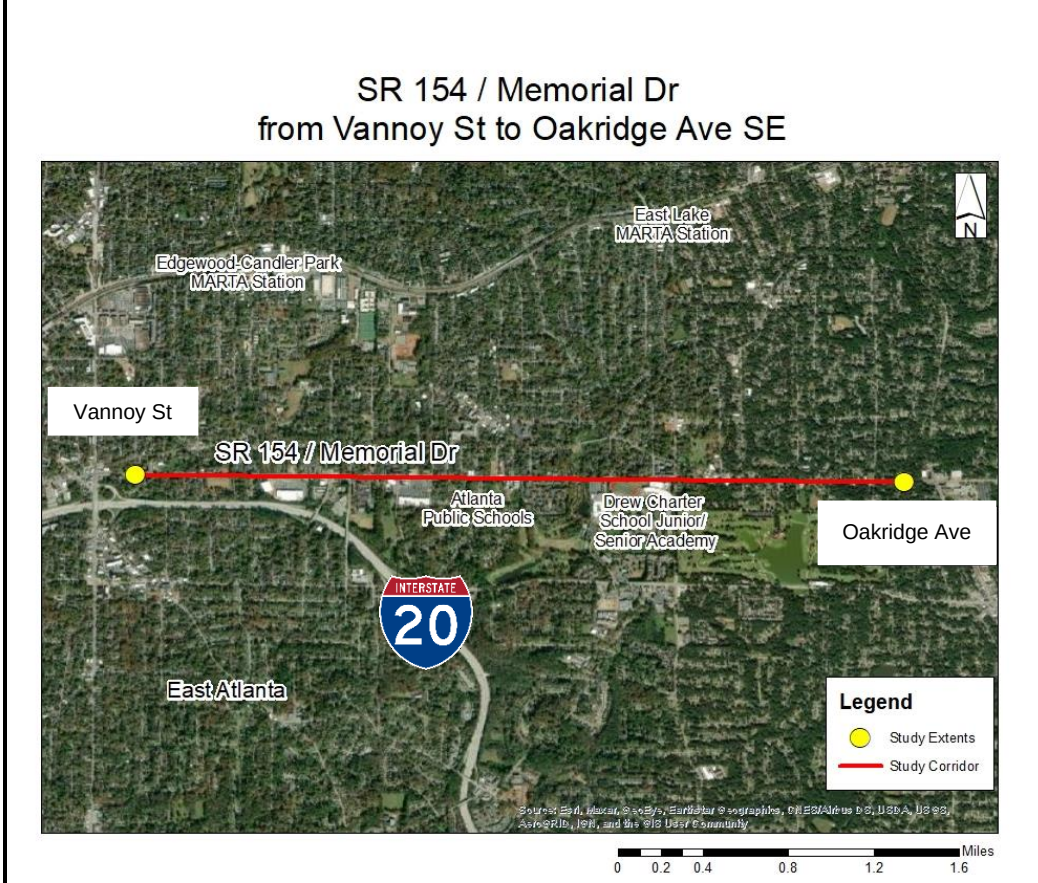
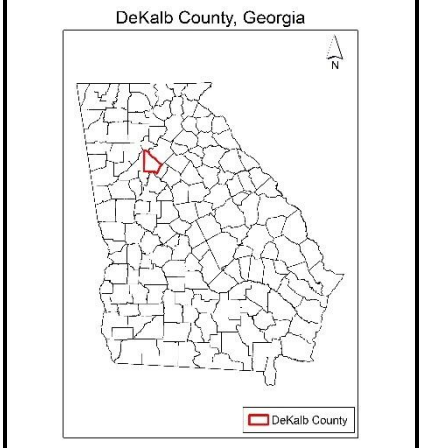
DEPARTMENT OF TRANSPORTATION

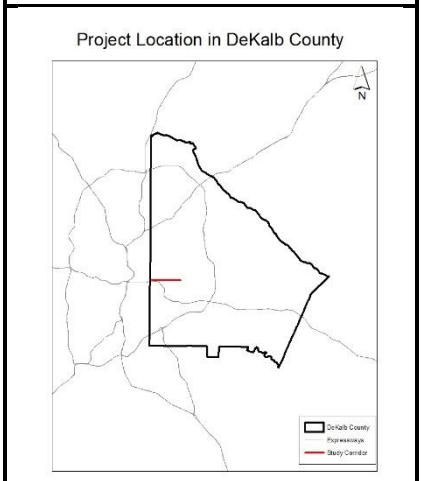
STATE OF GEORGIA

TRAFFIC ENGINEERING STUDY

January 2022







PRIMARY ROUTE: SR 154 / Memorial Dr

SECONDARY ROUTE: Vannoy St to Oakridge Ave

GDOT DISTRICT: 7

CONGRESSIONAL DISTRICT: 5

COUNTY: DeKalb

CITY: Atlanta

PREPARED BY: AECOM

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STUDY REQUEST

This study was requested by Sam Harris, State Safety Engineering Manager, as a follow up to previous studies along this corridor identifying it as a high priority for safety improvements to benefit all travelers. The goal of this study was to analyze the need, feasibility, and potential impacts of added medians and pedestrian crosswalks at target locations selected for their potential as a site for safety countermeasures developed through the menu of services design (MOSD) delivery mechanism. The focus of this study was on safety countermeasures that could be implemented without the need for additional right-of-way. More complex project opportunities, including those that would require acquisition of new right-of-way, could still be considered as part of one or more potential projects to address future safety and operational needs.

PROJECT JUSTIFICATION STATEMENT

SR 154 / Memorial Dr was identified by Georgia DOT as a priority corridor for pedestrian safety needs. The purpose of this project is to address safety concerns, such as frequency of crashes, severity of crashes, and historical pattern of pedestrian crashes that have been identified within the project's boundaries. SR 154 in the study area is a 3-lane facility with turn lanes. Using the criteria of state-owned roadways, crash rates and severity indexing show that SR 154 within the study limits ranks in the top 25 for crash rate in DeKalb County and top 40 for crash rate and severity in Atlanta. For pedestrian-involved crashes along state-owned roadways, crash rates and severity indexing show that SR 154 within the study limits ranks 11th for crash rate in DeKalb County and 12th for severity in Atlanta.

The 28 intersections studied along SR 154 / Memorial Dr between SR 42 / Moreland Ave to SR 155 / Candler Rd had a total of 1,140 crashes found for 2013-2021. These included two (2) fatal crashes and 308 injury crashes, with 16 resulting in severe injury (A), 55 resulting in minor injury (B), and 237 resulting in injury complaints (C). Rear end crashes were the most common manner of collision with 455 (40%), followed by angle crashes with 360 (32%) during the analysis period including 182 left turn angle crashes, 94 other angle crashes, 59 through angle crashes, and 25 right turn angle crashes. There were also 56 collisions not with a motor vehicle in the study area including **9 pedestrian-related crashes** and **3 cyclist-related crashes** as well as many vehicles crashing into the curb, sidewalk, trees, dogs, fire hydrants, utility poles, and other objects in the corridor. Pedestrian crashes at the study intersections included two (2) fatal crashes, six (6) injury crashes (2 A, 3 B, 1 C), and one (1) property damage only crash. Crashes in the study area decreased by approximately 39% after completion of a road diet and resurfacing project (PI# M005724) along SR 154 in early 2019. All manner of collision crashes were reduced following the resurfacing and road diet project, with the exception of rear end crashes (which were 16% above 2013 levels in 2021). Pedestrian crashes have persisted in the corridor, including a fatal crash in 2021 involving a child.

Calculated crash rates were consistently above statewide averages for minor arterials in urban areas in 2015-2019 (the most recent five years for which statewide average rates were available). In years when fatal crashes occurred (1 of 5 years analyzed), the fatal crash rate was over 2.5 times statewide averages for similar facilities. Injury crash rates were up to 6-52% higher than the statewide averages, while overall crash rates were up to 38% higher than statewide averages for urban minor arterials in 2015-2019 (the most recent 5-year period for which comparable statewide rates were available). Safety countermeasures that can substantially reduce the type and severity of crashes observed on this corridor should be considered for the proposed study boundaries.

PROJECT LOCATION

This study is focused on a total of 28 intersections along SR 154 / Memorial Dr between and including Vannoy St and Oakridge Ave in Atlanta, Georgia. These locations were selected for inclusion in the study due to their potential for menu of services design (MOSD) safety countermeasures or potential impacts to traffic volumes as a result of such changes. The posted speed limit is 35 mph throughout the study corridor. The study extents represent approximately 3.1 miles of SR 154, shown in **Figure 1** below, connecting residential and commercial areas throughout the study area.

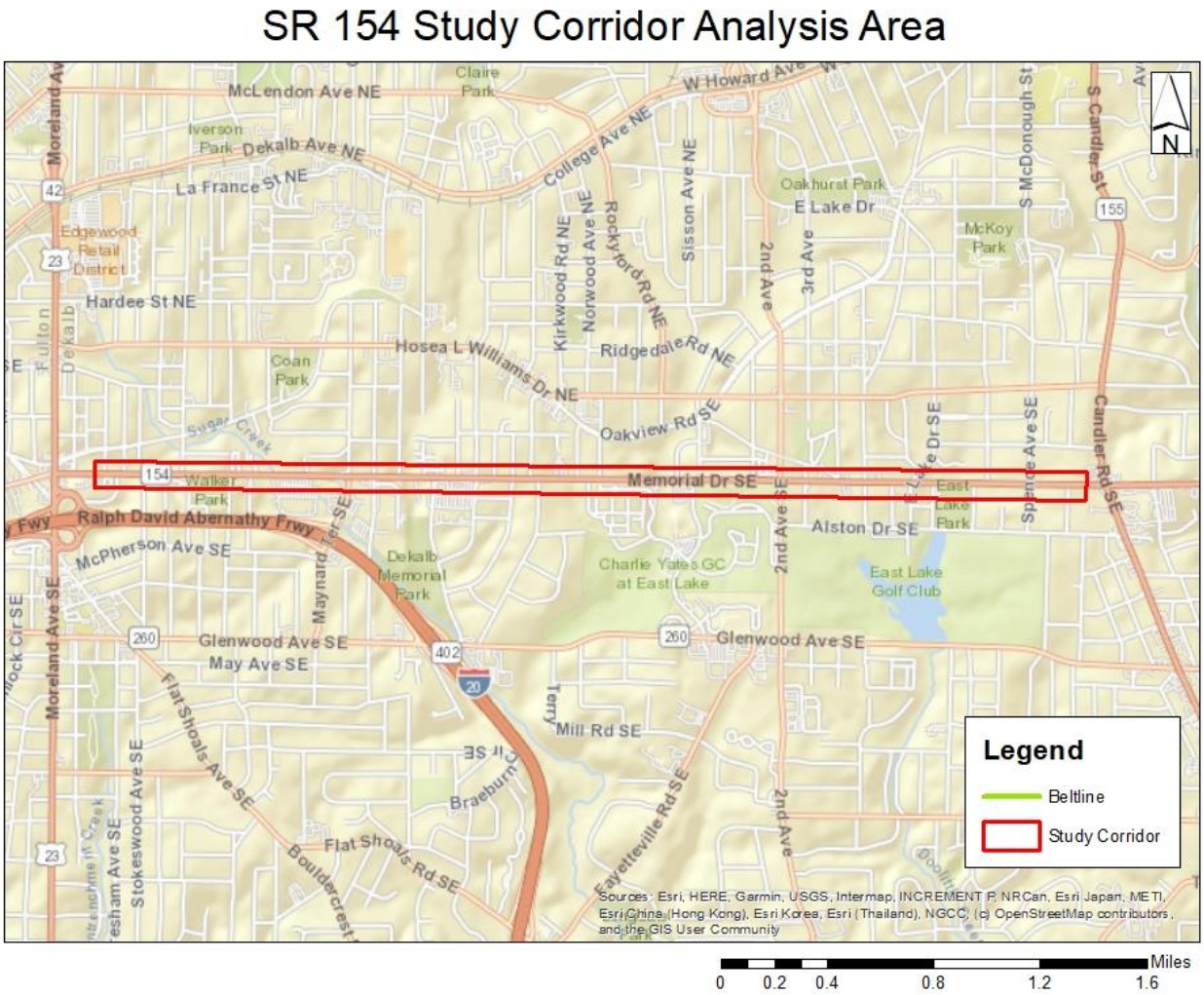


Figure 1 - Project Location Map

EXISTING CONDITIONS / FIELD VISIT

A field visit was conducted on January 26, 2022 as the Traffic Engineering Study was concluding to verify field conditions. The key findings are summarized below, with additional photos provided in **Appendix A**.

Existing Traffic Control / Geometry

SR 154 / Ralph David Abernathy Blvd is a minor arterial corridor in an urbanized area with three (3) lanes running west to east (one lane in each direction plus center turn lanes or two-way left turn median), with turn lanes provided at signalized intersections. There were six (6) signalized (*) and 22 unsignalized intersections analyzed for a total of 28 intersections along SR 154 / Memorial Drive in the study area, as listed below from west to east in **Table 1**.

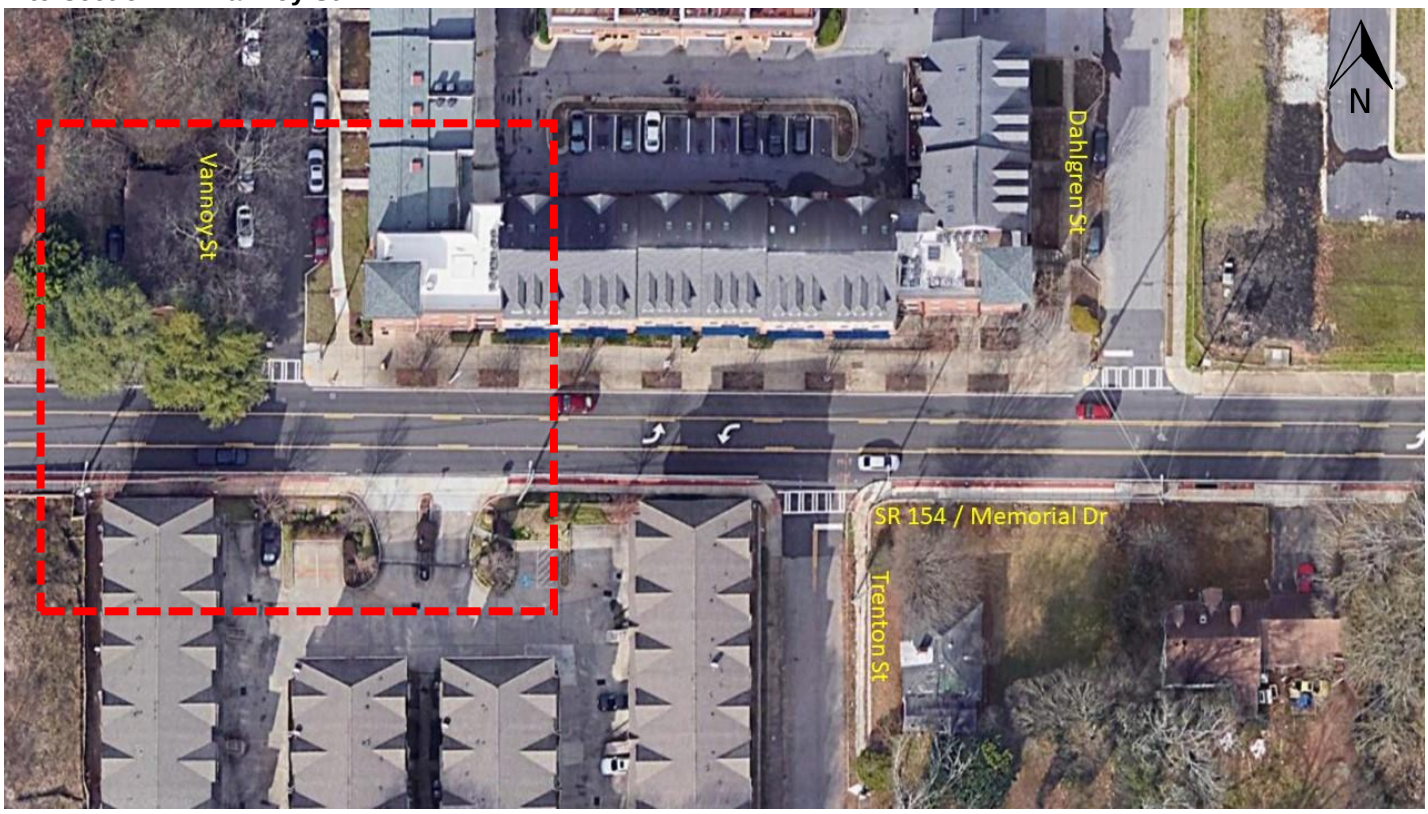
Table 1 - Study Intersections

Cross Street	Control	Legs	Crosswalks	Access
1. **Vannoy St**	TWSC	3	1	TWLTM
2. **Trenton St**	TWSC	3	1	TWLTM
3. **Dahlgren St**	TWSC	3	1	TWLTM
4. **East Side Ave**	TWSC	3	1	TWLTM
5. **Lamon Ave**	TWSC	3	2	Full
6. **Dixie St**	TWSC	3	2	Full
7. **Wilkerson Dr**	Signal	3	2	Full
8. **Dearborn St**	TWSC	3	1	Right-in, Right-out
9. **Warren St**	Signal	4	4	Full
10. **Campbell St**	TWSC	3	1	TWLTM
11. **Eleanor St**	TWSC	4	2	No Westbound Left
12. **Howard St**	TWSC	3	1	Full
13. **S Howard St**	TWSC	3	1	Right-in, Right-out
14. **Palatka St**	TWSC	4	1	No Westbound Left
15. **Watson Cir**	TWSC	3	1	TWLTM
16. **Eva Davis Way**	Signal	3	3	Full
17. **E Lake Terr**	TWSC	3	1	Right-in, Right-out
18. **1st Ave**	TWSC	3	1	TWLTM
19. **2nd Ave**	Signal	4	4	Full
20. **3rd Ave**	TWSC	3	1	Right-in, Right-out
21. **4th Ave / Cottage Grove Ave**	Signal	4	3	Full
22. **Carter Ave**	TWSC	4	2	Full
23. **E Lake Dr**	Signal	4	4	Full
24. **Green Ave**	TWSC	3	1	Right-in, Right-out
25. **Daniel Ave (W)**	TWSC	3	2	Full
26. **Daniel Ave (E)**	TWSC	3	2	Full
27. **Spence Ave**	TWSC	4	2	Full
28. **Oakridge Ave**	TWSC	3	1	Right-in, Right-out

TWSC = Two-way Stop-Controlled, NB = Northbound, TWLTM = Two-way Left Turn Median

Most intersections are oriented at or close to right (90°) angles relative to the main corridor. The geometry and traffic control information for each intersection is described on the following pages.

Intersection #1: Vannoy St



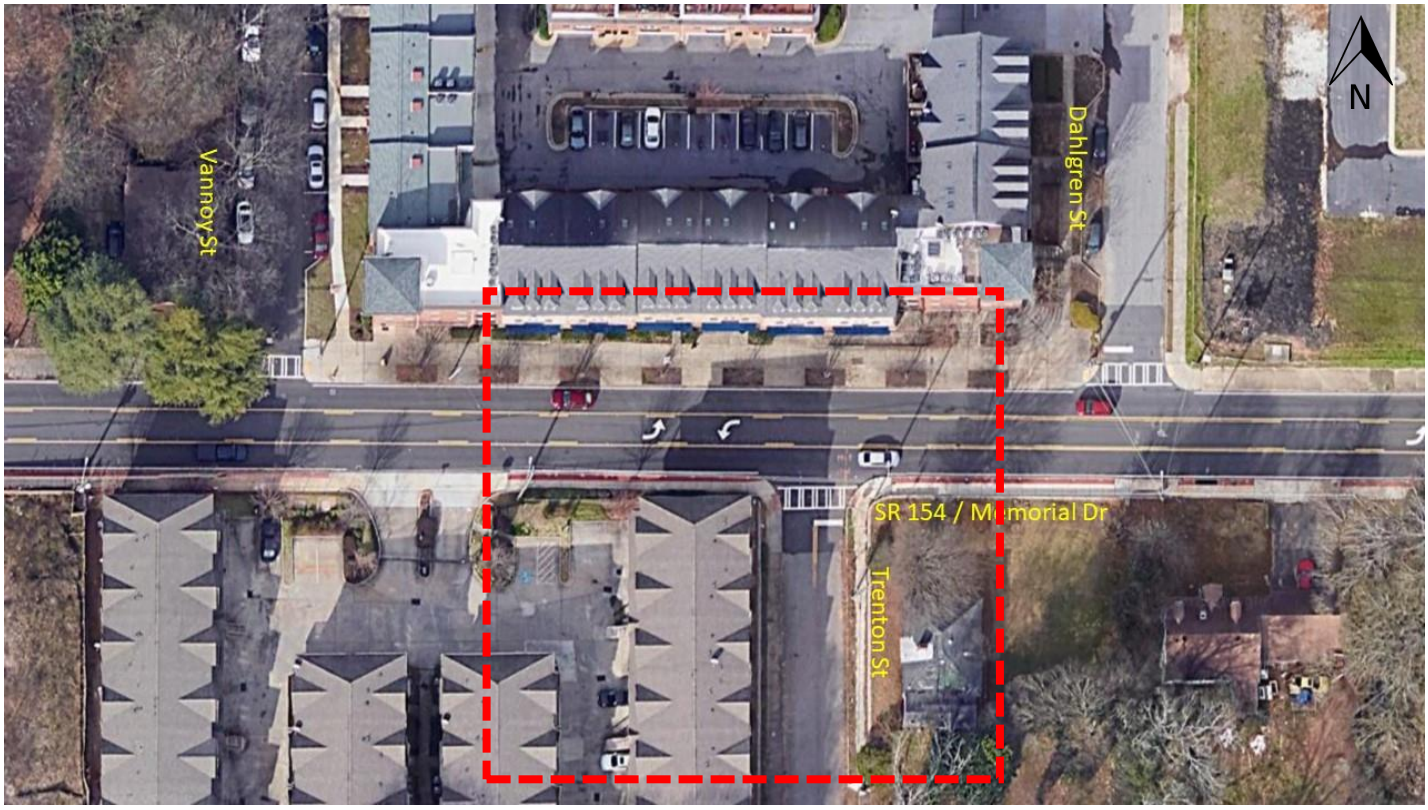
Geometry

SR 154 and Vannoy St converge at approximately 90° to form a 3-leg intersection with at least 30' of width along the mainline. There is one (1) painted crosswalk across Vannoy St on the north side of SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is **no stop sign** at the southbound stop bar on Vannoy St. There are no other traffic control signs or devices at this location. The two-way left turn median extends across this intersection indicating that all movements are allowed.

Intersection #2: Trenton St



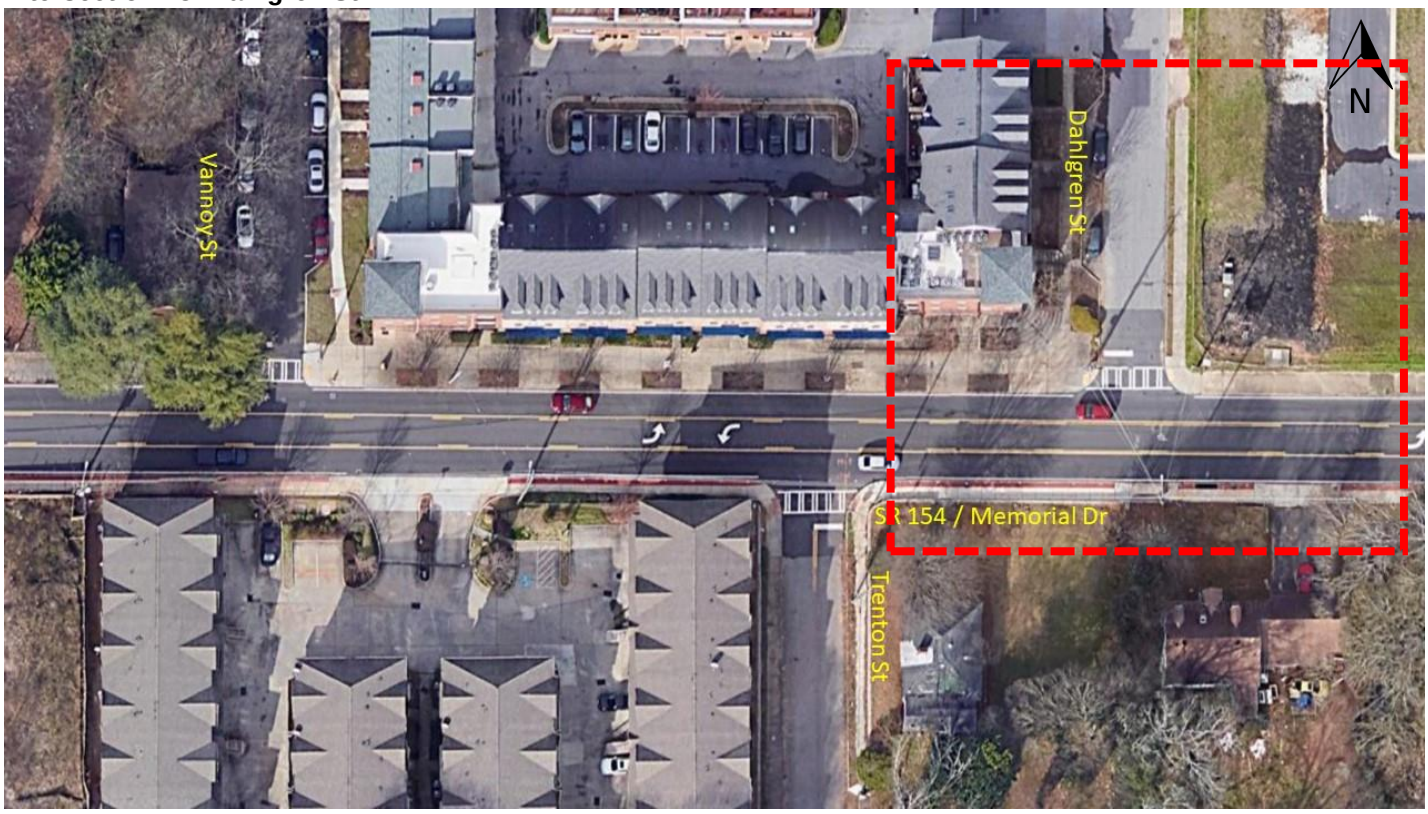
Geometry

SR 154 and Trenton St converge at approximately 90° to form a 3-leg intersection with at least 30’ of width along the mainline. There is one (1) painted crosswalk across Trenton St on the south side of SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the northbound stop bar on Trenton St. There are also two (2) “No Parking” signs on Trenton St near the intersection at this location. The two-way left turn median extends across this intersection indicating that all movements are allowed.

Intersection #3: Dahlgren St



Geometry

SR 154 and Dahlgren St converge at approximately 90° to form a 3-leg intersection with at least 30' of width along the mainline. There is one (1) painted crosswalk across Dahlgren St on the north side of SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the southbound stop bar on Dahlgren St. There are no other traffic control signs or devices at this location. The two-way left turn median extends across this intersection indicating that all movements are allowed.

Intersection #4: East Side Ave

Geometry

SR 154 and East Side Ave converge at approximately 90° to form a 3-leg intersection with at least 36’ of width along the mainline. There is one (1) painted crosswalk across East Side Ave on the south side of SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the northbound stop bar on East Side Ave. There is also several “No Parking” signs on East Side Ave. The two-way left turn median extends across this intersection indicating that all movements are allowed.

Intersection #5: Lamon Ave

Geometry

SR 154 and Lamon Ave converge at approximately 90° to form a 3-leg intersection with at least 36' of width along the mainline. There is one (1) painted crosswalk across Lamon Ave on the south side of SR 154 and one (1) painted crosswalk across SR 154 on the east side of Lamon Ave with two (2) high-visibility pedestrian crossing (W11-2) signs.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the northbound stop bar on East Side Ave. There is also several "No Parking" signs on Lamon Ave, as well as two (2) "Dead End" (W14-1) signs. The two-way left turn median breaks across this intersection indicating that all movements are allowed.

Intersection #6: Dixie St

Geometry

SR 154 and Dixie St converge at approximately 90° to form a 3-leg intersection with at least 36' of width along the mainline. There is one (1) painted crosswalk across Dixie St on the north side of SR 154 and one (1) painted crosswalk across SR 154 on the east side of Dixie St. A dedicated eastbound left turn lane is provided on SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the northbound stop bar on East Side Ave. There are also several "No Parking" signs on Lamon Ave, as well as one (1) "Dead End" (W14-1) sign and one (1) no trucks (R5-2) sign. The two-way left turn median breaks across this intersection indicating that all movements are allowed to and from Dixie St. There is one (1) high-visibility pedestrian crossing (W11-2) sign (for westbound drivers only) for the crosswalk across SR 154. The driveway on the south side of SR 154 just west of Dixie St has right-in, right-out traffic control based on existing pavement markings, but no stop sign, stop bar, or other traffic control devices.

