

April 19, 2023

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From: Kristof Devastey, P.E., PTOE, PTP

RE: Crash Analysis Memo
Waters Avenue (from Armenia Avenue to Florida Avenue)
Sligh Avenue (from Armenia Avenue to Nebraska Avenue)

Introduction

In December 2021, the City of Tampa published its first version of a Vision Zero Action Plan which supports the long-range vision of achieving zero traffic deaths and serious injuries. This action plan is a continuation of the Mayor's 2019 commitment to Vision Zero as part of the Transforming Tampa's Tomorrow (T3) effort) that brought together key City staff, agency partners, and community leaders to identify strategies to tackle major issues facing Tampa. The Vision Zero Action Plan is a component of the Citywide Mobility Plan, known as Tampa MOVES which is an acronym that represents the guiding principles of the citywide mobility plan.

As part of the Vision Zero Action Plan, the City of Tampa identified 54 street segments on its High Injury Network (HIN) which represents the network of streets where most of the city's deadly and life-altering injury crashes happen. This study, being led by the Hillsborough County Metropolitan Planning Organization (MPO), will develop Vision Zero and Speed Management solutions intended to increase safety for two (2) segments from the City of Tampa's HIN:

- Waters Avenue – Armenia Avenue to Florida Avenue (1.5 Miles)
- Sligh Avenue – Armenia Avenue to Nebraska Avenue (2 miles)

Using Hillsborough County's (HC) 3 Tier system, recommendations will be developed by Tier. The Tier 1 (aka "quick build") solutions are intended to increase safety in the short term, until more mid-term and long-term safety (Tier 2 and 3) solutions can be funded. The permanent safety (Tier 3) recommendations will inform the recommendations proposed in the short term. The recommendations developed as part of this study will improve safety for all modes of transportation by 1) identifying historical crash patterns along the corridor, 2) distinguishing the risk factors that contribute to these

types of collisions, 3) developing solutions that mitigate the identified crash patterns, and 4) applying best practices to reduce risks associated with severe crashes in urban areas. Consistent with the principles of Vision Zero, the focus will be on addressing crashes where a person was Killed or Severely Injured (KSI) and crashes involving pedestrians and people on bikes.

Waters Avenue Segment

Segment Description

The study segment is an east-west 1.5-mile segment of Waters Avenue spanning from Armenia Avenue to Florida Avenue. It is predominately a four-lane undivided section with two through lanes in each direction. Waters Avenue has a posted speed of 45 mph and an Average Annual Daily Traffic (AADT) of 28,000 vehicles per day. The roadway is functionally classified as an “Arterial” based on *Hillsborough County’s Roadways Functional Classification* map.

At the intersections of Armenia Avenue and Florida Avenue dedicated left-turn lanes are provided on all approaches and a 4-foot traffic separator is provided on the east-west approaches and on all approaches at Armenia Avenue and Florida Avenue respectively. There are 25 unsignalized intersections, and 4 signalized intersections within the study segment. There is an emergency signal for the Tampa Fire Rescue Station 11 approximately 350 feet east of Rome Avenue.

Transit

Transit along the segment is provided by the #16 Bus from the Hillsborough Area Regional Transit Authority (HART). The corridor has North-South transit connections at Armenia Avenue with the #14 bus, N Boulevard with the #45 bus, and Florida Avenue with the #1 bus. Waters Avenue also connects to the Yukon Transfer Station on Florida Avenue. There are 17 bus stops along Waters Avenue.

Pedestrian Infrastructure

Five-foot sidewalks are provided on both sides of the street throughout the segment with some areas narrowing down to a four-foot sidewalk. There is little to no buffer between the adjacent travel lanes and the sidewalk. Designated crossing locations are only provided at the signalized intersections which have an average spacing of 2,600 feet. At the unsignalized intersections, many of the minor approaches lack stop bars and have no marked crosswalks.

Bicycle Infrastructure

There are no bicycle facilities along Waters Avenue. The Hillsborough MPO is currently completing the *Hillsborough County Bicycle Network Plan* which is anticipated to evaluate the need for bicycle facilities along Waters Avenue. There is one existing north-south bike connection along N Florida Avenue which ends at the intersection of N. Florida Avenue and Waters Avenue.

Land Use Context

Land use along the corridor is predominantly commercial with some dense residential apartment complexes. There are many single-family neighborhoods that have direct access onto the roadway. There are many automobile repair shops, commercial properties, and international restaurants and grocers. Based on the Draft version of the *City of Tampa’s Context Classification*, the surrounding land use is categorized as Urban General Mixed-Use with the exception of the segment between Armenia Avenue and Waterford Avenue which is categorized as Suburban Commercial.

Communities of Concern

The Hillsborough MPO has identified several areas south of the roadway as a Community of Concern per Title VI requirements. Communities of Concern have more than one standard deviation above the County’s median in two or more characteristics of low income, disability, youth, elderly, limited English proficiency, minorities, and carless households. Areas south of the corridor have 4 deviations. These areas stretch along the entire southern side of the corridor from Armenia Avenue to Florida Avenue. None of the areas around this corridor are identified as having extreme poverty. It should be noted that the MPO’s Speed Management Action Plan identifies mobility justice as a factor in prioritization of corridor projects and funding. These communities have a higher-than-average dependency on transit, walking, and bicycling infrastructure for everyday use.

Crash Analysis

Historical crash data along the study segment was downloaded from SIGNAL-4 Analytics for a 5-year period (2018-2022). Based on the purpose of this study, the emphasis of the crash analysis and the recommendations to follow will be on severe crashes i.e., fatal, and incapacitating injury crashes. For this report these crashes will be referred to as KSI (Killed or Seriously Injured) crashes. Although the emphasis of the crash analysis will be focused on mitigating severe crashes, non-incapacitating injury crashes were also included in the initial crash analysis to obtain a bigger sample size of crashes that could help identify potential risk factors that are also common to the more severe crashes. Where applicable, severe injury crashes were juxtaposed to all injury crashes to help emphasize prevailing patterns. Hard Copy police reports were reviewed for crashes involving non-motorized users and for KSI crashes.

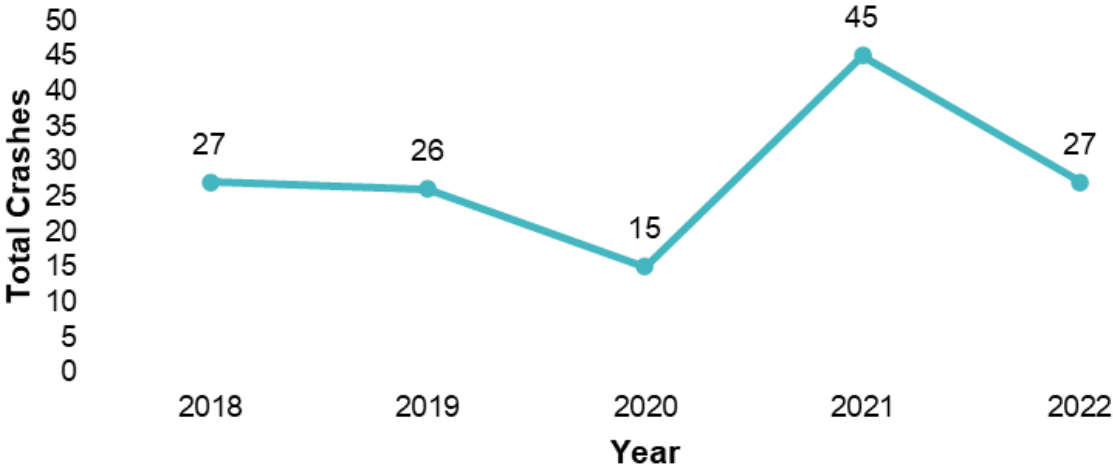
Between 2018 and 2022, the study segment experienced a total of 140 injury crashes which included 7 fatal crashes, 22 incapacitating injury crashes and 111 non-incapacitating injury crashes. The distribution of crashes by injury level is presented in **Figure 1**.

