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.*
- **Safer Speeds** - *Promote safer speeds in all roadway environments through a combination of thoughtful, equitable, context-appropriate roadway design, appropriate speed-limit setting, targeted education, outreach campaigns, and enforcement.*
- **Post-Crash Care** - *Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.*

Why is the Safe Systems Approach Important?

Because every life is important, and every life faces risk on the transportation network! From 2018-2022, 48 people lost their lives in fatal traffic collisions in the unincorporated areas of Montgomery County. 278 people faced incapacitation or other serious injuries.

"Vision Zero" is a concept that was first adopted in Sweden in 1997 but has since reached many transportation departments across the globe. Vision Zero's objective in transportation safety plans is to achieve and maintain zero deaths. The Safe Systems Approach underlines Vision Zero's purpose.

Montgomery County has every intention to be proactive about the current safety issues present on our roadways. The core objective of participating in the SS4A program is to design roads that reduce traffic collisions and eliminate the risk of fatal and serious injuries.

COMMUNITY ENGAGEMENT

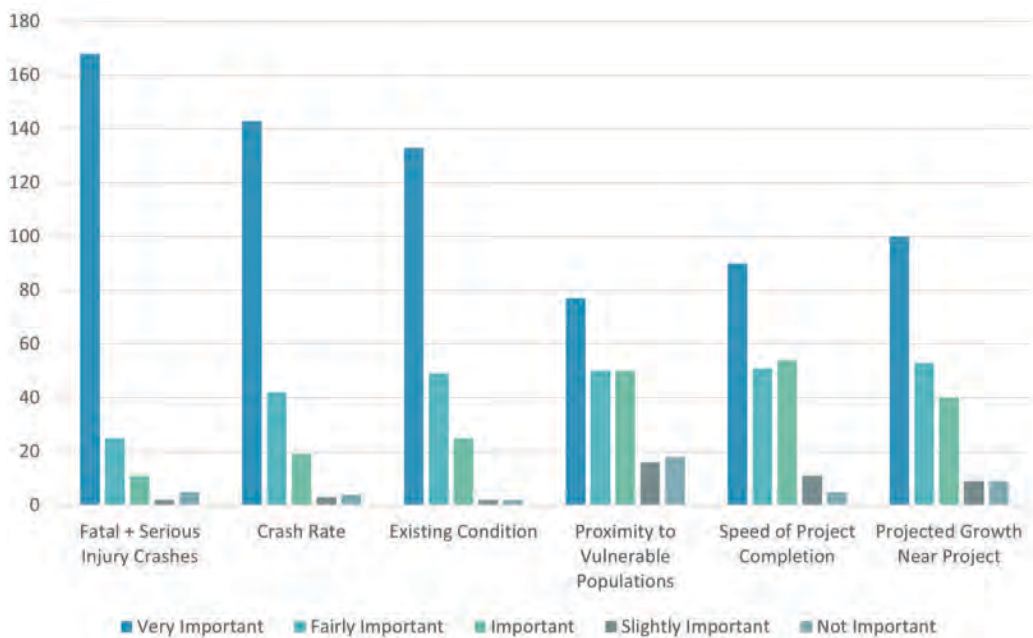
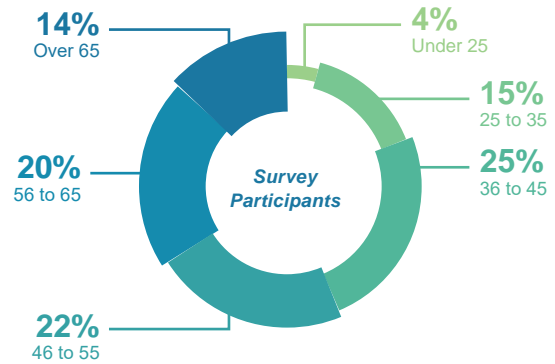
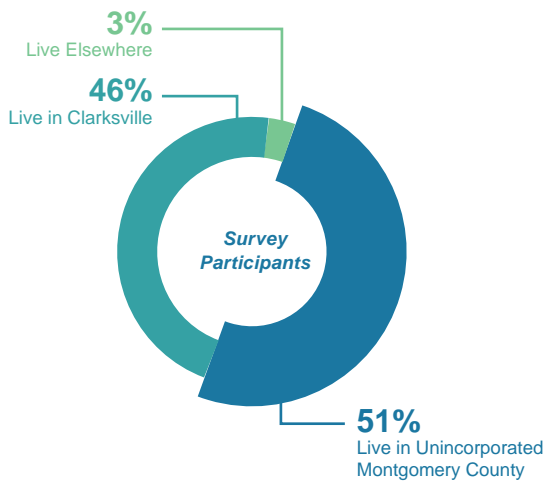
A major part of this CSAP was public engagement and committee meetings which served to understand the concerns of community members. Montgomery County understands that community engagement is necessary to understand the issues facing the public on its roadways. Residents and visitors of the county are the most familiar with the safety issues impacting roadways. Therefore, their input is crucial in designing a safer transportation system.

From April 1st to May 15th of 2023, a public survey was made available online. The survey prompted 211 respondents, with over half of the respondents residing in unincorporated areas of Montgomery County.

A major survey question presented to the respondents involved the prioritization of projects. Based on the presented criteria, respondents ranked how

important those criteria were in determining a project's prioritization. As illustrated in the bar chart below, survey respondents ranked the number of fatal/serious injury crashes to be the most important criteria in determining a project's prioritization, followed by the crash rate and existing road conditions.

These insights from Montgomery County's roadway users along with transportation safety data will lead focused efforts towards areas of concern. Moving forward, the county will continue to enhance its community outreach plan to further its transportation safety goals. After initiating this action plan, Montgomery County plans to inform the public of measured outcomes/improvements and engage with community members from various backgrounds to create representative and effective changes to its roads.



Another survey question asked respondents to select the top 5 types of projects that are needed on Montgomery County roads to promote safety. The survey responses offered the following results:

65% of survey respondents felt unsafe driving through intersections without turn lanes.



Un-signalized intersections, unclear warning signs/pavement markings & impeding roadside vegetation were also identified as prominent safety issues.



One of the top four safety concerns reported was inadequate street lighting.



More than 50% of respondents supported the widening of travel lanes.



42% of respondents identified pedestrian accessibility as a major safety concern.



Many respondents conveyed a need for more guardrails.



Advocating for Safety:

Roadways can be designed with a variety of safety enhancement solutions to eliminate fatalities and serious injuries. Despite best efforts however, human error will forever exist. Improvements to roadways will be most beneficial and effective when its users understand and support the county's safety mission. To ensure that the community is aware of the county's goals and roadway improvements, Montgomery County plans to present this CSAP at community meetings and open the floor to discussion. Safety campaign plans will also be developed in collaboration with other agencies to promote a strong safety culture. Further strategies will continue to evolve as more outreach and engagement with the community is conducted.

ANALYSIS OF EXISTING CONDITIONS & HISTORICAL TRENDS

Excluding Clarksville (the only incorporated municipality), Montgomery County manages approximately 859 total centerline miles of roadway, with approximately 745 of those centerline miles serving as county-maintained roads, 107 centerline miles are on state routes, and 7 are on interstates.

The crash data presented throughout this report was collected utilizing the Tennessee Department of Transportation's Enhanced Tennessee Roadway Information Management System (E-TRIMS), which is a database that includes all traffic safety data collected by law enforcement agencies throughout the state.

The chart below shows a breakdown of the amount of centerline miles by facility type and the number of crashes experienced on those facilities. Based on this data, a significantly disproportionate amount of total crashes (55%) and fatal/serious injuries (61%) occur on state routes and interstates even though they account for only 13% of the centerline mileage throughout the unincorporated areas of the county. This is most likely due to the higher exposure drivers experience on state routes and interstates which usually produce higher speeds and consist of multiple lanes and higher traffic volumes.

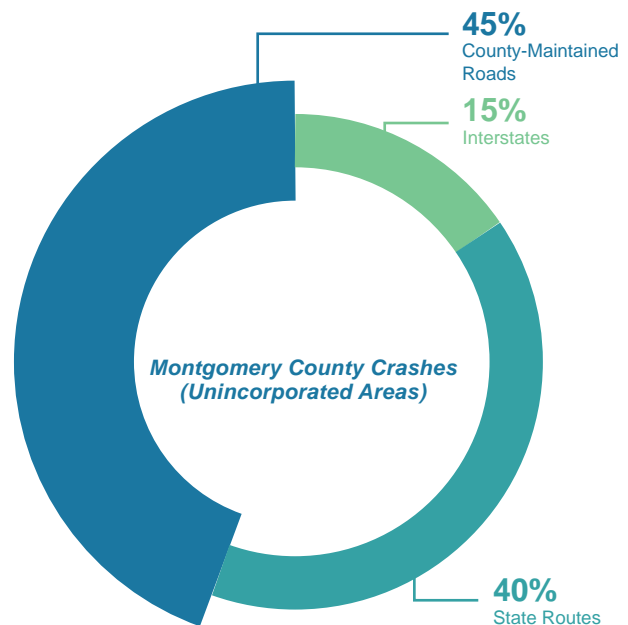
Facility Type	Centerline Miles	Total Crashes	Fatal + Serious Injuries
Interstates	7 (1%)	896 (15%)	42 (13%)
State Routes	107 (12%)	2341 (40%)	157 (48%)
County-Maintained	745 (87%)	2601 (45%)	127 (39%)

To further analyze these crashes, Montgomery County investigated the locations and routes where these crashes occurred on these routes. The data showed that 83% of the total crashes occurred along the roadway, 16% at intersections, and only 1% at on/off ramps. Similarly, 82% of the fatal and serious injuries occurred along the roadway and 18% at intersections and one incapacitating injury occurred at on/off ramps.

Montgomery County will use this information along with sound engineering judgment to apply safety enhancements in areas of concern on both intersections and along roadways, especially those lacking proper lighting, signage, sight-distance, shoulder space, wide lanes, etc. to reduce crashes and serious injuries. Just one fatal or serious injury prevented on Montgomery County Roads is considered a monumental success and the work it takes to design safer roadways is worth the cost.

The map of Montgomery County on the next page (Figure 1) pin-points the location and type of all collisions in unincorporated areas that occurred from 2018-2022.

There have been 32,430 crashes in Montgomery County from 2018-2022 and 5,838 (Over 18%) of those crashes occurred in unincorporated municipalities throughout the county. Of these 5,838 crashes, 896 occurred on interstates, 2,341 occurred on state routes, and 2,601 were on county-maintained roads, as portrayed in the chart below. A total of 326 fatal and serious injuries occurred during the study period. There were also 1,278 minor injuries reported as a result of these crashes.



To clarify the definitions of incapacitating and non-incapacitating injuries used on the next page in Figure 2, the KABCO injury classification scale is used. In Tennessee, the KABCO scale defines incapacitating and non-incapacitating injuries as follows:

Incapacitating Injury:

An incapacitating injury is any injury other than fatal which results in one or more of the following: Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood, broken or distorted extremity (arm or leg), crush injuries, suspected skull, chest or abdominal injury other than bruises or minor lacerations, significant burns (second and third degree burns over 10% or more of the body), unconsciousness when taken from the crash scene and/or paralysis.

Non-Incapacitating Injury:

A non-incapacitating injury is any injury that is evident at the scene of the crash, other than fatal or serious injuries. Examples include lump on the head, abrasions, bruises, minor lacerations (cuts on the skin surface with minimal bleeding and no exposure of deeper tissue/muscle).