Intersection #7: Wilkinson Dr

Geometry

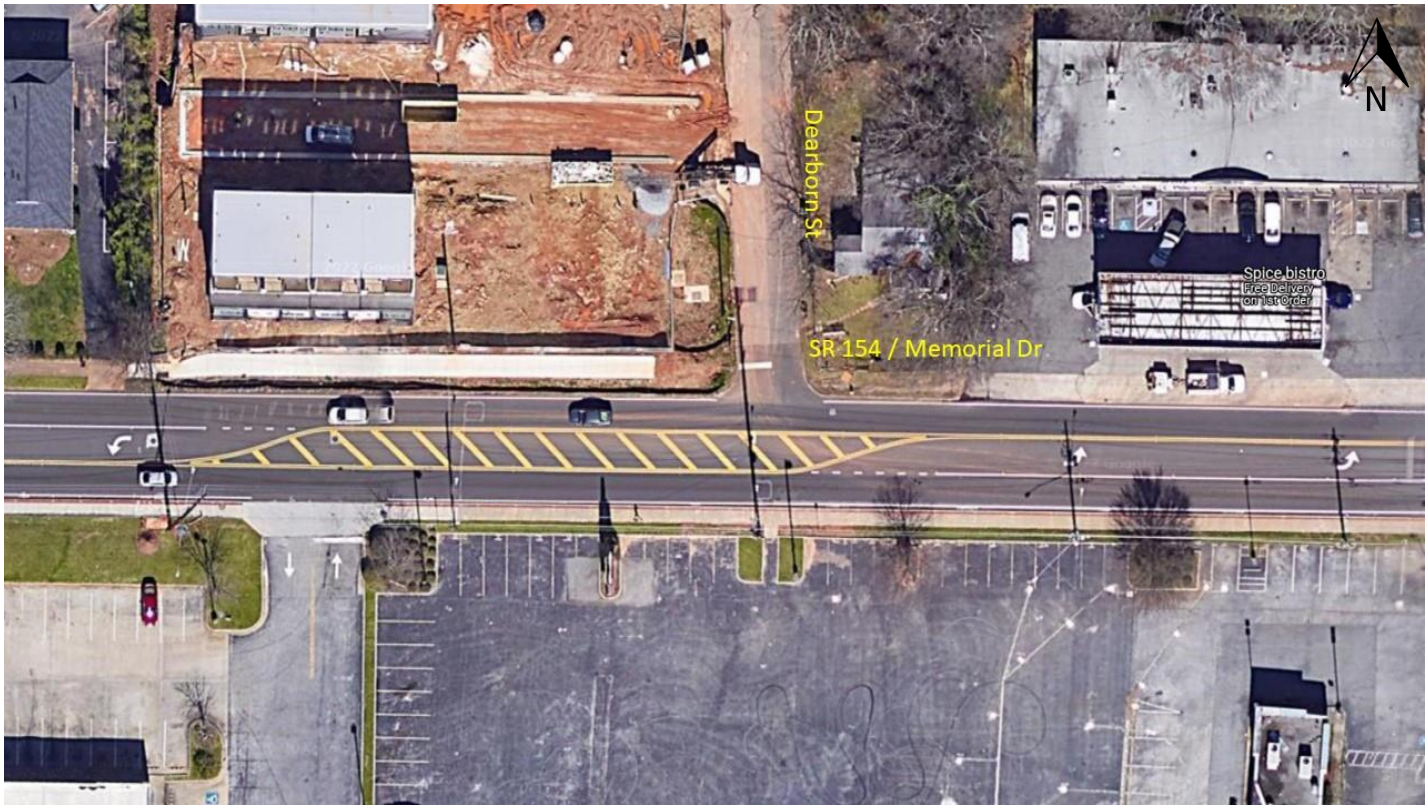
SR 154 and Wilkinson Dr converge at approximately 90° to form a 3-leg intersection with at least 36’ of width along the mainline. There is one (1) painted crosswalk across Wilkinson Dr on the south side of SR 154 and one (1) painted crosswalk across SR 154 on the west side of Wilkinson Dr. A dedicated westbound left turn lane is provided on SR 154.

Traffic Control

This intersection is fully signalized with all left turn, through, and right turn movements allowed. Pedestrian signal heads are present for all crosswalks. Traffic control signs and signal conditions are described below.

- Westbound – SR 154 has one (1) 3-section Flashing Yellow Arrow signal head with “Left Turn Yield on Flashing Yellow Arrow” sign for left turn movements and two (2) standard 3-section heads for through movements. There is a school speed limit 25 mph (S4-5) sign.
- Eastbound – SR 154 has two (2) standard 3-section heads for all movements. There is one (1) high-visibility pedestrian crossing (W11-2) sign at the crosswalk across SR 154.
- Northbound – Wilkerson Dr has two (2) standard 3-section heads for all movements. There is one (1) no trucks over 18 tons or over 30 ft in length (R5-2) sign for entering traffic and one (1) “No Parking” sign.

Intersection #8: Dearborn St



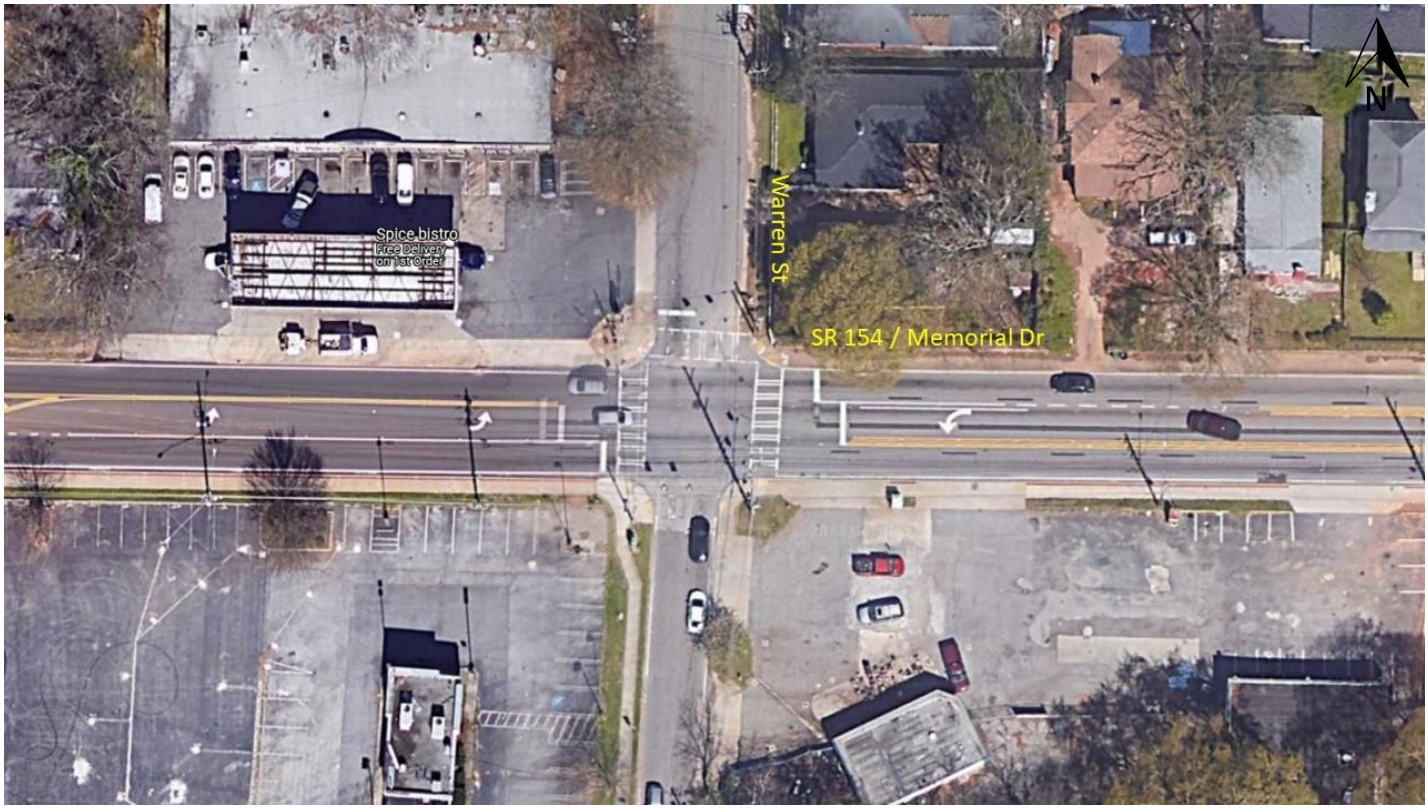
Geometry

SR 154 and Dearborn St converge at approximately 90° to form a 3-leg intersection with at least 36’ of width along the mainline.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the southbound stop bar on Dearborn St. and a “No Parking” sign on Dearborn St. There is a hatched flush median across this intersection indicating that left turns are not allowed to or from Dearborn St.

Intersection #9: Warren St



Geometry

SR 154 and Warren St converge at approximately 90° to form a 4-leg intersection with at least 36' of width along the mainline. There are four (4) painted crosswalks across all intersection approaches. Dedicated left turn lanes are provided on westbound and eastbound SR 154.

Traffic Control

This intersection is fully signalized with all left turn, through, and right turn movements allowed. Pedestrian signal heads are present for all crosswalks. Traffic control signs and signal conditions are described below.

- Westbound – SR 154 has one (1) 3-section Flashing Yellow Arrow signal head with "Left Turn Yield on Flashing Yellow Arrow" sign for left turn movements and two (2) standard 3-section heads for through and right turn movements.
- Eastbound – SR 154 has one (1) 3-section Flashing Yellow Arrow signal head with "Left Turn Yield on Flashing Yellow Arrow" sign for left turn movements and two (2) standard 3-section heads for through and right turn movements.
- Northbound – Warren St has two (2) standard 3-section heads for all movements. There is one (1) no trucks over 18 tons or over 30 ft in length (R5-2) sign for entering traffic.
- Southbound – Warren St has two (2) standard 3-section heads for all movements.

Intersection #10: Campbell St

Geometry

SR 154 and Campbell St converge at approximately 90° to form a 3-leg intersection with at least 38’ of width along the mainline. There is one (1) painted crosswalk across Campbell St on the north side of SR 154. There is also a pedestrian hybrid beacon crosswalk across SR 154 approximately 80’ to the east of the intersection.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the southbound stop bar on Campbell St and a “No Parking” sign on Campbell St. The two-way left turn median breaks across this intersection indicating that all movements are allowed to and from Campbell St. There are two (2) high-visibility pedestrian crossing (W11-2) signs, two (2) mast arm mounted “State Law Stop for Pedestrians” (R1-9a) signs as well as four (4) pedestrian hybrid beacon signal heads for the crosswalk across SR 154.

Intersection #11: Eleanor St

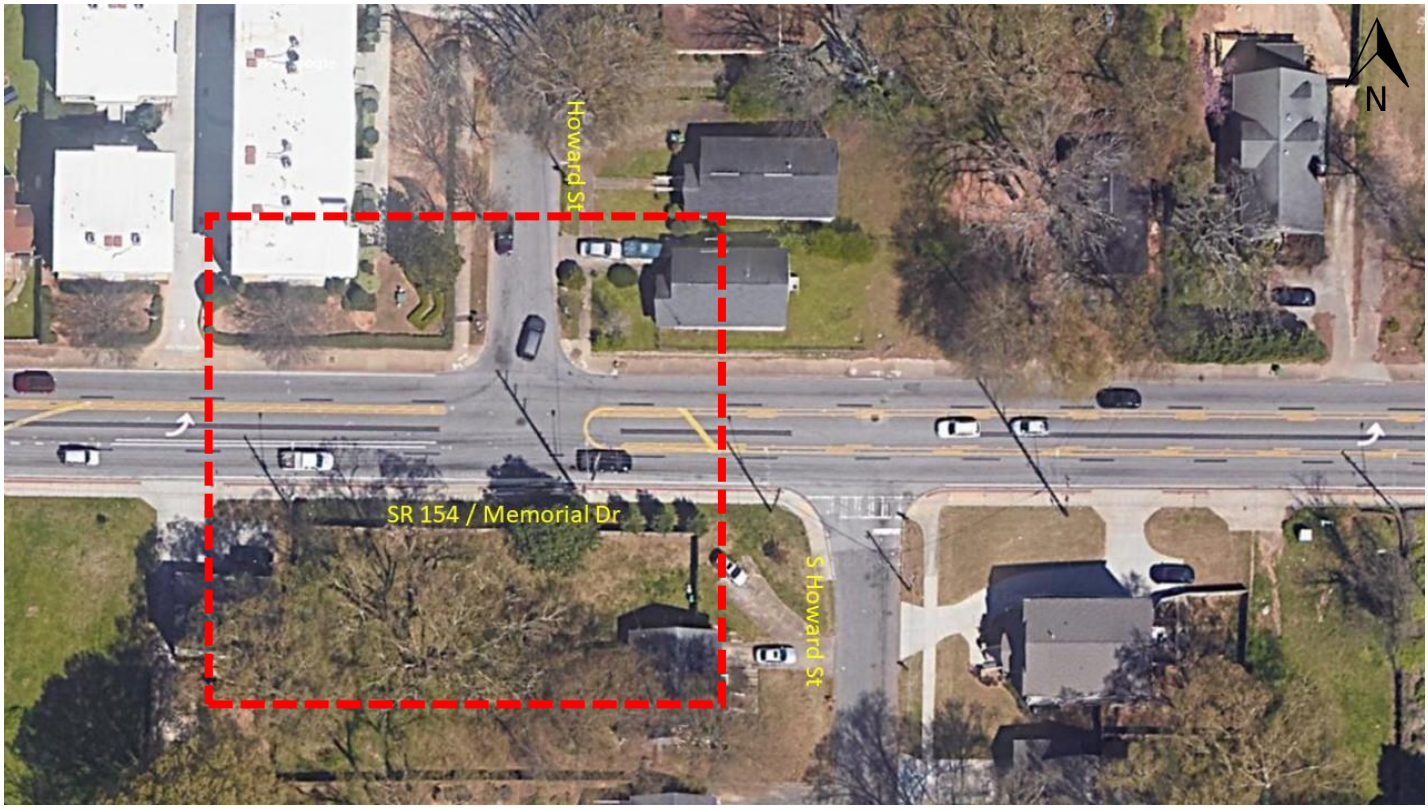
Geometry

SR 154 and Eleanor St converge at approximately 90° to form a 4-leg intersection with at least 38' of width along the mainline. There is two (2) painted crosswalk across Eleanor St on both sides of SR 154.

Traffic Control

This intersection is unsignalized with two-way stop control. There is a stop sign at the northbound stop bar on Eleanor St, but **no stop sign** at the southbound stop bar. There is also a "No Parking" sign on the north leg of Eleanor St, as well as two (2) no trucks over 18 tons or over 30 ft in length (R5-2) signs for entering traffic. The two-way left turn median breaks across this intersection indicating that all movements are allowed to and from Eleanor St.

Intersection #12: Howard St



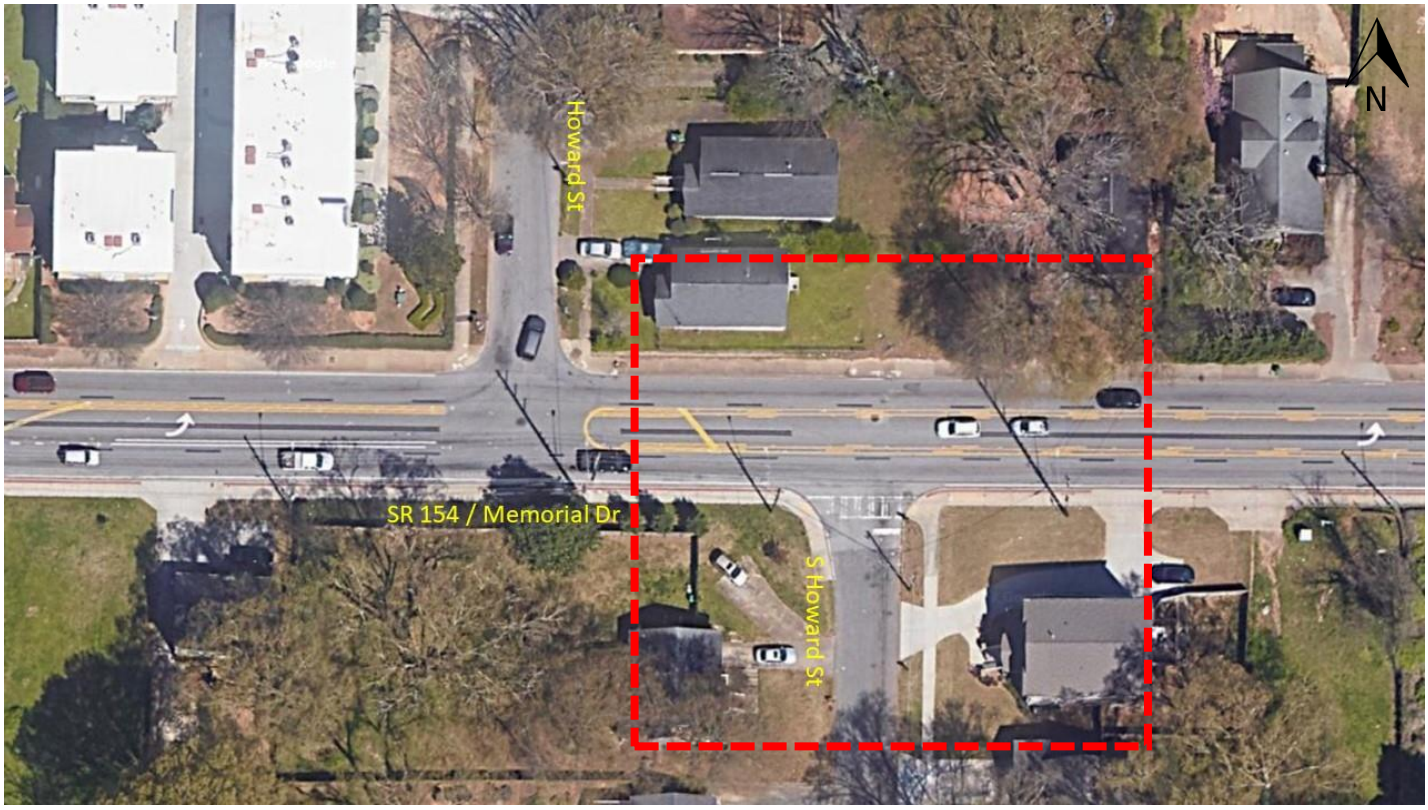
Geometry

SR 154 and Howard St converge at approximately 90° to form a 3-leg intersection with at least 38’ of width along the mainline. There is one (1) painted crosswalk across Howard St on the north side of SR 154. A dedicated eastbound left turn lane is provided on SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the southbound stop bar on Howard St. There are also two (2) “No Parking” signs on Howard St, as well as one (1) as well as two (2) no trucks over 18 tons or over 30 ft in length (R5-2) signs for entering traffic. The two-way left turn median breaks across this intersection indicating that all movements are allowed to and from Howard St.

Intersection #13: S Howard St



Geometry

SR 154 and S Howard St converge at approximately 90° to form a 3-leg intersection with at least 38’ of width along the mainline. There is one (1) painted crosswalk across S Howard St on the south side of SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign that has been struck and is currently leaning over the sidewalk at the northbound stop bar on S Howard St. There is also one (1) “No Left Turn” (R3-2) sign on SR 154 (for westbound drivers). Flex tube has been installed in the median across this intersection to indicate that left turns are not allowed to or from S Howard St.

Intersection #14: Palatka St

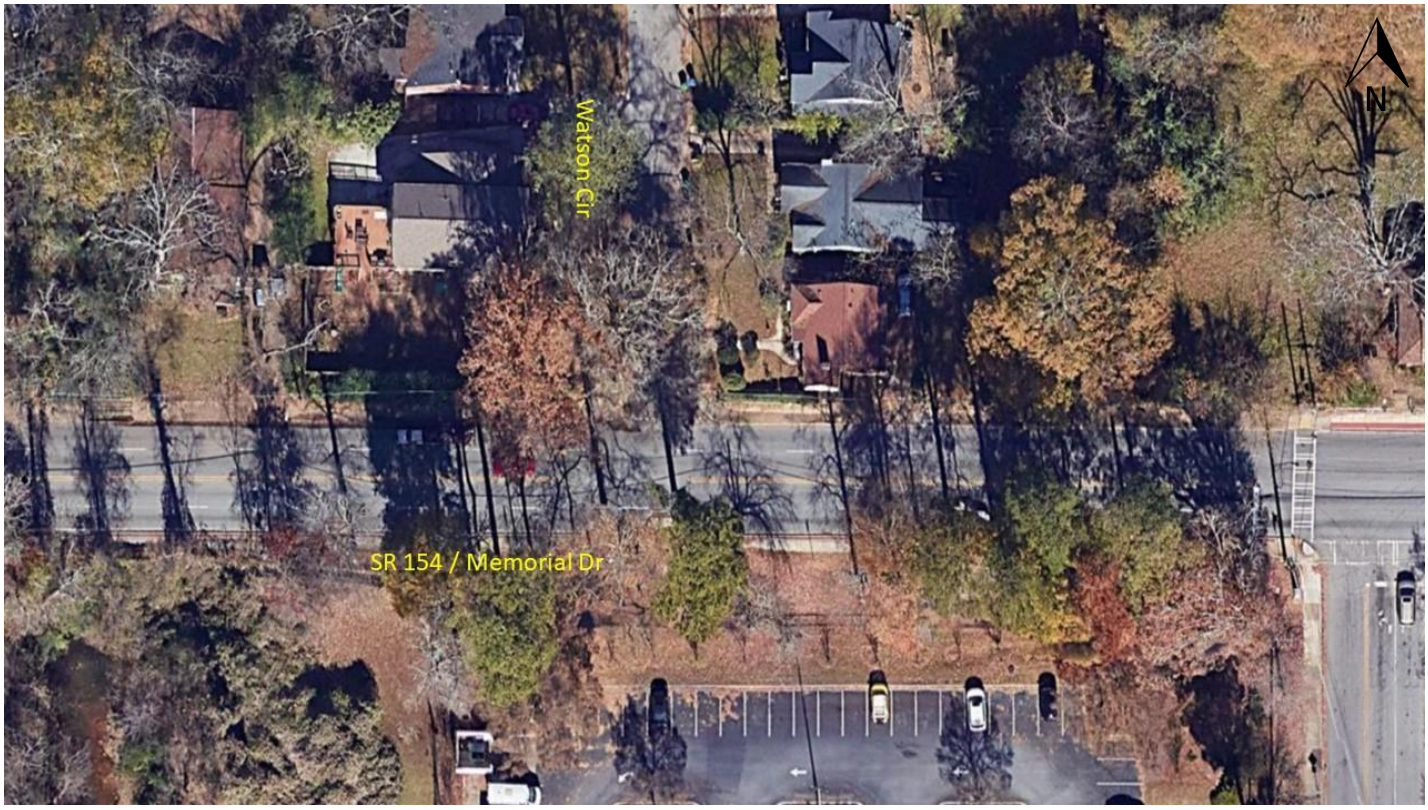
Geometry

SR 154 and Palatka St converge at approximately 90° to form a 3-leg intersection with at least 36' of width along the mainline. There is one (1) painted crosswalk across Palatka St on the north side of SR 154. A dedicated eastbound left turn lane is provided on SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the southbound stop bar on Palatka St. There are also several "No Parking" signs on Palatka St and two (2) no trucks (R5-2) signs for entering traffic. The two-way left turn median breaks across this intersection indicating that all movements are allowed to and from Palatka St.

Intersection #15: Watson Cir



Geometry

SR 154 and Watson Cir converge at approximately 90° to form a 3-leg intersection with at least 38’ of width along the mainline. There is one (1) painted crosswalk across Watson Cir on the north side of SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the southbound stop bar on Watson Cir. There are also two (2) “No Parking” signs on Watson Cir and one (1) on eastbound SR 154. There is one (1) high-visibility school crosswalk (S1-1) sign on SR 154 (for eastbound drivers). The two-way left turn median continues across this intersection indicating that all movements are allowed to and from Watson Cir.

Intersection #16: Eva Davis Way

Geometry

SR 154 and Eva Davis Way converge at approximately 90° to form a 3-leg intersection with at least 38' of width along the mainline. There is one (1) painted crosswalk across Eva Davis Way on the south side of SR 154 and two (2) painted crosswalks across SR 154 on both sides of Eva Davis Way. A dedicated westbound left turn lane is provided on SR 154.

Traffic Control

This intersection is fully signalized with all left turn, through, and right turn movements allowed. Pedestrian signal heads are present for all crosswalks. Traffic control signs and signal conditions are described below.

- Westbound – SR 154 has one (1) 4-section Flashing Yellow Arrow signal head with "Left Turn Yield on Flashing Yellow Arrow" sign for protected and permissive left turn movements and two (2) standard 3-section heads for through movements. There is one (1) high-visibility school crosswalk (S1-1) sign for the western crosswalk across SR 154.
- Eastbound – SR 154 has one (1) 4-section Flashing Yellow Arrow signal head with "Right Turn Yield on Flashing Yellow Arrow" sign for right turn movements, one (1) "No Left Turn" (R3-2) sign, and two (2) standard 3-section heads for all movements. There is one (1) high-visibility school crosswalk (S1-1) sign for the western crosswalk across SR 154.
- Northbound – Eva Davis Way has two (2) standard 3-section heads for all movements. There is one (1) "Turning Traffic Must Stop for Pedestrians" sign.

Intersection #17: E Lake Terr

Geometry

SR 154 and E Lake Terr converge at approximately 90° to form a 3-leg intersection with at least 38’ of width along the mainline. There is one (1) painted crosswalk across E Lake Terr on the north side of SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the southbound stop bar on E Lake Terr. There is one (1) “Right Turn Only” (R3-5R) sign and one (1) “No Left Turn” (R3-2) sign on southbound E Lake Terr, and two (2) “No Left Turn” (R3-2) signs on SR 154 (for eastbound drivers).

Intersection #18: 1st Ave

Geometry

SR 154 and 1st Ave converge at approximately 90° to form a 3-leg intersection with at least 38' of width along the mainline. There is one (1) painted crosswalk across 1st Ave on the north side of SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the southbound stop bar on 1st Ave. There is one (1) "No Parking" sign and a school speed limit 25 mph (S4-5) sign for eastbound drivers on SR154. There are no other traffic control signs or devices at this location. The two-way left turn median extends across this intersection indicating that all movements are allowed.

Intersection #19: 2nd Ave

Geometry

SR 154 and 2nd Ave converge at approximately 90° to form a 4-leg intersection with at least 38' of width along the mainline. There are four (4) painted crosswalks across all intersection approaches. Dedicated left turn lanes are provided on SR 154 in both directions as well as for both directions of 2nd Ave. A dedicated right turn lane is also provided for eastbound vehicles.

Traffic Control

This intersection is fully signalized with all left turn, through, and right turn movements allowed. Pedestrian signal heads are present for all crosswalks. Traffic control signs and signal conditions are described below.

- Westbound – SR 154 has one (1) 4-section Flashing Yellow Arrow signal head with "Left Turn Yield on Flashing Yellow Arrow" sign for protected and permissive left turn movements and two (2) standard 3-section heads for through and right turn movements. There are two (2) high-visibility pedestrian crossing (W11-2) signs at the crosswalk across SR 154.
- Eastbound – SR 154 has one (1) 3-section Flashing Yellow Arrow signal head with "Left Turn Yield on Flashing Yellow Arrow" sign for left turn movements and two (2) standard 3-section heads for through movements. There is one (1) high-visibility pedestrian crossing (W11-2) sign at the crosswalk across SR 154.
- Northbound – 2nd Ave has one (1) 4-section Flashing Yellow Arrow signal head with "Left Turn Yield on Flashing Yellow Arrow" sign for protected and permissive left turn movements and two (2) standard 3-section heads for through movements. There is one (1) "Left Turn Only" (R3-5L) sign and one (1) "No Turn on Red" (R10-11) sign.
- Southbound – 2nd Ave has one (1) 4-section Flashing Yellow Arrow signal head with "Left Turn Yield on Flashing Yellow Arrow" sign for protected and permissive left turn movements and two (2) standard 3-section heads for through movements. There is one (1) "No Parking Anytime" (R7-1) sign.

Intersection #20: 3rd Ave

Geometry

SR 154 and 3rd Ave converge at approximately 90° to form a 4-leg intersection with at least 30' of width along the mainline. There is one (1) painted crosswalk across 3rd Ave on the south side of SR 154.

Traffic Control

This intersection is unsignalized with two-way stop control. There are stop signs at northbound and southbound stop bars on 3rd Ave. There are also "No Left Turn" (R3-2) sign on 3rd Ave in both directions (though the sign for northbound traffic is knocked over and no longer visible). There is one (1) high-visibility school crosswalk ahead (S1-1, W16-9P) sign across SR 154 (for eastbound drivers) just east of the intersection, and a school speed limit 25 mph (S4-5) sign (for westbound drivers). Flex tube has been installed in the median across this intersection to indicate that left turns are not allowed to or from 3rd Ave.

Intersection #21: 4th Ave / Cottage Grove Ave

Geometry

SR 154 and 4th Ave converge at approximately 90°, while Cottage Grove Ave intersects at approximately 50°, to form a 4-leg intersection with at least 30' of width along the mainline. There is one (1) painted crosswalk across 4th Ave on the north side of SR 154, one (1) painted crosswalk across Cottage Grove Ave, and one (1) painted crosswalk across SR 154 on the west side of 4th Ave. A dedicated eastbound left turn lane is provided on SR 154.

Traffic Control

This intersection is fully signalized with all left turn, through, and right turn movements allowed. Pedestrian signal heads are present for all crosswalks. Traffic control signs and signal conditions are described below.

- Westbound – SR 154 has two (2) standard 3-section heads for through movements. There is one (1) high-visibility school crosswalk (S1-1) sign across SR 154 and one (1) "No Parking Anytime" (R7-1) sign. There are two (2) no trucks over 18 tons or over 30 ft in length (R5-2) signs for entering traffic from SR 154 onto 4th Ave and Cottage Grove Ave. There is also one (1) "Bicycles May Use Full Lane" (R4-11) sign for entering traffic from SR 154 onto Cottage Grove Ave.
- Eastbound – SR 154 has one (1) 3-section Flashing Yellow Arrow signal head with "Left Turn Yield on Flashing Yellow Arrow" sign for left turn movements and two (2) standard 3-section heads for through movements. There is one (1) high-visibility school crosswalk (S1-1) sign across SR 154.
- Southbound on 4th Ave – 4th Ave has two (2) standard 3-section heads for all movements. There is a "No Turn on Red" (R10-11a) sign.
- Southeast-bound on Cottage Grove Ave – Cottage Grove Ave has two (2) standard 3-section heads for all movements.

Intersection #22: Carter Ave

Geometry

SR 154 and Carter Ave converge at approximately 90° to form a 4-leg intersection with at least 30' of width along the mainline. There are two (2) painted crosswalk across Carter Ave on both sides of SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There are stop signs at the northbound and southbound stop bars on Carter Ave. There are two (2) no trucks over 18 tons or over 30 ft in length (R5-2) signs for entering traffic onto northbound Carter Ave. The two-way left turn median breaks across this intersection indicating that all movements are allowed to and from Carter Ave. There is one (1) high-visibility school crosswalk ahead (S1-1, W16-9P) sign (for westbound drivers) to the west of the intersection.