Figure 1: Crashes by Severity



In terms of yearly frequency, the number of injury crashes decreased slightly between 2018 and 2019, decreased again in 2020, tripled in 2021 relative to 2020 and decreased again to 2018-2019 levels. During the analysis period, the study segment had an average of 28 injury crashes per year. The distribution of injury crashes by year is presented in **Figure 2**.

Figure 2: Distribution of Injury Crashes by Year (2018-2022)



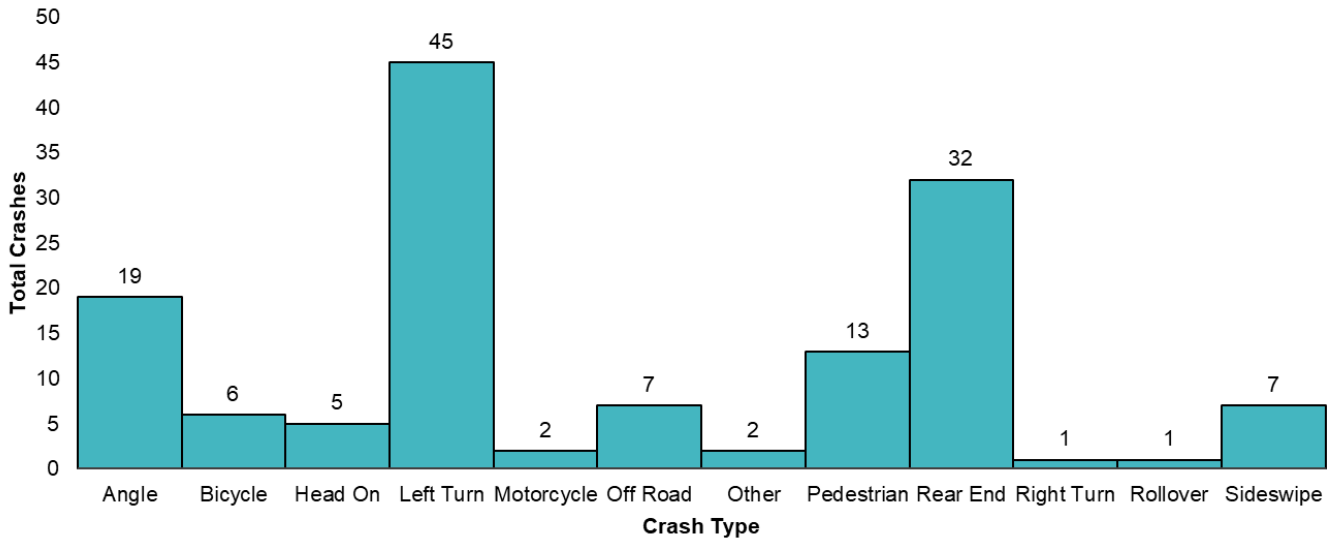
The majority of the injury crashes occurred between intersections but relatively small clusters are noticeable at the intersections of N. Florida Avenue, N. Armenia Avenue and North Boulevard. The injury crashes along the study segment are mapped in **Figure 3**.

Figure 3: Mapping of Injury Crashes



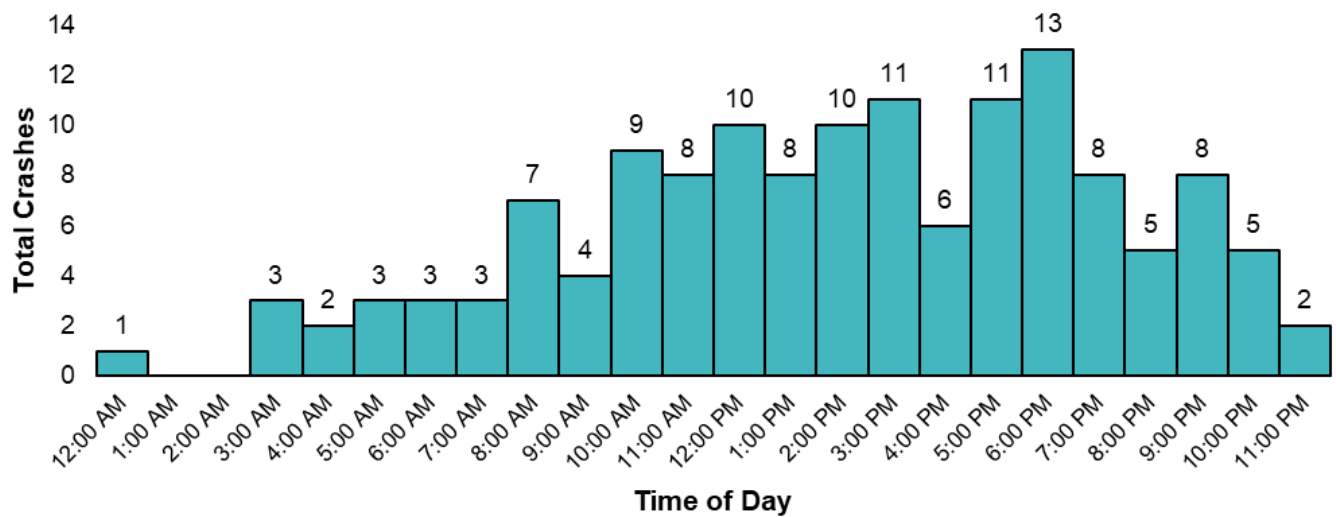
During the analysis period, the most frequent crash types were Left-Turn crashes with 45 crashes (32%), Rear-End crashes with 32 crashes (22%), and Right-Angle crashes with 19 crashes (14%). There were 13 pedestrian-involved crashes and 6 bicycle-related crashes recorded during the analysis period. The distribution of injury crashes by crash type is presented in **Figure 4**.

Figure 4: Distribution of Injury Crashes by Crash Type



When analyzed by Time of Day, the highest proportion of injury crashes (49%) occurred between 12 PM and 6 PM, with 6 PM having the highest frequency of injury crashes. The distribution by time-of-day of injury crashes is presented in **Figure 5**.

Figure 5: Distribution of Injury Crashes by Time of Day



During the analysis period, there were 45 crashes that occurred in the dark which accounted for 32% of all injury crashes; of the 45 crashes that occurred in the dark, 41 occurred with lighting present. No specific patterns were identified when analyzed by pavement conditions. The distribution of injury crashes by lighting conditions and pavement conditions are presented in **Figure 6** and **Figure 7** respectively.