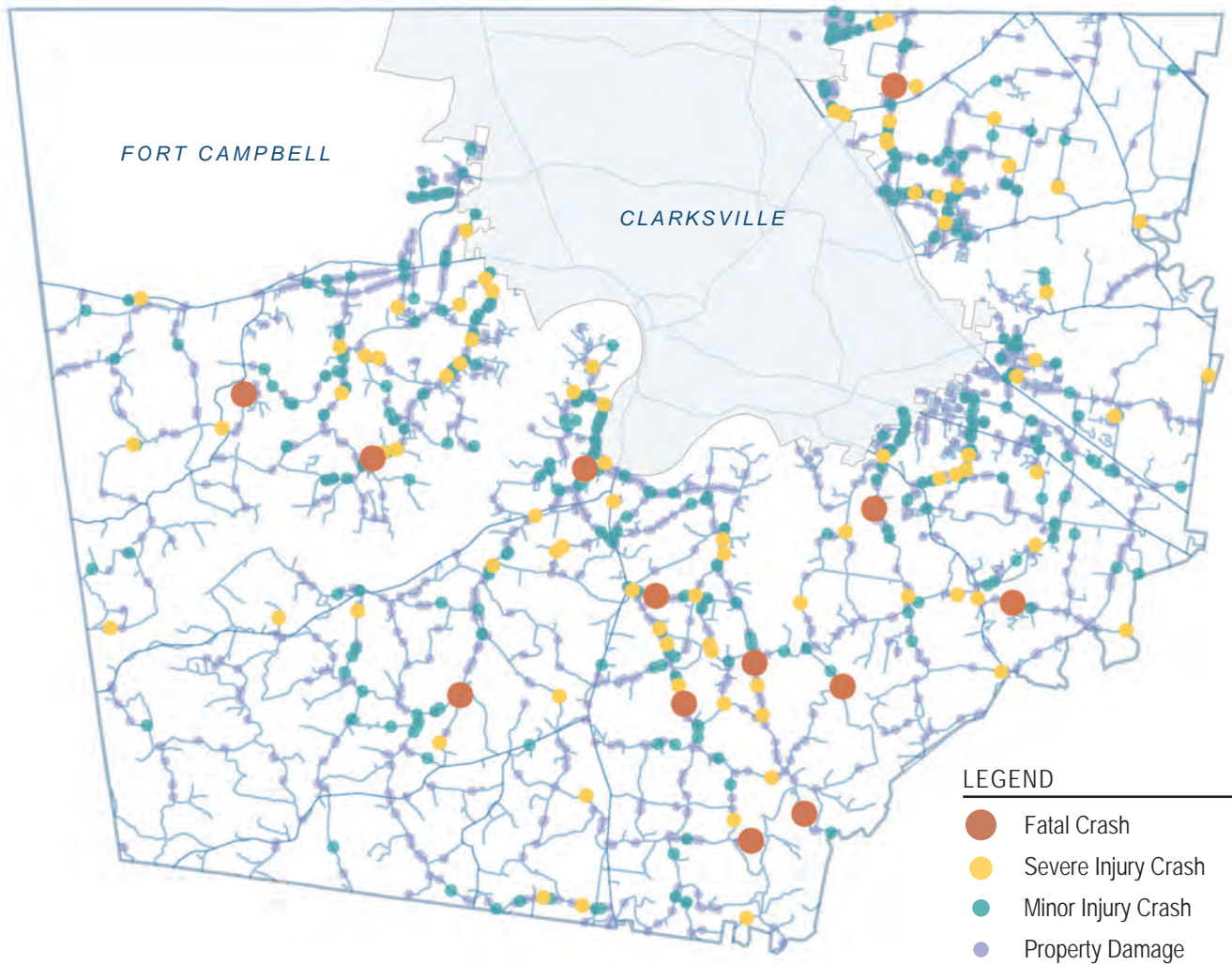
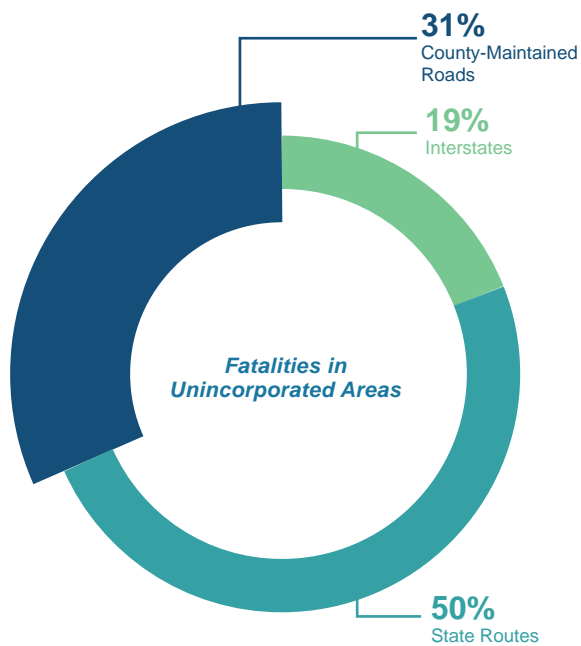


Figure 1: All crashes in Montgomery County's unincorporated areas (2018-2022); For a more detailed map, please refer to the appendix



Route Type	Fatalities	Incapacitating Injuries	Non-Incapacitating Injuries
Interstates	9	33	208
State Routes	24	133	565
County-Maintained	15	112	505
Total	48	278	1278

Figure 2: Fatalities and injuries in unincorporated areas of Montgomery County

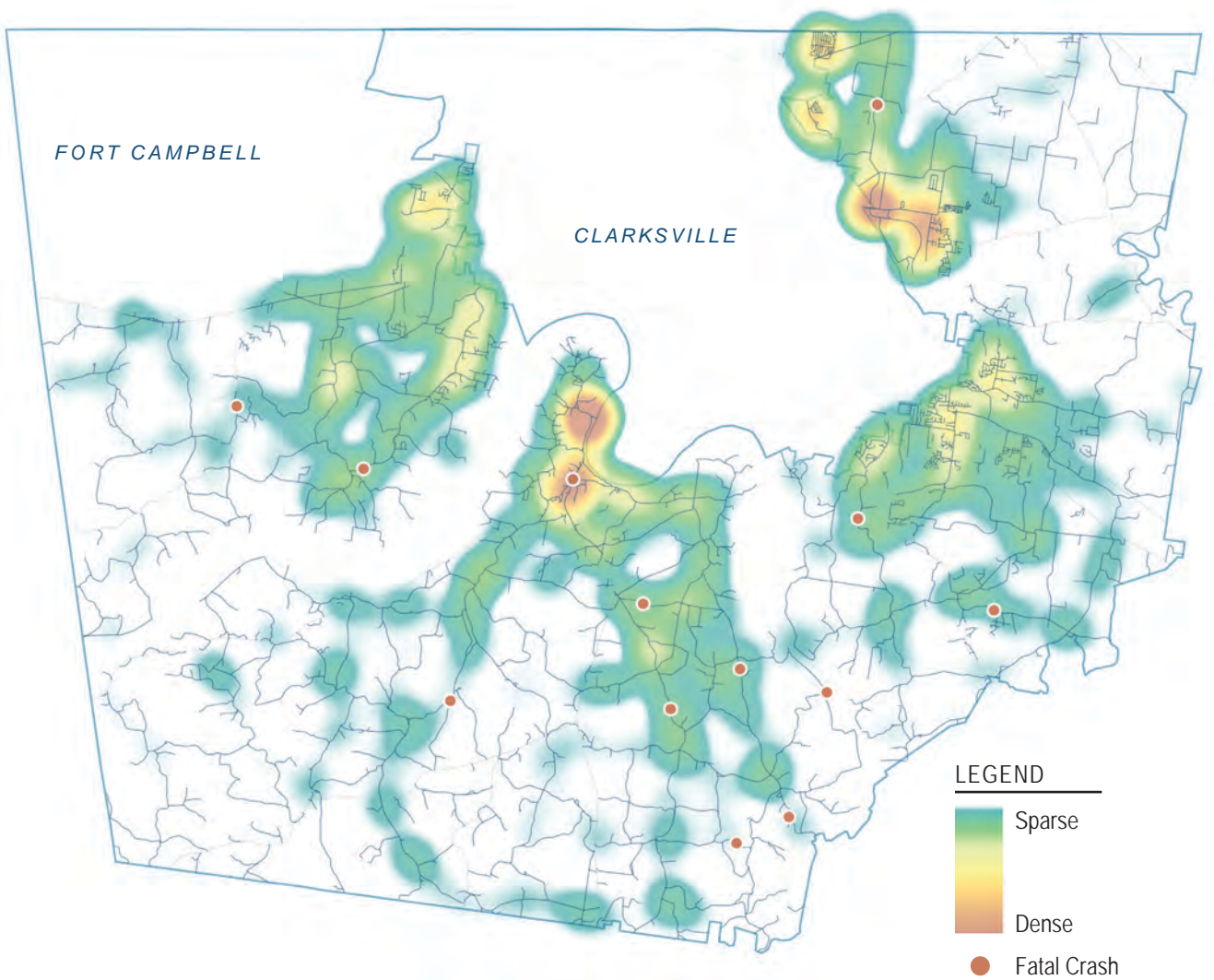


Figure 3 (above): Concentration of collisions in Montgomery County's unincorporated areas (2018-2022); For a more detailed map, please refer to the appendix

Fatal & Serious Injuries on All Unincorporated Roads



316 Motor Vehicle Users

1 Car = 10 Fatalities



2 Cyclists



8 Pedestrians

Fatal & Serious Injuries on Unincorporated County-Maintained Roads

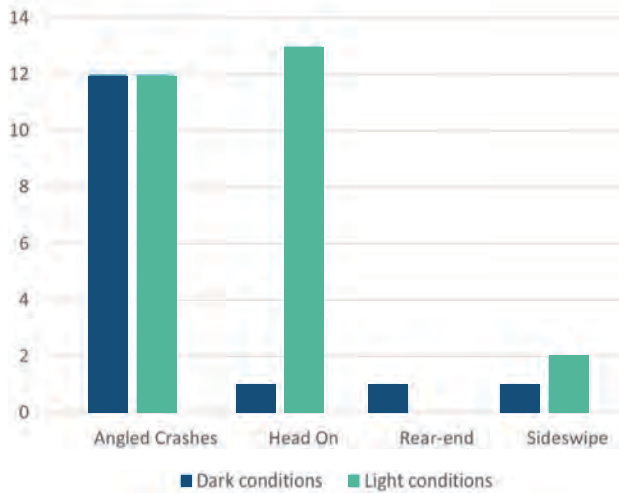


125 Motor Vehicle Users

1 Car = 10 Fatalities



2 Cyclists



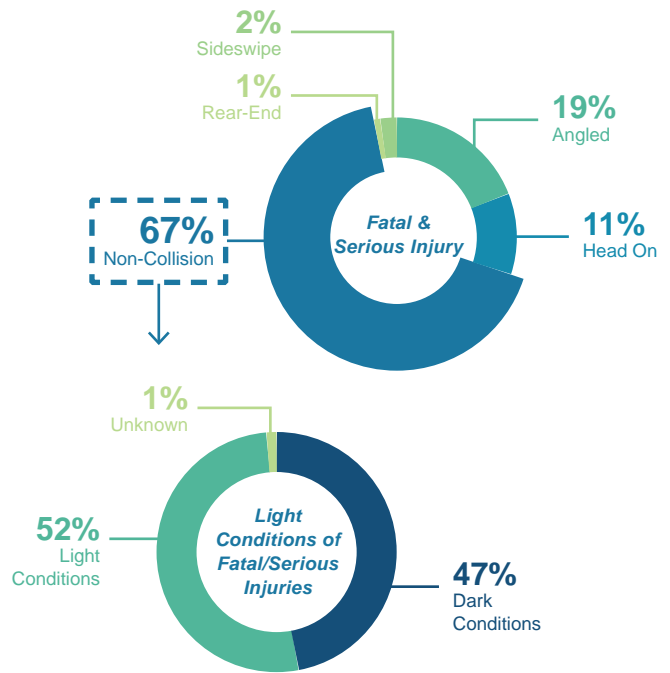
To create an effective action plan, Montgomery County has evaluated these collisions to find out who was impacted, why these crashes occurred, where they occurred, and how to prevent them from happening in the future.