Intersection #23: E Lake Dr

Geometry

SR 154 and E Lake Dr converge at approximately 85-90° (50° for the north leg) to form a 4-leg intersection with at least 30’ of width along the mainline. There is four (4) painted crosswalks across all intersection approaches.

Traffic Control

This intersection is fully signalized with all left turn, through, and right turn movements allowed. Pedestrian signal heads are present for all crosswalks. Traffic control signs and signal conditions are described below.

- Westbound – SR 154 has one (1) 3-section Flashing Yellow Arrow signal head with “Left Turn Yield on Flashing Yellow Arrow” sign for left turn movements and two (2) standard 3-section heads for through and right turn movements.
- Eastbound – SR 154 has one (1) 3-section Flashing Yellow Arrow signal head with “Left Turn Yield on Flashing Yellow Arrow” sign for left turn movements and two (2) standard 3-section heads for through and right turn movements. There is one (1) high-visibility pedestrian crossing (W11-2) sign at the crosswalk across SR 154.
- Northbound – E Lake Dr has two (2) standard 3-section heads for all movements.
- Southbound – E Lake Dr has two (2) standard 3-section heads for all movements.

Intersection #24: Green Ave

Geometry

SR 154 and Green Ave converge at approximately 90° to form a 3-leg intersection with at least 30’ of width along the mainline. There is one (1) painted crosswalk across Green Ave on the south side of SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the northbound stop bar on Green Ave. There is also one (1) “No Parking” sign on Green Ave. There is one (1) “No Left Turn” (R3-2) sign on westbound SR 154 and (1) one on northbound Green Ave. There is one (1) playground (W15-1) sign on eastbound SR 154. Flex tube has been installed in the median across this intersection to indicate that left turns are not allowed to or from Green Ave.

Intersection #25: Daniel Ave (W)

Geometry

SR 154 and Daniel Ave converge at approximately 90° to form a 3-leg intersection with at least 30' of width along the mainline. There is one (1) painted crosswalk across Daniel Ave on the south side of SR 154 and one (1) painted crosswalk across SR 154 on the west side of Daniel Ave. There are two (2) high-visibility pedestrian crossing (W11-2) signs at the crosswalk, as well as one (1) crosswalk advance warning sign (W11-2, W16-9P) for each mainline approach.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the northbound stop bar on Daniel Ave. The two-way left turn median breaks across this intersection indicating that all movements are allowed to and from Daniel Ave.

Intersection #26: Daniel Ave (E)

Geometry

SR 154 and Daniel Ave (E) converge at approximately 90° to form a 3-leg intersection with at least 30’ of width along the mainline. There is one (1) painted crosswalk across Daniel Ave (E) on the north side of SR 154 and one (1) painted crosswalk across SR 154 on the east side of Daniel Ave (E).

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the southbound stop bar on Daniel Ave. There is one (1) high-visibility pedestrian crossing (W11-2) sign for the crosswalk across SR 154 (for westbound drivers only). The two-way left turn median breaks across this intersection indicating that all movements are allowed from Daniel Ave (E).

Intersection #27: Spence Ave

Geometry

SR 154 and Spence Ave converge at approximately 90° to form a 4-leg intersection with at least 30’ of width along the mainline. There are two (2) painted crosswalks across Spence Ave on both sides of SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There are stop signs at the northbound and southbound stop bars on Spence Ave. The two-way left turn median breaks across this intersection indicating that all movements are allowed to and from Spence Ave.

Intersection #28: Oakridge Ave

Geometry

SR 154 and Oakridge Ave converge at approximately 90° to form a 3-leg intersection with at least 30’ of width along the mainline. There is one (1) painted crosswalk across Oakridge St on the south side of SR 154.

Traffic Control

This intersection is unsignalized with one-way stop control. There is a stop sign at the northbound stop bar on Oakridge Ave. There are two (2) “No Left Turn” (R3-2) signs on westbound SR 154 and on northbound Oakridge Ave at the intersection. Flex tube has been installed in the median across this intersection to indicate that left turns are not allowed to or from Oakridge Ave.

Existing Safety Measures

The Georgia Department of Transportation completed a corridor resurfacing and restriping project (PI M005724), which included a road diet, removal of the reversible lane, and installation of turn lanes throughout the study corridor, at the end of June 2019. Safety countermeasures installed as part of this project included new signals with retroreflective backplates, mast arms, and signage (including several flashing yellow arrow signal heads and signs), and pedestrian countdown signals and crosswalks with accessible ramps at all signalized intersections. As a result of the recent signal and pedestrian upgrades, the signalized intersections now include signal heads with reflective backplates as well as the signage and infrastructure needed to meet current GDOT standards. Further, several unsignalized intersections have been previously converted to right-in, right-out access through signage and installation of flexible delineators in the flush median, as shown in **Figure 2** below.

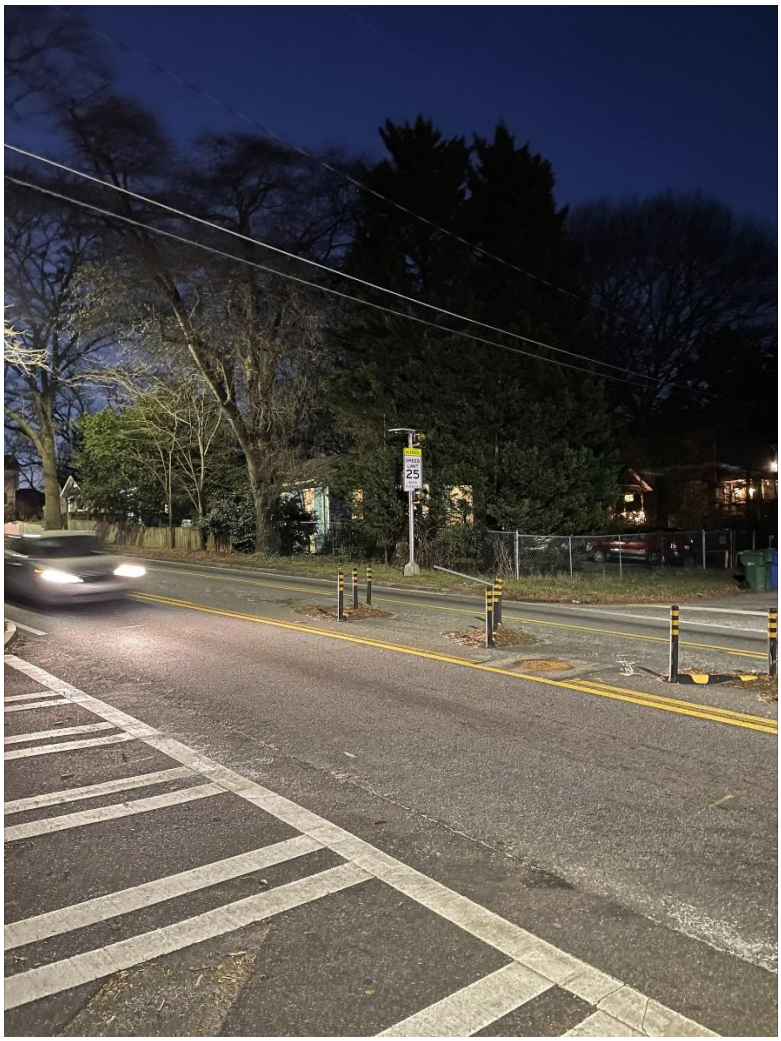


Figure 2 - Example of Road Diet and Right-in Right-out Conversion

Horizontal / Vertical Grades

Although the study corridor is straight in the horizontal direction, there are notable vertical grades that would impact future projects. Hills along the corridor create vertical crests that limit sight distances at several locations, which results in substandard sight distances given the posted 35 mph speed limit, as shown in **Figure 3** below.

Figure 3 - Vertical Grade Example at SR 154 and Palatka St

Sight Distance / Vegetation Concerns

The intersection sight distance was measured according to criteria outlined in Section 3.5 of the GDOT manual *Regulations for Driveway and Encroachment Control*. Sight distance concerns were noted throughout the study corridor, and measurements were taken when applicable and safe to do so in the field. The following intersections had noted sight distance concerns. Intersection sight distance was evaluated for all turn movements from stop-controlled minor roads where sight distances appeared to be potentially insufficient, and for right turns at signalized intersections. With a speed limit of 35 mph in the existing corridor condition, the required sight distance left (SDL) from a minor road along SR 154 / Memorial Dr is 365 ft. The required sight distance right (SDR) from a minor street-stop controlled intersection or a signalized intersection is 415 ft. The study team noted sight distance concerns at the intersections shown in **Table 2** and measured sight distances in the field where more permanent sight distance limiting factors were observed. Sight distances were also measured at each proposed pedestrian crossing location, as shown in **Table 3**. Photos showing sight distance limiting factors are included in **Appendix A**.

Table 2 - Limited Intersection Sight Distances Observed in Field

Location on SR 154	Signal	SDL (365')	SDL Limiting Factors	SDR (415')	SDR Limiting Factors
Vannoy St	N	-	-	16'	Fence
Trenton St	N	68'	Retaining wall, Bushes	294'	Slope, Utility pole
Dahlgren St	N	306'	Development fence and sign	-	-
East Side Ave	N	175'	Slope, Vegetation	-	-
Lamon Ave	N	236'	Trees	284'	Trees, Utility poles
Dixie St	N	99'	Vegetation, Pedestrian crossing sign	-	-
Wilkinson Dr	Y	204'	Vegetation, Utility pole	-	-
Dearborn St	N	82'	Fence	158'	Vertical crest, Vegetation
Warren St (southbound)	Y	56'	Retaining wall, Fence, Vegetation	-	-
Campbell St	N	208'	Fence, Vegetation	267'	Fence, Vegetation
Eleanor St (northbound)	N	113'	Utility poles	339'	Vertical crest, Utility poles
Eleanor St (southbound)	N	87'	Fence, Vegetation	226'	Trees, Utility poles
Howard St	N	104'	Vegetation	201'	Vertical crest
S Howard St	N	147'	Vegetation, Utility poles, Vertical crest	-	-
Palatka St	N	134'	Vertical crest	-	-
Watson Cir	N	59'	Vegetation	257'	Vegetation
Eva Davis Way	Y	143'	Trees, Utility poles	-	-
E Lake Terr	N	160'	Retaining wall, Vertical crest	225'	Retaining wall
1st Ave	N	-	-	200'	Church building
2nd Ave (northbound)	Y	116'	Trees	-	-
2nd Ave (southbound)	Y	319'	Trees	-	-
3rd Ave (northbound)	N	146'	Vegetation	-	-
3rd Ave (southbound)	N	126'	Trees	232'	Vegetation, Vertical crest
4th Ave/Cottage Grove Ave	Y	54'	Commercial building	119'	Commercial building
Carter Ave (northbound)	N	98'	Vertical crest	155'	Signs, Trees
Carter Ave (southbound)	N	93'	Fences, Vegetation	344'	Fences, Vegetation, Vertical crest
E Lake Dr (northbound)	Y	74'	Trees, Utility poles	-	-
E Lake Dr (southbound)	Y	125'	Trees, Utility poles	-	-
Green Ave	N	140'	Trees, Utility poles	232'	Trees
Daniel Ave (northbound)	N	265'	Vegetation	322'	Trees, Utility poles
Daniel Ave (southbound)	N	108'	Vegetation	150'	Utility poles
Spence Ave (northbound)	N	142'	Utility poles	305'	Trees, Utility poles
Spence Ave (southbound)	N	317'	Utility poles	-	Trees, Utility poles
Oakridge Ave	N	108'	Trees, Utility poles	222'	Trees, Fence

Table 3 - Limited Sight Distances Observed in Field at Pedestrian Crossing Locations Analyzed

Location on SR 154	SSD (305')	Stopping Sight Distance Limiting Factors	DSD (690')	Decision Sight Distance Limiting Factors
East Side Ave	-	-	465'	Vertical crest (eastbound)
Campbell St	-	-	359'	Vertical crest (westbound)
S Howard St	-	-	330'	Vertical crest (eastbound)
Palatka St	-	-	401'	Vertical crest (westbound)
Carter Ave	-	-	365'	Vertical crest (westbound)
Oakridge Ave	-	-	311'	Vertical crest (westbound)

Intersection Queuing and Delay

Traffic volumes are highest in the afternoon peak, but significant queuing was not observed during field visits that would indicate any signalized intersections having a failing level of service. This observation was supported by corridor traffic modeling, which estimated Level of Service (LOS) B or better for all signalized intersections during the peak hours, except for SR 154 at 2nd Ave (which is estimated at LOS D in the peak hours). Intersections and movements with the most queuing based on observations and capacity analysis include:

- SR 154 at Howard St – Southbound
- SR 154 at 2nd Ave – Northbound and Southbound
- SR 154 at Spence Ave – Northbound and Southbound

Pedestrian Movements / Accommodations

Pedestrians and a variety of multimodal travelers are frequently found in the study area. These vulnerable users were most often walking along sidewalks in the study area but were also seen crossing at crosswalks as well as outside of crosswalks. There are currently four (4) unsignalized crosswalks with no pedestrian refuge island across SR 154 in the study area. Sidewalks are present along both sides of SR 154 / Memorial Dr, but the sidewalk condition is more consistently up to GDOT standards along the south side of SR 154 as shown in **Figure 4** below. GDOT project PI 0012597 will replace many sections of deteriorated or missing sidewalk along the north and south sides of SR 154.

Figure 4 - Examples of Pedestrian Infrastructure in Study Area

Other Modes of Transportation Present

Cyclists have also been observed riding in the road or on sidewalks and crosswalk and people riding transit were commonly seen throughout the study area, as shown in **Figure 5** and **Figure 6**.

Figure 5 - Example of a Pedestrian-Generating Activity along SR 154

Figure 6 - Examples of Cyclists Transitioning from the Atlanta BeltLine to SR 154 in Study Area

MARTA transit buses operate throughout the entire study corridor, including Route 21 (Memorial Drive), which connects between Five Points Station and Kensington Station on the MARTA Blue and Green rail lines. See **Figure 7** and **Figure 8** for illustrative transit maps.

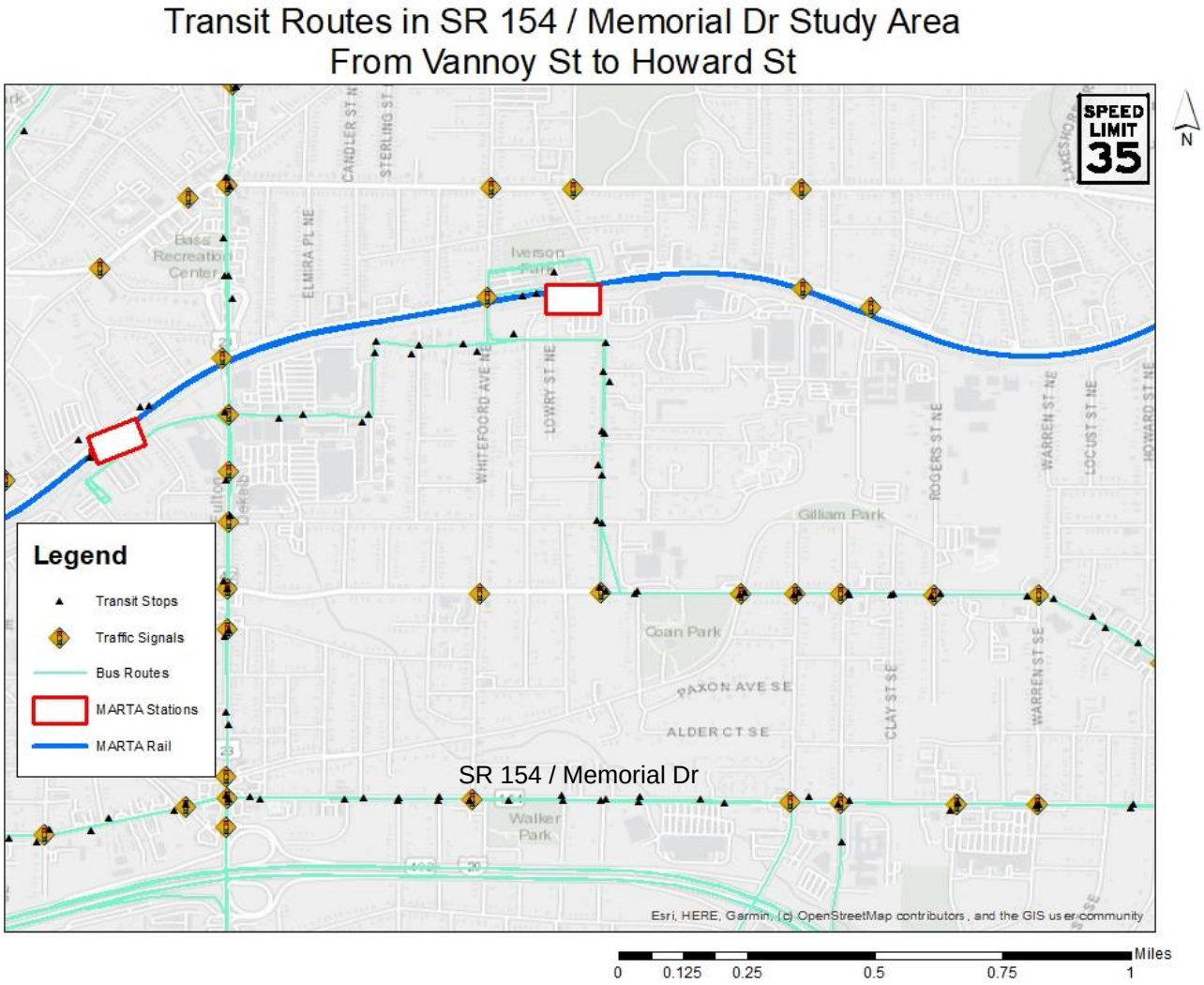


Figure 7 - Transit Routes and Stations in the Study Area (Vannoy St to Howard St)

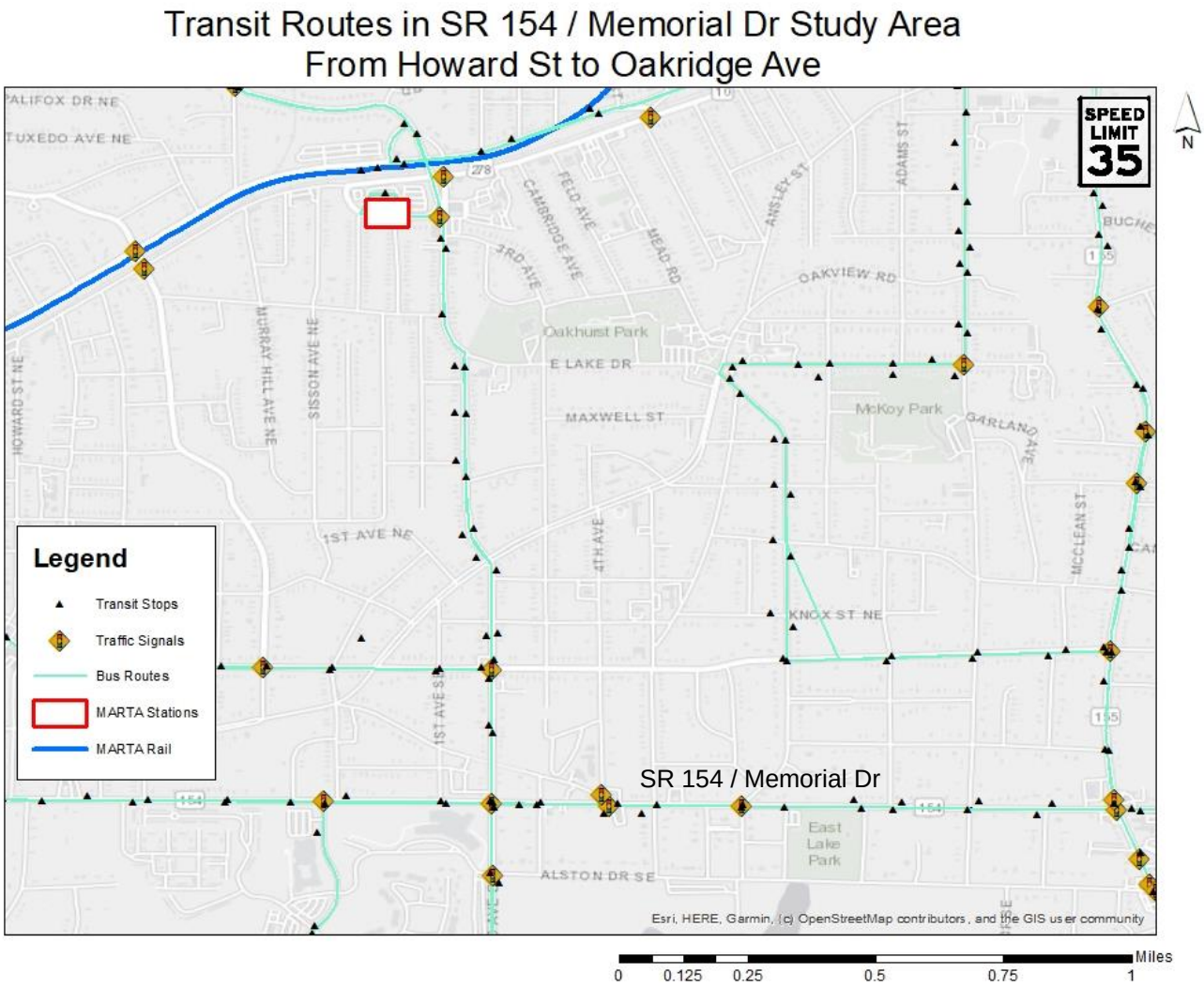


Figure 8 - Transit Routes and Stations in the Study Area (Howard St to Oakridge Ave)

Potential Environmental Impacts / Concerns

The study area falls within an MS4 area, a PM 2.5 non-attainment area, and an ozone non-attainment area. NPDES may be required if more than 1 acre of land is disturbed.

Lighting

Lighting conditions were assessed in January 2022 and found to be adequate, but with some room for improvement throughout the corridor. Although streetlights and nearby buildings provided enough light to illuminate the street, pedestrian-scale lighting was more limited in the study area. An example of lighting conditions found in the study area is shown in **Figure 9**.

Figure 9 - Example of Adequate Intersection Lighting along SR 154 / Memorial Dr

Parking

Free surface parking lots are abundant with ample capacity throughout the study area, and there are on-street parking areas along most intersecting minor streets. Large parking lots are centrally located within the study area at the intersection with Dixie St (Floor & Décor), across from Dearborn St (Parkview Station), and near Eva Davis Way (East Lake Family YMCA). No on-street parking is provided along SR 154 in the study area.

Other Projects in the Area

The following projects were identified through a review of GOASIS and GeoPI project databases as well as review of local and regional plans that may impact the study area.

PI # 0010642 – Battle of Atlanta Greenway Trail: The proposed project will construct concrete sidewalks and multi-use trails. The sections will vary from 5 ft to 12 ft wide. The 5 ft sections will be built at locations where the sidewalk will be parallel to the road, and 12 ft sections will be where there is adequate ROW outside stream buffers. Also, 16 ft wide boardwalks will be constructed inside stream buffers. The existing 6 ft sidewalk on Clifton Street will be removed and replaced with 6-inch thick, 12 ft wide section using part of the 14 ft shoulder on the bridge. No coordination anticipated to be needed.

PI # 0016078 – I-20 @ SR 42: The proposed project extends approximately 0.3 miles along SR 42/Moreland Avenue from SR 154/Memorial Drive SE to Faith Avenue SE/McPherson Avenue SE. The proposed project would reconfigure the SR 42/Moreland Avenue and I-20 interchange to directly align exit and entrance ramps to I-20 westbound at a signalized location. The proposed realigned exit ramp would widen to include dual left-turn and dual right-turn lanes onto SR 42/Moreland Avenue. The entrance ramp would widen to receive dual left-turn lanes from northbound SR 42/Moreland Avenue onto the I-20 westbound ramp. No coordination anticipated to be needed.

PI # 0012596 – SR 42 / US 23 @ CS 2113 / Arkwright Place: Reconstruction of the intersection of US 23 (Moreland Avenue) at Arkwright Place with the east and west legs of Arkwright Place converted to right-in right-out turns only; likely through the installation of a raised median on Moreland Avenue. No coordination anticipated to be needed.

PI # 0007952 – SR 154 / Memorial Drive Corridor Improvements: The City of Atlanta has determined SR154/Memorial Drive as an area in need of improvements due to their deteriorating sidewalks. The corridor of SR154/Memorial Drive between Connally Street and Chastain Street is a 1.25-mile area. The project will consist of expanding sidewalks on Memorial Drive to connect missing, broken or damaged sidewalk portions and upgrade to ADA standards where required. Existing curb is to remain where possible and a planting strip will be installed between the new sidewalks and the existing curb radius return. No coordination anticipated to be needed.

Lastly, the analysis and recommendations were considered from: 1) a previous Traffic Engineering Study for SR 154 / Memorial Dr from Pearl St to SR 155 / Candler Rd that was delivered to GDOT in May 2020 and 2) a Road Safety Audit (RSA) previously performed in 2012 for this portion of SR 154, from SR 42 / Moreland Ave to SR 155 / Candler Rd. The Traffic Engineering Report included ICE analysis at most of the study locations along the corridor. Recommendations from the RSA were also reviewed and further analyzed as part of this study, with those found to be feasibly incorporated within this proposed project included in the recommendations.

CRASH ANALYSIS

Analysis of crashes in the study area was conducted for crash years 2013 through 2021, with data collected and combined from the Georgia Electronic Accident Reporting System (GEARS) database and Numetric. The results of this analysis are summarized below.

A total of 1,140 crashes were found in the study area for 2013-2021. These included two (2) fatal crashes and 308 injury crashes, with 16 resulting in severe injury (A), 55 resulting in minor injury (B), and 237 resulting in injury complaints (C). Rear end crashes were the most common manner of collision with 455 (40%), followed by angle crashes with 360 (32%) during the analysis period including 182 left turn angle crashes, 94 other angle crashes, 59 through angle crashes, and 25 right turn angle crashes. There were also 56 collisions not with a motor vehicle in the study area including **9 pedestrian-related crashes** and **3 cyclist-related crashes** as well as many vehicles crashing into the curb, sidewalk, trees, dogs, fire hydrants, utility poles, and other objects in the corridor.

Crash rates and severity in terms of equivalent property damage only (ePDO) were analyzed for 1-mile segments of the study corridor compared to other 1-mile long state-owned corridor segments for 2013-2021 across the state and in GDOT District 7, DeKalb County, and the city of Atlanta. The rankings of this corridor by crash rate and severity compared to others in each jurisdiction is shown in **Table 4** for all crashes and in **Table 5** for pedestrian crashes.

Table 4 - Study Corridor Crash Rate and Severity Rankings

Area	Crash Rate Rank	Severity Rank
State	-	-
GDOT District 7 (Metro Atlanta)	71	-
DeKalb County	23	32
City of Atlanta	38	35

Table 5 - Study Corridor Pedestrian Crash Rate and Severity Rankings

Area	Crash Rate Rank	Severity Rank
State	-	-
GDOT District 7 (Metro Atlanta)	38	68
DeKalb County	11	23
City of Atlanta	22	12

Using the criteria of state-owned roadways, crash rates and severity indexing show that SR 154 within the study limits ranks in the top 25 for crash rate in DeKalb County and top 40 for crash rate and severity in Atlanta. For pedestrian-involved crashes along state-owned roadways, crash rates and severity indexing show that SR 154 within the study limits ranks 11th for crash rate in DeKalb County and 12th for severity in Atlanta.

As shown in **Table 6** and further documented in **Appendix C**, crashes in the study area decreased by approximately 39% after completion of a road diet and resurfacing project along SR 154 in early 2019. The intersections analyzed for potential inclusion in a Menu of Design Services (MOSD) safety project experienced an over 66% reduction in total crashes over three (3) years from a high of 191 in 2017 to a low of 64 in 2020. All manner of collision crashes were reduced following the resurfacing and road diet project, with the exception of rear end crashes (which were 16% above 2013 levels in 2021).