Figure 6: Distribution of Injury Crashes by Lighting Conditions

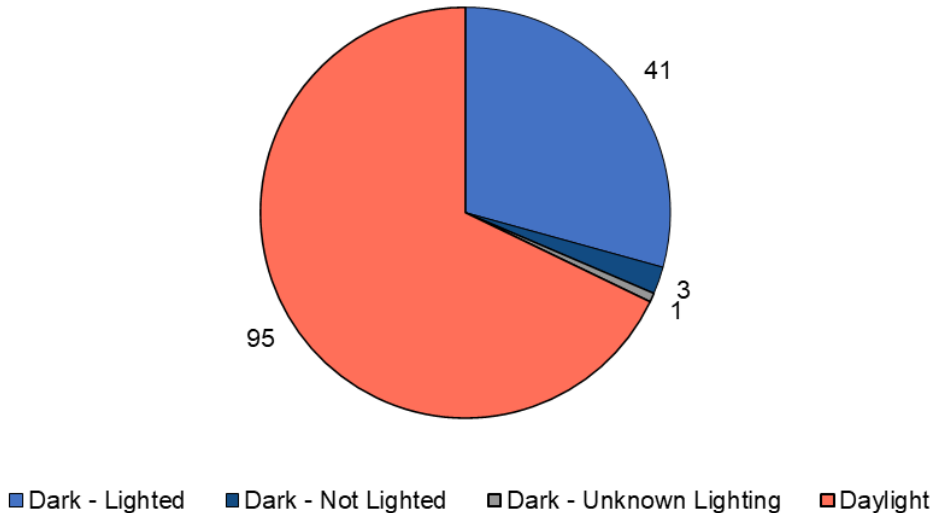
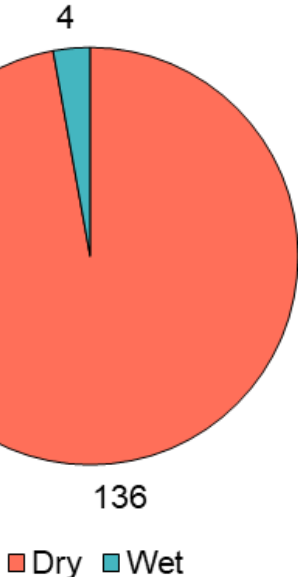


Figure 7: Distribution of Injury Crashes by Pavement Conditions



Severe Injury Crashes (KSI Crashes)

During the analysis period there were 29 KSI crashes which accounted for 20% of all the injury crashes that occurred along Waters Avenue. As previously mentioned, 7 fatal crashes occurred along the study segment during the analysis period of which 3 were pedestrian related, 1 head-on crash, 1 left-turn crash, 1 angle crash and 1 roadway departure crash. A narrative of the fatal crashes is provided below.

Fatal Crash #1: The fatal crash occurred on November 27, 2019, at 9:28 PM and involved a pedestrian crossing the north leg of the intersection at Florida Avenue. The pedestrian was traveling westbound within the marked crosswalk and was struck by a northbound vehicle. Based on the police report, the northbound vehicle had a green light.

Fatal Crash #2: The fatal crash occurred on February 29, 2020, at 7:12 PM and involved a pedestrian crossing Waters Avenue midblock (immediately west of N. Orleans Avenue). The pedestrian was traveling northbound and darted across the street and was struck by an eastbound vehicle.

Fatal Crash #3: The fatal crash occurred on January 3, 2021, at 4:50 PM and involved a motorcycle hitting a utility pole approximately 150 feet east of Oregon Avenue. The motorcyclist was traveling eastbound, was driving recklessly, lost control of the motorcycle and hit the utility pole.

Fatal Crash #4: The fatal crash occurred on June 26, 2021, at 6:20 AM and involved a pedestrian laying across Waters Avenue near the entrance of Balara Lakes Apartments (Waterford Avenue). The vehicle was traveling westbound.

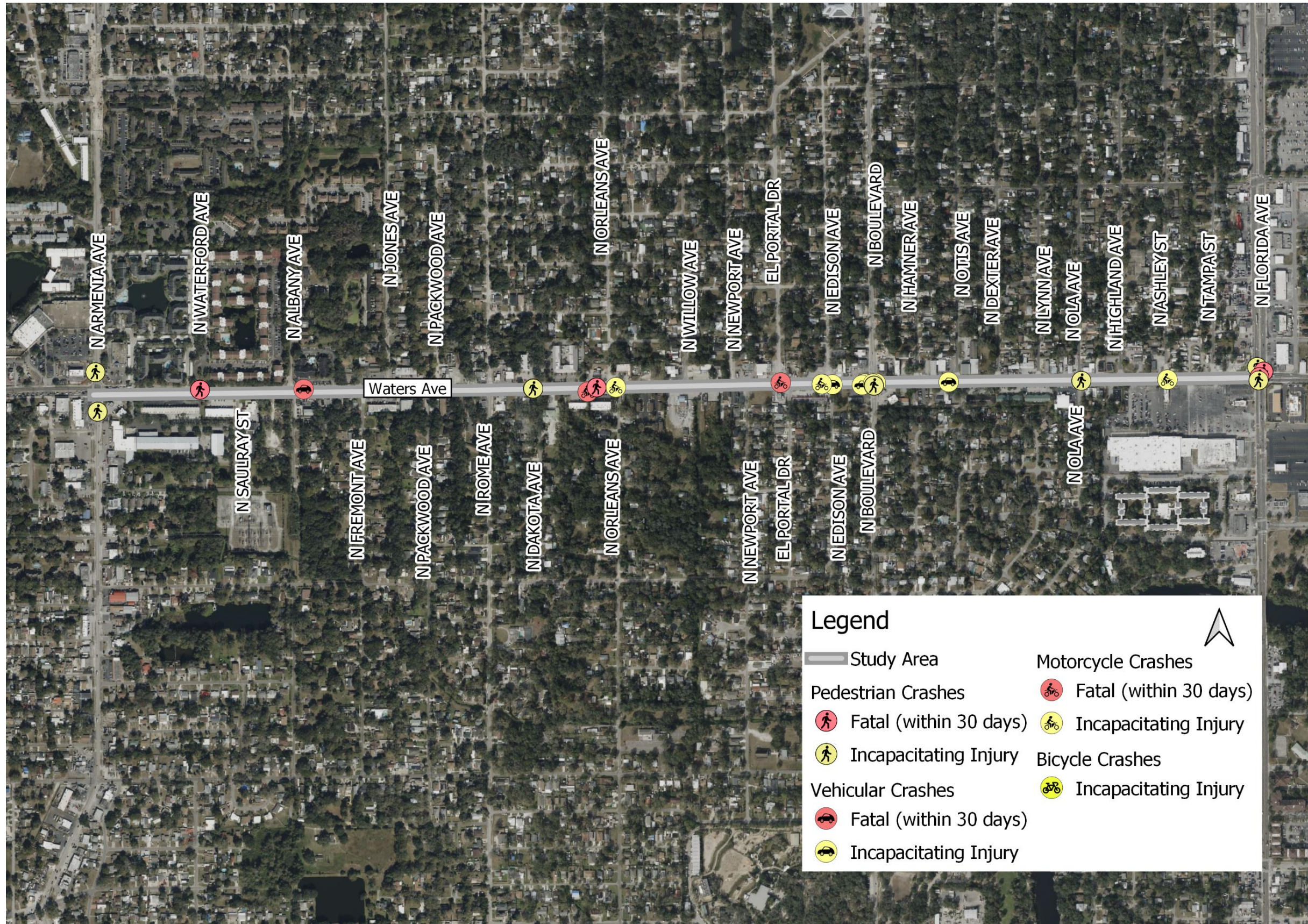
Fatal Crash #5: The fatal crash occurred on September 4, 2021, at 10:59 AM and involved a head-on collision approximately 70 feet east of Albany Avenue. The driver was traveling eastbound, lost control of the vehicle, crossed over into westbound traffic and hit a westbound vehicle head-on.

Fatal Crash #6: The fatal crash occurred on November 1, 2020, at 2:35 PM and involved a left-turn collision at the intersection of Waters Avenue and N. Florida Avenue between an eastbound to northbound left-turning vehicle and a vehicle traveling westbound. Both vehicles entered the intersection during the yellow interval and collided.

Fatal Crash #7: The fatal crash occurred on October 16, 2022, at 3:47 PM and involved a right-angle crash between a motorcycle and a passenger vehicle at El Portal Drive. The motorcyclist was traveling westbound, and the driver was traveling northbound. The driver drove into the path of the motorcyclist who hit the vehicle at a right angle and was ejected from the motorcycle.