Historical crash trends also revealed that 39% of all fatal and serious injury crashes in Montgomery County’s unincorporated areas happened on county-maintained roads.

Based on the collision data from 2018-2022, 67% of fatalities and serious injuries on unincorporated county-maintained roadways resulted from crashes that involved no collision with another vehicle. This involved a vehicle colliding with both stationary and mobile objects such as trees, ditches, mailboxes, animals, cyclists, etc. Non-collision crashes accounted for the most frequent crash type, followed by angled crashes, head on crashes, sideswipes, and rear-end crashes.

Of the fatal and serious injuries that resulted from non-collision crashes, 47% occurred during non-daylight hours, while 52% occurred during daylight hours. This distribution is a cause for concern because the amount of roadway users during non-daylight hours is much lower than the amount of roadway users during the day. This suggests that roadway conditions pose a greater threat during non-daylight hours, which coincides with one of the top four safety concerns voiced by Montgomery County community members - inadequate street lighting - as elaborated in the Community Engagement portion of this CSAP.

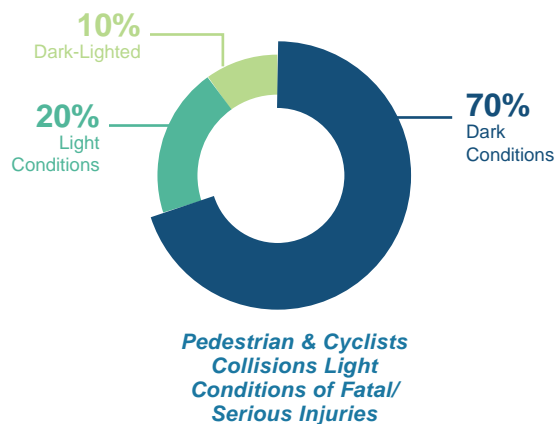
Montgomery County is committed to protecting all residents and visitors, including vulnerable community



members. Vulnerable Community members are defined as those who are at a greater risk of death or serious injury on the roadways. Vulnerable users can include pedestrians, cyclists, individuals with disabilities and the elderly.

As depicted on the previous page, from 2018-2022, 10 vulnerable users, including 2 pedestrians and 8 cyclists, suffered from fatal or serious injuries on unincorporated roadways.

70% of these fatal or serious injury crashes occurred at locations with dark lighting conditions and inadequate street lighting. Pedestrians and cyclists need visual awareness of their pathway and approaching motorists to maintain road safety. Street lighting is vital for improving pedestrian, cyclist, and driver visibility and is necessary for the safety of all road users. The findings from this crash data substantiate the need for adequate roadway lighting on Montgomery County’s unincorporated roadways.



The Montgomery County map on the next page (Figure 4) shows the county's designated shared bicycle-routes. They are displayed based on their Bicycle Level of Service (BLOS). The BLOS is used as the measurement of comfort that bicyclists experience on roads. This comfort is dependent on a variety of conditions such as:

- *Safety*
- *Traffic Flow*
- *Speed Limit*
- *Roadway Geometry*
- *Pavement Conditions*
- *Lane Widths*
- *Presence of Paved Shoulders or Bike Lanes*
- *Availability of On-Street Parking*
- *The Number of Lanes per Direction of Travel*

According to the Highway Capacity Manual, the BLOS for two-lane or multi-lane highways is based on a traveler perception model and is scored using the range of values outlined in the chart on the next page.

The two cyclist-related crashes occurred on county-maintained routes and therefore were not on established shared bicycle lanes (refer to graphic previous page). One of the cyclist related crashes occurred on Rollow Lane, which is located in an area with several new residential developments, businesses, and churches. The other cyclist related crash occurred on International Boulevard, which is in an industrial area surrounded by large factories and distribution centers. Both routes see higher traffic volumes and therefore are great candidates for shared bicycle lanes. Both roads intersect with an existing bicycle route, which is located on State Route 237. Currently 57% of the existing bicycle route on

State Route 237 operates at an LOS F and poses an unsafe environment for cyclists. Throughout the entire county, approximately 37% of the bicycle route network is rated as a LOS C or higher, whereas 63% were rated a LOS D or lower. It is also important to note that the data presented here does not include pedestrian and cyclist related injuries that resulted in minor injuries or property damage, which would serve to magnify the need for safe facilities for the county's most vulnerable roadway users.

The graphics on the next page illustrate shared use solutions for roadway improvements aimed at prioritizing pedestrian and cyclists safety (Figure 5a and 5b).

The need for further safety considerations regarding vulnerable users presents an opportunity for localities to collaborate with the City of Clarksville. Clarksville has a mission to create a stronger community by providing facilities, recreational activities, and safety upgrades for its citizens. The city plans to connect greenways to other facilities and enhance access to the city's points of interest. This mission can be expanded into the more rural parts of the county through collaboration and preparation so the county can also benefit from safer facilities and place necessary focus on vulnerable populations.

YEAR OF COLLISION	VULNERABLE USER	FATAL / SERIOUS INJURIES	LOCATION	ROUTE TYPE	LIGHT CONDITIONS
2018	Pedestrian	Serious Injury	State Hwy 12	State Route	Dark-Not Lighted
	Pedestrian	Serious Injury	State Hwy 13	State Route	Dark-Not Lighted
2019	Pedestrian	Fatal	Dover Rd.	State Route	Dark-Not Lighted
	Pedestrian	Fatal	Dover Rd.	State Route	Dark-Not Lighted
	Cyclist	Serious Injury	International Blvd.	County-Maintained	Daylight
2020	Pedestrian	Serious Injury	Dover Rd.	State Route	Dark-Not Lighted
2021	Pedestrian	Fatal	I-24	Interstate	Dark-Not Lighted
	Pedestrian	Serious Injury	Rossvie Rd.	State Route	Daylight
	Pedestrian	Serious Injury	SR-149	State Route	Dark-Not Lighted
2022	Cyclist	Serious Injury	Rollow Ln.	County-Maintained	Dark-Not Lighted

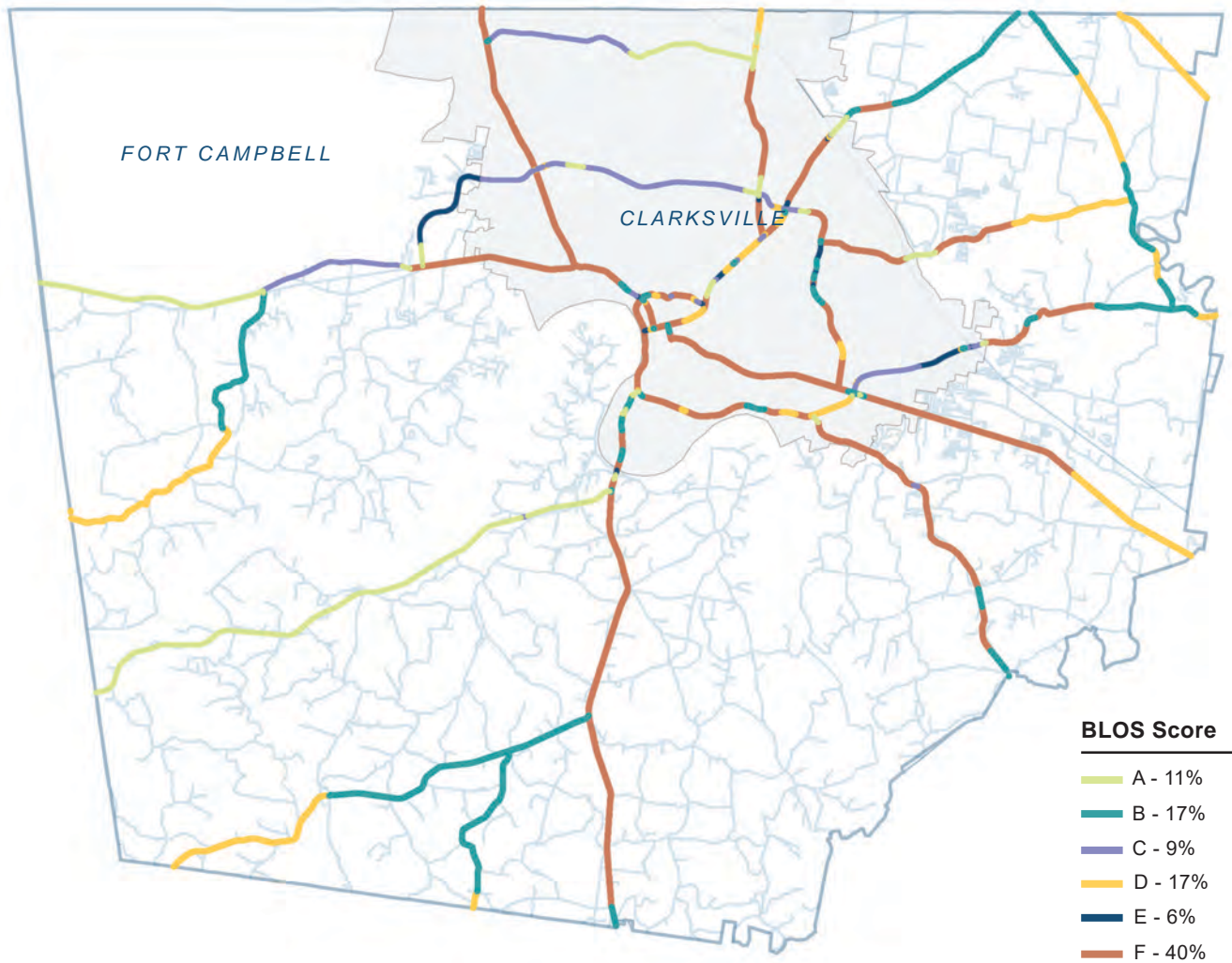


Figure 4 (above): BLOS scores in Montgomery County; Score descriptions below

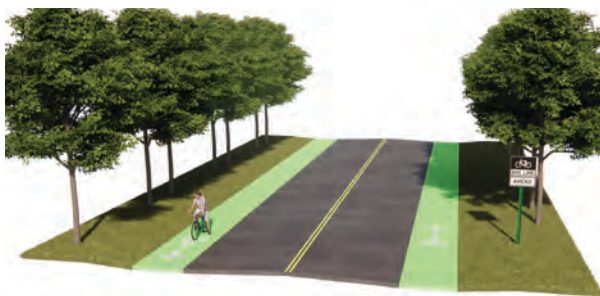


Figure 5a: Shared use example where the road is painted for designated bike lane use



Figure 5b: Shared use where a safety barrier is added to county roads with shoulder lanes