Table 6 - Crashes by Manner of Collision, KABCO Severity, and Year

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
Angle	**7**	**12**	**4**	**9**	**4**	**11**	**6**	**3**	**3**	**59**	**5%**
(A) Suspected Serious Injury		1								1	0%
(B) Suspected Minor/Visible Injury		1		1			1			3	0%
(C) Possible Injury / Complaint	1	2	1	1		3	3		1	12	1%
(O) No Injury	6	8	3	7	4	8	2	3	2	43	4%
Angle (Other)	**11**	**11**	**11**	**9**	**20**	**22**	**5**	**3**	**2**	**94**	**8%**
(B) Suspected Minor/Visible Injury	1			1		2				4	0%
(C) Possible Injury / Complaint	3		6		4	4	1			18	2%
(O) No Injury	7	11	5	8	16	16	4	3	2	72	6%
Head On		**2**	**1**	**1**	**3**	**1**	**1**	**1**	**2**	**12**	**1%**
(A) Suspected Serious Injury									1	1	0%
(B) Suspected Minor/Visible Injury					1			1		2	0%
(C) Possible Injury / Complaint			1	1	1	1	1		1	6	1%
(O) No Injury		2			1					3	0%
Left Angle Crash	**14**	**21**	**19**	**24**	**39**	**39**	**13**	**7**	**6**	**182**	**16%**
(A) Suspected Serious Injury				1	1	2				4	0%
(B) Suspected Minor/Visible Injury		1	3	1	4	4	1	1		15	1%
(C) Possible Injury / Complaint	6	6	4	7	14	13	4	2		56	5%
(O) No Injury	8	14	12	15	20	20	8	4	6	107	9%
Not a Collision with Motor Vehicle	**8**	**4**	**8**	**9**	**9**	**6**	**4**	**4**	**4**	**56**	**5%**
(K) Fatal Injury					1 P				1 P	2	0%
(A) Suspected Serious Injury		1 B, 1 P	1 P							3	0%
(B) Suspected Minor/Visible Injury		2 P	1 B, 1 OT	1 P				3 OT		8	1%
(C) Possible Injury / Complaint	3 OT			1 P, 2 OT	1 B, 1 OT	2 OT		1 OT	1 OT	12	1%
(O) No Injury	5 OT		5 OT	5 OT	6 OT	1 P, 3 OT	4 OT		2 OT	31	3%
Rear End	**50**	**42**	**44**	**43**	**55**	**49**	**77**	**37**	**58**	**455**	**40%**
(A) Suspected Serious Injury			1		1		2	1		5	0%
(B) Suspected Minor/Visible Injury	2	2		1	2	3	2		3	15	1%
(C) Possible Injury / Complaint	12	13	11	8	9	10	15	11	10	99	9%
(O) No Injury	36	27	32	34	43	36	58	25	45	336	29%
Right Angle Crash	**4**	**3**	**3**	**2**	**4**	**3**	**1**	**2**	**3**	**25**	**2%**
(A) Suspected Serious Injury					1			1		2	0%
(B) Suspected Minor/Visible Injury						1			1	2	0%
(C) Possible Injury / Complaint		2	1	1	1		1	1		7	1%
(O) No Injury	4	1	2	1	2	2			2	14	1%
Sideswipe-Opposite Direction	**2**		**1**	**2**	**3**	**2**	**1**			**11**	**1%**
(C) Possible Injury / Complaint					2	1	1			4	0%
(O) No Injury	2		1	2	1	1				7	1%
Sideswipe-Same Direction	**28**	**16**	**28**	**36**	**54**	**53**	**14**	**7**	**10**	**246**	**22%**
(B) Suspected Minor/Visible Injury		1		1	1	1		2		6	1%
(C) Possible Injury / Complaint	2	3	3	2	4	4	1	1	3	23	2%
(O) No Injury	26	12	25	33	49	48	13	4	7	217	19%
Totals	**124**	**111**	**119**	**135**	**191**	**186**	**122**	**64**	**88**	**1140**	**100%**
(K) Fatal Injury					1				1	2	0%
(A) Suspected Serious Injury		3	2	1	3	2	2	2	1	16	1%
(B) Suspected Minor/Visible Injury	3	7	5	6	8	11	4	7	4	55	5%
(C) Possible Injury / Complaint	27	26	27	23	37	38	27	16	16	237	21%
(O) No Injury	94	75	85	105	142	135	89	39	66	830	73%

B = Bicycle, P = Pedestrian, OT = Other (further defined in location tables)

Comprehensive crash analysis was also performed for each of the 28 analyzed intersections along SR 154 in the study area. A combined summary of crash data findings for each location is provided in **Tables 7-34** on the following pages.

Table 7 - Crashes by Manner of Collision, KABCO Severity, and Year (#1: SR 154 @ Vannoy St)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
01 - Vannoy St	**4**	**1**	**3**	**2**	**5**	**4**	**2**	**1**	**1**	**23**	**100%**
Angle						**1**				**1**	**4%**
(O) No Injury						1				1	4%
Angle (Other)	**2**	**1**	**2**	**1**	**3**	**3**				**12**	**52%**
(B) Suspected Minor/Visible Injury				1						1	4%
(C) Possible Injury / Complaint			1		1					2	9%
(O) No Injury	2	1	1		2	3				9	39%
Left Angle Crash			**1**		**1**		**1**			**3**	**13%**
(C) Possible Injury / Complaint					1					1	4%
(O) No Injury			1				1			2	9%
Rear End	**1**			**1**			**1**	**1**	**1**	**5**	**22%**
(C) Possible Injury / Complaint				1						1	4%
(O) No Injury	1						1	1	1	4	17%
Right Angle Crash	**1**									**1**	**4%**
(O) No Injury	1									1	4%
Sideswipe-Same Direction					**1**					**1**	**4%**
(O) No Injury					1					1	4%
Totals	**4**	**1**	**3**	**2**	**5**	**4**	**2**	**1**	**1**	**23**	**100%**
(B) Suspected Minor/Visible Injury				1						1	4%
(C) Possible Injury / Complaint			1	1	2					4	17%
(O) No Injury	4	1	2		3	4	2	1	1	18	78%

Table 8 - Crashes by Manner of Collision, KABCO Severity, and Year (#2: SR 154 @ Trenton St)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
02 - Trenton St				**1**	**2**	**1**			**1**	**5**	**100%**
Angle (Other)					**1**					**1**	**20%**
(O) No Injury					1					1	20%
Sideswipe-Same Direction				**1**	**1**	**1**			**1**	**4**	**80%**
(B) Suspected Minor/Visible Injury					1					1	20%
(C) Possible Injury / Complaint				1						1	20%
(O) No Injury						1			1	2	40%
Totals				**1**	**2**	**1**			**1**	**5**	**100%**
(B) Suspected Minor/Visible Injury					1					1	20%
(C) Possible Injury / Complaint				1						1	20%
(O) No Injury					1	1			1	3	60%

Table 9 - Crashes by Manner of Collision, KABCO Severity, and Year (#3: SR 154 @ Dahlgren St)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
03 - Dahlgren St	**4**	**1**	**4**	**5**	**4**	**3**	**2**			**23**	**100%**
Angle (Other)	**2**	**1**	**4**	**1**	**3**					**11**	**48%**
(B) Suspected Minor/Visible Injury	1									1	4%
(C) Possible Injury / Complaint			3		1					4	17%
(O) No Injury	1	1	1	1	2					6	26%
Left Angle Crash						**3**	**1**			**4**	**17%**
(C) Possible Injury / Complaint						1				1	4%
(O) No Injury						2	1			3	13%
Not a Collision with Motor Vehicle	**1**			**1**						**2**	**9%**
(C) Possible Injury / Complaint				1 SW						1	4%
(O) No Injury	1 FH									1	4%
Right Angle Crash				**1**						**1**	**4%**
(O) No Injury				1						1	4%
Sideswipe-Same Direction	**1**			**2**	**1**		**1**			**5**	**22%**
(B) Suspected Minor/Visible Injury				1						1	4%
(O) No Injury	1			1	1		1			4	17%
Totals	**4**	**1**	**4**	**5**	**4**	**3**	**2**			**23**	**100%**
(B) Suspected Minor/Visible Injury	1			1						2	9%
(C) Possible Injury / Complaint			3	1	1	1				6	26%
(O) No Injury	3	1	1	3	3	2	2			15	65%

FH = Fire Hydrant, SW = Sidewalk

Table 10 - Crashes by Manner of Collision, KABCO Severity, and Year (#4: SR 154 @ East Side Ave)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
04 - East Side Ave		**2**		**1**	**4**					**7**	**100%**
Left Angle Crash					**1**					**1**	**14%**
(C) Possible Injury / Complaint					1					1	14%
Rear End				**1**	**1**					**2**	**29%**
(O) No Injury				1	1					2	29%
Sideswipe-Same Direction		**2**			**2**					**4**	**57%**
(O) No Injury		2			2					4	57%
Totals		**2**		**1**	**4**					**7**	**100%**
(C) Possible Injury / Complaint					1					1	14%
(O) No Injury		2		1	3					6	86%

Table 11 - Crashes by Manner of Collision, KABCO Severity, and Year (#5: SR 154 @ Lamon Ave)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
05 - Lamon Ave	**1**		**2**	**1**		**2**	**1**			**7**	**100%**
Left Angle Crash						**1**				**1**	**14%**
(B) Suspected Minor/Visible Injury						1				1	14%
Not a Collision with Motor Vehicle	**1**									**1**	**14%**
(O) No Injury	1 PS									1	14%
Rear End			**1**							**1**	**14%**
(O) No Injury			1							1	14%
Sideswipe-Opposite Direction						**1**				**1**	**14%**
(C) Possible Injury / Complaint						1				1	14%
Sideswipe-Same Direction			**1**	**1**			**1**			**3**	**43%**
(O) No Injury			1	1			1			3	43%
Totals	**1**		**2**	**1**		**2**	**1**			**7**	**100%**
(B) Suspected Minor/Visible Injury						1				1	14%
(C) Possible Injury / Complaint						1				1	14%
(O) No Injury	1		2	1			1			5	71%

PS = Property Sign

Table 12 - Crashes by Manner of Collision, KABCO Severity, and Year (#6: SR @ Dixie St)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
06 - Dixie St		**3**			**2**	**1**		**2**	**1**	**9**	**100%**
Left Angle Crash						**1**		**1**		**2**	**22%**
(C) Possible Injury / Complaint						1				1	11%
(O) No Injury								1		1	11%
Not a Collision with Motor Vehicle		**1**			**1**					**2**	**22%**
(B) Suspected Minor/Visible Injury		1 PED								1	11%
(O) No Injury					1 UP					1	11%
Rear End		**2**			**1**				**1**	**4**	**44%**
(O) No Injury		2			1				1	4	44%
Sideswipe-Same Direction								**1**		**1**	**11%**
(C) Possible Injury / Complaint								1		1	11%
Totals		**3**			**2**	**1**		**2**	**1**	**9**	**100%**
(B) Suspected Minor/Visible Injury		1								1	11%
(C) Possible Injury / Complaint						1		1		2	22%
(O) No Injury		2			2			1	1	6	67%

PED = Pedestrian, UP = Utility Pole

Table 13 - Crashes by Manner of Collision, KABCO Severity, and Year (#7: SR 154 @ Wilkinson Dr)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
07 - Wilkinson Dr	**4**	**5**	**4**	**6**	**4**	**3**	**2**	**1**	**6**	**35**	**100%**
Angle									**1**	**1**	**3%**
(O) No Injury									1	1	3%
Left Angle Crash		**1**		**1**		**2**		**1**		**5**	**14%**
(B) Suspected Minor/Visible Injury						1				1	3%
(C) Possible Injury / Complaint		1				1		1		3	9%
(O) No Injury				1						1	3%
Not a Collision with Motor Vehicle	**1**			**1**						**2**	**6%**
(C) Possible Injury / Complaint				1 PED						1	3%
(O) No Injury	1 UP									1	3%
Rear End	**1**	**3**	**2**	**3**	**2**	**1**	**2**		**3**	**17**	**49%**
(C) Possible Injury / Complaint				1						1	3%
(O) No Injury	1	3	2	2	2	1	2		3	16	46%
Right Angle Crash			**1**						**1**	**2**	**6%**
(O) No Injury			1						1	2	6%
Sideswipe-Same Direction	**2**	**1**	**1**	**1**	**2**				**1**	**8**	**23%**
(C) Possible Injury / Complaint		1	1							2	6%
(O) No Injury	2			1	2				1	6	17%
Totals	**4**	**5**	**4**	**6**	**4**	**3**	**2**	**1**	**6**	**35**	**100%**
(B) Suspected Minor/Visible Injury						1				1	3%
(C) Possible Injury / Complaint		2	1	2		1		1		7	20%
(O) No Injury	4	3	3	4	4	1	2		6	27	77%

PED = Pedestrian, UP = Utility Pole

Table 14 - Crashes by Manner of Collision, KABCO Severity, and Year (#8: SR 154 @ Dearborn St)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
08 - Dearborn St	**1**	**3**		**1**	**1**	**1**	**2**	**1**	**2**	**12**	**100%**
Head On						**1**			**1**	**2**	**17%**
(A) Suspected Serious Injury									1	1	8%
(C) Possible Injury / Complaint						1				1	8%
Left Angle Crash					**1**		**1**			**2**	**17%**
(B) Suspected Minor/Visible Injury					1					1	8%
(C) Possible Injury / Complaint							1			1	8%
Not a Collision with Motor Vehicle				**1**						**1**	**8%**
(C) Possible Injury / Complaint				1 EM						1	8%
Rear End		**2**					**1**	**1**	**1**	**5**	**42%**
(C) Possible Injury / Complaint		1								1	8%
(O) No Injury		1					1	1	1	4	33%
Sideswipe-Same Direction	**1**	**1**								**2**	**17%**
(C) Possible Injury / Complaint		1								1	8%
(O) No Injury	1									1	8%
Totals	**1**	**3**		**1**	**1**	**1**	**2**	**1**	**2**	**12**	**100%**
(A) Suspected Serious Injury									1	1	8%
(B) Suspected Minor/Visible Injury					1					1	8%
(C) Possible Injury / Complaint		2		1		1	1			5	42%
(O) No Injury	1	1					1	1	1	5	42%

EM = Embankment

Table 15 - Crashes by Manner of Collision, KABCO Severity, and Year (#9: SR 154 @ Warren St)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
09 - Warren St	**7**	**7**	**6**	**11**	**14**	**10**	**12**	**5**	**4**	**76**	**100%**
Angle	**2**	**2**		**2**	**1**	**1**	**1**		**1**	**10**	**13%**
(B) Suspected Minor/Visible Injury				1						1	1%
(C) Possible Injury / Complaint		1					1			2	3%
(O) No Injury	2	1		1	1	1			1	7	9%
Angle (Other)				**1**	**3**		**2**	**1**		**7**	**9%**
(C) Possible Injury / Complaint					1		1			2	3%
(O) No Injury				1	2		1	1		5	7%
Left Angle Crash	**3**	**3**	**2**	**2**	**3**	**3**	**1**	**1**	**1**	**19**	**25%**
(B) Suspected Minor/Visible Injury			1							1	1%
(C) Possible Injury / Complaint	2				2	1				5	7%
(O) No Injury	1	3	1	2	1	2	1	1	1	13	17%
Not a Collision with Motor Vehicle			**2**	**1**						**3**	**4%**
(B) Suspected Minor/Visible Injury			1 BIKE	1 PED						2	3%
(O) No Injury			1 UP							1	1%
Rear End	**1**	**2**	**1**	**3**	**2**		**7**	**3**	**2**	**21**	**28%**
(C) Possible Injury / Complaint				1	1		1	2		5	7%
(O) No Injury	1	2	1	2	1		6	1	2	16	21%
Sideswipe-Same Direction	**1**		**1**	**2**	**5**	**6**	**1**			**16**	**21%**
(C) Possible Injury / Complaint					1	2				3	4%
(O) No Injury	1		1	2	4	4	1			13	17%
Totals	**7**	**7**	**6**	**11**	**14**	**10**	**12**	**5**	**4**	**76**	**100%**
(B) Suspected Minor/Visible Injury			2	2						4	5%
(C) Possible Injury / Complaint	2	1		1	5	3	3	2		17	22%
(O) No Injury	5	6	4	8	9	7	9	3	4	55	72%

BIKE = Bicycle, PED = Pedestrian, UP = Utility Pole

Table 16 - Crashes by Manner of Collision, KABCO Severity, and Year (#10: SR 154 @ Campbell St)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
10 - Campbell St	**2**	**2**	**2**	**3**	**1**	**1**	**1**	**2**	**3**	**17**	**100%**
Angle (Other)				**1**					**1**	**2**	**12%**
(O) No Injury				1					1	2	12%
Left Angle Crash		**1**								**1**	**6%**
(O) No Injury		1								1	6%
Not a Collision with Motor Vehicle	**1**	**1**	**1**	**1**	**1**					**5**	**29%**
(K) Fatal Injury					1 PED					1	6%
(A) Suspected Serious Injury		1 BIKE	1 PED							2	12%
(O) No Injury	1 FH			1 CB						2	12%
Rear End	**1**					**1**	**1**	**2**	**2**	**7**	**41%**
(B) Suspected Minor/Visible Injury									1	1	6%
(C) Possible Injury / Complaint						1				1	6%
(O) No Injury	1						1	2	1	5	29%
Sideswipe-Same Direction			**1**	**1**						**2**	**12%**
(O) No Injury			1	1						2	12%
Totals	**2**	**2**	**2**	**3**	**1**	**1**	**1**	**2**	**3**	**17**	**100%**
(K) Fatal Injury					1					1	6%
(A) Suspected Serious Injury		1	1							2	12%
(B) Suspected Minor/Visible Injury									1	1	6%
(C) Possible Injury / Complaint						1				1	6%
(O) No Injury	2	1	1	3			1	2	2	12	71%

BIKE = Bicycle, PED = Pedestrian, CB = Curb, FH = Fire Hydrant

Table 17 - Crashes by Manner of Collision, KABCO Severity, and Year (#11: SR 154 @ Eleanor St)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
11 - Eleanor St	**2**	**2**	**1**	**1**	**3**	**3**	**4**	**1**	**5**	**22**	**100%**
Angle								**1**		**1**	**5%**
(O) No Injury								1		1	5%
Angle (Other)				**1**						**1**	**5%**
(O) No Injury				1						1	5%
Left Angle Crash	**1**		**1**		**1**	**1**			**1**	**5**	**23%**
(A) Suspected Serious Injury						1				1	5%
(C) Possible Injury / Complaint	1									1	5%
(O) No Injury			1		1				1	3	14%
Not a Collision with Motor Vehicle					**1**					**1**	**5%**
(O) No Injury					1 UP					1	5%
Rear End					**1**		**4**		**3**	**8**	**36%**
(A) Suspected Serious Injury							1			1	5%
(C) Possible Injury / Complaint							1			1	5%
(O) No Injury					1		2		3	6	27%
Right Angle Crash	**1**	**2**								**3**	**14%**
(C) Possible Injury / Complaint		1								1	5%
(O) No Injury	1	1								2	9%
Sideswipe-Same Direction						**2**			**1**	**3**	**14%**
(B) Suspected Minor/Visible Injury						1				1	5%
(O) No Injury						1			1	2	9%
Totals	**2**	**2**	**1**	**1**	**3**	**3**	**4**	**1**	**5**	**22**	**100%**
(A) Suspected Serious Injury						1	1			2	9%
(B) Suspected Minor/Visible Injury						1				1	5%
(C) Possible Injury / Complaint	1	1					1			3	14%
(O) No Injury	1	1	1	1	3	1	2	1	5	16	73%

UP = Utility Pole

Table 18 - Crashes by Manner of Collision, KABCO Severity, and Year (#12: SR 154 @ Howard St)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
12 - Howard St	**4**	**6**	**5**	**6**	**9**	**14**	**5**	**5**	**6**	**60**	**100%**
Angle						**1**				**1**	**2%**
(O) No Injury						1				1	2%
Angle (Other)	**1**	**1**		**1**		**3**	**1**			**7**	**12%**
(B) Suspected Minor/Visible Injury						1				1	2%
(C) Possible Injury / Complaint						1				1	2%
(O) No Injury	1	1		1		1	1			5	8%
Left Angle Crash				**3**		**4**	**1**	**2**	**1**	**11**	**18%**
(B) Suspected Minor/Visible Injury						1				1	2%
(C) Possible Injury / Complaint				1		1		1		3	5%
(O) No Injury				2		2	1	1	1	7	12%
Not a Collision with Motor Vehicle		**1**								**1**	**2%**
(A) Suspected Serious Injury		1 PED								1	2%
Rear End	**2**	**2**	**3**		**6**	**2**	**3**	**3**	**4**	**25**	**42%**
(B) Suspected Minor/Visible Injury					1					1	2%
(C) Possible Injury / Complaint		1	2				1	1	1	6	10%
(O) No Injury	2	1	1		5	2	2	2	3	18	30%
Right Angle Crash	**1**					**2**				**3**	**5%**
(B) Suspected Minor/Visible Injury						1				1	2%
(O) No Injury	1					1				2	3%
Sideswipe-Opposite Direction					**1**					**1**	**2%**
(C) Possible Injury / Complaint					1					1	2%
Sideswipe-Same Direction		**2**	**2**	**2**	**2**	**2**			**1**	**11**	**18%**
(B) Suspected Minor/Visible Injury		1								1	2%
(C) Possible Injury / Complaint									1	1	2%
(O) No Injury		1	2	2	2	2				9	15%
Totals	**4**	**6**	**5**	**6**	**9**	**14**	**5**	**5**	**6**	**60**	**100%**
(A) Suspected Serious Injury		1								1	2%
(B) Suspected Minor/Visible Injury		1			1	3				5	8%
(C) Possible Injury / Complaint		1	2	1	1	2	1	2	2	12	20%
(O) No Injury	4	3	3	5	7	9	4	3	4	42	70%

PED = Pedestrian

Table 19 - Crashes by Manner of Collision, KABCO Severity, and Year (#13: SR 154 @ S Howard St)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
13 - S Howard St	**1**		**2**	**4**	**7**	**4**	**2**		**3**	**23**	**100%**
Angle (Other)							**1**			**1**	**4%**
(O) No Injury							1			1	4%
Left Angle Crash			**1**	**3**	**4**	**2**				**10**	**43%**
(B) Suspected Minor/Visible Injury					1					1	4%
(C) Possible Injury / Complaint			1	3	2					6	26%
(O) No Injury					1	2				3	13%
Not a Collision with Motor Vehicle							**1**		**1**	**2**	**9%**
(O) No Injury							1 UP		1 UP	2	9%
Rear End			**1**		**1**	**1**			**2**	**5**	**22%**
(O) No Injury			1		1	1			2	5	22%
Right Angle Crash					**1**					**1**	**4%**
(C) Possible Injury / Complaint					1					1	4%
Sideswipe-Same Direction	**1**			**1**	**1**	**1**				**4**	**17%**
(C) Possible Injury / Complaint	1									1	4%
(O) No Injury				1	1	1				3	13%
Totals	**1**		**2**	**4**	**7**	**4**	**2**		**3**	**23**	**100%**
(B) Suspected Minor/Visible Injury					1					1	4%
(C) Possible Injury / Complaint	1		1	3	3					8	35%
(O) No Injury			1	1	3	4	2		3	14	61%

UP = Utility Pole

Table 20 - Crashes by Manner of Collision, KABCO Severity, and Year (#14: SR 154 @ Palatka St)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
14 - Palatka St	**1**	**1**	**2**	**2**	**2**	**3**	**2**	**1**	**4**	**18**	**100%**
Angle (Other)							**1**			**1**	**6%**
(O) No Injury							1			1	6%
Left Angle Crash		**1**		**1**	**1**	**1**				**4**	**22%**
(A) Suspected Serious Injury				1						1	6%
(O) No Injury		1			1	1				3	17%
Not a Collision with Motor Vehicle			**1**				**1**			**2**	**11%**
(O) No Injury			1 UP				1 UP			2	11%
Rear End				**1**	**1**	**1**		**1**	**3**	**7**	**39%**
(B) Suspected Minor/Visible Injury									1	1	6%
(C) Possible Injury / Complaint									1	1	6%
(O) No Injury				1	1	1		1	1	5	28%
Sideswipe-Same Direction	**1**		**1**			**1**			**1**	**4**	**22%**
(O) No Injury	1		1			1			1	4	22%
Totals	**1**	**1**	**2**	**2**	**2**	**3**	**2**	**1**	**4**	**18**	**100%**
(A) Suspected Serious Injury				1						1	6%
(B) Suspected Minor/Visible Injury									1	1	6%
(C) Possible Injury / Complaint									1	1	6%
(O) No Injury	1	1	2	1	2	3	2	1	2	15	83%

UP = Utility Pole

Table 21 - Crashes by Manner of Collision, KABCO Severity, and Year (#15: SR 154 @ Watson Cir)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
15 - Watson Cir	**3**	**1**	**3**	**3**	**2**	**4**	**5**	**2**	**3**	**26**	**100%**
Angle (Other)			**1**			**1**			**1**	**3**	**12%**
(C) Possible Injury / Complaint			1							1	4%
(O) No Injury						1			1	2	8%
Left Angle Crash			**1**		**1**		**1**			**3**	**12%**
(C) Possible Injury / Complaint							1			1	4%
(O) No Injury			1		1					2	8%
Not a Collision with Motor Vehicle				**1**						**1**	**4%**
(O) No Injury				1 FH						1	4%
Rear End	**2**	**1**		**1**	**1**	**2**	**3**		**1**	**11**	**42%**
(A) Suspected Serious Injury							1			1	4%
(C) Possible Injury / Complaint	2	1				1				4	15%
(O) No Injury				1	1	1	2		1	6	23%
Right Angle Crash								**1**		**1**	**4%**
(A) Suspected Serious Injury								1		1	4%
Sideswipe-Opposite Direction	**1**									**1**	**4%**
(O) No Injury	1									1	4%
Sideswipe-Same Direction			**1**	**1**		**1**	**1**	**1**	**1**	**6**	**23%**
(B) Suspected Minor/Visible Injury								1		1	4%
(C) Possible Injury / Complaint									1	1	4%
(O) No Injury			1	1		1	1			4	15%
Totals	**3**	**1**	**3**	**3**	**2**	**4**	**5**	**2**	**3**	**26**	**100%**
(A) Suspected Serious Injury							1	1		2	8%
(B) Suspected Minor/Visible Injury								1		1	4%
(C) Possible Injury / Complaint	2	1	1			1	1		1	7	27%
(O) No Injury	1		2	3	2	3	3		2	16	62%

FH = Fire Hydrant

Table 22 - Crashes by Manner of Collision, KABCO Severity, and Year (#16: SR 154 @ Eva Davis Way)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
16 - Eva Davis Way	**15**	**6**	**9**	**9**	**13**	**7**	**6**	**3**	**1**	**69**	**100%**
Angle (Other)		**1**								**1**	**1%**
(O) No Injury		1								1	1%
Left Angle Crash	**4**		**1**	**3**	**3**	**1**	**1**	**1**		**14**	**20%**
(B) Suspected Minor/Visible Injury			1					1		2	3%
(C) Possible Injury / Complaint	2				1	1	1			5	7%
(O) No Injury	2			3	2					7	10%
Not a Collision with Motor Vehicle	**1**	**1**	**1**		**1**	**1**				**5**	**7%**
(B) Suspected Minor/Visible Injury		1 PED								1	1%
(C) Possible Injury / Complaint					1 BIKE					1	1%
(O) No Injury	1 DG		1 UP			1 PED				3	4%
Rear End	**6**	**3**	**5**	**3**	**2**	**4**	**4**	**1**	**1**	**29**	**42%**
(A) Suspected Serious Injury								1		1	1%
(B) Suspected Minor/Visible Injury		1				1				2	3%
(C) Possible Injury / Complaint			2	1	1	1	1			6	9%
(O) No Injury	6	2	3	2	1	2	3		1	20	29%
Right Angle Crash		**1**								**1**	**1%**
(C) Possible Injury / Complaint		1								1	1%
Sideswipe-Same Direction	**4**		**2**	**3**	**7**	**1**	**1**	**1**		**19**	**28%**
(C) Possible Injury / Complaint				1						1	1%
(O) No Injury	4		2	2	7	1	1	1		18	26%
Totals	**15**	**6**	**9**	**9**	**13**	**7**	**6**	**3**	**1**	**69**	**100%**
(A) Suspected Serious Injury								1		1	1%
(B) Suspected Minor/Visible Injury		2	1			1		1		5	7%
(C) Possible Injury / Complaint	2	1	2	2	3	2	2			14	20%
(O) No Injury	13	3	6	7	10	4	4	1	1	49	71%

BIKE = Bicycle, PED = Pedestrian, DG = Dog, UP = Utility Pole

Table 23 - Crashes by Manner of Collision, KABCO Severity, and Year (#17: SR 154 @ E Lake Terr)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
17 - E Lake Terr	**7**	**3**	**6**	**5**	**6**	**5**	**4**	**3**	**4**	**43**	**100%**
Angle	**1**									**1**	**2%**
(O) No Injury	1									1	2%
Angle (Other)			**1**							**1**	**2%**
(O) No Injury			1							1	2%
Left Angle Crash		**3**	**2**	**1**	**1**	**2**				**9**	**21%**
(A) Suspected Serious Injury					1					1	2%
(C) Possible Injury / Complaint		1	1	1		1				4	9%
(O) No Injury		2	1			1				4	9%
Not a Collision with Motor Vehicle	**1**				**1**	**1**				**3**	**7%**
(C) Possible Injury / Complaint	1 FH				1 UP					2	5%
(O) No Injury						1 TI				1	2%
Rear End	**4**			**2**	**2**	**1**	**3**	**3**	**3**	**18**	**42%**
(C) Possible Injury / Complaint	1					1	1	3		6	14%
(O) No Injury	3			2	2		2		3	12	28%
Right Angle Crash			**1**	**1**						**2**	**5%**
(C) Possible Injury / Complaint				1						1	2%
(O) No Injury			1							1	2%
Sideswipe-Same Direction	**1**		**2**	**1**	**2**	**1**	**1**		**1**	**9**	**21%**
(C) Possible Injury / Complaint							1		1	2	5%
(O) No Injury	1		2	1	2	1				7	16%
Totals	**7**	**3**	**6**	**5**	**6**	**5**	**4**	**3**	**4**	**43**	**100%**
(A) Suspected Serious Injury					1					1	2%
(C) Possible Injury / Complaint	2	1	1	2	1	2	2	3	1	15	35%
(O) No Injury	5	2	5	3	4	3	2		3	27	63%

FH = Fire Hydrant, TI = Tire, UP = Utility Pole

Table 24 - Crashes by Manner of Collision, KABCO Severity, and Year (#18: SR 154 @ 1st Ave)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
18 - 1st Ave		**2**	**2**	**1**	**2**	**4**	**2**		**2**	**15**	**100%**
Angle						**1**				**1**	**7%**
(O) No Injury						1				1	7%
Angle (Other)		**1**								**1**	**7%**
(O) No Injury		1								1	7%
Not a Collision with Motor Vehicle							**1**			**1**	**7%**
(O) No Injury							1 EM			1	7%
Rear End			**2**		**1**	**1**	**1**		**2**	**7**	**47%**
(C) Possible Injury / Complaint			1			1				2	13%
(O) No Injury			1		1		1		2	5	33%
Sideswipe-Same Direction		**1**		**1**	**1**	**2**				**5**	**33%**
(O) No Injury		1		1	1	2				5	33%
Totals		**2**	**2**	**1**	**2**	**4**	**2**		**2**	**15**	**100%**
(C) Possible Injury / Complaint			1			1				2	13%
(O) No Injury		2	1	1	2	3	2		2	13	87%