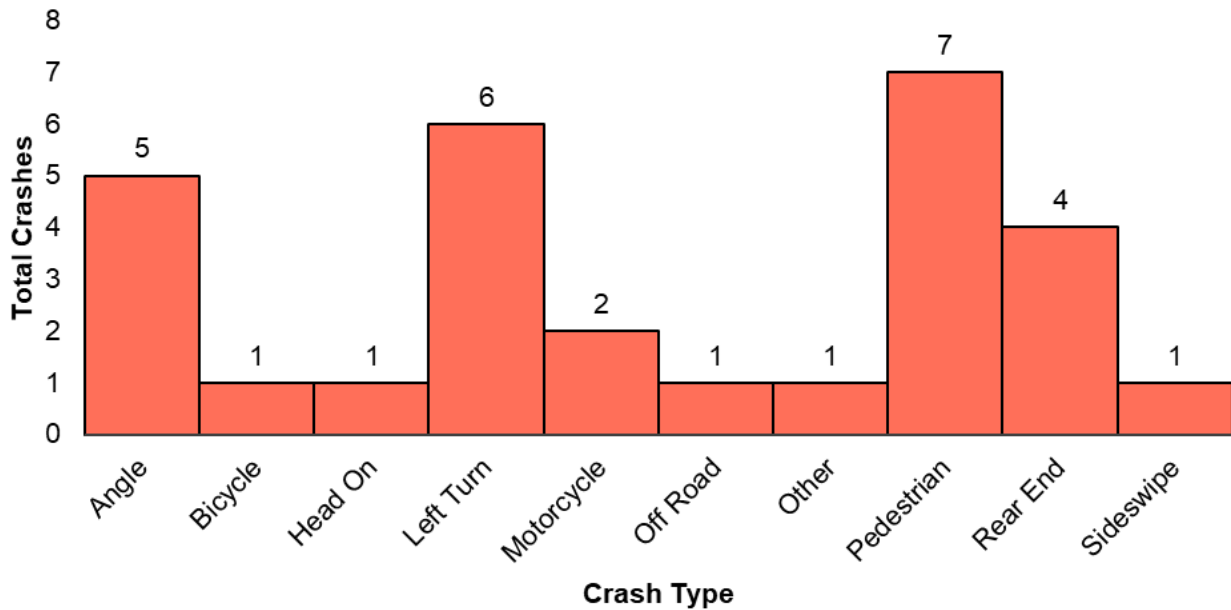
Clusters of KSI crashes are noticeable at the intersection of N. Florida Avenue, near the intersection of Orleans Avenue and between El Portal Drive and North Boulevard. The KSI crashes along the study segment are mapped in **Figure 8**

Figure 8: Mapping of KSI Crashes



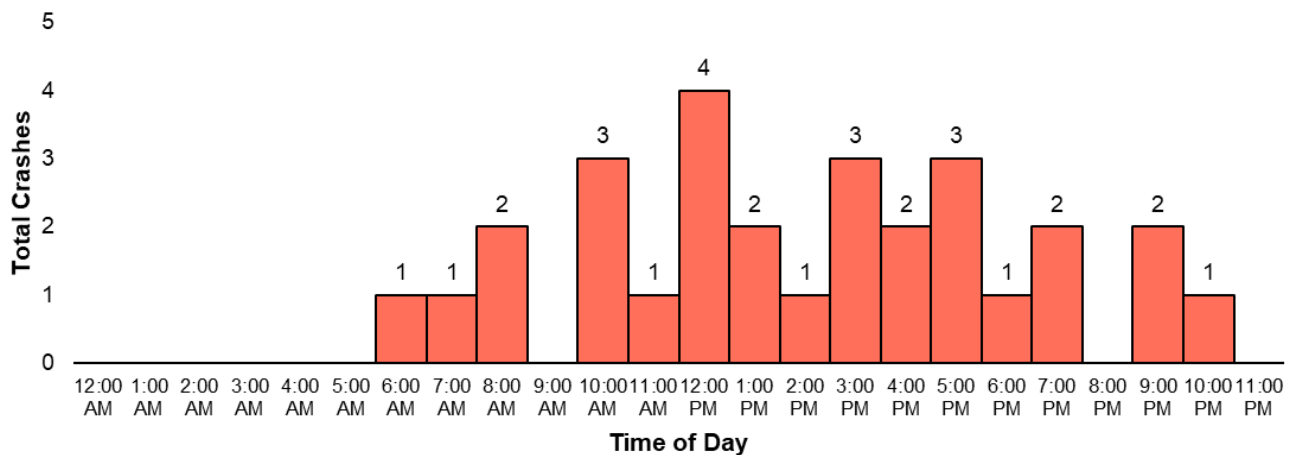
When analyzed by crash type, the most frequent KSI crashes were pedestrian crashes with 7 crashes (24% of KSI crashes), left turn crashes with 6 crashes (20% of KSI crashes) and angle crashes with 5 crashes (17% of KSI crashes). The distribution of KSI crashes by crash type is presented in **Figure 9**.

Figure 9: Distribution of KSI Crashes by Crash Type



When analyzed by Time of Day, the highest proportion of injury crashes (49%) occurred between 12 PM and 6 PM, with 12 PM having the highest frequency of injury crashes. The distribution by time-of-day of injury crashes is presented in **Figure 10**.

Figure 10: Distribution of KSI Crashes by Time of Day



Crashes Involving Non-Motorized Users

Considering the particular emphasis on safety for non-motorized users as part of the Tampa Vision Zero Action Plan and the relative frequency of these types of crashes during the analysis period, crashes involving pedestrians and bicyclists were analyzed independently. During the analysis period there were 13 crashes involving pedestrians and 6 bicycle-related crashes. It should be noted that 4 of the 7 fatal crashes (57%) involved a non-motorized user. Clusters of crashes involving non-motorized users were identified at Armenia Avenue and Florida Avenue. Most the crashes that occurred at these intersections, involved pedestrians being hit in the crosswalk by a turning vehicle. It should be noted that all the midblock pedestrian crashes occurred in the vicinity of a bus stop; including one of the fatal crashes which occurred near the bus stop at Orleans Avenue. There were no patterns identified for crashes involving non-motorized users when analyzed by Time of Day, pavement condition and lighting conditions.

The crashes involving non-motorized users that occurred along Sligh Avenue during the analysis period are mapped in **Figure 11**.

Figure 11: Mapping of Crashes involving Non-motorized Users



Summary of Findings for Waters Avenue

- Pedestrian crashes, left-turn crashes, and angle crashes accounted for 62% of all KSI crashes with pedestrian crashes accounting for the highest proportion (24%) of KSI crashes
- Approximately 50% of all injury crashes and KSI crashes occurred between 12 PM and 6 PM
- Over 30% of the injury crashes that occurred during the analysis period were in the dark with 29% occurring with lighting present
- Most of the injury crashes occurred between intersections, but relatively small clusters are noticeable at the intersections of N. Florida Avenue, N. Armenia Avenue and North Boulevard
- Clusters of KSI crashes are noticeable at the intersection of N. Florida Avenue, near the intersection of Orleans Avenue and between El Portal Drive and North Boulevard.
- Clusters of pedestrian crashes are noticeable at the intersections of Armenia Avenue and at Florida Avenue
- Most of the pedestrian crashes that occurred at Armenia Avenue and at Florida Avenue, involved pedestrians being hit in the crosswalk by a turning vehicle.
- All the pedestrian crashes that occurred midblock were in the vicinity of a bus stop; this includes one fatal crash which involved a pedestrian crossing midblock near the bus stop at Orleans Avenue.

Sligh Avenue Street Segment

Segment Description

The study segment is an east-west two-mile segment of Sligh Avenue spanning from Armenia Avenue to Nebraska Avenue and includes a bridge that crosses the Hillsborough River. It is predominately a four-lane undivided section, with two through lanes in each direction. There are 24 unsignalized intersections and eight signalized intersections within the study segment. Sligh Avenue has a posted speed of 35 mph and an Average Annual Daily Traffic (AADT) of 28,500 vehicles per day (vpd). The roadway is functionally classified as an “Arterial” based on *Hillsborough County’s Roadways and Functional Classification* map.