LOS	BLOS SCORE	DESCRIPTION
A	≤ 1.5	Excellent bicycle environment
B	> 1.5-2.5	Good bicycle environment
C	> 2.5-3.5	Fair bicycle environment (acceptable to experienced & novice bicyclists)
D	> 3.5-4.5	Poor bicycle environment (unacceptable to experienced & novice bicyclists)
E	> 4.5-5.5	Deficient bicycle environment (unacceptable to experienced & novice bicyclists)
F	> 5.5	Unsafe bicycle environment (Unsuitable for any bicycle travel)

HIGH INJURY NETWORK (HIN)

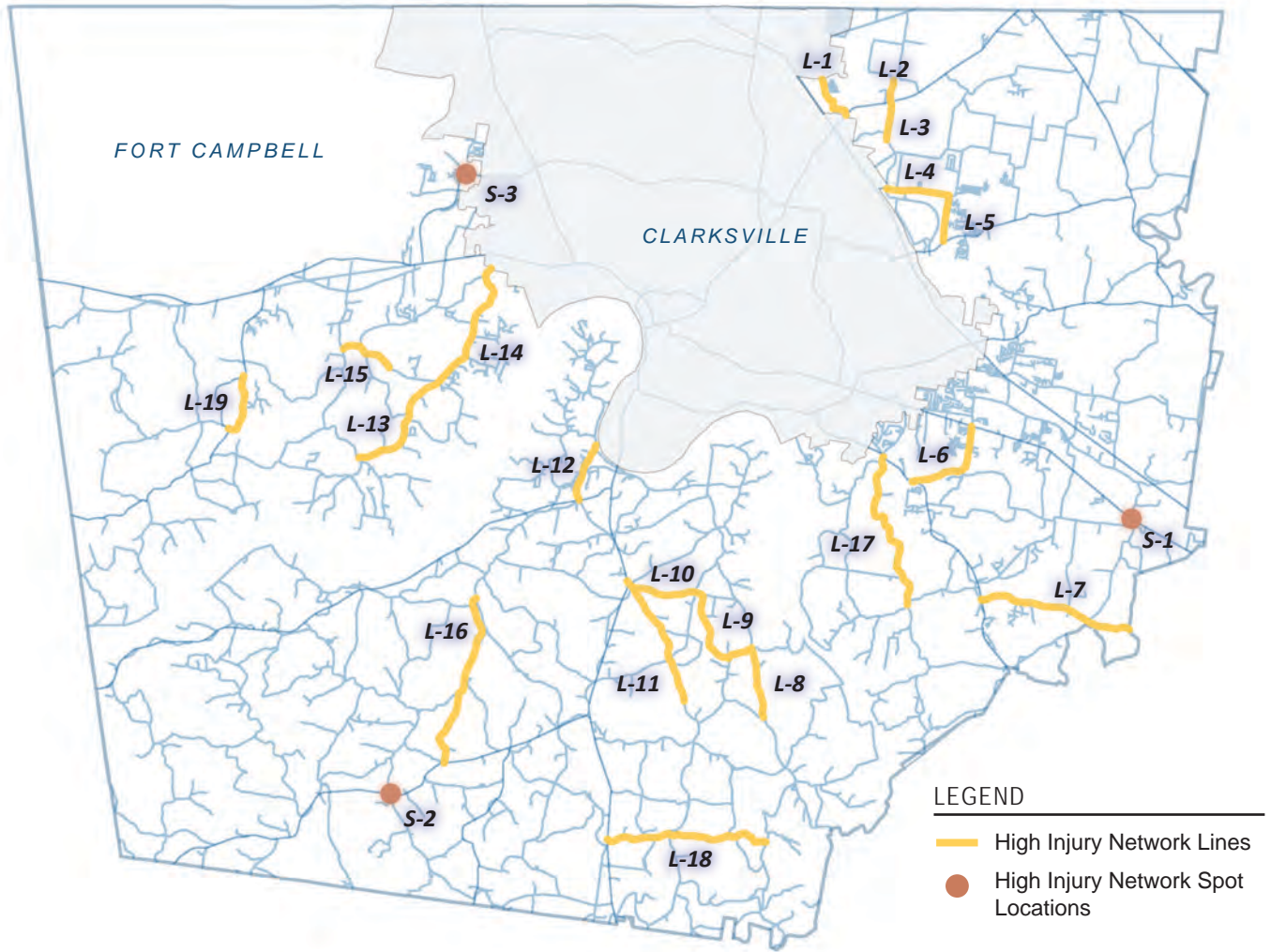
To achieve its goal of eliminating fatalities and serious injuries on its roads, Montgomery County has identified a HIN, consisting of the roads with the highest accumulation of fatal and serious injury crashes. By pinpointing these locations, safety issues can be addressed, and more competent designs can be implemented to protect residents and visitors in the future.

The HIN was selected in Montgomery County's unincorporated areas on its county-maintained roads only. However, all the intersection spot locations evaluated as part of the HIN intersect with State-owned routes. It is important to analyze these locations regardless of ownership and these intersections present an opportunity for collaboration between state and local agencies.

The HIN consists of nineteen roadway segments (represented by lines) and three precise spot locations (represented by spots) as represented on the map in Figure 6 (next page). The chart below the map lists the names of these roads and the number of fatal and serious injuries that were reported from 2018-2022.

Montgomery County's HIN accounts for:





L-1	Oakland Road	56 Collisions & 2 Fatalities	
L-2	Boolean Drive	11 Collisions & 1 Fatality	
L-3	International Boulevard	91 Collisions & 3 Fatalities	
L-4	Dunlop Lane	137 Collisions & 4 Fatalities	
L-5	Rollow Lane	32 Collisions & 1 Fatality	
L-6	Mcadoo Creek Road	33 Collisions & 4 Fatalities	
L-7	Old Clarksville Pike	19 Collisions & 6 Fatalities	
L-8	Chapel Hill Road	41 Collisions & 4 Fatalities	
L-9	Lock B Road South	8 Collisions & 2 Fatalities	
L-10	Old Highway 48	69 Collisions & 7 Fatalities	
L-11	Marthas Chapel Road	48 Collisions & 6 Fatalities	
L-12	River Road	160 Collisions & 6 Fatalities	

L-13	Dotsonville Road	108 Collisions & 8 Fatalities	
L-14	Ogburn Chapel Road	13 Collisions & 2 Fatalities	
L-15	York Road	21 Collisions & 1 Fatality	
L-16	Budds Creek Road	15 Collisions & 2 Fatalities	
L-17	Hickory Point Road	29 Collisions & 2 Fatalities	
L-18	Grays Chapel Road	11 Collisions & 1 Fatality	
L-19	John Taylor Road	5 Collisions & 1 Fatality	
S-1	Intersection of Oak Plains Rd. & State Hwy 112	12 Collisions & 8 Fatalities	
S-2	Intersection of Bryant Hollow Rd. & State Hwy 13	3 Collisions & 1 Fatalities	
S-3	Intersection of Garrettsburg Rd. & State Route 374	9 Collisions & 3 Fatalities	

Figure 6: Montgomery County's High Injury Network (HIN) from 2018-2022; Refer to Page 20 for Safety Enhancement Recommendations

SAFETY ENHANCEMENT SUGGESTIONS

Montgomery County has an ambitious goal of implementing more safety throughout each location on the HIN. In addition to the project specific recommendations made by Montgomery County, the following county-wide solutions should be implemented to enhance the safety of roadways on the HIN and throughout the county regardless of their inclusion in the HIN.

Based on the community feedback received, the crash data analysis, and the HIN, Montgomery County believes that these roadway safety enhancements will yield a safer transportation system by managing vehicle speeds, sight visibility, warning signs, and creating a safe space for vulnerable users. These county-wide safety enhancements include:

Roadway Lighting

This will enhance visibility and safety for both drivers and vulnerable users, such as cyclists and pedestrians. Inadequate street lighting was expressed by Montgomery County community members, supported by the crash data, and posed safety concerns on many of the roads in the HIN.



Intersection Signalization

This will provide exact indications for roadway users to advance their travels. It also prevents uncertainty amongst drivers on what movements should be prioritized.



Pavement Markings

Refreshing existing pavement markings and adding them in areas where they are lacking will clearly define lanes which reduces driver and vulnerable user confusion and increases guidance on the road.



Widening Lanes

Many of the roads on the HIN provide inadequate space for both drivers and other road users. Widening the travel lanes and widening/creating shoulder lanes will provide adequate safety without affecting traffic flow.



Flashing Beacons/Other Warning Signs

These give drivers and other roadway users adequate time to prepare for the road conditions ahead. This includes High Visibility Stop Bars which alert drivers of a stop ahead.



High Visibility Crosswalks

These create more visibility for drivers and inform them that a crosswalk and/or pedestrians are ahead. It also provides a sense of comfort to pedestrians that are crossing roads.



Guardrail Installation

Increasing the amount of guardrail in high-risk areas that include sharp curves, ditches, and culverts will provide drivers with a physical barrier to redirect vehicles and/or prevent major collisions.



Removal of Roadway Obstructions

Removing overgrown vegetation and other roadway obstructions on or near the road will improve driver visibility and reduce the risk of crashes. Vegetation removal can also improve and lower the costs of infrastructure maintenance.



The following table details the recommendations for each road segment on the HIN.

LABEL ON HIN MAP	LOCATION	MAX SPEED LIMIT	AADT	RELEVANT CRASH INFORMATION	ROADWAY ENHANCEMENT RECOMMENDATIONS
L-1	Oakland Rd.	35 MPH	10,750	<ul style="list-style-type: none"> 56 total crashes 2 fatalities/serious injuries 46% non-collision crashes 36% rear-end crashes 48% of crashes occurred in areas with dark lighting conditions 	Stop signs should be added on all approaches of the T-intersection at Terrace Creek Road. Widen shoulders to 8' (minimum) from Meriwether Road to 435 Oakland Road. Deer crossing signs should be installed at Spring Creek Crossing. The bridge over Spring Creek should be widened and upgraded with Type 21 end terminals. Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves.
L-2	Boolean Dr.	30 MPH	1,000	<ul style="list-style-type: none"> 11 total crashes 1 fatality/serious injury 55% non-collision crashes 9% rear-end crashes 55% of crashes occurred in areas with dark lighting conditions 	Add traffic signals at the intersection with Jim Johnson Boulevard. Add missing end terminal to guardrail on bridge over Spring Creek. Pave all gravel shoulders on this road. Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves. Clear vegetation throughout roadway and in ditches.
L-3	International Blvd.	45 MPH	5,885	<ul style="list-style-type: none"> 91 total crashes 3 fatalities/serious injuries 1 incapacitating bicycle-related crash 43% non-collision crashes 40% of crashes occurred in areas with dark lighting conditions 	Add bike lane with buffer zone (this road connects to State Route 237, which has an existing bike route. 56.8% of that bike route currently operates at LOS F). Refresh stop bars and add flashing beacons at Corporate Parkway. Add stop bars at intersection with Industrial Park Road.
L-4	Dunlap Ln.	45 MPH	5,417	<ul style="list-style-type: none"> 137 total crashes 4 fatalities/serious injuries 38% non-collision crashes 32% angled crashes 30% of crashes occurred in areas with dark lighting conditions 	Add stop bar at Michaela Circle (this road serves as an entrance and exit from the subdivision). Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves. Widen road to include 3 lanes (from Steel Stock Road to Rollow Lane). The road currently has 3 lanes from International Boulevard to Steel Stock Road. Widen travel lanes to 12' and add in 8' shoulders.
L-5	Rollow Ln.	45 MPH	2,500	<ul style="list-style-type: none"> 32 total crashes 1 fatality/serious injury 1 incapacitating bicycle-related crash 56% non-collision crashes 50% of crashes occurred in areas with dark lighting conditions 	Add bike lane with buffer zone (this road connects to State Route 237, which has an existing bike route. 56.8% of that bike route currently operates at LOS F.) Add guardrails in areas with ditches and culverts. Realign Rossvie Road to correct intermediate and stopping sight distance issues. Refer to Figure 7 on pg. 14 for design strategy illustration.
L-6	Mcadoo Creek Rd.	40 MPH	2,000	<ul style="list-style-type: none"> 33 total crashes 4 fatalities/serious injuries 70% non-collision crashes 15% rear-end crashes 61% of crashes occurred in areas with dark lighting conditions 	Reconfigure Ashland City Road and Shady Grove Road intersections to correct intermediate sight distance issues. Clear vegetation throughout roadway and in ditches. Add safety end walls to entrance pipes that are inside of the clear zone.
L-7	Old Clarksville Pike	45 MPH	1,506	<ul style="list-style-type: none"> 19 total crashes 6 fatalities/serious injuries 58% non-collision crashes 11% rear-end crashes 42% of crashes occurred in areas with dark lighting conditions 	Widen travel lane to 11' minimum and shoulders to 4' minimum. Add stop bar at intersection with Ashland City Road. Add stop bar and stop sign at Old Mallory Lane (unpaved road) and add a stop bar at Jarrell Lane. Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves.

