



---

CAPE COD  
COMMISSION

Town of Mashpee  
Road Safety Audit  
Route 151 (Nathan Ellis Highway) at  
Ninigret Ave, Algonquin Ave, and Job's  
Fishing Road/Frank E Hicks Drive

**May 9, 2018**



Prepared by the Cape Cod Commission in cooperation with the Town of Mashpee and MassDOT Highway Division, Traffic Safety, and District 5 Offices.



# Table of Contents

Background..... 5

Road Safety Audit Multidisciplinary Team ..... 6

Project Location and Description .....7

Project Data ..... 9

Road Safety Audit Observations and Potential Improvements..... 11

    Intersection: Route 151 @ Job’s Fishing Road/Frank E Hicks Drive..... 11

    Safety Issue #1. Intersection Control and Signage ..... 11

    Safety Issue #2. Speed.....13

    Safety Issue #3. Pavement Markings & Condition .....14

    Intersection: Route 151 @ Algonquin Ave .....16

    Safety Issue #1. Speed and Sight Distance.....16

    Safety Issue #2. Road Alignment and Cross Section .....18

    Safety Issue #3. Pavement Markings & Condition .....19

    Safety Issue #4. Signage.....21

    Intersection: Route 151 @ Ninigret Ave..... 22

    Safety Issue #1. Speed and Sight Distance..... 22

    Safety Issue #2. Road Alignment and Cross Section ..... 24

    Safety Issue #3. Pavement Markings & Condition ..... 25

    Safety Issue #4. Signage and Lighting ..... 27

    Safety Issue #5. Clear Zones and Crash Barriers ..... 28

Summary of Road Safety Audit..... 30



CAPE COD  
COMMISSION

Appendices:

Road Safety Audit Team Members' Contact Information

Road Safety Audit Meeting Agenda

Crash Diagrams

Traffic Data



# List of Figures

Figure 1 – Aerial view of Route 151 at Ninigret Ave, Algonquin Ave, and Job’s Fishing Rd/Frank E. Hicks Dr .....7

Figure 2 – Locus Map ..... 8

Figure 3 – Frank E Hicks Drive sign broken on signal pole .....12

Figure 4– Motorists queing on Job’s Fishing Road in left turn lane.....12

Figure 5– Vehicles approaching intersection along Route 151 eastbound .....14

Figure 6– Faded crosswalk markings across Route 151 ..... 15

Figure 7 - Stop bar, crosswalk, and lane marking worn on Route 151 westbound ..... 15

Figure 8– Car blocking sight distance on northeast corner of intersection ..... 17

Figure 9– Car turning left onto Algonquin Ave, large signs along Route 151 affecting sight distance ..... 17

Figure 10– Large hole along corner of intersection.....18

Figure 11– Downgraded slope approaching intersection from north on Algonquin Ave..19

Figure 12 – Car turning left on Route 151, poor pavement conditions along southeast corner ..... 20

Figure 13 – Northeast corner of intersection with poor pavement conditions and parked car blocking sight distance..... 20

Figure 14– No stop sign at Algonquin Ave northbound approach, bent street sign .....21

Figure 15– Debris on northwest corner of intersection causing sight distance issues..... 22

Figure 16– Two-lane travel along Route 151 westbound ..... 23

Figure 17– Vehicles travelling eastbound along Route 151..... 23

Figure 18– Drainage on northeast corner leads to puddling during large storm events . 24

Figure 19– Patched pavement and worn pavement marking on Ninigret Ave ..... 26

Figure 20– Worn white dashed line along Route 151..... 26



Figure 21– Undersized and bent stop sign at Ninigret Ave ..... 27

Figure 22– Utility poles very close to roadway on north side of Route 151..... 28



## Background

All levels of government— local, regional, state, and federal—have been considering locations where crashes are most severe for many years. Several years ago, the national consensus was that there should be goals to reduce crashes, and in the 2005 federal legislation: Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), there was more emphasis on improving highway safety along with a dedicated funding program—the Highway Safety Improvement Program (HSIP). The latest federal legislation: Fixing America’s Surface Transportation (FAST), signed into law on December 4, 2015, retains the Highway Safety Improvement Program (HSIP) as one of its core highway programs.

To reduce the number of crash-related fatalities and incapacitating injuries, Massachusetts developed a Strategic Highway Safety Plan in 2006. The mission of the Safety Plan is to “Develop, promote, implement, and evaluate data-driven, multidisciplinary strategies to maximize safety for users of the roadway system.” One of the many strategies noted in the Safety Plan is to “conduct Road Safety Audits at high-crash locations throughout the Commonwealth.” The Massachusetts Department of Transportation (MassDOT) incorporated the Road Safety Audit as a requirement for securing Federal funding (Highway Safety Improvement Program [HSIP] funds) for safety projects.