The intersections at Armenia Avenue, Rome Avenue, North Boulevard, and North Florida Avenue have a dedicated left-turn lane on all approaches, except for N Boulevard which doesn’t have a westbound left-turn lane onto Sligh Avenue. The interchange of Sligh Avenue and I-275 is a diamond interchange with the Interstate traversing the roadway at an above grade bridge. On the eastbound approach of Sligh Avenue and Nebraska Avenue, the outside lane becomes a right-turn only lane (drop lane) as Sligh Avenue becomes a two-lane section east of the intersection.

Transit

The Hillsborough Area Regional Transit Authority (HART) does not serve the entire corridor, but there is a 0.5-mile transit connection with two bus stops from the #45 bus from Rome Avenue to N Boulevard near Lowry Park. North-south Transit connections are at Armenia Avenue with the #14 bus, Florida Avenue with the #1 bus, and Nebraska Avenue with the #400 bus. The #1 bus connects to the Yukon Transfer Station on Florida Avenue.

Pedestrian Infrastructure

Five-foot sidewalks are provided on both side of the street throughout the segment with some areas narrowing down to a four-foot sidewalk. There is little to no buffer between the adjacent travel lanes and the sidewalk. There is an un-buffered sidewalk on both sides of the bridge across the Hillsborough River. Designated crossing locations are only provided at the signalized intersections which have an average spacing of 2,600 feet. There are pedestrian signals and ramps but no marked crosswalks at the I-275 interchanges. Painted crosswalks are available at the other eight signalized crossings. At the unsignalized intersections, many of the minor approaches lack stop bars and have no marked crosswalks.

Bicycle Infrastructure

There are no bicycle facilities along Sligh Avenue and no north-south bicycle facilities across any intersections. The Hillsborough MPO is currently completing the *Hillsborough County Bicycle Network Plan* which will evaluate the need for bicycle facilities along Sligh Avenue.

Land Use Context

The land use along the corridor is predominately single-family homes with driveways and parking along their frontage. There are a few apartment complexes directly along the corridor. There are single-family neighborhoods that have direct access onto the roadway. There are many recreational and community facilities along the corridor including access to Rome & Slight Park off Rome Avenue, an entrance to ZooTampa at Lowry Park, the Wayne C Papy Athletic facility, and many religious centers. Between I-

275 and Nebraska Avenue, there is a shift in land use to more industrial uses such as auto service centers. Based on the Draft version of the *City of Tampa's Context Classification*, the land use around Armenia Avenue is classified as Urban General Mixed Use, the area south of Sligh Avenue from Armenia Avenue to Albany Avenue is classified as Suburban Residential, the remaining area from Armenia Avenue to Florida Avenue is Urban General Residential, the land at ZooTampa at Lowry Park is Suburban Commercial, and the area from Florida Avenue to Nebraska Avenue is Urban General Mixed Use.

Communities of Concern

The majority of Sligh Avenue is not within a Community of Concern. The Hillsborough MPO has identified the northern section along Sligh Avenue between Florida Avenue and Nebraska Avenue as a Community of Concern per Title VI requirements with three deviations. Communities of Concern have more than one standard deviation above the County's median in two or more characteristics: low income, disability, youth, elderly, limited English proficiency, minorities, and carless households. None of the areas around this corridor are identified as having extreme poverty. The MPO's Speed Management Action Plan identifies mobility justice as a factor in prioritization of corridor projects and funding. These communities have a higher-than-average dependency on transit, walking, and bicycling infrastructure for everyday use.

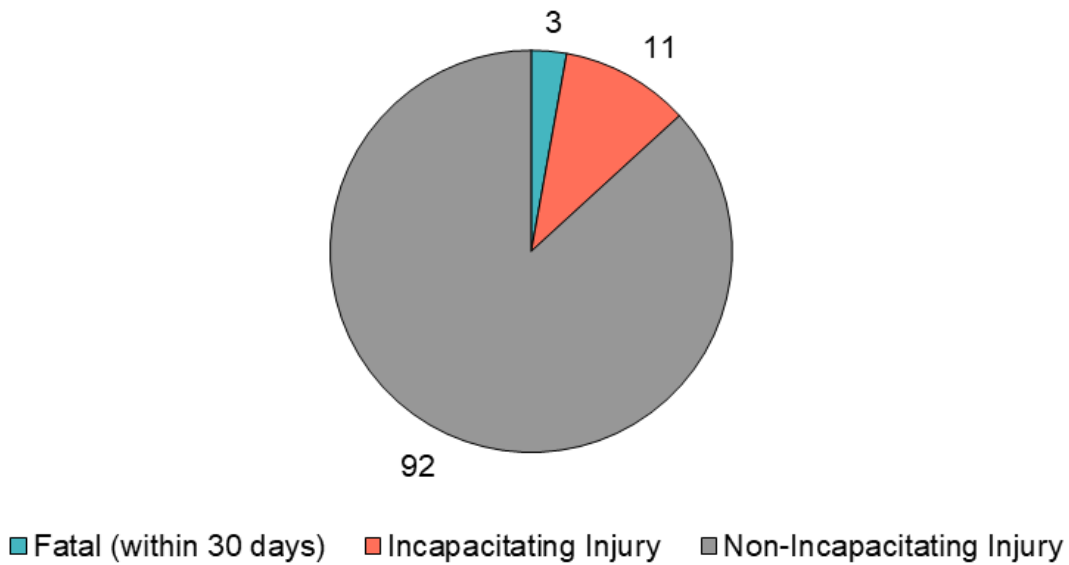
Crash Analysis

Historical crash data along the study segment was downloaded from SIGNAL-4 Analytics for a 5-year period (2018-2022). Based on the purpose of this study, the emphasis of the crash analysis and the recommendations to follow will be on severe crashes i.e., fatal, and incapacitating injury crashes. For this report these crashes will be referred to as KSI (Killed or Seriously Injured) crashes. Although the emphasis of the crash analysis will be focused on mitigating severe crashes, non-incapacitating injury crashes were also included in the initial crash analysis to obtain a bigger sample size of crashes that could help identify potential risk factors that are also common to the more severe crashes. Where applicable, severe injury crashes were juxtaposed to all injury crashes to help emphasize prevailing patterns. Hard Copy police reports were reviewed for crashes involving non-motorized users and for KSI crashes.

Between 2018 and 2022, the study segment experienced a total of 106 injury crashes which included 3 fatal crashes, 11 incapacitating injury crashes and 92 non-incapacitating injury crashes.

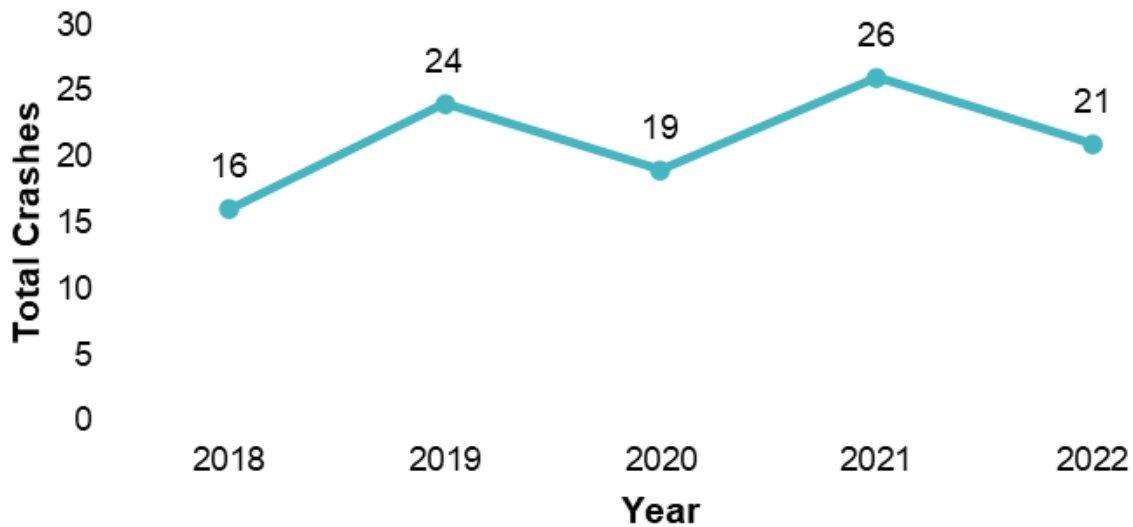
The distribution of crashes by injury level is presented in **Figure 12**.