LABEL ON HIN MAP	LOCATION	MAX SPEED LIMIT	AADT	RELEVANT CRASH INFORMATION	ROADWAY ENHANCEMENT RECOMMENDATIONS
L-8	Chapel Hill Rd.	45 MPH	555	<ul style="list-style-type: none"> 41 total crashes 4 fatalities/serious injuries 85% non-collision crashes 7% rear-end crashes 51% of crashes occurred in areas with dark lighting conditions 	Widen travel lane to 11' minimum and shoulders to 4' minimum. Reconfigure intersection with Liverworth Road into T-intersection. Add stop bar at intersection with 7 Mile Ferry Road.
L-9	Lock B Rd. South	30 MPH	Data Not Available	<ul style="list-style-type: none"> 8 total crashes 2 fatalities/serious injuries 93% non-collision crashes 40% of crashes occurred in areas with dark lighting conditions 	Widen travel lane to 9' minimum and shoulders to 2' minimum. Reconfigure intersection with Old Highway 48 and Lock B Drive to correct sight distance issues. Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves.
L-10	Old Hwy 48	45 MPH	1,699	<ul style="list-style-type: none"> 69 total crashes 7 fatalities/serious injuries 84% of crashes involved no collision with another vehicle 6% of crashes were rear-end crashes 51% of crashes occurred in areas with dark lighting conditions 	Widen travel lane to 11' minimum and shoulders to 4' minimum. Reconfigure intersection at Marthas Chapel Road and Lock B Road South to correct sight distance issues.

Design Strategies for Rollow Lane:

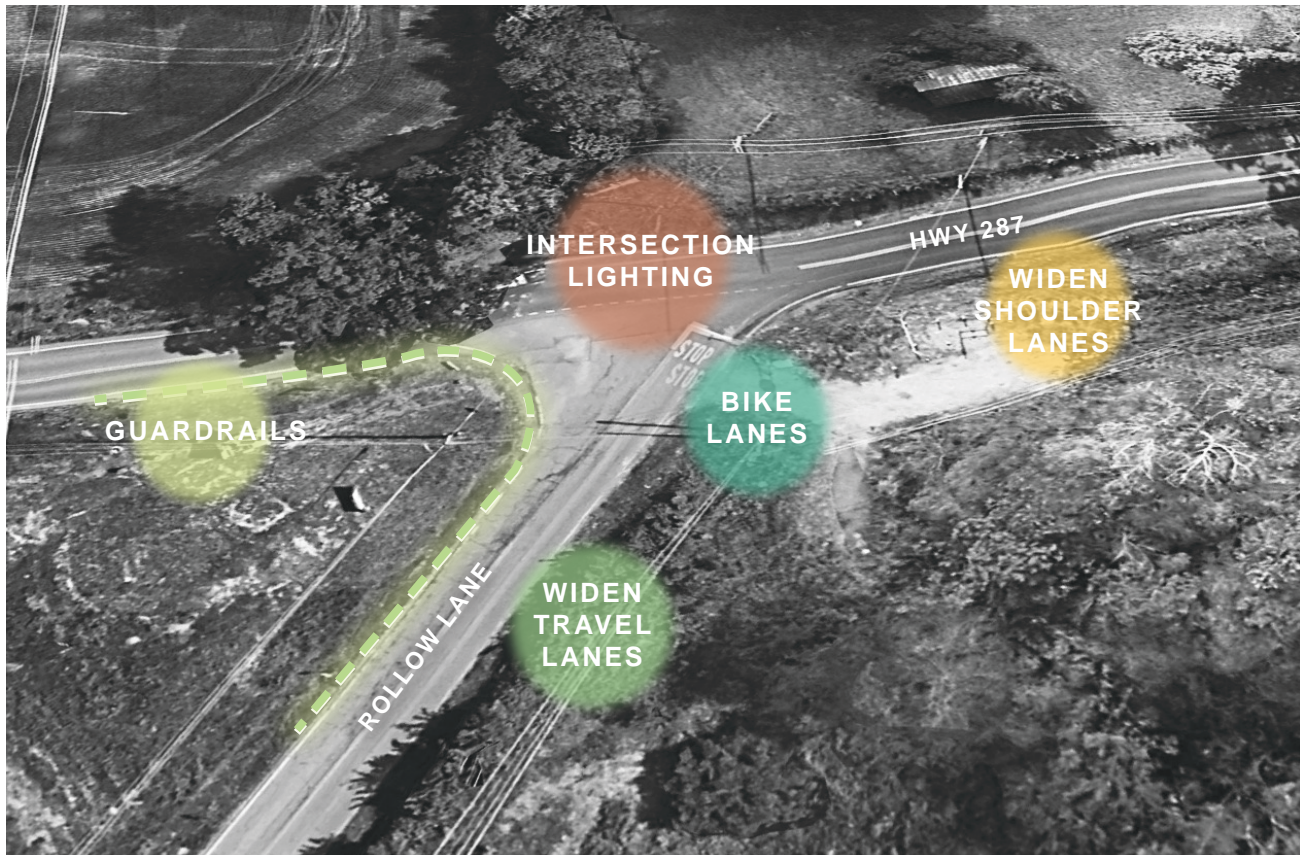


Figure 7: Existing conditions of Rollow Lane, plan view. Refer to Figure 6 (pg. 11) for location on HIN map (L5).

LABEL ON HIN MAP	LOCATION	MAX SPEED LIMIT	AADT	RELEVANT CRASH INFORMATION	ROADWAY ENHANCEMENT RECOMMENDATIONS
L-11	Marthas Chapel Rd.	45 MPH	Data Not Available	<ul style="list-style-type: none"> 48 total crashes 6 fatalities/serious injuries 85% non-collision crashes 4% rear-end crashes 40% of crashes occurred in areas with dark lighting conditions 	Widen travel lane to 11' minimum and shoulders to 4' minimum. Reconfigure intersection at Bumpus Road to correct sight distance issues. Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves.
L-12	River Rd.	40 MPH	7,865	<ul style="list-style-type: none"> 160 total crashes 6 fatalities/serious injuries 37% Non-collision crashes 24% angled crashes 38% of crashes occurred in areas with dark lighting conditions 	Widen travel lane to 12' minimum and shoulders to 8' minimum. Reconfigure intersection with Richmond Place into T-intersection. Realign intersection with Mayhew Road to correct sight distance issues. Refer to Figures 8a & 8b on pages 18 & 19.
L-13	Dotsonville Rd.	45 MPH	4,667	<ul style="list-style-type: none"> 108 total crashes 8 fatalities/serious injuries 76% non-collision crashes 10% rear-end crashes 52% of crashes occurred in areas with dark lighting conditions 	Widen travel lane to 12' minimum and shoulders to 8' minimum. Reconfigure intersection with Moore Hollow Road/ Dunbar Road into roundabout to manage safe speeds. Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves. Add stop bar at Cummings Creek Road, Dotsonville Church Road, Dailey Road, Trey Phillips Drive, Foxland Drive, and Arrowfield Drive. Create left-turn lane onto Dover Road. Refer to Figures 9a & 9b on pages 20 & 21.
L-14	Ogburn Chapel Rd.	45 MPH	200	<ul style="list-style-type: none"> 13 total crashes 2 fatalities/serious injuries 92% non-collision crashes 8% angled crashes 38% of crashes occurred in areas with dark lighting conditions 	Widen travel lane to 9' minimum and shoulders to 2' minimum. Add stop bar at intersection with Dailey Road and Double R Boulevard. Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves.
L-15	York Rd.	45 MPH	689	<ul style="list-style-type: none"> 21 total crashes 1 fatality /serious injury 100% non-collision crashes 38% of crashes occurred in areas with dark lighting conditions 	Add stop bar at intersection with Tommy Oliver Road. Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves. Clear vegetation throughout roadway and in ditches.
L-16	Budds Creek Rd.	45 MPH	635	<ul style="list-style-type: none"> 15 total crashes 2 fatalities/serious injuries 93% non-collision crashes 7% angled crashes 47% of crashes occurred in areas with dark lighting conditions 	Refresh stop bar paint at intersection with Vernon Creek Road, Goolinghorn Road, Locust Grove Church Road, Baggett Hollow Road, Hodges Lane, and State Highway 13. Reconfigure intersection with Buck Smith Hill Road. Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves. Clear vegetation throughout roadway and in ditches.
L-17	Hickory Point Rd.	45 MPH	1,136	<ul style="list-style-type: none"> 29 total crashes 2 fatalities/serious injuries 79% non-collision crashes 10% angled crashes 41% of crashes occurred in areas with dark lighting conditions 	Refresh stop bar paint at intersection with Ashland City Road, Gholson Road, Johnson Road, and Lock B Road North. Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves. Clear vegetation throughout roadway and in ditches.

LABEL ON HIN MAP	LOCATION	MAX SPEED LIMIT	AADT	RELEVANT CRASH INFORMATION	ROADWAY ENHANCEMENT RECOMMENDATIONS
L-18	Grays Chapel Rd.	45 MPH	749	<ul style="list-style-type: none"> 11 total crashes 1 fatality/serious injury 82% non-collision crashes 9% rear-end crashes 36% of crashes occurred in areas with dark lighting conditions 	Refresh stop bar paint at intersection with State Highway 48 and Old Highway 48. Add stop bar at Groves Road, Akin Road, Swift Lane, Devers Road, Epps Road and Watkins Ford Road. Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves.
L-19	John Taylor Rd.	35 MPH		<ul style="list-style-type: none"> 5 total crashes 1 fatality/serious injury 100% non-collision crashes 40% of crashes occurred in areas with dark lighting conditions 	Add stop bar at intersection with Timber Trace. Add "Curve Ahead" signs in areas with curves and add chevron signs in areas with sharp curves.

An in-depth analysis of each intersection location on the HIN was also conducted and the results are shown below.