The Federal Highway Administration (FHWA) defines a Road Safety Audit (RSA) as the formal safety examination of an existing or future road or intersection by an independent, multidisciplinary team. The purpose of a Road Safety Audit is to identify potential safety issues and possible opportunities for safety improvements while considering all roadway users.

The Cape Cod Commission (CCC), serving as the regional planning agency for the fifteen towns on Cape Cod, has reviewed many transportation locations over the years during various processes, including the Regional Transportation Plan, the Transportation Improvement Program, and Developments of Regional Impact, considering the existing safety issues and potential improvements. In addition, the CCC began looking at specific safety locations annually through safety studies and Road Safety Audits. A portion of the federal HSIP funds are allocated for improvements to the region’s highest crash locations.

This RSA evaluates the intersections of Route 151 (Nathan Ellis Highway) at Ninigret Ave, Algonquin Ave, and Job’s Fishing Road/Frank E. Hicks Drive in Mashpee, Massachusetts as shown in Figures 1 and 2.



## Road Safety Audit Multidisciplinary Team

The Road Safety Audit was scheduled with representatives of the Massachusetts Department of Transportation (MassDOT), town officials, and representatives of other stakeholders. The Road Safety Audit meeting was held on April 11, 2018, beginning at 9:00 a.m., at the Mashpee Public Library. The multidisciplinary team also visited the sites during the Road Safety Audit meeting, and then reconvened at the library to analyze observations.

**Table 1 - RSA Team Members**

<b>Audit Team Member</b>	<b>Agency / Affiliation</b>
John Phelan	Mashpee Fire Department
Bryan Burke	Mashpee Police Department
Robert Palermo	Mashpee Police Department
Catherine Laurent	Mashpee Department of Public Works
Jason Steiding	Mashpee Wampanoag Tribe
Alan Cloutier	Stantec
Michelle Deng	MassDOT Traffic Safety
Lisa Schletzbaum	MassDOT Traffic Safety
Kevin T. Fitzgerald	MassDOT Traffic Safety
Jason Walters	MassDOT District 5 – Traffic
Daniel Reutzell	MassDOT District 5 – Projects
Steven Tupper	Cape Cod Commission
David Nolan Jr.	Cape Cod Commission



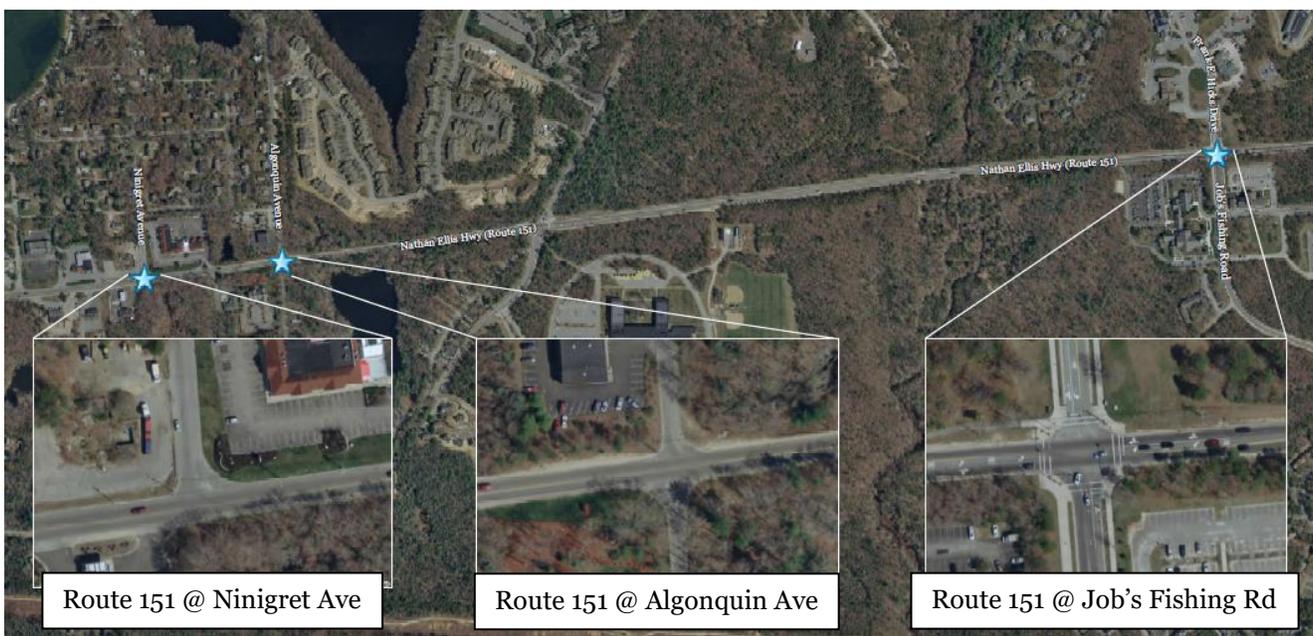
## Project Location and Description

Route 151 (Nathan Ellis Highway) at Job’s Fishing Road/Frank E. Hicks Drive in Mashpee is a four-way, signalized intersection. Job’s Fishing Road is a privately-owned road that provides access to the Mashpee Public Library, Mashpee Commons, and Route 28, while Frank E. Hicks Drive is public road that offers access to the Mashpee Police and Fire Departments, Mashpee Senior Center, and the Boys & Girls Club of Cape Cod.