Figure 12: Crashes by Severity



In terms of yearly frequency, the number of injury crashes increased between 2018 and 2019, decreased in 2020, increased in 2021 and decreased again in 2022. During the analysis period, the study segment had an average of 21 injury crashes per year. The distribution of injury crashes by year is presented in **Figure 13**.

Figure 13: Crashes by Year (2018-2022)



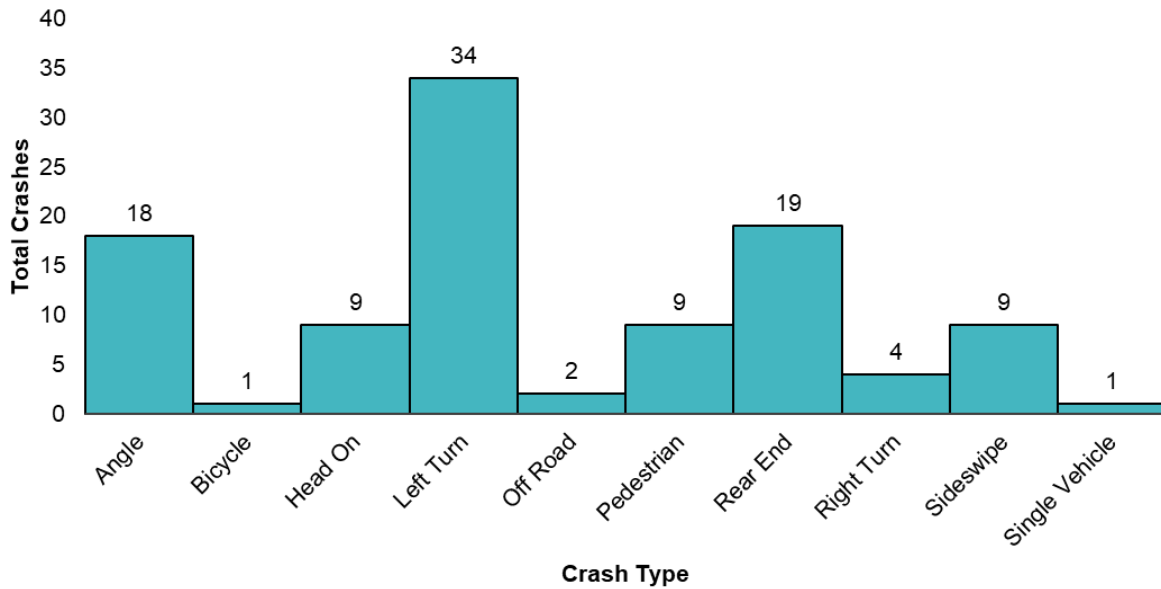
Most of the injury crashes occurred between intersections; however, relatively small clusters are noticeable at the intersections of N. Rome Avenue, N Armenia Ave, at the interchange of I-275 and at Nebraska Avenue. The injury crashes along the study segment are mapped in **Figure 14**.

Figure 14: Mapping of Injury Crashes



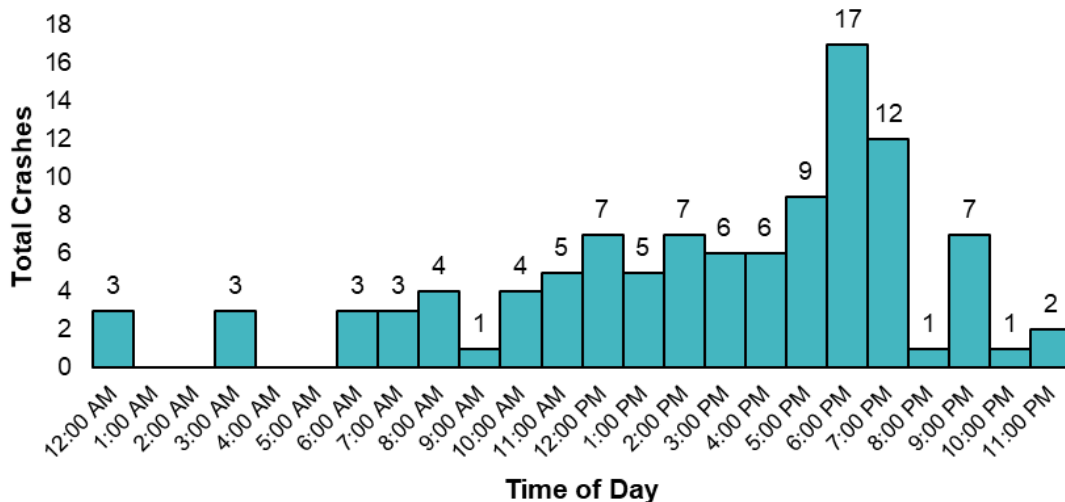
During the analysis period, the most frequent crash types were Left-Turn crashes with 31 crashes (32%), Rear-End crashes with 19 crashes (18%) and Right-Angle crashes with 18 crashes (17%). It should be noted that 6 of the 34 left turn crashes involved motorcycles. There were 9 pedestrian-involved crashes and 1 bicycle related crash recorded during the analysis period. The distribution of injury crashes by crash type is presented in **Figure 14**.

Figure 15: Distribution of Injury Crashes by Crash Type



When analyzed by Time of Day, a relatively high proportion (46%) of the injury crashes occurred between 5 PM and midnight with 6 PM having the highest frequency of injury crashes. The distribution by time-of-day of injury crashes is presented in **Figure 16**.

Figure 16: Distribution of Injury Crashes by Time of Day



During the analysis period, there were 31 crashes that occurred in the dark which accounted for 29% of all injury crashes; of the 31 crashes that occurred in the dark, 30 of those occurred with lighting present. No specific patterns were identified when analyzed by pavement conditions. The distribution of injury crashes by lighting conditions and pavement conditions are presented in **Figure 17** and **Figure 18** respectively.