S-1: Intersection of Oak Plains Rd. & State Highway 112

Oak Plains Road is a county-maintained road in Montgomery County with a speed limit of 45 miles per hour. It intersects State Highway 112 at a four-way stop sign controlled intersection. The speed limit of State Highway 112 is also 45 miles per hour. From 2018-2022, twelve crashes occurred at or near this intersection as summarized in the chart below.

YEAR OF COLLISION	RESULT OF CRASH	FATALITIES / SERIOUS INJURIES	WEATHER CONDITIONS	TYPE OF CRASH	LIGHT CONDITIONS
2018	Serious Injury	3	Clear	Angled	Daylight
	Property Damage	0	Clear	Sideswipe	Daylight
2019	Serious Injury	1	Clear	Angled	Daylight
	Fatal	1	Clear	Angled	Daylight
	Property Damage	0	Clear	Angled	Daylight
	Property Damage	0	Clear	Rear-end	Dark-Not Lighted
	Serious Injury	2	Clear	Angled	Daylight
	Property Damage	0	Clear	Rear-end	Daylight
2020	Serious Injury	1	Cloudy	Angled	Daylight
2021	Property Damage	0	Unknown	Unknown	Unknown
	Property Damage	0	Clear	Rear-end	Daylight
	Property Damage	0	Clear	Angled	Daylight

OAK PLAINS RD. AADT	STATE HWY 112 AADT	ROADWAY ENHANCEMENT RECOMMENDATIONS
1030	5653	Reconfigure into 4-way traffic signal controlled intersection. Widen Travel lanes on Oak Plains Rd. and add in left turn lane on State Highway 112. Add turn lanes on both approaches of State Highway 112 onto Oak Plains Rd.

S-2: Intersection of Bryant Hollow Road and State Highway 13

Bryant Hollow Road is a county-maintained road in Montgomery County with a speed limit of 45 miles per hour. It intersects State Highway 13 at a two-way stop sign controlled intersection. The speed limit of State Highway 13 is 55 miles per hour. From 2018-2022, three crashes occurred at or near this intersection. The crashes are summarized in the chart below.

YEAR OF CRASH	RESULT OF CRASH	FATALITIES / SERIOUS INJURIES	WEATHER CONDITIONS	TYPE OF CRASH	LIGHT CONDITIONS
2020	Fatal	1	Clear	Angled	Daylight
2021	Property Damage	0	Clear	Angled	Daylight
2022	Property Damage	0	Cloudy	Non-Collision	Daylight

BRYANT HOLLOW AADT	STATE HWY 13 AADT	ROADWAY ENHANCEMENT RECOMMENDATIONS
466	1947	Freshen stop bar paint on Bryant Hollow Rd. and increase retro-reflectivity on stop signs. Add flashing beacons to warn drivers on State Hwy 13 of an intersection ahead.

S-3: Intersection of Garrettsburg Road and State Route 374

Garrettsburg Road is a county-maintained road in Montgomery County with a speed limit of 30 miles per hour. It intersects State Route 374 at a four-way signalized intersection. The speed limit of State Route 374 is 55 miles per hour. From 2018-2022, nine crashes occurred at or near this intersection and are summarized in the chart below.

YEAR OF CRASH	RESULT OF CRASH	FATALITIES / SERIOUS INJURIES	WEATHER CONDITIONS	TYPE OF CRASH	LIGHT CONDITIONS
2019	Possible Injury	0	Cloudy	Angled	Daylight
	Minor Injury	0	Clear	Angled	Dark-Not Lighted
2020	Property Damage	0	Rain	Angled	Dark-Not Lighted
	Property Damage	0	Cloudy	Angled	Daylight
	Property Damage	0	Rain	Angled	Dark-Not Lighted
2021	Serious Injury	3	Clear	Angled	Daylight
	Property Damage	0	Clear	Angled	Daylight
2022	Property Damage	0	Snow	Angled	Daylight
	Possible Injury	0	Clear	Non-Collision	Daylight

GARRETTSBURG ROAD AADT	STATE ROUTE 374 AADT	ROADWAY ENHANCEMENT RECOMMENDATIONS
Unknown	15168	This intersection was recently updated into a 4-way traffic signal controlled intersection. Add left turn lane on Garrettsburg Rd. onto State Route 374

SAFETY ENHANCEMENT SUGGESTIONS, CONT.



Figure 8a: River Road existing conditions, plan view and axonometric view above. Refer to Figure 8 (pg. 11) for location on HIN map (L12).

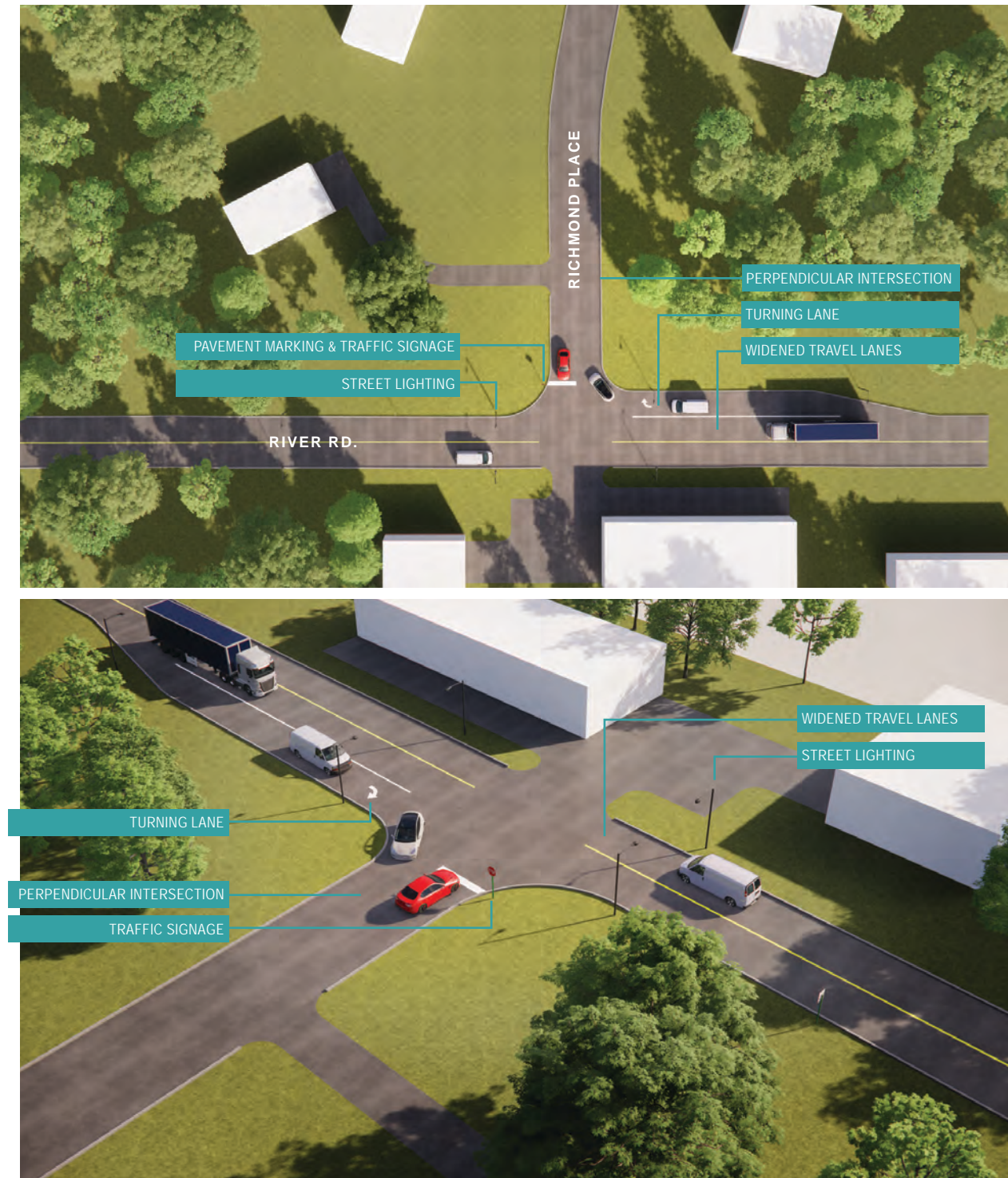


Figure 8b: River Road proposed conditions, plan view & axonometric view above. Proposed improvements to include:

- Widening travel lanes to 12 feet minimum and shoulders to 8 feet minimum.
- Reconfiguring intersection with Richmond Place into T-intersection.
- Realigning intersection with Mayhew Road to correct sight distance issues.

SAFETY ENHANCEMENT SUGGESTIONS, CONT.



Figure 9a: Dotsonville Road existing conditions, plan view and axonometric view above. Refer to Figure 8 (pg. 11) for location on HIN map (L13).

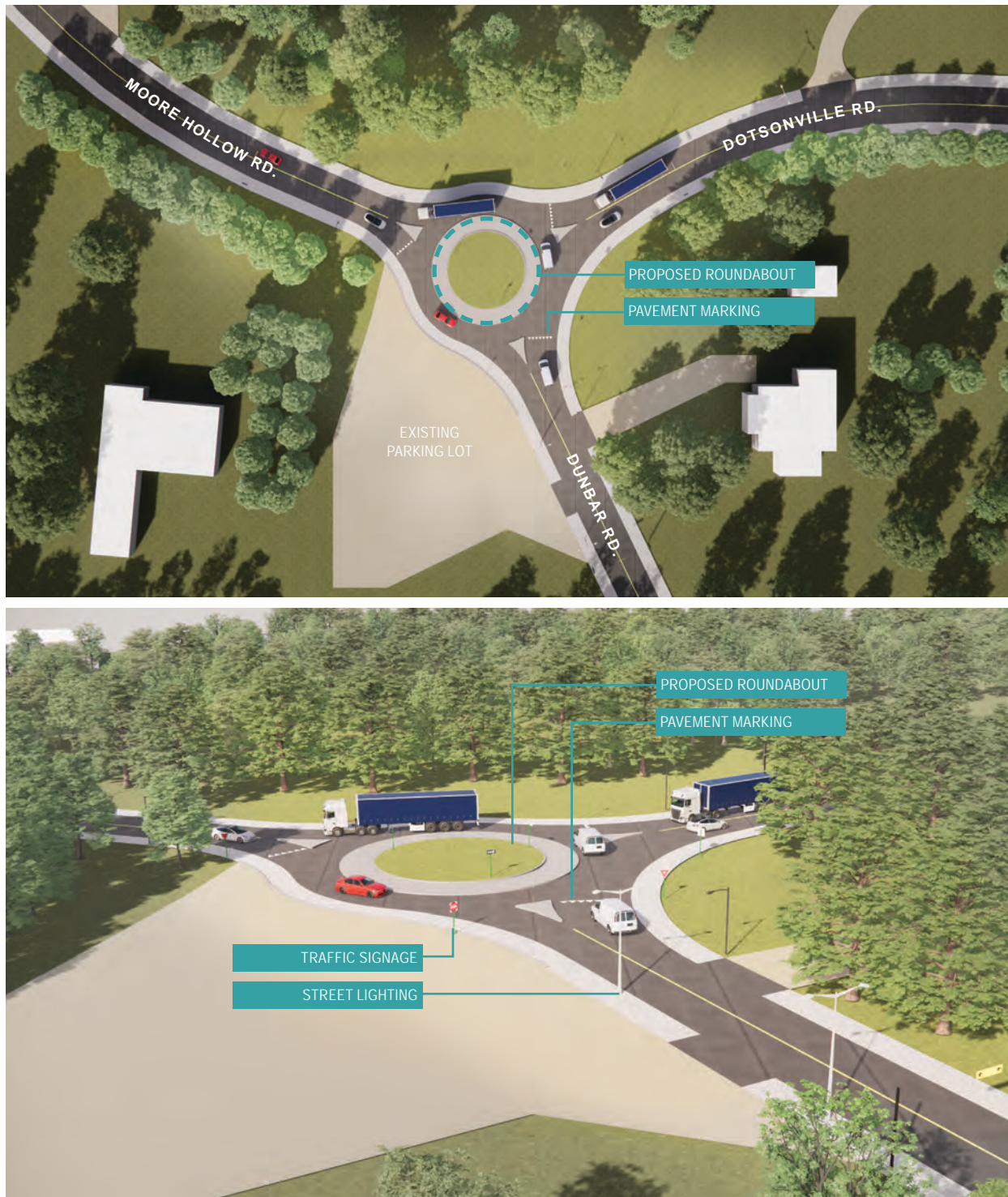


Figure 9b: Dotsonville Road proposed conditions, plan view & axonometric view above. Proposed improvements to include:

- Widening travel lanes to 12 feet minimum and shoulders to 8 feet minimum.
- Reconfiguring the intersection with a roundabout to manage safe speeds.
- Adding "Curve Ahead" signs in areas with curves and chevron signs in areas with sharp curves.
- Adding a stop bar at Dotsonville Road

EQUITY CONSIDERATIONS

The SS4A program requires that a CSAP must include an equity analysis aimed at creating inclusive and representative processes to serve the community's most vulnerable transportation users, including pedestrians, cyclists, the elderly population, and other individuals at risk on the roadways.