EM = Embankment

Table 25 - Crashes by Manner of Collision, KABCO Severity, and Year (#19: SR 154 @ 2nd Ave)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
19 - 2nd Ave	**24**	**31**	**29**	**32**	**39**	**32**	**24**	**10**	**11**	**232**	**100%**
Angle	**2**	**8**	**2**	**4**		**3**		**1**		**20**	**9%**
(C) Possible Injury / Complaint	1	1	1	1		1				5	2%
(O) No Injury	1	7	1	3		2		1		15	6%
Angle (Other)	**1**		**1**	**2**	**3**	**1**				**8**	**3%**
(C) Possible Injury / Complaint						1				1	0%
(O) No Injury	1		1	2	3					7	3%
Head On				**1**	**1**		**1**	**1**	**1**	**5**	**2%**
(B) Suspected Minor/Visible Injury								1		1	0%
(C) Possible Injury / Complaint				1	1		1		1	4	2%
Left Angle Crash	**3**	**7**	**6**	**8**	**13**	**9**	**2**		**1**	**49**	**21%**
(B) Suspected Minor/Visible Injury			1	1	1					3	1%
(C) Possible Injury / Complaint	1	2	2	2	5	3	1			16	7%
(O) No Injury	2	5	3	5	7	6	1		1	30	13%
Not a Collision with Motor Vehicle			**1**	**1**	**1**			**1**		**4**	**2%**
(C) Possible Injury / Complaint								1 UP		1	0%
(O) No Injury			1 TR	1 UP	1 UP					3	1%
Rear End	**11**	**12**	**9**	**11**	**12**	**9**	**16**	**6**	**7**	**93**	**40%**
(A) Suspected Serious Injury					1					1	0%
(B) Suspected Minor/Visible Injury		1								1	0%
(C) Possible Injury / Complaint	3	4	1	1		2	2	1	1	15	6%
(O) No Injury	8	7	8	10	11	7	14	5	6	76	33%
Sideswipe-Opposite Direction	**1**			**1**		**1**				**3**	**1%**
(O) No Injury	1			1		1				3	1%
Sideswipe-Same Direction	**6**	**4**	**10**	**4**	**9**	**9**	**5**	**1**	**2**	**50**	**22%**
(C) Possible Injury / Complaint			1		1					2	1%
(O) No Injury	6	4	9	4	8	9	5	1	2	48	21%
Totals	**24**	**31**	**29**	**32**	**39**	**32**	**24**	**10**	**11**	**232**	**100%**
(A) Suspected Serious Injury					1					1	0%
(B) Suspected Minor/Visible Injury		1	1	1	1			1		5	2%
(C) Possible Injury / Complaint	5	7	5	5	7	7	4	2	2	44	19%
(O) No Injury	19	23	23	26	30	25	20	7	9	182	78%

TR = Tree, UP = Utility Pole

Table 26 - Crashes by Manner of Collision, KABCO Severity, and Year (#20: SR 154 @ 3rd Ave)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
20 - 3rd Ave	**6**	**5**	**4**	**6**	**6**	**7**	**1**	**1**	**4**	**40**	**100%**
Angle					**1**					**1**	**3%**
(O) No Injury					1					1	3%
Angle (Other)		**1**			**1**	**2**		**1**		**5**	**13%**
(O) No Injury		1			1	2		1		5	13%
Left Angle Crash					**1**					**1**	**3%**
(O) No Injury					1					1	3%
Not a Collision with Motor Vehicle						**1**				**1**	**3%**
(C) Possible Injury / Complaint						1 TR				1	3%
Rear End	**4**		**3**	**3**	**3**	**3**	**1**		**4**	**21**	**53%**
(B) Suspected Minor/Visible Injury						1				1	3%
(C) Possible Injury / Complaint					2				2	4	10%
(O) No Injury	4		3	3	1	2	1		2	16	40%
Sideswipe-Opposite Direction			**1**							**1**	**3%**
(O) No Injury			1							1	3%
Sideswipe-Same Direction	**2**	**4**		**3**		**1**				**10**	**25%**
(C) Possible Injury / Complaint	1	1								2	5%
(O) No Injury	1	3		3		1				8	20%
Totals	**6**	**5**	**4**	**6**	**6**	**7**	**1**	**1**	**4**	**40**	**100%**
(B) Suspected Minor/Visible Injury						1				1	3%
(C) Possible Injury / Complaint	1	1			2	1			2	7	18%
(O) No Injury	5	4	4	6	4	5	1	1	2	32	80%

TR = Tree

Table 27 - Crashes by Manner of Collision, KABCO Severity, and Year (#21: SR 154 @ 4th Ave / Cottage Grove Ave)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
21 - 4th Ave	**14**	**6**	**2**	**2**	**10**	**6**	**3**	**2**	**5**	**50**	**100%**
Angle (Other)	**2**	**1**								**3**	**6%**
(C) Possible Injury / Complaint	1									1	2%
(O) No Injury	1	1								2	4%
Left Angle Crash	**1**		**1**		**1**					**3**	**6%**
(O) No Injury	1		1		1					3	6%
Not a Collision with Motor Vehicle								**1**	**1**	**2**	**4%**
(B) Suspected Minor/Visible Injury								1 UP		1	2%
(O) No Injury									1 SW	1	2%
Rear End	**8**	**5**			**5**	**2**	**3**	**1**	**3**	**27**	**54%**
(B) Suspected Minor/Visible Injury									1	1	2%
(C) Possible Injury / Complaint	3	3				1	1			8	16%
(O) No Injury	5	2			5	1	2	1	2	18	36%
Right Angle Crash									**1**	**1**	**2%**
(B) Suspected Minor/Visible Injury									1	1	2%
Sideswipe-Opposite Direction				**1**						**1**	**2%**
(O) No Injury				1						1	2%
Sideswipe-Same Direction	**3**		**1**	**1**	**4**	**4**				**13**	**26%**
(C) Possible Injury / Complaint					1					1	2%
(O) No Injury	3		1	1	3	4				12	24%
Totals	**14**	**6**	**2**	**2**	**10**	**6**	**3**	**2**	**5**	**50**	**100%**
(B) Suspected Minor/Visible Injury								1	2	3	6%
(C) Possible Injury / Complaint	4	3			1	1	1			10	20%
(O) No Injury	10	3	2	2	9	5	2	1	3	37	74%

SW = Sidewalk, UP = Utility Pole

Table 28 - Crashes by Manner of Collision, KABCO Severity, and Year (#22: SR 154 @ Carter Ave)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
22 - Carter Ave	**7**		**1**	**4**	**6**	**15**	**6**	**5**	**2**	**46**	**100%**
Angle				**1**		**1**				**2**	**4%**
(C) Possible Injury / Complaint						1				1	2%
(O) No Injury				1						1	2%
Angle (Other)	**1**					**1**				**2**	**4%**
(B) Suspected Minor/Visible Injury						1				1	2%
(C) Possible Injury / Complaint	1									1	2%
Head On					**1**					**1**	**2%**
(B) Suspected Minor/Visible Injury					1					1	2%
Left Angle Crash					**1**	**5**		**1**	**1**	**8**	**17%**
(B) Suspected Minor/Visible Injury						1				1	2%
(C) Possible Injury / Complaint					1	2				3	7%
(O) No Injury						2		1	1	4	9%
Not a Collision with Motor Vehicle					**1**					**1**	**2%**
(O) No Injury					1 UP					1	2%
Rear End	**3**		**1**	**1**	**2**	**4**	**3**	**2**	**1**	**17**	**37%**
(B) Suspected Minor/Visible Injury	1						1			2	4%
(C) Possible Injury / Complaint			1		1		1	2		5	11%
(O) No Injury	2			1	1	4	1		1	10	22%
Right Angle Crash							**1**			**1**	**2%**
(C) Possible Injury / Complaint							1			1	2%
Sideswipe-Opposite Direction							**1**			**1**	**2%**
(C) Possible Injury / Complaint							1			1	2%
Sideswipe-Same Direction	**3**			**2**	**1**	**4**	**1**	**2**		**13**	**28%**
(O) No Injury	3			2	1	4	1	2		13	28%
Totals	**7**		**1**	**4**	**6**	**15**	**6**	**5**	**2**	**46**	**100%**
(B) Suspected Minor/Visible Injury	1				1	2	1			5	11%
(C) Possible Injury / Complaint	1		1		2	3	3	2		12	26%
(O) No Injury	5			4	3	10	2	3	2	29	63%

UP = Utility Pole

Table 29 - Crashes by Manner of Collision, KABCO Severity, and Year (#23: SR 154 @ E Lake Dr)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
23 - E Lake Dr	**4**	**7**	**6**	**5**	**16**	**20**	**11**	**4**	**7**	**80**	**100%**
Angle		**1**			**1**	**2**	**1**			**5**	**6%**
(B) Suspected Minor/Visible Injury		1								1	1%
(O) No Injury					1	2	1			4	5%
Angle (Other)	**1**	**1**			**2**	**5**				**9**	**11%**
(C) Possible Injury / Complaint					1	1				2	3%
(O) No Injury	1	1			1	4				7	9%
Head On		**1**								**1**	**1%**
(O) No Injury		1								1	1%
Left Angle Crash	**1**	**2**	**2**		**2**	**2**	**2**		**1**	**12**	**15%**
(A) Suspected Serious Injury						1				1	1%
(C) Possible Injury / Complaint		1			1					2	3%
(O) No Injury	1	1	2		1	1	2		1	9	11%
Not a Collision with Motor Vehicle						**1**				**1**	**1%**
(O) No Injury						1 TI				1	1%
Rear End	**1**	**2**	**2**	**2**	**2**	**5**	**7**	**4**	**5**	**30**	**38%**
(B) Suspected Minor/Visible Injury						1				1	1%
(C) Possible Injury / Complaint	1	1		1	1		2	1	1	8	10%
(O) No Injury		1	2	1	1	4	5	3	4	21	26%
Right Angle Crash	**1**				**2**				**1**	**4**	**5%**
(A) Suspected Serious Injury					1					1	1%
(O) No Injury	1				1				1	3	4%
Sideswipe-Same Direction			**2**	**3**	**7**	**5**	**1**			**18**	**23%**
(C) Possible Injury / Complaint			1							1	1%
(O) No Injury			1	3	7	5	1			17	21%
Totals	**4**	**7**	**6**	**5**	**16**	**20**	**11**	**4**	**7**	**80**	**100%**
(A) Suspected Serious Injury					1	1				2	3%
(B) Suspected Minor/Visible Injury		1				1				2	3%
(C) Possible Injury / Complaint	1	2	1	1	3	1	2	1	1	13	16%
(O) No Injury	3	4	5	4	12	17	9	3	6	63	79%

TI = Tire

Table 30 - Crashes by Manner of Collision, KABCO Severity, and Year (#24: SR 154 @ Green Ave)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
24 - Green Ave	**2**	**4**	**4**	**6**	**6**	**3**	**2**	**1**		**28**	**100%**
Angle (Other)		**1**								**1**	**4%**
(O) No Injury		1								1	4%
Head On		**1**								**1**	**4%**
(O) No Injury		1								1	4%
Left Angle Crash				**1**						**1**	**4%**
(O) No Injury				1						1	4%
Not a Collision with Motor Vehicle	**1**									**1**	**4%**
(C) Possible Injury / Complaint	1 TR									1	4%
Rear End		**2**	**3**	**3**	**3**	**2**	**2**	**1**		**16**	**57%**
(B) Suspected Minor/Visible Injury				1						1	4%
(C) Possible Injury / Complaint		1	2	1	1	1		1		7	25%
(O) No Injury		1	1	1	2	1	2			8	29%
Sideswipe-Opposite Direction					**1**					**1**	**4%**
(C) Possible Injury / Complaint					1					1	4%
Sideswipe-Same Direction	**1**		**1**	**2**	**2**	**1**				**7**	**25%**
(O) No Injury	1		1	2	2	1				7	25%
Totals	**2**	**4**	**4**	**6**	**6**	**3**	**2**	**1**		**28**	**100%**
(B) Suspected Minor/Visible Injury				1						1	4%
(C) Possible Injury / Complaint	1	1	2	1	2	1		1		9	32%
(O) No Injury	1	3	2	4	4	2	2			18	64%

TR = Tree

Table 31 - Crashes by Manner of Collision, KABCO Severity, and Year (#25: SR 154 @ Daniel Ave W)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
25 - Daniel Ave (W)	**2**	**1**	**3**	**3**	**2**	**4**	**1**		**2**	**18**	**100%**
Angle	**1**			**1**						**2**	**11%**
(O) No Injury	1			1						2	11%
Angle (Other)		**1**	**1**		**1**					**3**	**17%**
(C) Possible Injury / Complaint			1							1	6%
(O) No Injury		1			1					2	11%
Left Angle Crash	**1**					**1**				**2**	**11%**
(O) No Injury	1					1				2	11%
Not a Collision with Motor Vehicle			**1**	**1**						**2**	**11%**
(B) Suspected Minor/Visible Injury			1 CB							1	6%
(O) No Injury				1 TR						1	6%
Rear End			**1**	**1**		**1**	**1**		**1**	**5**	**28%**
(C) Possible Injury / Complaint			1				1		1	3	17%
(O) No Injury				1		1				2	11%
Sideswipe-Same Direction					**1**	**2**			**1**	**4**	**22%**
(C) Possible Injury / Complaint						1				1	6%
(O) No Injury					1	1			1	3	17%
Totals	**2**	**1**	**3**	**3**	**2**	**4**	**1**		**2**	**18**	**100%**
(B) Suspected Minor/Visible Injury			1							1	6%
(C) Possible Injury / Complaint			2			1	1		1	5	28%
(O) No Injury	2	1		3	2	3			1	12	67%

CB = Curb, TR = Tree

Table 32 - Crashes by Manner of Collision, KABCO Severity, and Year (#26: SR 154 @ Daniel Ave E)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
26 - Daniel Ave (E)	**1**	**1**	**4**	**4**	**6**	**7**	**3**	**1**	**4**	**31**	**100%**
Angle			**1**							**1**	**3%**
(O) No Injury			1							1	3%
Angle (Other)					**2**	**2**				**4**	**13%**
(O) No Injury					2	2				4	13%
Not a Collision with Motor Vehicle							**1**		**1**	**2**	**6%**
(K) Fatal Injury									1 PED	1	3%
(O) No Injury							1 MB			1	3%
Rear End	**1**		**2**	**4**	**1**	**4**	**2**	**1**	**3**	**18**	**58%**
(C) Possible Injury / Complaint	1					1			2	4	13%
(O) No Injury			2	4	1	3	2	1	1	14	45%
Sideswipe-Same Direction		**1**	**1**		**3**	**1**				**6**	**19%**
(O) No Injury		1	1		3	1				6	19%
Totals	**1**	**1**	**4**	**4**	**6**	**7**	**3**	**1**	**4**	**31**	**100%**
(K) Fatal Injury									1	1	3%
(C) Possible Injury / Complaint	1					1			2	4	13%
(O) No Injury		1	4	4	6	6	3	1	1	26	84%

PED = Pedestrian, MB = Mailbox

Table 33 - Crashes by Manner of Collision, KABCO Severity, and Year (#27: SR 154 @ Spence Ave)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
27 - Spence Ave	**5**	**7**	**10**	**7**	**11**	**15**	**15**	**4**	**3**	**77**	**100%**
Angle	**1**	**1**	**1**	**1**	**1**	**1**	**4**	**1**	**1**	**12**	**16%**
(A) Suspected Serious Injury		1								1	1%
(B) Suspected Minor/Visible Injury							1			1	1%
(C) Possible Injury / Complaint						1	2		1	4	5%
(O) No Injury	1		1	1	1		1	1		6	8%
Angle (Other)	**1**	**1**	**1**	**1**	**1**	**2**				**7**	**9%**
(C) Possible Injury / Complaint	1					1				2	3%
(O) No Injury		1	1	1	1	1				5	6%
Head On			**1**		**1**					**2**	**3%**
(C) Possible Injury / Complaint			1							1	1%
(O) No Injury					1					1	1%
Left Angle Crash		**1**	**1**		**3**	**1**	**2**			**8**	**10%**
(B) Suspected Minor/Visible Injury					1		1			2	3%
(C) Possible Injury / Complaint						1				1	1%
(O) No Injury		1	1		2		1			5	6%
Not a Collision with Motor Vehicle					**2**	**1**		**1**	**1**	**5**	**6%**
(B) Suspected Minor/Visible Injury								1 UP		1	1%
(C) Possible Injury / Complaint									1 UP	1	1%
(O) No Injury					1 CB, 1 TR	1 CB				3	4%
Rear End	**2**	**4**	**4**	**1**		**3**	**9**	**1**	**1**	**25**	**32%**
(A) Suspected Serious Injury			1							1	1%
(B) Suspected Minor/Visible Injury	1						1			2	3%
(C) Possible Injury / Complaint			1				2		1	4	5%
(O) No Injury	1	4	2	1		3	6	1		18	23%
Right Angle Crash			**1**		**1**	**1**				**3**	**4%**
(C) Possible Injury / Complaint			1							1	1%
(O) No Injury					1	1				2	3%
Sideswipe-Opposite Direction					**1**					**1**	**1%**
(O) No Injury					1					1	1%
Sideswipe-Same Direction	**1**		**1**	**4**	**1**	**6**		**1**		**14**	**18%**
(B) Suspected Minor/Visible Injury								1		1	1%
(C) Possible Injury / Complaint						1				1	1%
(O) No Injury	1		1	4	1	5				12	16%
Totals	**5**	**7**	**10**	**7**	**11**	**15**	**15**	**4**	**3**	**77**	**100%**
(A) Suspected Serious Injury		1	1							2	3%
(B) Suspected Minor/Visible Injury	1				1		3	2		7	9%
(C) Possible Injury / Complaint	1		3			4	4		3	15	19%
(O) No Injury	3	6	6	7	10	11	8	2		53	69%

CB = Curb, TR = Tree, UP = Utility Pole

Table 34 - Crashes by Manner of Collision, KABCO Severity, and Year (#28: SR 154 @ Oakridge Ave)

Location, Manner of Collision, KABCO	Year 2013	2014	2015	2016	2017	2018	2019	2020	2021	Crashes	%
28 - Oakridge Ave	**3**	**4**	**5**	**4**	**8**	**7**	**4**	**9**	**4**	**48**	**100%**
Angle (Other)						**2**		**1**		**3**	**6%**
(O) No Injury						2		1		3	6%
Left Angle Crash		**2**		**1**	**1**					**4**	**8%**
(B) Suspected Minor/Visible Injury		1								1	2%
(C) Possible Injury / Complaint		1								1	2%
(O) No Injury				1	1					2	4%
Not a Collision with Motor Vehicle	**1**		**1**	**1**		**1**		**1**		**5**	**10%**
(B) Suspected Minor/Visible Injury								1 FH		1	2%
(C) Possible Injury / Complaint	1 UP					1 UP				2	4%
(O) No Injury			1 TR	1 TR						2	4%
Rear End	**2**	**2**	**4**	**2**	**6**	**2**	**3**	**6**	**4**	**31**	**65%**
(B) Suspected Minor/Visible Injury					1					1	2%
(C) Possible Injury / Complaint	1	1		1	2		1			6	13%
(O) No Injury	1	1	4	1	3	2	2	6	4	24	50%
Right Angle Crash								**1**		**1**	**2%**
(C) Possible Injury / Complaint								1		1	2%
Sideswipe-Same Direction					**1**	**2**	**1**			**4**	**8%**
(C) Possible Injury / Complaint					1					1	2%
(O) No Injury						2	1			3	6%
Totals	**3**	**4**	**5**	**4**	**8**	**7**	**4**	**9**	**4**	**48**	**100%**
(B) Suspected Minor/Visible Injury		1			1			1		3	6%
(C) Possible Injury / Complaint	2	2		1	3	1	1	1		11	23%
(O) No Injury	1	1	5	3	4	6	3	7	4	34	71%

FH = Fire Hydrant, TR = Tree, UP = Utility Pole

A summary of the crashes found for each intersection and segment in the study corridor was also tabulated by manner of collision, year, and severity, as shown in **Tables 35-38**.

Table 35 - Crashes by Location and Manner of Collision

Location on SR 154	Angle	Angle (Other)	Head On	Left Turn Angle	Not a Crash with Motor Vehicle	Rear End	Right Turn Angle	Side-swipe (Opp)	Side-swipe (Same)	Total Crashes
01 - Vannoy St	1	12		3		5	1		1	**23**
02 - Trenton St		1							4	**5**
03 - Dahlgren St		11		4	2		1		5	**23**
04 - East Side Ave				1		2			4	**7**
05 - Lamon Ave				1	1	1		1	3	**7**
06 - Dixie St				2	2	4			1	**9**
07 - Wilkinson Dr	1			5	2	17	2		8	**35**
08 - Dearborn St			2	2	1	5			2	**12**
09 - Warren St	10	7		19	3	21			16	**76**
10 - Campbell St		2		1	5	7			2	**17**
11 - Eleanor St	1	1		5	1	8	3		3	**22**
12 - Howard St	1	7		11	1	25	3	1	11	**60**
13 - S Howard St		1		10	2	5	1		4	**23**
14 - Palatka St		1		4	2	7			4	**18**
15 - Watson Cir		3		3	1	11	1	1	6	**26**
16 - Eva Davis Way		1		14	5	29	1		19	**69**
17 - E Lake Terr	1	1		9	3	18	2		9	**43**
18 - 1st Ave	1	1			1	7			5	**15**
19 - 2nd Ave	20	8	5	49	4	93		3	50	**232**
20 - 3rd Ave	1	5		1	1	21		1	10	**40**
21 - 4th Ave		3		3	2	27	1	1	13	**50**
22 - Carter Ave	2	2	1	8	1	17	1	1	13	**46**
23 - E Lake Dr	5	9	1	12	1	30	4		18	**80**
24 - Green Ave		1	1	1	1	16		1	7	**28**
25 - Daniel Ave (W)	2	3		2	2	5			4	**18**
26 - Daniel Ave (E)	1	4			2	18			6	**31**
27 - Spence Ave	12	7	2	8	5	25	3	1	14	**77**
28 - Oakridge Ave		3		4	5	31	1		4	**48**

Of the study intersections, the most crashes (232) were found at the intersection of SR 154 and 2nd Ave. The intersections of SR 154 with Warren St, E Lake Dr, and Spence Ave each had 75-80 crashes in the 9-year analysis period. The not a crash with a motor vehicle type crashes are broken out in **Table 36**.

Table 36 - Not a Collision with a Motor Vehicle Crashes by Location

Location on SR 154	Pedestrian	Cyclist	Other	Not a Collision with a Motor Vehicle
01 - Vannoy St				
02 - Trenton St				
03 - Dahlgren St			2	**2**
04 - East Side Ave				
05 - Lamon Ave			1	**1**
06 - Dixie St	1		1	**2**
07 - Wilkinson Dr	1		1	**2**
08 - Dearborn St			1	**1**
09 - Warren St	1	1	1	**3**
10 - Campbell St	2	1	2	**5**
11 - Eleanor St			1	**1**
12 - Howard St	1			**1**
13 - S Howard St			2	**2**
14 - Palatka St			2	**2**
15 - Watson Cir			1	**1**
16 - Eva Davis Way	2	1	2	**5**
17 - E Lake Terr			3	**3**
18 - 1st Ave			1	**1**
19 - 2nd Ave			4	**4**
20 - 3rd Ave			1	**1**
21 - 4th Ave			2	**2**
22 - Carter Ave			1	**1**
23 - E Lake Dr			1	**1**
24 - Green Ave			1	**1**
25 - Daniel Ave (W)			2	**2**
26 - Daniel Ave (E)	1		1	**2**
27 - Spence Ave			5	**5**
28 - Oakridge Ave			5	**5**

Table 37 - Crashes by Location and Year

Location on SR 154	2013	2014	2015	2016	2017	2018	2019	2020	2021
01 - Vannoy St	4	1	3	2	5	4	2	1	1
02 - Trenton St				1	2	1			1
03 - Dahlgren St	4	1	4	5	4	3	2		
04 - East Side Ave		2		1	4				
05 - Lamon Ave	1		2	1		2	1		
06 - Dixie St		3			2	1		2	1
07 - Wilkinson Dr	4	5	4	6	4	3	2	1	6
08 - Dearborn St	1	3		1	1	1	2	1	2
09 - Warren St	7	7	6	11	14	10	12	5	4
10 - Campbell St	2	2	2	3	1	1	1	2	3
11 - Eleanor St	2	2	1	1	3	3	4	1	5
12 - Howard St	4	6	5	6	9	14	5	5	6
13 - S Howard St	1		2	4	7	4	2		3
14 - Palatka St	1	1	2	2	2	3	2	1	4
15 - Watson Cir	3	1	3	3	2	4	5	2	3
16 - Eva Davis Way	15	6	9	9	13	7	6	3	1
17 - E Lake Terr	7	3	6	5	6	5	4	3	4
18 - 1st Ave		2	2	1	2	4	2		2
19 - 2nd Ave	24	31	29	32	39	32	24	10	11
20 - 3rd Ave	6	5	4	6	6	7	1	1	4
21 - 4th Ave	14	6	2	2	10	6	3	2	5
22 - Carter Ave	7		1	4	6	15	6	5	2
23 - E Lake Dr	4	7	6	5	16	20	11	4	7
24 - Green Ave	2	4	4	6	6	3	2	1	
25 - Daniel Ave (W)	2	1	3	3	2	4	1		2
26 - Daniel Ave (E)	1	1	4	4	6	7	3	1	4
27 - Spence Ave	5	7	10	7	11	15	15	4	3
28 - Oakridge Ave	3	4	5	4	8	7	4	9	4
TOTAL	**124**	**111**	**119**	**135**	**191**	**186**	**122**	**64**	**88**

Total crashes at the study intersections increased by 54% from 2013 to a peak in 2017, but the level has since dropped to 71% of 2013 crash levels in 2021. Following completion of PI# M005724 in 2019, which included resurfacing and restriping SR 154 using a 3-lane typical section, crashes along SR 154 between SR 42 and SR 155 have decreased by an average of 39% overall. Intersections studied were found to have varying trends before and after this project, with average annual crashes being reduced up to 100% at 21 locations while crashes increased by up to 67% at seven (7) locations. The greatest relative decrease in crashes (100%) took place at the intersections of SR 154 with Dahlgren St, East Side Ave, and Lamon Ave. SR 154 at 2nd Ave was noted to have the greatest absolute reduction in crashes of more than 20.5 crashes eliminated per year after project implementation. On the other extreme, SR 154 at Eleanor St had the greatest relative increase in crashes of 67% in the after condition. The largest absolute increase in crashes occurred at Oakridge Ave, where crashes have increased by 1.7 crashes per year.

Table 38 - Crashes by Location and Severity

Location on SR 154	K	A	B	C	O
01 - Vannoy St			1	4	18
02 - Trenton St			1	1	3
03 - Dahlgren St			2	6	15
04 - East Side Ave				1	6
05 - Lamon Ave			1	1	5
06 - Dixie St			1	2	6
07 - Wilkinson Dr			1	7	27
08 - Dearborn St		1	1	5	5
09 - Warren St			4	17	55
10 - Campbell St	1	2	1	1	12
11 - Eleanor St		2	1	3	16
12 - Howard St		1	5	12	42
13 - S Howard St			1	8	14
14 - Palatka St		1	1	1	15
15 - Watson Cir		2	1	7	16
16 - Eva Davis Way		1	5	14	49
17 - E Lake Terr		1		15	27
18 - 1st Ave				2	13
19 - 2nd Ave		1	5	44	182
20 - 3rd Ave			1	7	32
21 - 4th Ave			3	10	37
22 - Carter Ave			5	12	29
23 - E Lake Dr		2	2	13	63
24 - Green Ave			1	9	18
25 - Daniel Ave (W)			1	5	12
26 - Daniel Ave (E)	1			4	26
27 - Spence Ave		2	7	15	53
28 - Oakridge Ave			3	11	34
TOTAL	**2**	**16**	**55**	**237**	**830**

Two (2) fatal crashes occurred at the study intersections, including one (1) fatal pedestrian crash at SR 154 and Campbell St as well as one (1) east of Daniel St (E). Two (2) severe injury crashes also occurred at SR 154 and Campbell St, as well as at the intersections of SR 154 with Eleanor St, Watson Cir, E Lake Dr, and Spence Ave.

The top 10 locations with the highest number of crashes along SR 154 in the study area are in **Table 39** below, in descending order of crash totals along with crash severity classification totals.

Table 39 - Top 10 Crash Locations by Crash Count

Location on SR 154	Signal	Crashes	K	A	B	C	O
1. **2nd Ave**	Y	232		1	5	44	182
2. **E Lake Dr**	Y	80		2	2	13	63
3. **Spence Ave**	N	77		2	7	15	53
4. **Warren St**	Y	76			4	17	55
5. **Eva Davis Way**	Y	69		1	5	14	49
6. **Howard St**	N	60		1	5	12	42
7. **4th Ave**	Y	50			3	10	37
8. **Oakridge Ave**	N	48			3	11	34
9. **Carter Ave**	N	46			5	12	29
10. **E Lake Terr**	N	43		1		15	27

The top 10 locations with the most fatal and severe injury crashes along SR 154 in the study area are shown in **Table 40**, in descending order of fatal and then decreasingly severe crashes.

Table 40 - Top 10 Crash Locations by Crash Severity

Location on SR 154	Signal	Crashes	K	A	B	C	O
1. **Campbell St**	N	17	1	2	1	1	12
2. **Daniel Ave (E)**	N	31	1			4	26
3. **Spence Ave**	N	77		2	7	15	53
4. **E Lake Dr**	Y	80		2	2	13	63
5. **Watson Cir**	N	26		2	1	7	16
6. **Eleanor St**	N	22		2	1	3	16
7. **2nd Ave**	Y	232		1	5	44	182
8. **Eva Davis Way**	Y	69		1	5	14	49
9. **Howard St**	N	60		1	5	12	42
10. **Dearborn St**	N	12		1	1	5	5

One (1) fatal pedestrian crash occurred in 2017 near Campbell St. One (1) more fatal pedestrian crash involving a child occurred on Halloween night in 2021 to the east of the crosswalk across Daniel St (E).