Figure 17: Distribution of Injury Crashes by Lighting Conditions

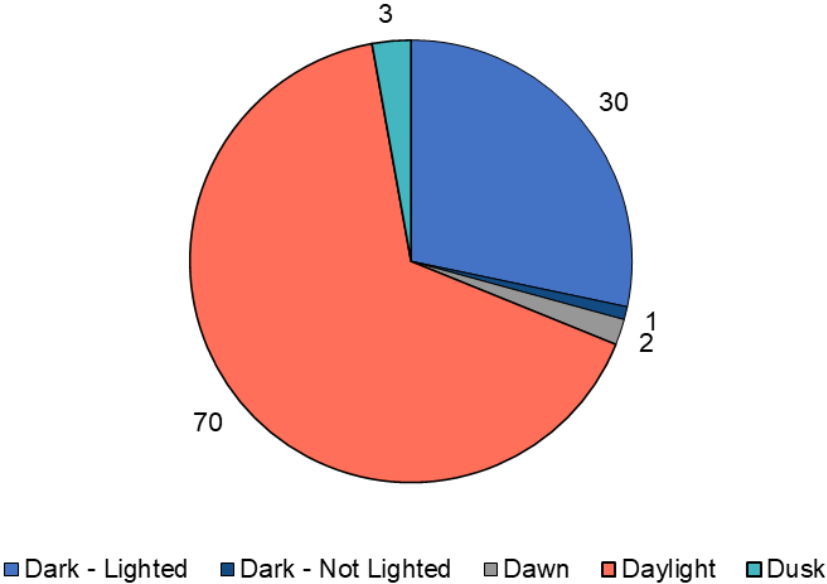
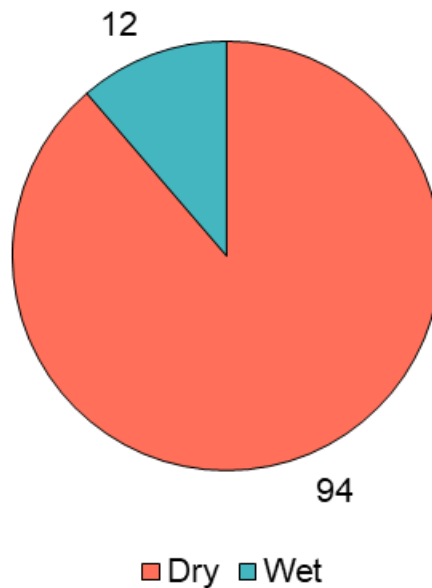


Figure 18: Distribution of Injury Crashes by Pavement Conditions



Severe Injury Crashes (KSI Crashes)

During the analysis period there were 14 KSI crashes which accounted for 13% of all the injury crashes that occurred along Sligh Avenue. As previously mentioned, 3 fatal crashes occurred along the study segment during the analysis period of which 2 were pedestrian-related, and 1 left-turn crash involving a motorcycle. A narrative of the fatal crashes is provided below.

Fatal Crash #1: The fatal crash occurred on August 10, 2018, at 3:43 PM and involved a pedestrian crossing Sligh Avenue approximately 50 feet east of N. Rome Avenue. The pedestrian was traveling northbound and crossed between stopped vehicles in the westbound left-turn lane and was struck by a westbound vehicle traveling in the inside through lane.

Fatal Crash #2: The fatal crash occurred on November 9, 2019, at 2:32 PM and involved a motorcycle being hit by a vehicle at the intersection of Armenia Avenue. The vehicle was making a northbound to westbound left-turn and struck the motorcyclist traveling southbound.

Fatal Crash #3: The fatal crash occurred on August 22, 2021, at 7:10 PM and involved a pedestrian being struck on the northbound exit ramp from I-275. The vehicle was traveling northbound and veered off the roadway striking the pedestrian standing near the intersection.

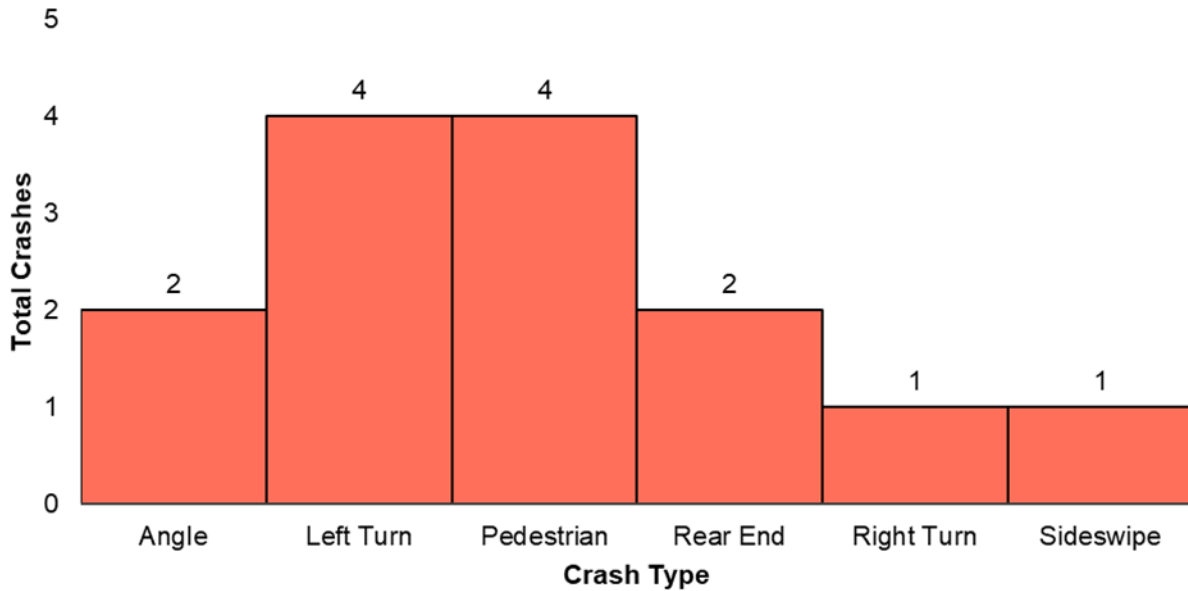
The KSI crashes were spread throughout the segment; no noticeable clusters were identified. The KSI crashes along the study segment are mapped in **Figure 19**.

Figure 19: Mapping of KSI Crashes



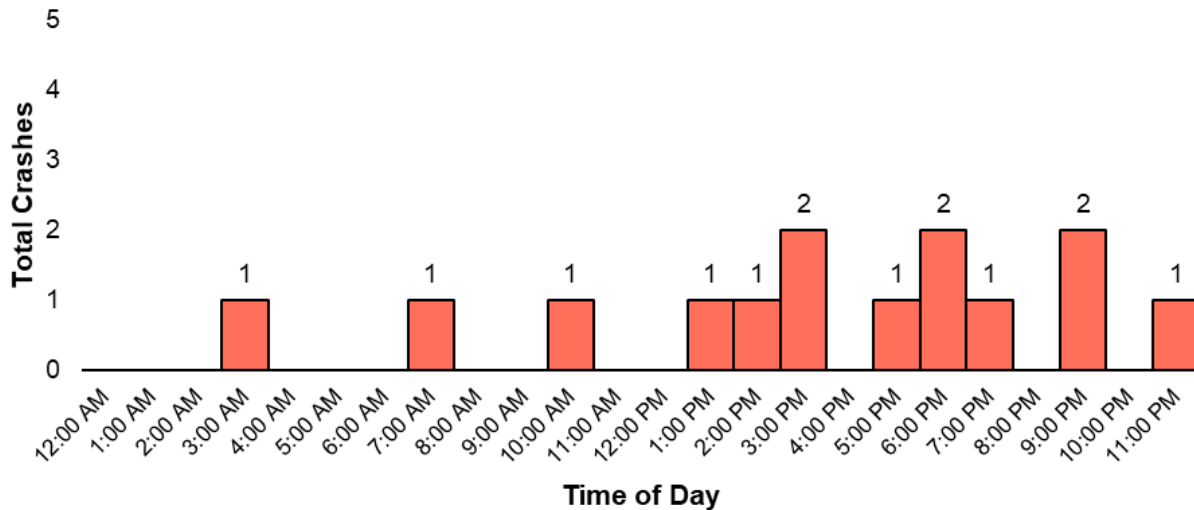
When analyzed by crash type, the most frequent KSI crashes were Left-Turn and Pedestrian crashes with 4 crashes each. The distribution of KSI crashes by crash type is presented in **Figure 20**.

Figure 20: Distribution of KSI Crashes by Crash Type



When analyzed by Time of Day, a relatively high proportion (50%) of the KSI crashes occurred between 5 PM and midnight. The distribution by time-of-day of KSI crashes is presented in **Figure 21**.