220,069 POPULATION



10% AGE 65 or OVER



85,714 HOUSING UNITS

Equity is a serious and complicated subject that can be examined from various viewpoints. Historically underserved communities and vulnerable roadway users often lack access to the resources that a county can provide. Montgomery County understands the significance of these issues and aims to prioritize equity on its transportation system.

Using the SS4A Underserved Communities Census tracts, Montgomery County identified the historically disadvantaged communities in the county. Throughout the county, there are 35 census tracts which have at least one transportation related disadvantage.

According to the SS4A Underserved Communities Census Tract of Historically Disadvantaged Communities, there are six possible transportation disadvantaged indicators that can identify a community as disadvantaged. These definitions are consistent with interim guidance set by the U.S. Office of Management and Budget. The six categories are defined below.

- **Transportation Access Disadvantage**
Identifies communities and places that spend more, and longer, to get where they need to go. (CDC Social Vulnerability Index, Census America Community Survey, EPA Smart Location Map, HUD Location Affordability Index)
- **Health Disadvantage**
Identifies communities based on variables associated with adverse health outcomes, disability, as well as environmental exposures. (CDC Social Vulnerability Index)
- **Environmental Disadvantage**
Identifies communities with disproportionate pollution burden and inferior environmental quality. (EPA EJ Screen)

- **Economic Disadvantage**
Identifies areas and populations with high poverty, low wealth, lack of local jobs, low homeownership, low educational attainment, and high inequality. (CDC Social Vulnerability Index, Census America Community Survey, FEMA Resilience Analysis & Planning Tool)
- **Resilience Disadvantage**
Identifies communities vulnerable to hazards caused by climate change. (FEMA National Risk Index)
- **Equity Disadvantage**
Identifies communities with a high percentile of persons (age 5+) who speak English "less than well." (CDC Social Vulnerability Index)

Other census tracts in Montgomery County belonged under the category of persistent poverty. Though the entire county is not considered to be in persistent poverty, over 47,000 individuals reside in those tracts. According to the United States Census Bureau, counties are typically considered to be in persistent poverty if they maintained poverty rates of 20 percent or more for the past 30 years. Individuals living in poverty have less access to safe and reliable transportation. Many who live in poverty often rely on public transportation or safe pedestrian facilities to operate in their daily lives.

Steps for Prioritizing Equity:



1

IDENTIFY

Pinpoint the most vulnerable communities & identify roads that pose safety threats to those users.



2

CONNECT

Develop further engagement methods to connect with vulnerable communities & address their concerns.



3

FUND

Utilize grant funding to apply safe road designs & pedestrian facilities in disadvantaged areas.



4

DESIGN

Adopt & implement the Equity in Design tool for all transportation projects.

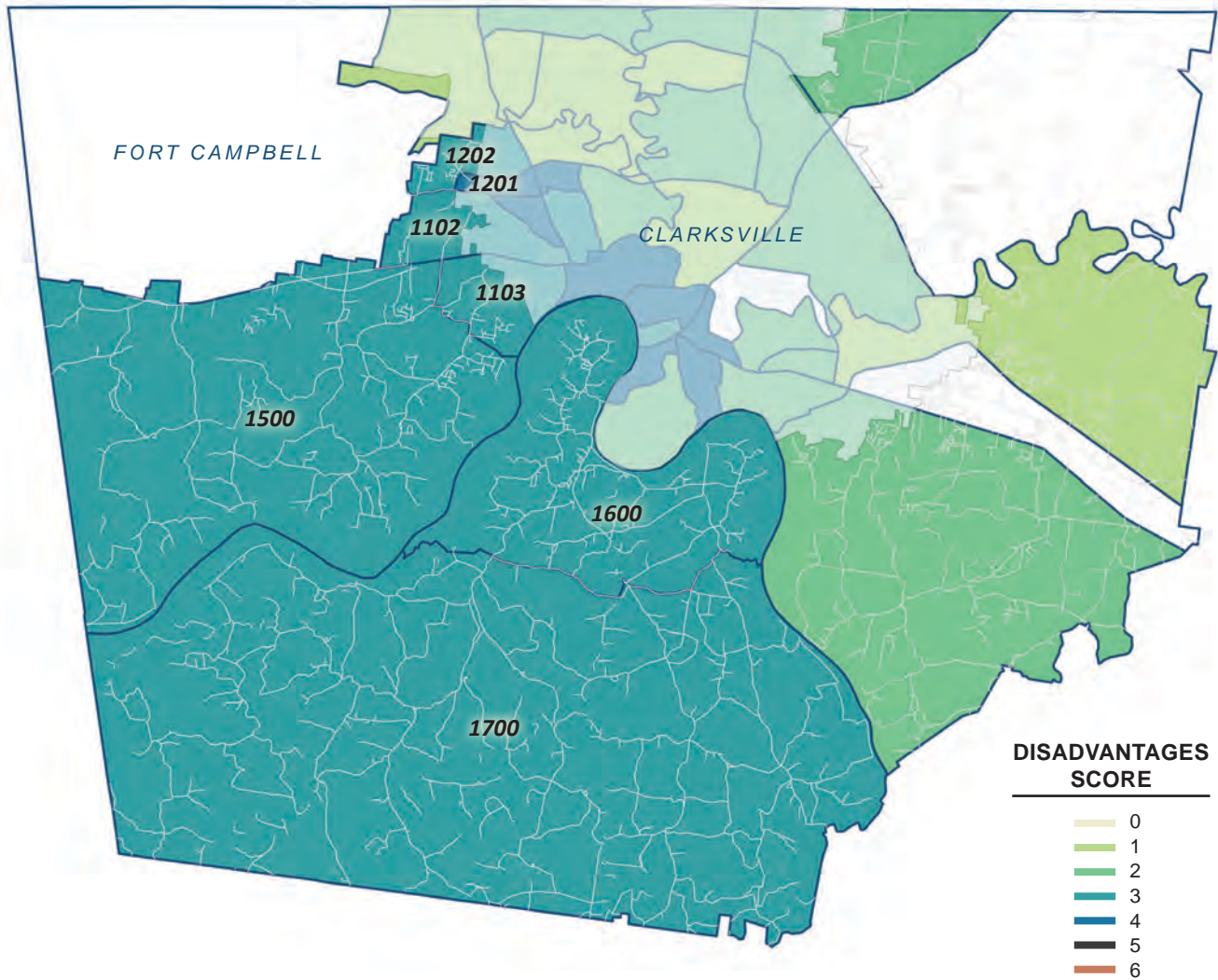


Figure 10: Disadvantaged census tracts in Montgomery County

CENSUS TRACT	DISADVANTAGES						TOTAL DISADVANTAGES SCORE
	TRANSPORTATION ACCESS	HEALTH	ENVIRONMENTAL	ECONOMIC	RESILIENCE	EQUITY	
47125101102	X	X		X			3
47125101103	X	X		X			3
47125101201	X	X		X		X	4
47125101500	X	X			X		3
47125101600	X	X		X			3
47125101700	X	X			X		3
47125100202	X	X		X			3

Figure 11: Disadvantaged census tracts in the unincorporated Montgomery County area based on the SS4A Underserved Communities census data; Tracts that have Transportation Disadvantages and scored 3 or higher in Total Disadvantages listed in chart above

POLICY & PROCESS REVIEWS

An assessment of current policies, plans, and guidelines was conducted as part of this CSAP. Opportunities for improving these existing policies were also explored and are presented in the table below.

Many agencies hold accountability for the safety and accessibility of the Montgomery County transportation system, including The Tennessee Department of Transportation (TDOT), the City of Clarksville, and more. However, on a local level, there are not many existing plans devoted to safety issues in Montgomery County. Although the Montgomery County Highway Department has a strategic plan in place, it does not go into depth on safety concerns and solutions. Developmental process specifications do exist for subdivision regulations and zoning ordinances, which ensure that roadway designs follow the minimum specifications for user safety, but safety data is not addressed.

With that in consideration, this CSAP will serve as an in-depth evaluation of the safety issues afflicting Montgomery County and will work to enhance process and collaboration efforts. This CSAP will initiate the goal of eliminating deaths and serious injuries among those traveling on Montgomery County's unincorporated roadways.

This goal will be achieved through the following actions:

1. *Establishment of a CSAP which has a Vision Zero goal.*
2. *Attainment of a funding source to support the Vision Zero goal.*
3. *Coordination with all involved agencies to develop more policies related to the safety concerns of the public.*
4. *Continuous coordination and outreach to Montgomery County residents to receive input and feedback on concerns and implemented solutions.*
5. *Improvement of data quality and collection by coordinating with TDOT and local law enforcement agencies.*
6. *Prioritization of equity by monitoring progress when designs are implemented to serve vulnerable populations.*
7. *Implementation of a transparent approach with the public by improving communication and providing safety progress reports involving the Vision Zero Goal.*

EXISTING PLAN/ POLICY	RESPONSIBLE AGENCY	REVIEW
Montgomery County Highway Department Strategic Plan	Montgomery County	<ul style="list-style-type: none"> • The mission of this plan is to provide citizens of the county with a safe, cost-effective transportation system that ensures the mobility of people and products and promotes economic prosperity and preserves the quality of the environment. • Some of the goals of the county's strategic plan are to: replace or resurface 40-55 miles of roadways annually, replace a bridge every other year, with culvert repairs when necessary, and mow/maintain the county's total right-of-way six times annually.
Clarksville Transit Strategic Plan	City of Clarksville	<ul style="list-style-type: none"> • The plan focuses on the current and future transit and mobility needs of the residents of the City of Clarksville and the greater Clarksville Urbanized Area. • Fare-free rides are provided to senior citizens and recommendations are being presented to offer the same for ambulatory individuals who qualify for ADA services. • This plan could be improved by providing recommendations to increase ridership to residents of the county's unincorporated areas.
Strategic Highway Safety Plan (SHSP)	Tennessee Department of Transportation (TDOT)	<ul style="list-style-type: none"> • The purpose of this plan is to identify concerns related to fatal and serious injury crashes and provide strategies to eliminate those concerns. • A data driven assessment is conducted to determine fatal and serious injury crash rates. The rates for each category are normalized based on vehicle miles traveled (VMT). • There is a strong focus on human error and how to create redundant systems to prevent dangerous injuries resulting from those errors. Data on vulnerable users, such as pedestrians, cyclists, and the elderly is discussed in detail.