To put the crash volumes at each location into context, the average annual crashes over the 9-year analysis period from 2013 to 2021 were compared to the HSM predicted number of crashes per year before and after the road diet that was implemented in 2019, as shown in **Table 41**. A ratio of average annual crashes to the HSM predicted values was calculated as shown in the table. The corridor overall had 2.74 times the HSM predicted number of crashes annually before the road diet was implemented, but this ratio dropped to 1.77 times the HSM predicted crashes after completion of the project. The intersection of SR 154 and 2nd Ave had the highest ratio of the study intersections, with 8.01 crashes per HSM predicted crash before the road diet and dropped to the 4th highest ratio of 3.50 crashes per HSM predicted crash. The intersection of SR 154 at Oakridge Ave had the second highest ratio (5.65) before the road diet, but this ratio increased to the highest among the study locations with 7.65 crashes per HSM predicted crash after. The intersections studied were observed to have 86 more crashes per year than the HSM predicted total before the road diet, dropping to 33 crashes per year above the predicted total. The largest difference between average annual crashes and HSM predicted crashes were at the intersection of SR 154 and 2nd Ave (27 crashes per year difference) before the road diet and has continued to take the top rank despite dropping to less than 8 crashes per year above the HSM predicted value after the road diet.

Table 41 - Annual Crashes versus HSM Predicted Before and After Road Diet

Location	2013	2014	2015	2016	2017	2018	2019	2020	2021	Before	After	A/B	A-B	HSM_B	HSM_A	HSM_R	HSM_D	Ratio_B	Diff_B	Ratio_A	Diff_A
01 - Vannoy St	4	1	3	2	5	4	2	1	1	3.0	1.0	0.33	-2.00	0.67	0.67	1.00	0.00	4.48	2.33	1.49	0.33
02 - Trenton St				1	2	1			1	0.6	0.5	0.83	-0.10	0.63	0.63	1.00	0.00	0.95	-0.03	0.79	-0.13
03 - Dahlgren St	4	1	4	5	4	3	2			3.6	0.0	0.00	-3.60	1.13	1.13	1.00	0.00	3.19	2.47	0.00	-1.13
04 - East Side Ave		2		1	4					1.4	0.0	0.00	-1.40	1.98	1.48	0.75	-0.50	0.71	-0.58	0.00	-1.48
05 - Lamon Ave	1		2	1		2	1			0.8	0.0	0.00	-0.80	1.98	1.48	0.75	-0.50	0.40	-1.18	0.00	-1.48
06 - Dixie St		3			2	1		2	1	1.0	1.5	1.50	0.50	1.98	1.48	0.75	-0.50	0.51	-0.98	1.02	0.02
07 - Wilkinson Dr	4	5	4	6	4	3	2	1	6	4.6	3.5	0.76	-1.10	2.36	2.12	0.90	-0.24	1.95	2.24	1.65	1.38
08 - Dearborn St	1	3		1	1	1	2	1	2	1.2	1.5	1.25	0.30	0.61	0.61	1.00	0.00	1.97	0.59	2.46	0.89
09 - Warren St	7	7	6	11	14	10	12	5	4	9.0	4.5	0.50	-4.50	3.76	3.05	0.81	-0.71	2.39	5.24	1.48	1.45
10 - Campbell St	2	2	2	3	1	1	1	2	3	2.0	2.5	1.25	0.50	1.37	0.93	0.68	-0.44	1.46	0.63	2.69	1.57
11 - Eleanor St	2	2	1	1	3	3	4	1	5	1.8	3.0	1.67	1.20	2.11	2.11	1.00	0.00	0.85	-0.31	1.42	0.89
12 - Howard St	4	6	5	6	9	14	5	5	6	6.0	5.5	0.92	-0.50	2.41	1.61	0.67	-0.80	2.49	3.59	3.42	3.89
13 - S Howard St	1		2	4	7	4	2		3	2.8	1.5	0.54	-1.30	1.73	1.27	0.73	-0.46	1.62	1.07	1.18	0.23
14 - Palatka St	1	1	2	2	2	3	2	1	4	1.6	2.5	1.56	0.90	0.85	0.57	0.67	-0.28	1.88	0.75	4.39	1.93
15 - Watson Cir	3	1	3	3	2	4	5	2	3	2.4	2.5	1.04	0.10	1.02	1.02	1.00	0.00	2.35	1.38	2.45	1.48
16 - Eva Davis Way	15	6	9	9	13	7	6	3	1	10.4	2.0	0.19	-8.40	2.31	2.21	0.96	-0.10	4.50	8.09	0.90	-0.21
17 - E Lake Terr	7	3	6	5	6	5	4	3	4	5.4	3.5	0.65	-1.90	1.72	1.43	0.83	-0.29	3.14	3.68	2.45	2.07
18 - 1st Ave		2	2	1	2	4	2		2	1.4	1.0	0.71	-0.40	1.72	1.43	0.83	-0.29	0.81	-0.32	0.70	-0.43
19 - 2nd Ave	24	31	29	32	39	32	24	10	11	31.0	10.5	0.34	-20.50	3.87	3.00	0.78	-0.87	8.01	27.13	3.50	7.50
20 - 3rd Ave	6	5	4	6	6	7	1	1	4	5.4	2.5	0.46	-2.90	1.69	1.69	1.00	0.00	3.20	3.71	1.48	0.81
21 - 4th Ave	14	6	2	2	10	6	3	2	5	6.8	3.5	0.51	-3.30	2.08	1.93	0.93	-0.15	3.27	4.72	1.81	1.57
22 - Carter Ave	7		1	4	6	15	6	5	2	3.6	3.5	0.97	-0.10	1.91	1.91	1.00	0.00	1.88	1.69	1.83	1.59
23 - E Lake Dr	4	7	6	5	16	20	11	4	7	7.6	5.5	0.72	-2.10	3.35	2.71	0.81	-0.64	2.27	4.25	2.03	2.79
24 - Green Ave	2	4	4	6	6	3	2	1		4.4	0.5	0.11	-3.90	1.20	1.20	1.00	0.00	3.67	3.20	0.42	-0.70
25 - Daniel Ave (W)	2	1	3	3	2	4	1		2	2.2	1.0	0.45	-1.20	1.20	1.20	1.00	0.00	1.83	1.00	0.83	-0.20
26 - Daniel Ave (E)	1	1	4	4	6	7	3	1	4	3.2	2.5	0.78	-0.70	0.77	0.77	1.00	0.00	4.16	2.43	3.25	1.73
27 - Spence Ave	5	7	10	7	11	15	15	4	3	8.0	3.5	0.44	-4.50	2.45	2.45	1.00	0.00	3.27	5.55	1.43	1.05
28 - Oakridge Ave	3	4	5	4	8	7	4	9	4	4.8	6.5	1.35	1.70	0.85	0.85	1.00	0.00	5.65	3.95	7.65	5.65
Grand Total	**124**	**111**	**119**	**135**	**191**	**186**	**122**	**64**	**88**	**136.0**	**76.0**	**0.56**	**-60.00**	**49.71**	**42.93**	**0.86**	**-6.78**	**2.74**	**86.29**	**1.77**	**33.07**

Comparison with GDOT annual average crashes for non-NHS urban minor arterials indicated elevated crash rates throughout the study corridor from 2015-2019. There was one (1) fatal pedestrian crash in 2017 near Campbell St, so the fatal crash rate in that year was over 2.6 times the statewide average for similar corridors. Another fatal pedestrian crash occurred in 2021 just east of Daniel Ave (E). Injury crash rates were up to 52% above the average of comparable facilities statewide during the 5-year analysis period. Similarly, overall crash rates were up to 38% above statewide averages for urban minor arterials in 2015-2019. Results are shown in **Table 42**. Although statewide crash rates are not yet available for 2020 nor 2021, the calculated injury and crash rates in these years were below the 2019 averages and down 18-43% from 2019 crash rates. However, the fatal pedestrian crash in 2021 put the fatal crash rate in that year at more than twice the statewide average over the previous 5 years.

Table 42 - Corridor Crash Rates versus Statewide Averages

Location	2015			2016			2017			2018			2019		
	Fatal Crashes	Injury Crashes	All Crashes	Fatal Crashes	Injury Crashes	All Crashes	Fatal Crashes	Injury Crashes	All Crashes	Fatal Crashes	Injury Crashes	All Crashes	Fatal Crashes	Injury Crashes	All Crashes
SR 154 (Memorial Drive) from Vannoy St to Oakridge Ave	0.00	198	692	0.00	169	760	3.59	172	686	0.00	204	744	0.00	131	486
GDOT Statewide Crash Rate for Urban Minor Arterial (non-NHS)	1.68	156	637	1.53	156	655	1.35	153	623	1.34	134	540	1.32	124	480
Ratio	0.00	1.27	1.09	0.00	1.08	1.16	2.66	1.13	1.10	0.00	1.52	1.38	0.00	1.06	1.01
Difference	-1.68	41.69	54.91	-1.53	12.88	104.94	2.24	19.45	63.19	-1.34	69.95	203.82	-1.32	7.37	5.68

Pedestrian and cyclist crashes were analyzed, with the findings summarized in **Table 43**. Of pedestrians hit, 56% were in the roadway and 44% were in a crosswalk. Of the cyclists hit, 67% were in the roadway and 33% involved a cyclist in a crosswalk.

Table 43 - Pedestrian and Cyclist Related Crash Locations 2013-2021

Location	Ped in Crosswalk	Ped on Sidewalk	Ped in Roadway	Bike in Crosswalk	Bike on Sidewalk	Bike in Roadway	Ped/Bike Related	Total
SR 154 at Dixie St	-	-	1	-	-	-	-	1
SR 154 at Wilkinson Dr	1	-	-	-	-	-	-	1
SR 154 at Warren St	1	-	-	-	-	1	-	2
SR 154 at Campbell St	-	-	2	-	-	1	-	3
SR 154 at Howard St	-	-	1	-	-	-	-	1
SR 154 at Eva Davis Way	2	-	-	1	-	-	-	3
SR 154 at Daniel Ave (E)	-	-	1	-	-	-	-	1

Existing Documented Safety Concerns

Crash diagrams were created for 28 locations where crashes had occurred along or near SR 154 / Memorial Dr. The most notable vehicular crash patterns (defined as those with at least 5 crashes documented in 9 years) are shown in **Figures 10-28** and discussed in this section. The full set of crash diagrams are provided in **Appendix C**.

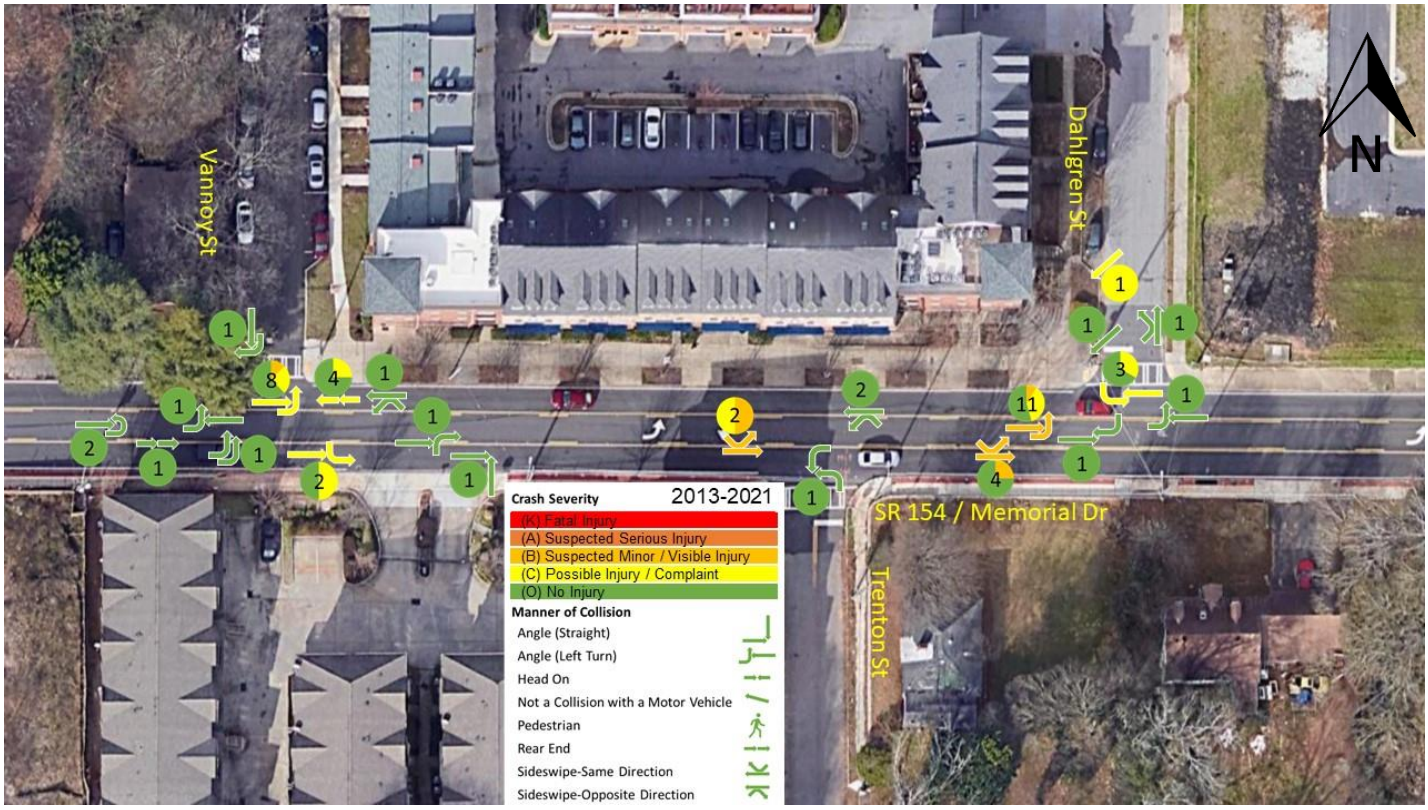


Figure 10 - Crash Diagram for SR 154 at Vannoy St, Trenton St, and Dahlgren St

SR 154 / Memorial Dr at Vannoy St / Trenton St / Dahlgren St had two (2) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 44** and **Table 45**. The most frequent crash pattern was found to be angle crashes for the eastbound approach caused by left-turning vehicles from the eastbound approach colliding with the eastbound through vehicles. This crash pattern could be addressed through safety countermeasures including dedicated turn lanes and a road diet.

Table 44 - 2013-2021 Crash Patterns for SR 154 at Vannoy St

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Angle – Eastbound Left vs. Eastbound	8	0	0	1	2	5	Dedicated eastbound left turn lane

Table 45 - 2013-2021 Crash Patterns for SR 154 at Dahlgren St

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Angle – Eastbound Left vs. Eastbound	11	0	0	1	4	6	Dedicated eastbound left turn lane

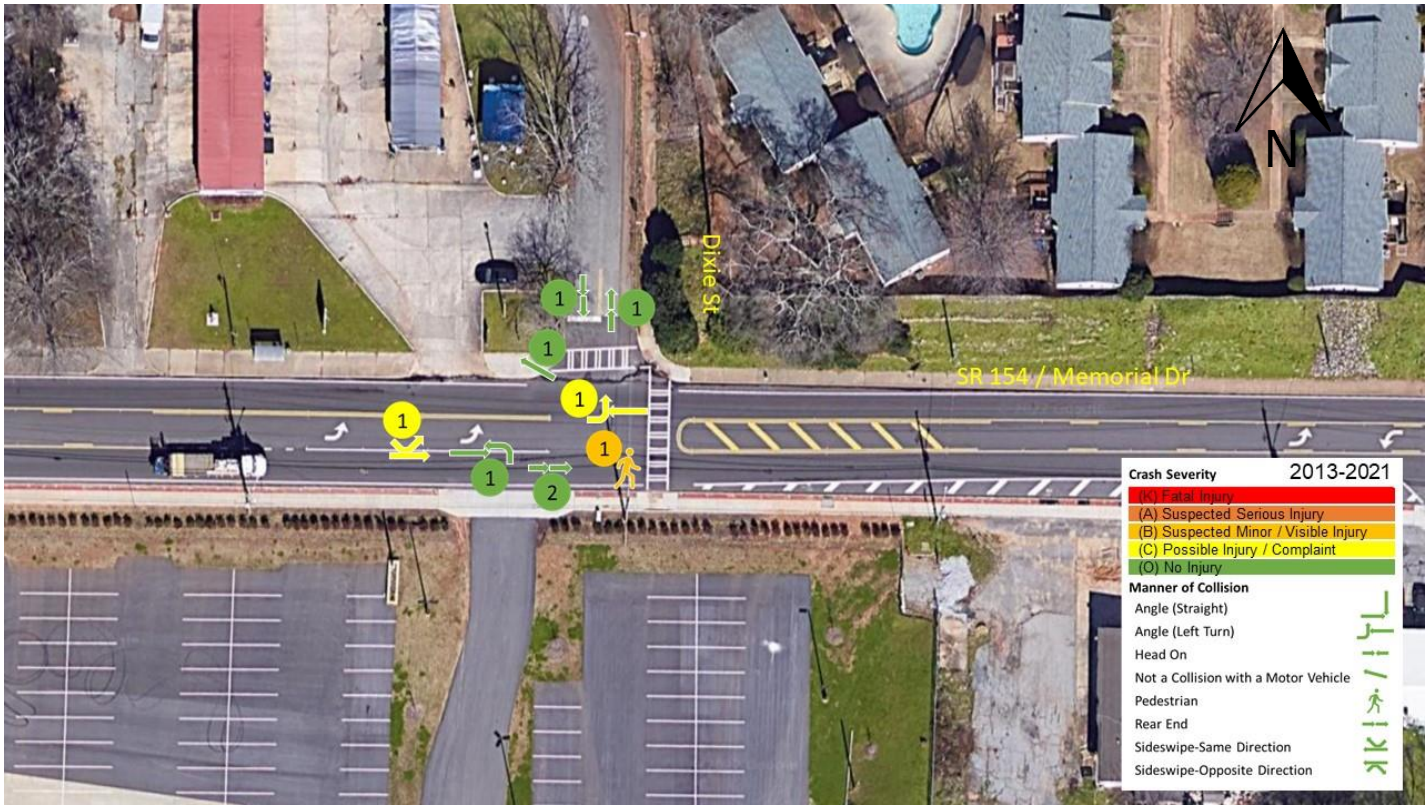


Figure 11 - Crash Diagram for SR 154 at Dixie St

SR 154 / Memorial Dr at Dixie St had zero (0) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 46**. One (1) pedestrian was injured by an eastbound vehicle while crossing across SR 154 outside of the marked crosswalk. This crash pattern could be addressed through safety countermeasures including enhanced crosswalk with RRFB and refuge.

Table 46 - 2013-2021 Crash Patterns for SR 154 at Dixie St

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Pedestrian	1	0	0	1	0	0	RRFB, Pedestrian refuge island

Figure 12 - Crash Diagram for SR 154 at Wilkinson Dr

SR 154 / Memorial Dr at Wilkinson Dr had one (1) crash pattern with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 47**. The most frequent crash pattern was found to be rear end crashes for the westbound approach. This could be addressed by providing advance signing and marking to alert drivers of the traffic signal. One (1) pedestrian was injured by a westbound vehicle while attempting to cross the western leg of SR 154. This crash pattern could be addressed through safety countermeasures including enhanced crosswalk with RRFB and pedestrian refuge island.

Table 47 - 2013-2021 Crash Patterns for SR 154 at Wilkinson Dr

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Westbound	10	0	0	0	1	9	Advance signing and marking, Left-turn lane (added in 2019)
2. Pedestrian in Crosswalk	1	0	0	0	1	0	Leading pedestrian interval, Pedestrian refuge island

Figure 13 - Crash Diagram for SR 154 at Warren St

SR 154 / Memorial Dr at Warren St had seven (7) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 48**. The most frequent crash patterns were found for the westbound and eastbound approaches, including rear end, left turn angle, and sideswipe-same direction crashes. These crash patterns could be addressed through safety countermeasures including dedicated turn lanes (added 2019) and protected turn phases for the mainline approaches. One (1) pedestrian was injured by a westbound vehicle while crossing SR 154 west of the intersection. One (1) cyclist was also injured by a northbound turning vehicle while attempting to cross SR 154. These crash patterns could be addressed through safety countermeasures including leading pedestrian interval and dedicated bicycle facilities.

Table 48 - 2013-2021 Crash Patterns for SR 154 at Warren St

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Westbound	12	0	0	0	2	10	Dedicated westbound turn lane(s) (added 2019)
2. Rear End – Eastbound	9	0	0	0	3	6	Dedicated eastbound turn lane(s) (added 2019)
3. Angle – Westbound Left vs. Eastbound	7	0	0	0	0	7	Protected westbound left turn phase, Roundabout
4. Angle – Westbound vs. Southbound	6	0	0	1	1	4	Increase yellow and/or all-red time, Roundabout
5. Sideswipe-Same Direction – Westbound	6	0	0	0	1	5	Dedicated westbound turn lane(s) (added 2019)
6. Sideswipe-Same Direction – Eastbound	6	0	0	0	0	6	Dedicated eastbound turn lane(s) (added 2019)
7. Angle – Eastbound Left vs. Westbound	5	0	0	0	2	3	Protected eastbound left turn phase, Roundabout
8. Pedestrian	1	0	0	1	0	0	Leading pedestrian interval
9. Cyclist	1	0	0	1	0	0	Dedicated bicycle facilities

Figure 14 - Crash Diagram for SR 154 at Campbell St

SR 154 / Memorial Dr at Campbell St had one (1) crash pattern with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 49**. The most frequent crash pattern was found to be rear end crashes for the westbound approach. This crash pattern could be addressed through safety countermeasures including signing and marking improvements. One (1) pedestrian was severely injured (serious injury crash) by a westbound left-turning vehicle while crossing SR 154 west of the intersection, and one (1) resulted in a fatality caused by a westbound left-turning vehicle striking the pedestrian crossing SR 154, west of the intersection. One (1) cyclist was also severely injured by a westbound left-turning vehicle while making a southbound right turn. These crash patterns could be addressed through safety countermeasures including enhanced crosswalk with RRFB and dedicated bicycle facilities.

Table 49 - 2013-2021 Crash Patterns for SR 154 at Campbell St

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Westbound	5	0	0	1	0	4	Signing and marking improvements
2. Pedestrian	2	1	1	0	0	0	Enhance crosswalk with refuge island
3. Cyclist	1	0	1	0	0	0	Dedicated bicycle facilities

Figure 15 - Crash Diagram for SR 154 at Eleanor St

SR 154 / Memorial Dr at Eleanor St had one (1) crash pattern with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 50**. The most frequent crash pattern was found to be rear end crashes for the westbound approach. This crash pattern indicate rear end collisions caused by following too closely was an issue at this intersection, which could be addressed through turn lane additions or a right-in right-out at the intersection.

Table 50 - 2013-2021 Crash Patterns for SR 154 at Eleanor St

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Westbound	6	0	1	0	1	4	Right-turn lane, RIRO

Figure 16 - Crash Diagram for SR 154 at Howard St and S Howard St

SR 154 / Memorial Dr at Howard St and S Howard St had four (4) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 51**. The most frequent crash patterns were found to be rear-end crashes for the westbound and eastbound approaches, followed by left turn angle crashes, and sideswipe-same direction crashes at the intersection of SR 154 and Howard St. These crash patterns could be addressed through safety countermeasures including dedicated turn lane, restricted crossing U-turns (RCUTs) or right-in right-out (RIRO)s with flex tube delineators or median. One (1) pedestrian was injured by an eastbound vehicle while crossing across the western leg of SR 154 (west of Howard St).

Table 51 - 2013-2021 Crash Patterns for SR 154 at Howard St

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Westbound	11	0	0	0	3	8	Right-turn lane
2. Rear End – Eastbound	9	0	0	0	2	7	Left-turn lanes (added in 2019)
3. Angle – Eastbound Left vs. Westbound	7	0	0	0	3	4	RCUT, RIRO
4. Sideswipe-Same Direction – Westbound	7	0	0	1	0	6	Right-turn lane
5. Pedestrian	1	0	1	0	0	0	RRFB crosswalk

Figure 17 - Crash Diagram for SR 154 at Palatka St

SR 154 / Memorial Dr at Palatka St had one (1) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 52**. The most frequent crash patterns were found to be rear-end crashes on the eastbound approach. These crash patterns, as well as sideswipe-same direction and rear-end crashes for the other approaches, could be addressed through adding left-turn lanes on SR 154.

Table 52 - 2013-2021 Crash Patterns for SR 154 at Palatka St

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Eastbound	5	0	0	1	0	4	Eastbound left-turn lane

Figure 18 - Crash Diagram for SR 154 at Watson Cir

SR 154 / Memorial Dr at Watson Cir had three (3) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 53**. The most frequent crash pattern was found to be rear end crashes for the eastbound and westbound approaches and sideswipe-same direction crash pattern for the eastbound vehicles. These crash patterns could be addressed through adding left-turn lanes on SR 154.

Table 53 - 2013-2021 Crash Patterns for SR 154 at Watson Cir

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Westbound	5	0	1	0	0	4	Eastbound right-turn lane
2. Sideswipe-Same Direction – Eastbound	5	0	0	0	4	1	Westbound left-turn lane (added in 2019)
3. Rear End – Eastbound	5	0	0	1	1	3	Westbound left-turn lane (added in 2019)

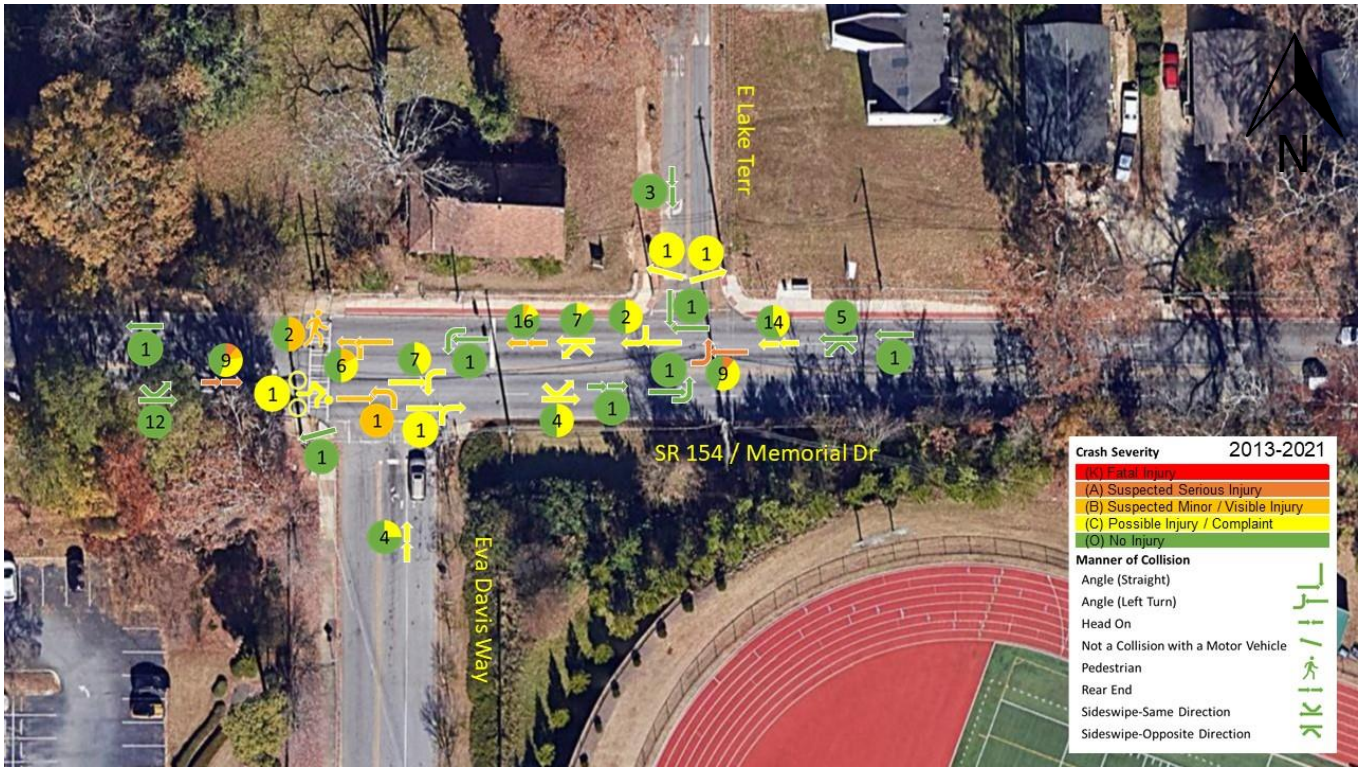


Figure 19 - Crash Diagram for SR 154 at Eva Davis Way and E Lake Terr

SR 154 / Memorial Dr at Eva Davis Way and E Lake Terr had nine (9) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 54** and **Table 55**. The most frequent crash patterns were found to be westbound and eastbound rear-end crashes and sideswipe-same direction crashes. There was also a pattern of left-turning angle crashes from the mainline and the side street approaches at this location. These crash patterns could be addressed through safety countermeasures including a road diet, dedicated eastbound and westbound turn lanes or right-in right-out access. Additionally, two (2) pedestrian crashes were reported on the west leg of SR 154 while crossing in crosswalk on SR154. This crash pattern could be addressed through installation of a rectangular rapid flash beacon (RRFB) and a pedestrian refuge island at the existing crosswalk

Table 54 - 2013-2021 Crash Patterns for SR 154 at Eva Davis Way

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Westbound	16	0	0	1	2	13	Turn lanes on SR 154, Road diet (added in 2019)
2. Sideswipe-Same Direction – Eastbound	12	0	0	0	0	12	Turn lanes on SR 154, Road diet (added in 2019)
3. Rear End – Eastbound	9	0	1	1	3	4	Turn lanes on SR 154, Road diet (added in 2019)
4. Angle – Westbound Left vs. Eastbound	7	0	0	0	3	4	Road diet (added in 2019), RIRO
5. Sideswipe-Same Direction – Westbound	7	0	0	0	1	6	Turn lanes on SR 154, Road diet (added in 2019)
6. Angle – Northbound Left vs. Westbound	6	0	0	1	2	3	Road diet (added in 2019), RIRO
7. Pedestrian	2	0	0	1	0	1	RIRO, RRFB

Table 55 - 2013-2021 Crash Patterns for SR 154 at E Lake Terr

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Westbound	14	0	1	0	0	4	Turn lanes on SR 154, Road diet (added in 2019)
2. Angle – Eastbound Left vs. Westbound	9	0	0	1	4	4	Road diet (added in 2019), RIRO
3. Sideswipe-Same Direction – Westbound	5	0	0	0	0	5	Turn lanes on SR 154, Road diet (added in 2019)

Figure 20 - Crash Diagram for SR 154 at 2nd Ave

SR 154 / Memorial Dr at 2nd Ave has nine (9) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 56**. The most frequent crash pattern was found to be left turning angle crashes caused by westbound left-turning vehicles not yielding to the eastbound though vehicles, followed by rear-end and sideswipe same direction crashes on all approaches. Left-turning angle crashes could be addressed by installing protected only left-turn phasing or a roundabout at the intersection. Rear-end and sideswipe angle crashes could be addressed by adding turn lanes at the intersection or a road diet. Angle crash patterns were identified that indicate red light running as an issue at this intersection, which could be addressed by increasing the yellow time and/or all-red time.