Figure 21: Distribution of KSI Crashes by Time of Day



Crashes Involving Non-Motorized Users

Considering the particular emphasis on safety for non-motorized users as part of the Tampa Vision Zero Action Plan and the relative frequency of these types of crashes during the analysis period, crashes involving pedestrians and bicyclists were analyzed independently. During the analysis period there were 9 crashes involving pedestrians and 1 bicycle-related crash. It should be noted that 2 of the 3 fatal crashes that occurred during the analysis period involved a pedestrian. Clusters of crashes involving non-motorized users were identified at Rome Avenue, at the I-275 interchange and at Nebraska Avenue. From the crashes that occurred at these intersections, 3 involved non-motorized users being hit in the crosswalk by a turning vehicle. From the 9 pedestrian crashes, 6 occurred between 5 PM and midnight. There were no patterns identified for crashes involving non-motorized users when analyzed by pavement condition and lighting conditions.

The crashes involving non-motorized users that occurred along Sligh Avenue during the analysis period are mapped in **Figure 22** and the crashes by Time of Day are presented in **Figure 23**.

Figure 22: Mapping of Crashes involving Non-motorized Users

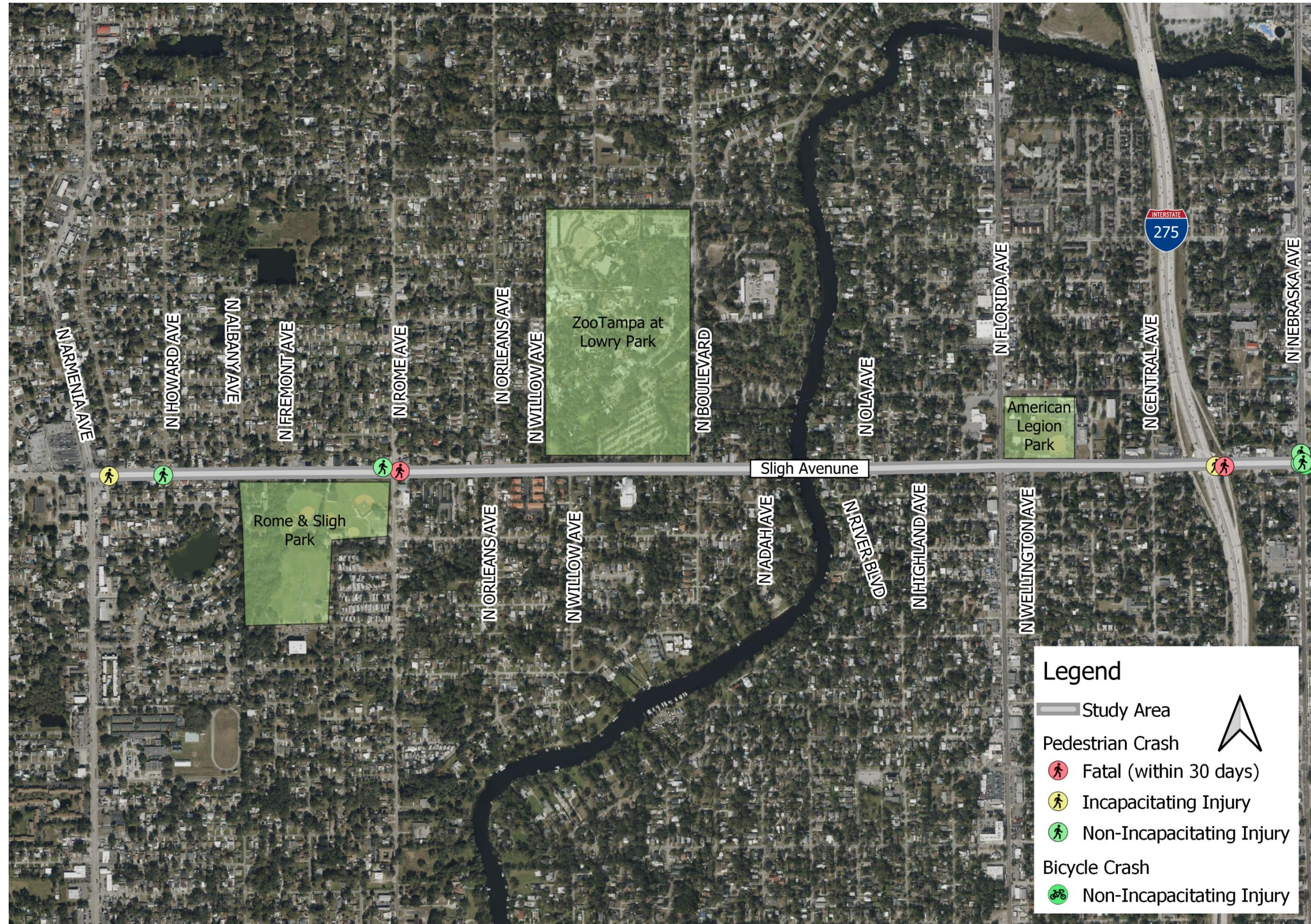
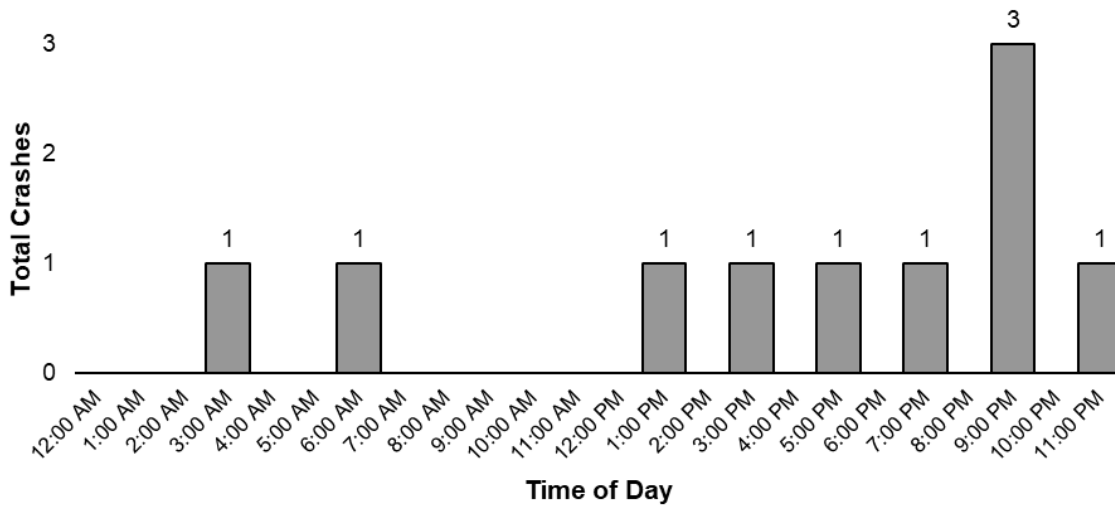


Figure 23: Distribution of Non-Motorized Crashes by Time of Day



Summary of Findings for Sligh Avenue

- Left turn crashes and Pedestrian crashes accounted for 50% of all KSI crashes
- Approximately 50% of all injury crashes and KSI crashes occurred between 5 PM and midnight
- Close to 30% of the injury crashes that occurred during the analysis period were in the dark with 29% occurring with no lighting present
- Most of the injury crashes occurred between intersections; however, relatively small clusters are noticeable at the intersections of N. Rome Avenue, at the interchange of I-275 and at Nebraska Avenue
- The KSI crashes were spread throughout the segment; no noticeable clusters were identified
- Clusters of crashes involving non-motorized users were identified at Rome Avenue, at the I-275 interchange and at Nebraska Avenue
- 2 of the 3 fatal crashes that occurred during the analysis period involved a pedestrian