EXISTING PLAN/ POLICY	RESPONSIBLE AGENCY	REVIEW
Montgomery County Specifications for Subdivision Roadway & Drainage Construction	Clarksville- Montgomery County Regional Planning Commission	<ul style="list-style-type: none"> • The purpose of this document is to provide specifications for transportation-related infrastructure that is to be built in conjunction with new subdivision developments. • The document states that the developer must submit detailed construction plans to the Highway Superintendent. • Roads built as part of new subdivision developments will be classified as either local, collector, or arterial roads.
Highway Safety Improvement Program (HSIP) Annual Report	Tennessee Department of Transportation (TDOT)	<p>This program focuses on various safety-related initiatives:</p> <ul style="list-style-type: none"> • Road Safety Audits (RSA) - These audits are conducted to identify and assess roads and intersections with disproportionate occurrences of roadway departure related crashes. • Local Roads and Safety Initiative (LRSI) - This initiative focuses on identifying and assessing roads and intersections of local non-state routes in county areas that are not represented by a MPO.

STRATEGIES FOR MEASURING PROGRESS

As previously stated, this CSAP constitutes as the launch for eliminating fatal and serious injuries in Montgomery County. Progress will be tracked to create a transparent, credulous, and successful community dedicated to transportation related safety issues. Montgomery County is committed to notifying the public on its progress, accomplishments, limitations, and experiences from this CSAP. Implemented safety projects will be tracked to measure their effectiveness and any necessary modifications will be applied. On an annual basis, the county plans to report on the progress accomplished as part of this CSAP.

CONCLUSIONS & CONTINUED EFFORTS

Montgomery County's commitment to the Vision Zero goal will be an on-going process. This CSAP provides a preliminary blueprint to achieving safe streets for all. By prioritizing and implementing safety improvements along the county's HIN, Montgomery County can begin working towards zero roadway fatalities and serious injuries.

Two of the most important steps to implementing this CSAP are active collaboration with agency partners and the establishment of funding methods. Subsequent to the approval of this CSAP, Montgomery County will then qualify as an applicant for the federal SS4A Implementation Grant which focuses on specific projects that directly support the goals and mission of the U.S. Department of Transportation's NRSS. Eliminating deaths and serious injuries is a long-term mission that will be accomplished through considerable efforts and is contingent on the availability of funding, resources, collaboration, and acceptance.

The following steps serve as continued efforts that the County will actively pursue:

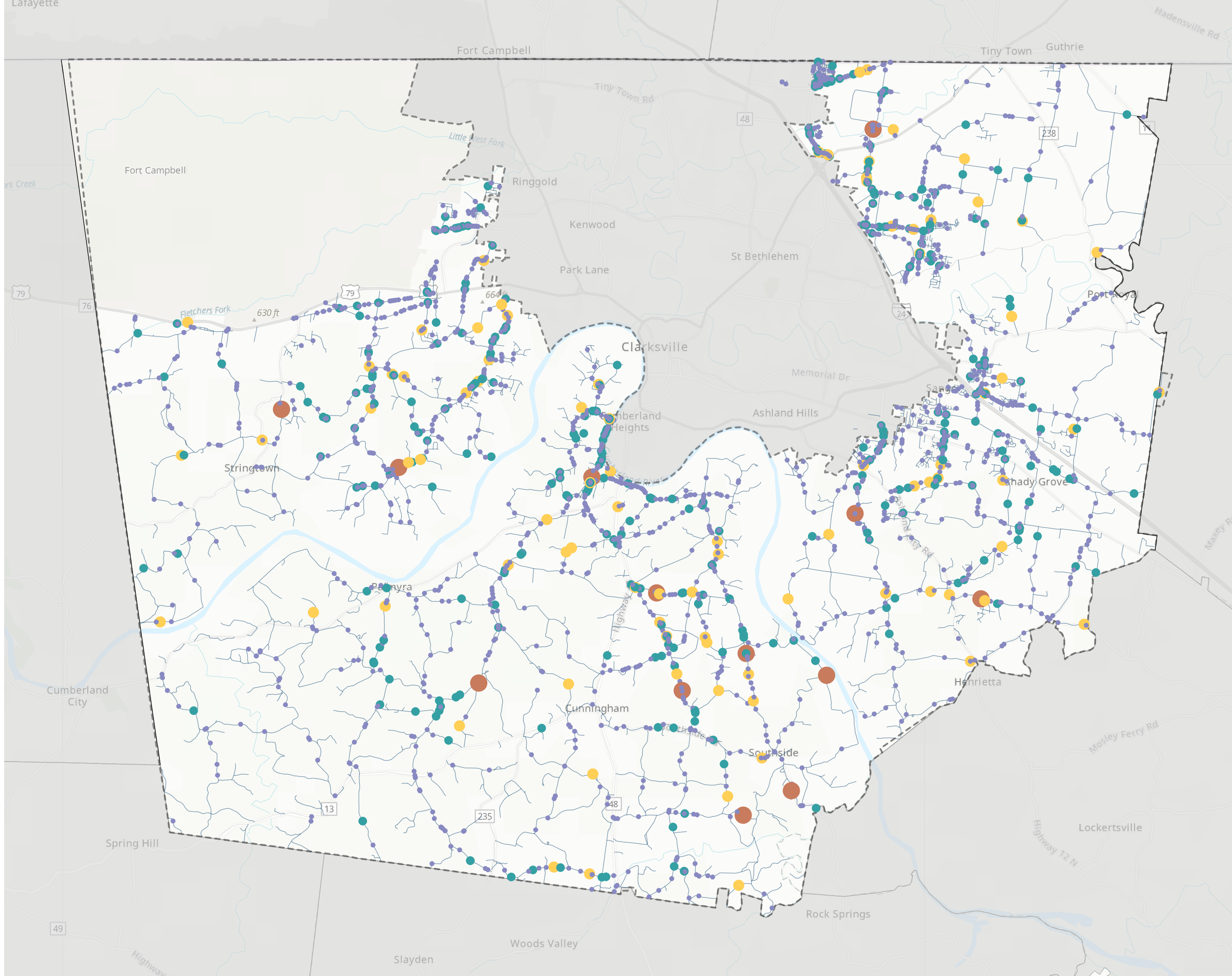
1. Public collaboration and communication
2. Partnerships with TDOT, City of Clarksville, and other agency partners
3. Continuous data collection and analysis
4. Transparent progress reports on implementation updates
5. Prioritization of vulnerable user safety, comfort, and equity
6. Cultivation of a community culture that supports safety and inclusion

With these actions at the forefront of Montgomery County's mission for roadway safety, we can foster and maintain a safer transportation community for all to use.



APPENDIX

All crashes
on Montgomery County
maintained roads
2018 to 2022



--- Montgomery County (Unincorporated)

— Montgomery County Maintained Roads

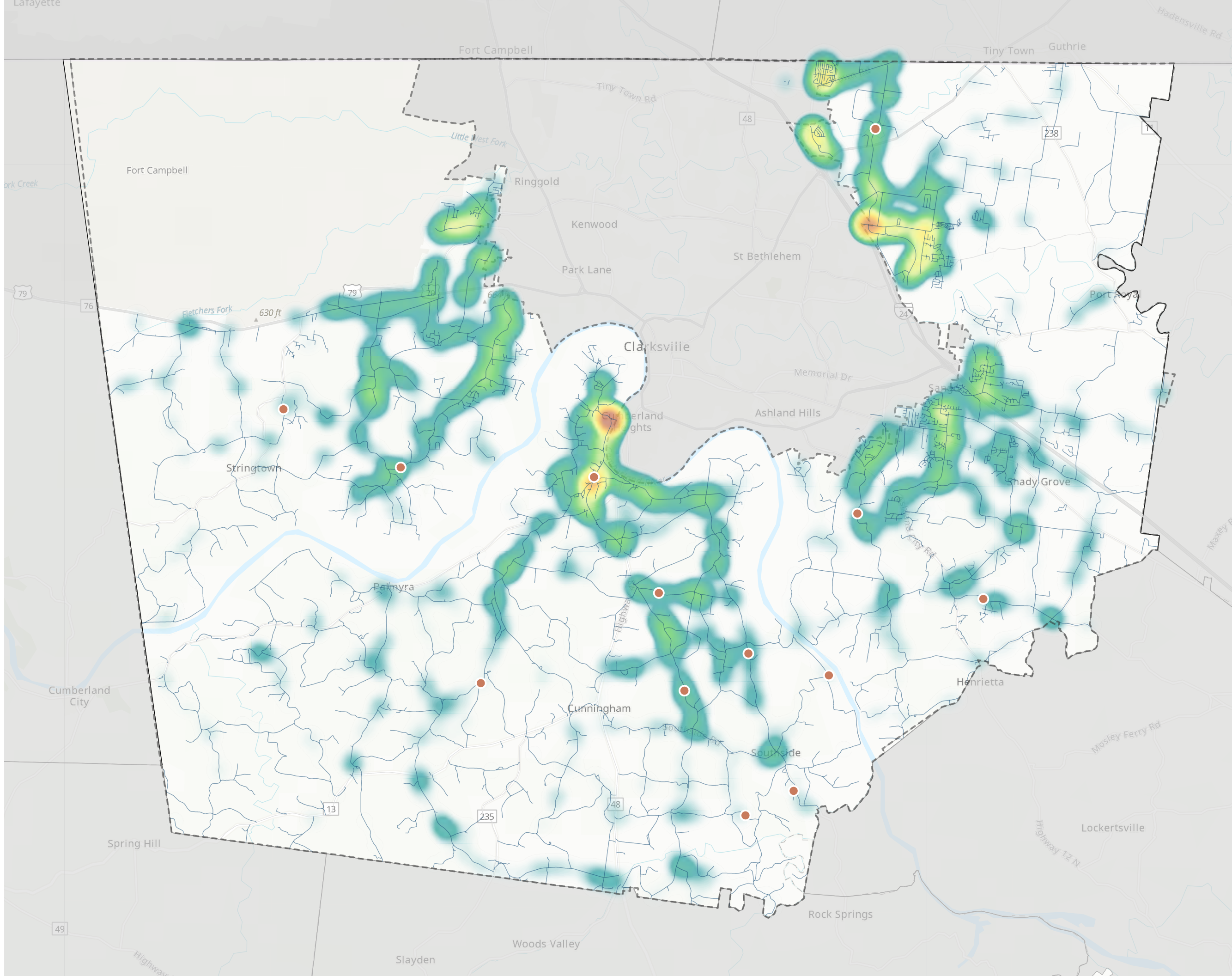
Type of Collision

- Fatal
- Severe Injury
- Minor Injury
- Property Damage



0 1 2 Miles
1 inch equals 2 miles

Heatmap of all crashes
on Montgomery County
maintained roads
2018 to 2022



- Montgomery County (Unincorporated)
- Montgomery County Maintained Roads
- Fatal Collision
- Collision Density
 - Sparse
 - Dense