Table 56 - 2013-2021 Crash Patterns for SR 154 at 2nd Ave

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Angle – Westbound Left vs. Eastbound	34	0	0	2	12	20	Protected-only left-turn phasing, Roundabout
2. Sideswipe-Same Direction – Eastbound	32	0	0	0	1	31	Turn lanes on SR 154, Road diet (added in 2019)
3. Rear End – Westbound	31	0	0	0	8	23	Turn lanes on SR 154, Road diet (added in 2019)
4. Rear End – Eastbound	28	0	1	1	5	21	Turn lanes on SR 154, Road diet (added in 2019)
5. Rear End – Northbound	17	0	0	0	1	16	Turn lanes on SR 154, Road diet (added in 2019)
6. Rear End – Southbound	17	0	0	0	1	16	Turn lanes on SR 154, Road diet (added in 2019)
7. Angle – Eastbound vs. Southbound	13	0	0	0	2	11	Increase yellow and/or all-red time
8. Sideswipe-Same Direction – Westbound	12	0	0	0	1	11	Turn lanes on SR 154, Road diet (added in 2019)
9. Angle – Eastbound Left vs. Westbound	5	0	0	0	1	4	Protected left-turn phasing, Roundabout

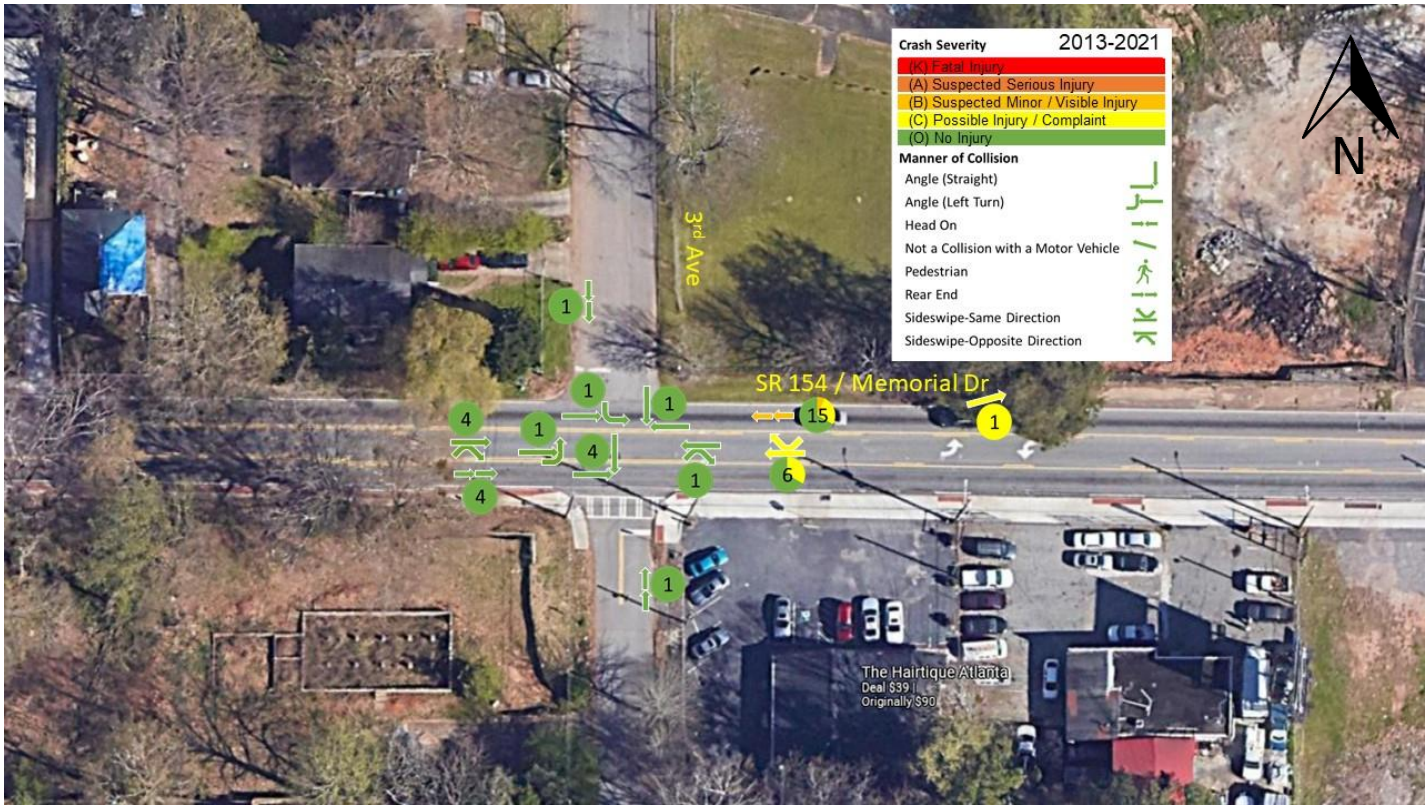


Figure 21 - Crash Diagram for SR 154 at 3rd Ave

SR 154 / Memorial Dr at 3rd Ave had two (2) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 57**. The most frequent crash patterns were found for the westbound approaches, including rear-end and sideswipe-same direction crashes. These crash patterns could be addressed by left-turn lanes on the mainline at the intersection. There were also angle crashes reported at the intersection with the most common crash pattern involving southbound through vehicles not yielding to the westbound through vehicles. These crash patterns, as well as those observed for the other approaches, could be addressed through safety countermeasures including a right-in right-out with flex-tube delineators or raised median at this intersection.

Table 57 - 2013-2021 Crash Patterns for SR 154 at 3rd Ave

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Westbound	15	0	0	1	4	16	Left-turn lanes, RIRO (added in 2019)
2. Sideswipe-Same Direction – Westbound	6	0	0	0	1	5	Left-turn lanes, RIRO (added in 2019)

Figure 22 - Crash Diagram for SR 154 at 4th Ave / Cottage Grove Ave

SR 154 / Memorial Dr at 4th Ave / Cottage Grove Ave had three (3) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 58**. The most frequent crash patterns were found for the eastbound and westbound approaches, including rear-end and sideswipe-same direction crashes. These crash patterns could be addressed through safety countermeasures including advance signing and marking to warn vehicles about the approaching signal and a road diet for SR 154.

Table 58 - 2013-2021 Crash Patterns for SR 154 at 4th Ave / Cottage Grove Ave

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Westbound	15	0	0	0	5	10	Advance signing and marking, Road diet (added in 2019)
2. Rear End – Eastbound	12	0	0	1	3	8	Advance signing and marking, Road diet (added in 2019)
3. Sideswipe-Same Direction – Westbound	9	0	0	0	1	8	Advance signing and marking, Road diet (added in 2019)

Figure 23 - Crash Diagram for SR 154 at Carter Ave

SR 154 / Memorial Dr at Carter Ave had three (3) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 59**. The most frequent crash patterns were found for the eastbound and westbound approaches, including rear-end and sideswipe-same direction crashes. These crash patterns, as well as those observed for the other approaches, could be addressed through safety countermeasures including a road diet for SR 154 as well as dedicated turn lanes. Left-turning angle crash patterns were identified at the intersection, which could be addressed through safety countermeasures including a right-in right-out with flex-tube delineators or raised median at this intersection.

Table 59 - 2013-2021 Crash Patterns for SR 154 at 4th Ave / Cottage Grove Ave

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Eastbound	9	0	0	1	3	5	Turn lanes, Road diet (added in 2019)
2. Sideswipe-Same Direction – Eastbound	8	0	0	0	0	8	Turn lanes, Road diet (added in 2019)
3. Rear End – Westbound	7	0	0	1	1	5	Turn lanes, Road diet (added in 2019)

Figure 24 - Crash Diagram for SR 154 at E Lake Dr

SR 154 / Memorial Dr at E Lake Dr had five (5) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 60**. The most frequent crash patterns were found to be rear-end and sideswipe-same direction crashes on the eastbound and westbound approaches. Left-turning angle crashes involving mainline left-turning vehicles and mainline through vehicles were observed at the intersection. These crash patterns, as well as those observed for the other approaches, could be addressed through safety countermeasures including a road diet for SR 154 as well as dedicated turn lanes and protected left turn phases.

Table 60 - 2013-2021 Crash Patterns for SR 154 at E Lake Dr

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Westbound	18	0	0	1	4	13	Turn lanes (left-turn lanes added for mainline approaches in 2019), Road diet (added in 2019)
2. Sideswipe-Same Direction – Eastbound	13	0	0	0	0	13	Turn lanes (left-turn lanes added for mainline approaches in 2019), Road diet (added in 2019)
3. Rear End –Eastbound	9	0	0	0	2	7	Turn lanes (left-turn lanes added for mainline approaches in 2019), Road diet (added in 2019)
4. Angle – Westbound Left vs. Eastbound	6	0	1	0	1	4	Protected left-turn phasing
5. Angle – Eastbound Left vs. Eastbound	5	0	0	0	2	3	Turn lanes (left-turn lanes added for mainline approaches in 2019), Road diet (added in 2019)

Figure 25 - Crash Diagram for SR 154 at Green Ave

SR 154 / Memorial Dr at Green Ave has two (2) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 61**. The most frequent crash patterns were found to be rear-end and sideswipe-same direction crashes for the eastbound and westbound approaches. These crash patterns, as well as those observed for the other approaches, could be addressed through safety countermeasures including a road diet for SR 154 as well as dedicated turn lanes.

Table 61 - 2013-2021 Crash Patterns for SR 154 at Green Ave

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End –Westbound	13	0	0	1	7	5	Left turn lane, Road diet (added in 2019)
2. Sideswipe-Same Direction – Eastbound	5	0	0	0	0	5	Right turn lane, Road diet (added in 2019)

Figure 26 - Crash Diagram for SR 154 at Daniel Ave

SR 154 / Memorial Dr at Daniel Ave had two (2) crash patterns with five (5) or more crashes during the 5-year analysis period from 2013-2021, as shown in **Table 62**. The most frequent crash pattern was rear-end crashes for the eastbound and westbound approaches. This crash pattern, as well as sideswipe-same direction crashes observed for the other approaches, could be addressed through safety countermeasures including a road diet for SR 154 as well as dedicated turn lanes. A pedestrian fatality was recorded on the east leg of SR 154 caused by a pedestrian crossing mid-block across SR 154 and being hit by an eastbound vehicle.

Table 62 - 2013-2021 Crash Patterns for SR 154 at Daniel Ave (E)

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Eastbound	9	0	0	0	2	7	Right turn lane, Road diet (added in 2019)
2. Rear End – Westbound	7	0	0	0	2	5	Left-turn lane, Road diet (added in 2019)
3. Pedestrian	1	1	0	0	0	0	Raised median, RRFB

Figure 27 - Crash Diagram for SR 154 at Spence Ave

SR 154 / Memorial Dr at Spence Ave had four (4) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 63**. The most frequent crash patterns were found to be rear-end crashes for the eastbound and westbound approaches, followed by sideswipe crashes for the eastbound approach. There were also angle crashes related to eastbound left-turning vehicles colliding with eastbound through vehicles as they make the left-turn on to Spencer Ave at the study intersection. These crash patterns, as well as those observed for the other approaches, could be addressed through safety countermeasures including a road diet for SR 154 as well as dedicated turn lanes.

Table 63 - 2013-2021 Crash Patterns for SR 154 at Spence Ave

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Eastbound	16	0	1	1	4	10	Turn lanes, Road diet (added in 2019)
2. Sideswipe-Same Direction – Eastbound	11	0	0	1	0	10	Turn lanes, Road diet (added in 2019)
3. Rear End – Westbound	9	0	0	1	0	8	Turn lanes, Road diet (added in 2019)
4. Angle – Eastbound Left vs. Eastbound	5	0	0	0	2	3	Left-turn lane

Figure 28 - Crash Diagram for SR 154 at Oakridge Ave

SR 154 / Memorial Dr at Oakridge Rd had two (2) crash patterns with five (5) or more crashes during the 9-year analysis period from 2013-2021, as shown in **Table 64**. The most frequent crash patterns were found to be rear-end crashes on the eastbound and westbound approaches. These crash patterns could be addressed through safety countermeasures including a road diet for SR 154 as well as dedicated turn lanes.

Table 64 - 2013-2021 Crash Patterns for SR 154 at Oakridge Ave

Crash Patterns	Crashes	K	A	B	C	O	Countermeasure(s)
1. Rear End – Eastbound	18	0	0	1	2	15	Right turn lane, Road diet (added in 2019)
2. Rear End – Westbound	12	0	0	0	4	8	Left-turn lane, Road diet (added in 2019)

Although protected only left turn phasing is listed under countermeasures in several crash pattern tables, crash data did not justify implementation of protected-only left turn phasing. If corresponding left angle crashes at any signalized intersection exceed 5 in any 24-month period under protected-permissive phasing moving forward or other factors require protected only left turn phasing, then this countermeasure could be further analyzed and potentially implemented in the future.

Lastly, crashes for the corridor overall were analyzed by time of day (hour) and day of the week for data from 2013-2021, as shown in **Figure 29**. The afternoon peak hours as well as Thursdays and Fridays appear to have the most crashes, with injury crashes up in midday while fatal crashes occurred during peak AM or night hours (7-9pm).

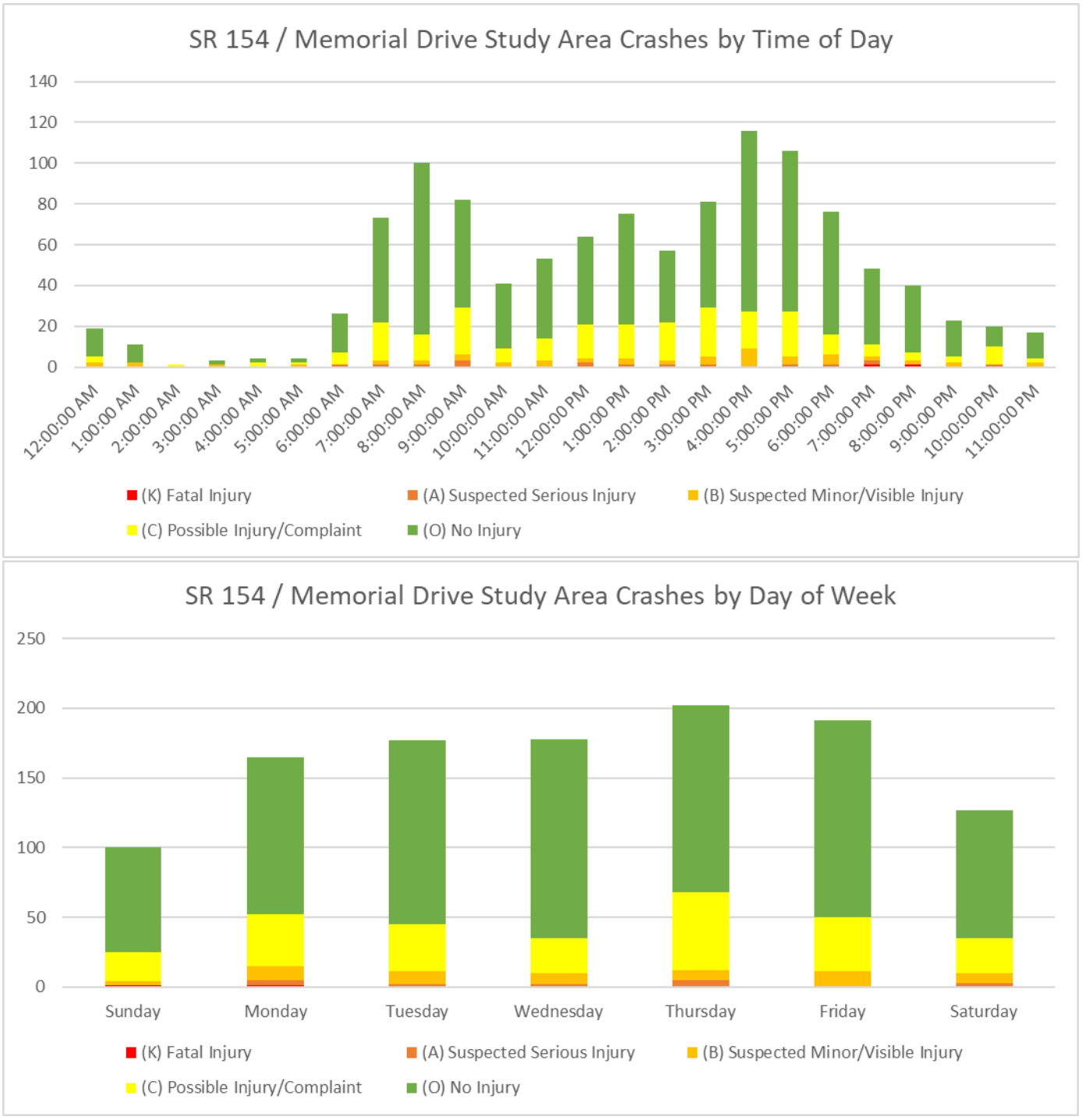


Figure 29 - Crashes by Hour and Day

OPERATIONAL ANALYSIS

This report section documents the operational analysis performed for the existing corridor configuration, as shown below.

Traffic Volume History

New traffic counts were collected at the following locations in the study area to support development of traffic models. All raw count data is provided in **Appendix D**. New counts collected for this study included 17 12-hour TMCs, two (2) 48-hour average daily traffic counts (ADTs), 10 pedestrian and bike counts, at the locations (west to east) and on the dates listed below.

Turn movement counts collected were collected on Tuesday, January 11, 2022 at:

- SR 154 / Memorial Dr at Wilkinson Dr
- SR 154 / Memorial Dr at Dearborn St
- SR 154 / Memorial Dr at Warren St
- SR 154 / Memorial Dr at Howard St
- SR 154 / Memorial Dr at S Howard St
- SR 154 / Memorial Dr at Watson Cir
- SR 154 / Memorial Dr at Eva Davis Way
- SR 154 / Memorial Dr at E Lake Terr
- SR 154 / Memorial Dr at 1st Ave
- SR 154 / Memorial Dr at 2nd Ave
- SR 154 / Memorial Dr at 3rd Ave
- SR 154 / Memorial Dr at 4th Ave / Cottage Grove Ave
- SR 154 / Memorial Dr at E Lake Dr
- SR 154 / Memorial Dr at Green Ave
- SR 154 / Memorial Dr at Daniel Ave (W)
- SR 154 / Memorial Dr at Daniel Ave (E)
- SR 154 / Memorial Dr at Spence Ave

Average daily traffic counts were collected on Tuesday, January 11 and Wednesday, January 12, 2022 at:

- SR 154 / Memorial Dr East of Clay St
- SR 154 / Memorial Dr between Green Ave and Daniel Ave (W)

Pedestrian counts collected were collected on Tuesday, January 11, 2022 at:

- SR 154 / Memorial Dr between Trenton St and Dahlgren St
- SR 154 / Memorial Dr at East Side Ave
- SR 154 / Memorial Dr at Lamon Ave
- SR 154 / Memorial Dr at Dixie St
- SR 154 / Memorial Dr between Howard St and S Howard St
- SR 154 / Memorial Dr at Palatka St
- SR 154 / Memorial Dr at Carter Ave
- SR 154 / Memorial Dr at Daniel Ave (W)
- SR 154 / Memorial Dr at Daniel Ave (E)
- SR 154 / Memorial Dr at Oakridge Ave

In addition to count data collection, the study team investigated traffic volumes and class data through the GDOT Traffic Analysis and Data Application (TADA) platform and the GDOT Automated Traffic Signal Performance Measures (ATSPM). TADA data was available at two (2) classification count sites along SR 154 within the study area, which were used to inform growth rates for traffic volume projections and heavy vehicle percentages. Current AADTs are estimated at 20,500 for the western station (089-3183), west of Clay St, and at 18,600 for the eastern station (089-3185), between Green Ave and Daniel Ave (W). This corridor has a peak hourly volume of 1,350 in one direction.

TADA also provided a basis for comparison of counts collected in 2020 to pre-pandemic counts from 2018 and 2019. These values were used to determine an hourly correction factor to apply to raw 2022 counts so that they more accurately reflect traffic conditions prior to the onset of the COVID 19 pandemic in the United States.

No major delays were noted in the study corridor during field visits, which was further verified through analysis of the Purdue Split Failure metrics in ATSPM. Results indicating higher levels of intersection delay are summarized below:

- Eva Davis Way was found to have up to 33% split failures in the morning peak period.
- 2nd Ave was found to have up to 28% split failures in the morning, midday, and afternoon peak periods.
- E Lake Dr was found to have up to 19% split failures in the mid-morning peak period.

Delay

Intersections in the study area were modeled and analyzed using Synchro 11 software for the existing conditions in current year 2022, opening year 2024, and design year 2044. The results are summarized in **Table 65** for the morning peak hour and **Table 66** for the afternoon peak hour. As shown, delay is expected to be highest for the minor street approaches of S Howard St and Spence Ave at SR 154, which both have failing level of service (LOS) in 2022 that could become worse if traffic volumes grow at the projected 1% compound annual growth rate estimated for the corridor over the next 20+ years. All traffic modeling reports are provided in **Appendix E**.

Table 65 - Existing and No Build Intersection Delay and LOS for AM Peak Hour

Cross Street	Signal	2022 No Build		2024 No Build		2044 No Build	
Wilkinson Dr	Y	6.4	A	6.5	A	10.8	B
Dearborn St	N	24.6	C	25.5	D	37.8	E
Warren St	Y	8.9	A	9.0	A	13.1	B
Howard St	N	53.0	F	56.1	F	195.0	F
S Howard St	N	13.0	B	13.1	B	15.4	C
Watson Cir	N	19.0	C	19.5	C	26.0	D
Eva Davis Way*	Y	8.3	A	8.3	A	11.9	B
E Lake Terr	N	19.3	C	19.7	C	26.8	D
1st Ave	N	19.4	C	19.9	C	26.3	D
2nd Ave*	Y	37.0	D	38.2	D	74.4	E
3rd Ave	N	12.0	B	12.1	B	13.4	B
4th Ave / Cottage Grove Ave*	Y	5.0	A	5.1	A	8.1	A
East Lake Dr	Y	10.8	B	11.3	B	32.4	C
Green Ave	N	12.1	B	12.3	B	13.6	B
Daniel Ave (W)	N	12.1	B	12.2	B	13.6	B
Daniel Ave (E)	N	21.0	C	21.5	C	27.9	D
Spence Ave	N	62.1	F	64.9	F	166.3	F

* = HCM 2000 Methodology

Table 66 - Existing and No Build Intersection Delay and LOS for PM Peak Hour

Cross Street	Signal	2022 No Build		2024 No Build		2044 No Build	
Wilkinson Dr	Y	16.9	B	13.8	B	39.4	D
Dearborn St	N	16.8	C	17.1	C	21.1	C
Warren St	Y	8.6	A	9.6	A	11.2	B
Howard St	N	27.2	D	28.1	D	62.8	F
S Howard St	N	16.9	C	17.2	C	22.5	C
Watson Cir	N	13.7	B	13.9	B	16.2	C
Eva Davis Way*	Y	14.7	B	12.8	B	16.5	B
E Lake Terr	N	14.7	B	14.9	B	18.7	C
1st Ave	N	15.2	C	15.4	C	18.4	C
2nd Ave*	Y	46.8	D	46.8	D	89.4	F
3rd Ave	N	16.3	C	16.6	C	20.4	C
4th Ave / Cottage Grove Ave*	Y	10.3	B	11.7	B	13.1	B
East Lake Dr	Y	9.0	A	10.2	B	14.6	B
Green Ave	N	18.2	C	18.6	C	23.7	C
Daniel Ave (W)	N	18.3	C	18.7	C	23.9	C
Daniel Ave (E)	N	17.1	C	17.4	C	21.2	C
Spence Ave	N	91.7	F	100.7	F	500.0	F

* = HCM 2000 Methodology

Traffic Signal Warrant Analysis

Traffic signal warrant analysis was performed for each intersection included in ICE analysis using HCS 7 Warrants software as well as direct referral to the MUTCD. The results for MUTCD Traffic Signal Warrants 1-8 are summarized in **Table 67**. Full warrant reports are included in **Appendix F**.

Overall, MUTCD Warrants 1-3 were not met for any intersection, including Eva Davis Way which is currently signalized. The only traffic signal warrants met were:

- Warrant 5 (School Crossing) at Eva Davis Way
- Warrant 6 (Coordinated Signal System) was met at each analyzed location except for Dearborn St

Table 67 - Results of Traffic Signal Warrant Analysis for MUTCD Warrants

SR 154 @	Right Turn Reduction	Warrant 1	Warrant 2	Warrant 3	Warrant 4	Warrant 5	Warrant 6	Warrant 7	Warrant 8
Dearborn St	No	-	-	-	-	-	-	-	-
	Yes	-	-	-	-	-	-	-	-
S Howard St	No	-	-	-	-	-	Met	-	-
	Yes	-	-	-	-	-	Met	-	-
Eva Davis Way	No	-	-	-	-	Met	Met	-	-
	Yes	-	-	-	-	Met	Met	-	-
E Lake Terr	No	-	-	-	-	-	Met	-	-
	Yes	-	-	-	-	-	Met	-	-
3rd Ave	No	-	-	-	-	-	Met	-	-
	Yes	-	-	-	-	-	Met	-	-
Green Ave	No	-	-	-	-	-	Met	-	-
	Yes	-	-	-	-	-	Met	-	-

ENVIRONMENTAL SCREENING

A concept-level desktop environmental screening was performed for the study area, including NEPA/GEPA, Ecology, History, and Archaeology. The findings are summarized below.

NEPA/GEPA

A Categorical Exemption (CE) is anticipated due to this project scope being limited to installation of crosswalks and installation of short median sections. Outreach activities (e.g., stakeholder meetings and Public Information Open Houses) to solicit local business and residence feedback would be an integrated part of the project development process. The project corridor is a major thoroughfare surrounded by the Edgewood, Kirkwood, and East Lake communities of Atlanta. The above listed communities are established residential neighborhoods, and Memorial Drive consists of an established commercial and institutional corridor. A desktop review of the current City of Atlanta zoning map indicates mixed use, commercial, single and multi-family residential, residential-limited commercial and planned development uses.

A desktop review was completed to identify the various community groups in the project area. An environmental justice study is recommended to evaluate project impacts on low income and minority populations afforded protection under Executive Order (EO) 12898 and limited English Proficient populations afforded protection under EO 13166.

There are eleven (11) churches, four (4) schools, two (2) parks, four (4) community recreation areas and five (5) potential UST facilities present along the project corridor. There is also one (1) subsidized housing facility present along the project corridor: Villages of East Lake, Subsidized Housing (Housing Authority of Atlanta). These community resources serve as a foundation for developing the public outreach approach for this project. Businesses would also be notified of public outreach activities and project plans.

There are currently no facilities present along the project corridor that are listed with the Georgia Environmental Protection Division (EPD) as a leaking UST (LUST).

MARTA Bus Route 21: Route 21 follows the entire length of the project corridor between Downtown Atlanta and the Kensington Marta Station in Avondale Estates. An early coordination letter to MARTA would be necessary to inform the agency of the project.

Ecology

Based on a desktop review of the National Hydrography Dataset, six (6) streams were identified in the immediate vicinity of the project corridor, four (4) of which intersect the project corridor: Sugar Creek crosses the project between the intersections of East Side Avenue and Lamon Avenue; Hardee Creek intersects the project corridor between the intersections of Clay Street and Wilkinson Drive; an unnamed stream intersects the project corridor approximately 150 feet west of the intersection with Watson Circle; and an unnamed stream intersects the project corridor at the intersection of Palatka Street. The remaining two (2) streams are located in the project area, but do not intersect the corridor: an unnamed tributary of Shoal Creek is located approximately 500 feet northeast of the intersection of Candler Road (project's eastern terminus); an unnamed stream is located approximately 325 feet north of the project corridor, northeast of the intersection with Lamon Avenue. Sugar Creek, which crosses the project corridor, is also on the 303(d) list of impaired streams due to urban runoff/urban effects.

A review of the National Wetlands Inventory (NWI) did not identify wetlands in the immediate area (within 500 feet of the corridor). However, a field survey for Waters of the U.S. and state buffered waters would be necessary to confirm the desktop results and locate any resources that cannot be identified by desktop review. A US Army Corps of Engineers permit is anticipated for this project. A stream buffer variance from the Georgia Department of Natural Resources (GA DNR) would be required if the project impacts the buffers of state waters outside of the exempted criteria.

Based on desktop review for protected species, there is one (1) federally protected species with the potential to occur in the project area: Michaux's Sumac (*Rhus michauxii*) listed by the United States Fish and Wildlife Service (USFWS). Also the GA DNR lists twenty-six (26) state protected species for Fulton and DeKalb counties. A field survey for protected species would be necessary to confirm the presence of species and/or habitat identified by the desktop review.

History

Based on a desktop review for historic resources, one (1) National Register of Historic Places (NRHP)-listed historic district (Kirkwood Historic District) and one (1) NRHP-eligible historic district (East Lake Historic District) were also identified in the project area. In addition, a review of Georgia's Natural, Archaeological, and Historic Resources GIS (GNAHRGIS) identified three (3) historic resources along the project corridor. These include three (3) historic resources which are residences and do not currently have an NRHP recommendation. Additionally, within the project area, there are approximately 85 properties in DeKalb County with buildings or structures 50 years old or older based on the desktop review. These identified properties would be field surveyed as part of the historic resources survey.

Seven (7) historic markers were identified along the project corridor. Should the markers be required to be removed during construction and reset after, then the contractor would be required to contact the Program Assistant at the Georgia Historical Society to arrange for the removal, storage, and replacement of the markers during construction. If the markers are to be relocated from their original sites following construction, coordination on new locations would also need to be coordinated with the Georgia Historical Society.

Archaeology

Based on desktop review for archaeological resources, there were no previously recorded archaeological sites present within a 1-kilometer radius of the project corridor. There are no cemeteries present along the project corridor. There is a low potential for future recordation of archaeological sites due to the urbanized nature of the project corridor. The corridor will cross historic streetcar lines at the intersections with Howell Drive, Flat Shoals Avenue, 4th Avenue, and E. Lake Drive. The trolley line at 4th Avenue is programmatically ineligible for listing in the NRHP, but the others must be investigated and may necessitate the use of ground penetrating radar (GPR) investigations.

POTENTIAL ALTERNATIVES AND COUNTERMEASURES

To compare alternatives at each intersection where a change to the intersection geometry and access is being considered, ICE analysis was performed. The results are briefly summarized below, with full ICE reports provided in **Appendix G**.

Intersection Control Evaluation (ICE) – Stage 1

This process was the framework for consideration of the most applicable intersection alternatives based on seven (7) questions, shown below. The results guided the selection of 2-4 alternatives per intersection to advance to Stage 2 analysis, as shown in **Table 68**.

1. Does alternative address the project need in a balanced manner and in scale with the project?
2. Does alternative improve safety performance in terms of reducing severe crashes?
3. Does alternative incorporate safety, convenience, and accessibility for pedestrians and bicyclists?
4. Does alternative improve (or preserve) traffic operations (congestion, delay, reliability, etc.)?
5. Does alternative appear feasible given the site characteristics, constraints, and location context?
6. Does alternative appear feasible with respect to other project factors?
7. Overall feasible alternative (select alternative for further evaluation in Stage 2)?

Table 68 - ICE Stage 1 Analysis Results

SR 154 @	Stage 1 Alternative	Need	Safety	Ped/Bike	Operations	Feasible site	Feasible project	Feasible overall	Advanced to ICE Stage 2
Dearborn St	Conventional (Minor Stop)	N	N	N	Y	Y	Y	N	-
	RCUT (Stop Control)	N	N	N	Y	N	N	N	-
	RIRO w/downstream U-turn	Y	Y	N	Y	Y	Y	Y	Waiver
	High-T (unsignalized)	N	N	N	Y	N	N	N	-
	Add one LT Lane on SR 154	N	N	N	N	N	N	N	-
S Howard St	Conventional (Minor Stop)	Y	N	N	N	Y	Y	Y	Yes
	RCUT (Stop Control)	Y	Y	N	Y	Y	Y	Y	Yes
	RIRO w/downstream U-turn	Y	Y	N	Y	Y	Y	Y	Yes
	High-T (unsignalized)	N	N	N	Y	N	N	N	-
	Add LT Lanes on SR 154	N	N	N	N	N	N	N	-
Eva Davis Way	Conventional (Minor Stop)	N	N	N	Y	Y	Y	N	-
	RIRO w/downstream U-turn	Y	Y	N	Y	Y	Y	N	-
	High-T (unsignalized)	N	N	N	Y	N	N	N	-
	Traffic Signal	N	N	N	N	N	N	N	Waiver
E Lake Terr	Conventional (Minor Stop)	N	N	N	Y	Y	Y	N	-
	RCUT (Stop Control)	N	N	N	Y	N	N	N	-
	RIRO w/downstream U-turn	Y	Y	Y	Y	Y	Y	Y	Waiver
	High-T (unsignalized)	N	N	N	Y	N	N	N	-
3rd Ave	Conventional (Minor Stop)	N	N	N	Y	Y	Y	N	-
	RCUT (Stop Control)	N	N	N	Y	N	N	N	-
	RIRO w/downstream U-turn	Y	Y	N	Y	Y	Y	Y	Waiver
	High-T (unsignalized)	N	N	N	Y	N	N	N	-
	Add LT Lanes on SR 154	N	N	N	N	N	N	N	-
Green Ave	Conventional (Minor Stop)	N	N	N	Y	Y	Y	N	-
	RCUT (Stop Control)	N	N	N	Y	N	N	N	-
	RIRO w/downstream U-turn	Y	Y	N	Y	Y	Y	Y	Waiver
	High-T (unsignalized)	N	N	N	Y	N	N	N	-
	Add one LT Lane on SR 154	N	N	N	N	N	N	N	-

Crash Reduction Factors

The following crash reduction factors taken from the CMF Clearinghouse at http://www.cmfclearinghouse.org were used in the ICE analysis and overall benefit cost-ratio calculation for the recommended multimodal safety project:

- Enhance existing crosswalk or install new ped crossing with raised refuge island and RRFBs (if pedestrian crashes are observed at the intersection)
  - CRF_{PDO}: 47% reduction of vehicle-pedestrian crashes (CMF ID 9024)
  - $CRF_{I/F}$: 47% reduction of vehicle-pedestrian crashes (CMF ID 9024)
- Enhance existing crosswalk or install new ped crossing with raised refuge island and RRFBs (if pedestrian crashes are not observed at the intersection)
  - CRF_{PDO}: 7% reduction of rear-end crashes (CMF ID 9125)
  - $CRF_{I/F}$: 7% reduction of rear-end crashes (CMF ID 9125)
- Reinforce Right-in Right-out (RIRO) with raised median (existing condition is RIRO with flex tubes)
  - CRF_{PDO}: 23% reduction of angle, head-on and sideswipe-opposite direction crashes (CMF ID 2514)
  - $CRF_{I/F}$: 23% reduction of angle, head-on and sideswipe-opposite direction crashes (CMF ID 2514)
- Install Right-in Right-out (RIRO) with flex tube delineators
  - CRF_{PDO}: 100% reduction of angle, head-on and sideswipe-opposite direction crashes (based on engineering judgement)
  - $CRF_{I/F}$: 100% reduction of angle, head-on and sideswipe-opposite direction crashes (based on engineering judgement)
- Install pedestrian refuge island
  - CRF_{PDO}: 32% reduction of vehicle-pedestrian crashes (CMF ID 8799)
  - $CRF_{I/F}$: 32% reduction of vehicle-pedestrian crashes (CMF ID 8799)

This corridor completed a road diet project that included a road diet with turn lanes at intersections and RIRO with flex tube delineators at certain intersections in 2019. The RIRO improvements may have reduced angle crashes at the treatment locations in the “after road diet” period (2020 – 2021). Hence, a CRF of 23% reduction of angle, head-on and sideswipe-opposite direction crashes was applied for installing RIRO with raised medians where RIRO with flex tube delineators are existing. RRFB pedestrian crosswalks with raised pedestrian refuge islands are proposed at several locations along the corridor to improve pedestrian safety. However, there are no recorded pedestrian crashes during the 9-year crash period between 2013 and 2021 at a few proposed RRFB locations. Hence, a 7% reduction of rear-end crashes was considered for calculating the benefits at these locations.

Intersection Control Evaluation (ICE) – Stage 2

Further analysis of each road diet alternative that advanced to ICE Stage 2 included consideration of planning-level cost estimates, traffic operations factors, and safety benefits estimated from crash data and appropriate crash reduction factors (CRFs) for property damage only (PDO) and injury or fatal crashes (I/F). These estimates were used to calculate a benefit-cost (B/C) ratio for each alternative, as well as an ICE score and rank among the alternatives considered for each intersection. The results of the ICE Stage 2 analysis process are shown in **Table 69** with the preferred alternative shown in bold. The intersection alternatives included in the study recommendations all ranked 1st in ICE Stage 2.

Table 69 - ICE Stage 2 Analysis Results

SR 154 @	Alternative	Cost	CRF_{PDO}	$CRF_{I/F}$	Rank	Score
S Howard St	1 – Conventional (Minor Stop)	$7,000	0%	0%	3	5.7
	2 – RCUT (Stop Control)	**$75,000**	**31%**	**53%**	**1**	**7.0**
	3 – RIRO w/downstream U-turn	$95,000	35%	54%	2	6.8

In addition to proposing enhancements to pedestrian crosswalks and signalized intersections where crash patterns have persisted, analysis was performed to evaluate potential new crosswalk locations in the study area. The results informing study recommendations are summarized in **Table 70** below, with full results in **Appendix B**.

Table 70 - Pedestrian Crosswalk Evaluation Summary

Location along SR 154	Max. Ped Count/Hr	Ped Crashes	Ped Inj. Crashes	Ped Fatal Crashes	Notes	Recommendations
Vannoy St – Dahlgren St	1	0	0	0	MARTA, 900' to nearest crosswalk	Crosswalk + RRFB + Ped Refuge
East Side Ave	3	0	0	0	Limited sight distance	-
Dixie St	2	1	1	0	Existing crosswalk	RRFB + Ped Refuge
Howard St – S Howard St	3	1	1	0	MARTA, 900' to nearest crosswalk	Crosswalk + RRFB + Ped Refuge
Palatka St	16	0	0	0	MARTA, 1,250' to nearest crosswalk	Crosswalk + RRFB + Ped Refuge
Carter Ave	4	0	0	0	MARTA, 500' to nearest crosswalk	-
Daniel Ave	4	1	0	1	Existing crosswalks	RRFBs + Ped Refuges
Oakridge Ave	3	0	0	0	MARTA, RIRO	Crosswalk + RRFB + Ped Refuge

Safety Impact of Potential Alternatives and Countermeasures

The actual crash reduction realized as a result of safety countermeasures depends on many factors that could increase or decrease effectiveness, such as driver attentiveness, travel speeds, and compliance. While all influential factors cannot be accounted for, estimates of crash reduction for individual interventions have been generated and vetted through extensive research. Appropriate Crash Reduction Factors (CRFs) were used to compare anticipated benefits of each intersection alternative to score and rank them for prioritization purposes. Since the alternatives considered were not always mutually exclusive, additional analysis was performed to predict the safety impacts of countermeasures used in combination as part of one or more projects. Further, the potential safety impact of each alternative depends not only on if but when it is implemented. Countermeasures deployed that reduce crashes occurring at an intersection can lessen the need and estimated safety benefit of countermeasures that could be additionally implemented later, though this is not always the case (especially if the added countermeasures address different sets of crash patterns than those initially put in place).

The overall crash reduction expected for a menu of services design (MOSD) multimodal safety project along SR 154 / Memorial Dr from Vannoy St to Oakridge Ave is 8% for fatal and injury crashes and 4% for PDO crashes. With recommended medians and crosswalk treatments, the cumulative crash reduction estimate was 5% for all crashes. The breakdown of cumulative crash reduction by KABCO severity is estimated as follows:

- Fatal (K) crashes reduced by 47%
- Severe injury (A) crashes reduced by 34%
- Mild injury (B) crashes reduced by 6%
- Complaint injury (C) crashes reduced by 7%
- Property damage only (O) crashes reduced by 4%

Since crashes have decreased by 44% at the intersections studied since implementation of a road diet along SR 154, the study team also analyzed the estimated impacts of the proposed project on the redesigned corridor. Fewer crashes in the corridor means less opportunity to reduce crashes, such that in this case the study team estimates a 2% reduction in crashes overall when compared to current crash rates under the new corridor condition (versus 4% when including all historical crashes). The breakdown of cumulative crash reduction by KABCO severity is estimated as follows:

- Fatal (K) crashes reduced by 47%
- Severe injury (A) crashes reduced by 18%
- Mild injury (B) crashes reduced by 4%
- Complaint injury (C) crashes reduced by 0.4%
- Property damage only (O) crashes reduced by 1%

Operational Impact of Potential Alternatives and Countermeasures

Average vehicle delay was estimated at each intersection in the study area for the "Build" corridor scenario, as shown below. The "Build" Scenario includes a road diet with left turn lane and phasing safety countermeasures, with the delay and LOS results from analysis in Synchro 11 shown in **Table 71** for the morning peak hour and in **Table 72** for the afternoon peak.

Table 71 - Build Scenario Intersection Delay and LOS for AM Peak Hour

Cross Street	Signal	2024 No Build		2024 Build		2044 No Build		2044 Build	
Wilkinson Dr	Y	6.5	A	6.5	A	10.8	B	6.8	A
Dearborn St	N	25.5	D	25.5	D	37.8	E	37.8	E
Warren St	Y	9.0	A	9.0	A	13.1	B	13.3	B
Howard St	N	56.1	F	56.1	F	195.0	F	195.0	F
S Howard St	N	13.1	B	13.1	B	15.4	C	15.4	C
Watson Cir	N	19.5	C	19.5	C	26.0	D	26.0	D
Eva Davis Way*	Y	8.3	A	8.3	A	11.9	B	11.5	B
E Lake Terr	N	19.7	C	19.7	C	26.8	D	26.8	D
1st Ave	N	19.9	C	19.9	C	26.3	D	26.3	D
2nd Ave*	Y	38.2	D	38.2	D	74.4	E	74.0	E
3rd Ave	N	12.1	B	12.1	B	13.4	B	13.4	B
4th Ave / Cottage Grove Ave*	Y	5.1	A	5.1	A	8.1	A	7.8	A
East Lake Dr	Y	11.3	B	11.3	B	32.4	C	31.6	C
Green Ave	N	12.3	B	12.3	B	13.6	B	13.6	B
Daniel Ave (W)	N	12.2	B	12.2	B	13.6	B	13.6	B
Daniel Ave (E)	N	21.5	C	21.5	C	27.9	D	27.9	D
Spence Ave	N	64.9	F	64.9	F	166.3	F	166.3	F

* = HCM 2000 Methodology

Table 72 - Build Scenario Intersection Delay and LOS for PM Peak Hour

Cross Street	Signal	2024 No Build		2024 Build		2044 No Build		2044 Build	
Wilkinson Dr	Y	13.8	B	13.8	B	39.4	D	34.3	C
Dearborn St	N	17.1	C	17.1	C	21.1	C	21.1	C
Warren St	Y	9.6	A	9.6	A	11.2	B	10.9	B
Howard St	N	28.1	D	28.1	D	62.8	F	62.8	F
S Howard St	N	17.2	C	17.2	C	22.5	C	22.5	C
Watson Cir	N	13.9	B	13.9	B	16.2	C	16.2	C
Eva Davis Way*	Y	12.8	B	12.8	B	16.5	B	16.9	B
E Lake Terr	N	14.9	B	14.9	B	18.7	C	16.7	C
1st Ave	N	15.4	C	15.4	C	18.4	C	18.4	C
2nd Ave*	Y	46.8	D	46.8	D	89.4	F	89.4	F
3rd Ave	N	16.6	C	16.6	C	20.4	C	20.4	C
4th Ave / Cottage Grove Ave*	Y	11.7	B	11.7	B	13.1	B	12.6	B
East Lake Dr	Y	10.2	B	10.2	B	14.6	B	14.5	B
Green Ave	N	18.6	C	18.6	C	23.7	C	23.7	C
Daniel Ave (W)	N	18.7	C	18.7	C	23.9	C	23.9	C
Daniel Ave (E)	N	17.4	C	17.4	C	21.2	C	21.2	C
Spence Ave	N	100.7	F	100.7	F	500.0	F	500.0	F

* = HCM 2000 Methodology

When the “Build” Scenario was compared to the “No Build” scenario, no significant differences were found. Although there were notable delays in the morning and afternoon peak hours, the traffic models indicate passing level of service (LOS) throughout the corridor, with the following exceptions in BOTH the “Build” and the “No Build” scenarios:

- SR 154 / Memorial Dr at Howard St
- SR 154 / Memorial Dr at 2nd Ave (signalized)
- SR 154 / Memorial Dr at Spence Ave

BENEFIT COST

The estimated cost of this project including median installation and pedestrian crossing enhancements is $550,000 for SR 154 from SR 42 / Moreland Ave to SR 155 / Candler Rd. An overall benefit cost ratio was also calculated for the proposed improvements using crashes for the study period between 2013 and 2021. A breakdown of the benefit-cost ratios for the proposed safety improvements at each location is provided in **Table 73**. Due to the road diet project that was completed in 2019, benefit cost ratios for the proposed improvements were calculated for the study period before the installation of a road diet (2013-2017) and also for the study period after the installation of a road-diet (2020-2021). The purpose of this was to have a conservative benefit cost analysis by acknowledging the safety improvements completed during the road diet project. A breakdown of the benefit-cost ratios for the proposed safety improvements at each location in the "before road diet" period is provided in **Table 74** and for the "after road diet" period is provided in **Table 75**.

Table 73 – Benefit-Cost Estimates for Recommended Project Elements (Overall)

Location	Recommendations	Crash Type	CRF_{PDO}	$CRF_{I/F}$	Cost	B/C
SR 154 between Vannoy St and Trenton St	New ped crossing with raised refuge island and RRFBs	Rear-end (no ped crashes)	7%	7%	$25,000	0.2
SR 154 at Lamon Ave	Enhance existing ped crossing with raised refuge island and RRFBs	Rear-end (no ped crashes)	7%	7%	$20,000	0.0
SR 154 at Dixie St	Enhance existing ped crossing with raised refuge island and RRFBs	Ped	47%	47%	$20,000	3.7
SR 154 at Dearborn St	Reinforce RIRO with raised median	Angle, head-on, sideswipe-opp. dir.	23%	23%	$75,000	4.7
SR 154 / Memorial Dr at or between Howard St and S Howard St	New ped crossing with raised refuge island and RRFBs	Ped	47%	47%	$25,000	15.8
	Remove flex tube delineators and install RCUT at S Howard St	Angle, head-on, sideswipe-opp. dir.	23%	23%	$75,000	1.4
SR 154 / Memorial Dr at Palatka St	New ped crossing with raised refuge island and RRFBs	Ped	7%	7%	$25,000	0.8
SR 154 / Memorial Dr at Eva Davis Way / E Lake Terr	Raised median on west leg of Eva Davis Way	Ped / Bike	32%	32%	$35,000	3.1
	RIRO at E Lake Terr with Flex Tube	Angle, head-on, sideswipe-opp. dir.	100%	100%	$25,000	42.2
SR 154 / Memorial Dr at 3rd Ave	Reinforce RIRO with raised median	Angle, head-on, sideswipe-opp. dir.	23%	23%	$75,000	0.3
SR 154 / Memorial Dr at Green Ave	Reinforce RIRO with raised median	Angle, head-on, sideswipe-opp. dir.	23%	23%	$75,000	0.2
SR 154 / Memorial Dr at or between Daniel Ave (W) and Daniel Ave (E)	Enhance existing ped crossings with raised refuge island and RRFBs (2 locations)	Ped	47%	47%	$50,000	36.1
SR 154 / Memorial Dr at Oakridge Ave	New ped crossing with raised refuge island and RRFBs	Rear-end (no ped crashes)	7%	7%	$25,000	1.8
Project Combined		**Varies**	-	-	**$550,000**	**8.3**

An overall benefit-cost ratio of 8.3 was calculated for this project for the study period between 2013 and 2021. A benefit-cost ratio of 6.7 was calculated for the corridor for the "before road diet" study period between 2013 and 2017 and a benefit-cost ration of 6.9 was calculated the corridor considering the "after road diet" study period between 2020 and 2021. Crashes between 2013 and 2017 were considered for the "before road diet" benefit-cost analysis for all improvements. However, for the "after road diet" benefit-cost analysis, crashes between 2020 and 2021 were considered for locations

that have had additional safety improvements installed as a part of the road diet project (RIRO with flex-tube delineators) and crashes between 2013 and 2021 were considered for locations that had no additional safety improvements installed as part of the road diet project. All values used in the benefit-cost calculation are provided in **Appendix H**.

Table 74 – Benefit-Cost Estimates for Recommended Project Elements (Before Road Diet)

Location	Recommendations	Crash Type	CRF_{PDO}	$CRF_{I/F}$	Cost	B/C
SR 154 between Vannoy St and Trenton St	New ped crossing with raised refuge island and RRFBs	Rear-end (no ped crashes)	7%	7%	$25,000	0.3
SR 154 at Lamon Ave	Enhance existing ped crossing with raised refuge island and RRFBs	Rear-end (no ped crashes)	7%	7%	$20,000	0.1
SR 154 at Dixie St	Enhance existing ped crossing with raised refuge island and RRFBs	Ped	47%	47%	$20,000	6.7
SR 154 at Dearborn St	Reinforce RIRO with raised median	Angle, head-on, sideswipe-opp. dir.	23%	23%	$75,000	1.4
SR 154 / Memorial Dr at or between Howard St and S Howard St	New ped crossing with raised refuge island and RRFBs	Ped	47%	47%	$25,000	28.5
	Remove flex tube delineators and install RCUT at S Howard St	Angle, head-on, sideswipe-opp. dir.	23%	23%	$75,000	2.4
SR 154 / Memorial Dr at Palatka St	New ped crossing with raised refuge island and RRFBs	Ped	7%	7%	$25,000	0.1
SR 154 / Memorial Dr at Eva Davis Way / E Lake Terr	Raised median on west leg of Eva Davis Way	Ped / Bike	32%	32%	$35,000	4.8
	RIRO at E Lake Terr with Flex Tube	Angle, head-on, sideswipe-opp. dir.	100%	100%	$25,000	72.5
SR 154 / Memorial Dr at 3rd Ave	Reinforce RIRO with raised median	Angle, head-on, sideswipe-opp. dir.	23%	23%	$75,000	0.3
SR 154 / Memorial Dr at Green Ave	Reinforce RIRO with raised median	Angle, head-on, sideswipe-opp. dir.	23%	23%	$75,000	0.4
SR 154 / Memorial Dr at or between Daniel Ave (W) and Daniel Ave (E)	Enhance existing ped crossings with raised refuge island and RRFBs (2 locations)	Ped	47%	47%	$50,000	0.4
SR 154 / Memorial Dr at Oakridge Ave	New ped crossing with raised refuge island and RRFBs	Rear-end (no ped crashes)	7%	7%	$25,000	2.4
Project Combined		**Varies**	-	-	**$550,000**	**6.7**

Table 75 – Benefit-Cost Estimates for Recommended Project Elements (After Road Diet)

Location	Recommendations	Crash Type	CRF_{PDO}	$CRF_{I/F}$	Cost	B/C
SR 154 between Vannoy St and Trenton St	New ped crossing with raised refuge island and RRFBs	Rear-end (no ped crashes)	7%	7%	$25,000	0.2
SR 154 at Lamon Ave	Enhance existing ped crossing with raised refuge island and RRFBs	Rear-end (no ped crashes)	7%	7%	$20,000	0.0
SR 154 at Dixie St	Enhance existing ped crossing with raised refuge island and RRFBs	Ped	47%	47%	$20,000	3.7
SR 154 at Dearborn St	Reinforce RIRO with raised median	Angle, head-on, sideswipe-opp. dir.	23%	23%	$75,000	15.9
SR 154 / Memorial Dr at or between Howard St and S Howard St	New ped crossing with raised refuge island and RRFBs	Ped	47%	47%	$25,000	15.8
	Remove flex tube delineators and install RCUT at S Howard St	Angle, head-on, sideswipe-opp. dir.	23%	23%	$75,000	0.0
SR 154 / Memorial Dr at Palatka St	New ped crossing with raised refuge island and RRFBs	Ped	7%	7%	$25,000	0.8
SR 154 / Memorial Dr at Eva Davis Way / E Lake Terr	Raised median on west leg of Eva Davis Way	Ped / Bike	32%	32%	$35,000	0.0
	RIRO at E Lake Terr with Flex Tube	Angle, head-on, sideswipe-opp. dir.	100%	100%	$25,000	0.0
SR 154 / Memorial Dr at 3rd Ave	Reinforce RIRO with raised median	Angle, head-on, sideswipe-opp. dir.	23%	23%	$75,000	0.2
SR 154 / Memorial Dr at Green Ave	Reinforce RIRO with raised median	Angle, head-on, sideswipe-opp. dir.	23%	23%	$75,000	0.0
SR 154 / Memorial Dr at or between Daniel Ave (W) and Daniel Ave (E)	Enhance existing ped crossings with raised refuge island and RRFBs (2 locations)	Ped	47%	47%	$50,000	36.1
SR 154 / Memorial Dr at Oakridge Ave	New ped crossing with raised refuge island and RRFBs	Rear-end (no ped crashes)	7%	7%	$25,000	1.1
Project Combined		**Varies**	**-**	**-**	**$550,000**	**6.9**

CONCLUSION

Traffic engineering and safety analysis for SR 154 / Memorial Dr indicates that proposed crosswalk and median enhancements are a viable safety project for several of the study locations in the corridor. Raised medians and enhanced pedestrian crosswalks have been proven to reduce crashes and create a safer travel environment for motorists, cyclists, and pedestrians.

The 28 intersections studied along SR 154 / Memorial Dr between SR 42 / Moreland Ave to SR 155 / Candler Rd had a total of 1,140 crashes found for 2013-2021. These included two (2) fatal crashes and 308 injury crashes, with 16 resulting in severe injury (A), 55 resulting in minor injury (B), and 237 resulting in injury complaints (C). Rear end crashes were the most common manner of collision with 455 (40%), followed by angle crashes with 360 (32%) during the analysis period including 182 left turn angle crashes, 94 other angle crashes, 59 through angle crashes, and 25 right turn angle crashes. There were also 56 collisions not with a motor vehicle in the study area including **9 pedestrian-related crashes** and **3 cyclist-related crashes** as well as many vehicles crashing into the curb, sidewalk, trees, dogs, fire hydrants, utility poles, and other objects in the corridor. Pedestrian crashes at the study intersections included two (2) fatal crashes, six (6) injury crashes (2 A, 3 B, 1 C), and one (1) property damage only crash. Crashes in the study area decreased by approximately 39% after completion of a road diet and resurfacing project (PI# M005724) along SR 154 in early 2019. All manner of collision crashes were reduced following the resurfacing and road diet project, with the exception of rear end crashes (which were 16% above 2013 levels in 2021). Pedestrian crashes have persisted in the corridor, including a fatal crash in 2021 involving a child.

This study has confirmed a significant and persistent pattern of pedestrian crashes along SR 154 in the study area, as well as many angle, sideswipe, and rear end crashes that could be addressed through installation of raised medians and other safety countermeasures. Operational analysis indicates acceptable level of service (LOS) for all intersections with minimal project impacts on delay and traffic re-routing.

RECOMMENDATIONS

This section summarizes the elements and alternatives recommended for inclusion in a multimodal safety corridor project for SR 154 / Memorial Dr from Vannoy St to Oakridge Ave, as well as opportunities for further study. Layouts of the proposed project recommendations are provided in **Appendix I**.

Menu of Services Design (MOSD) Project Recommendations

Reinforcement of existing right-in, right-out access limitations for minor streets is recommended at the following unsignalized intersections along SR 154:

- Dearborn St – raised median
- E Lake Terr – flexible delineators
- 3rd Ave – raised median
- Green Ave – raised median
- Oakridge Ave – raised median

Following additional evaluation of crash patterns and rerouting due to access limitations implemented with the road diet project, the intersection of SR 154 / Memorial Dr at S Howard St is recommended for conversion from right-in, right-out access to a half-RCUT configuration.

The following crosswalk improvements are also recommended:

- New crosswalks with pedestrian refuge and RRFBs at unsignalized / mid-block locations
  - SR 154 between Vannoy St and Dahlgren St
  - SR 154 between Howard St and S Howard St
  - SR 154 at Palatka St
  - SR 154 at Daniel Ave (W)
  - SR 154 at Daniel Ave (E)
  - SR 154 at Oakridge Ave

- Existing crosswalks at unsignalized / mid-block locations
  - SR 154 at Lamon Ave – add RRFBs
  - SR 154 at Dixie St – add RRFBs with pedestrian refuge island
  - SR 154 at Daniel Ave (W) – add RRFBs with pedestrian refuge island
  - SR 154 at Daniel Ave (E) – add RRFBs with pedestrian refuge island

Maintenance Recommendations

Missing or damaged signage in the study area should be replaced as described below.

- SR 154 at Vannoy St
  - Replace stop sign for southbound approach
- SR 154 at Eleanor St
  - Replace stop sign for southbound approach

Trimming of vegetation that limits sight distances is recommended at these intersections in the study area:

- SR 154 at Trenton St – Northbound approach
- SR 154 at Dixie St – Southbound approach
- SR 154 at Warren St – Southbound approach
- SR 154 at Eleanor St – Southbound approach
- SR 154 at Howard St – Southbound approach
- SR 154 at S Howard St – Northbound approach
- SR 154 at Watson Cir – Southbound approach
- SR 154 at 3rd Ave – Northbound and Southbound approaches
- SR 154 at Carter Ave – Northbound and Southbound approaches
- SR 154 at E Lake Dr – Northbound and Southbound approaches
- SR 154 at Green Ave – Northbound approach
- SR 154 at Daniel Ave – Northbound and Southbound approaches

RECOMMENDED BY: _____ DATE _____
Dwayne Tedder, PE
Consultant Project Manager

RECOMMENDED BY: _____ DATE _____
Samuel Harris, PE
State Safety Engineering Manager

RECOMMENDED BY: _____ DATE _____
Megan Wilson, PE
District Traffic Engineer

APPENDIX A FIELD VISIT PHOTOS

APPENDIX B CROSSWALK ANALYSIS SUMMARIES

APPENDIX C CRASH DIAGRAMS

APPENDIX D RAW COUNTS DATA

APPENDIX E TRAFFIC MODELING REPORTS

APPENDIX F TRAFFIC SIGNAL WARRANT REPORTS

APPENDIX G INTERSECTION CONTROL EVALUATION (ICE) REPORTS

APPENDIX H BENEFIT-COST CALCULATION

APPENDIX I PLAN LAYOUTS