Route 151 at Algonquin Ave is a four-way, unsignalized intersection. The north side of the roadway is publicly owned and provides access to a large residential neighborhood. The southern side of Algonquin Ave is a privately-owned roadway that offers access to the funeral home as well as a smaller residential neighborhood.

Route 151 at Ninigret Ave is a three-way, unsignalized intersection, with two westbound lanes along Route 151. Ninigret Ave approaches Route 151 from the north, and connects to the same neighborhood as Algonquin Ave. On the southerly side of Route 151 there is a Shell gas station with a driveway just west of Ninigret Ave. Between Ninigret and Algonquin there is a right-in right-out only driveway accessing Dino’s and Dunkin Donuts.

These intersections, shown in Figure 1, serve both regional and local traffic. The location of these intersections makes it important for commercial and non-commercial through-trips to/from the towns of Mashpee and Falmouth from/to the rest of Cape Cod and beyond. A locus map of the study area is shown in Figure 2.



**Figure 1 – Aerial view of Route 151 at Ninigret Ave, Algonquin Ave, and Job’s Fishing Rd/Frank E. Hicks Dr**

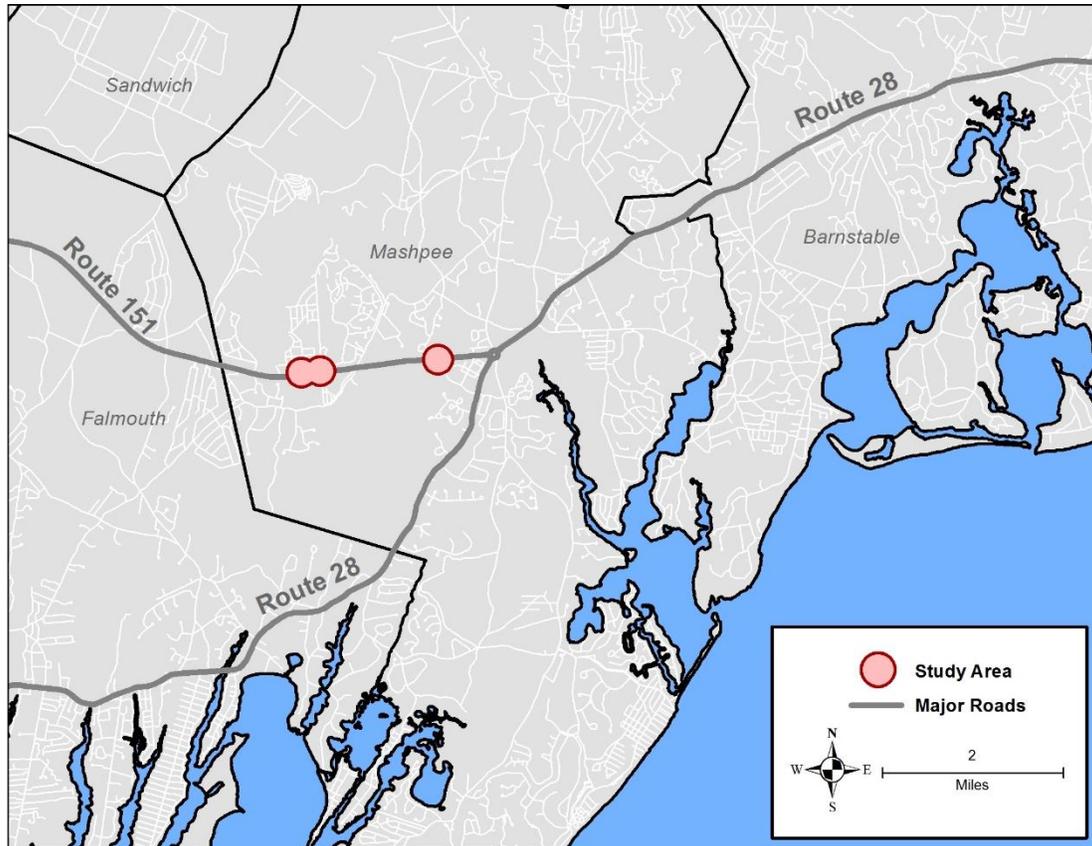


Figure 2 – Locus Map

Route 151 is a main route of travel to Mashpee High School and Middle School, Mashpee Commons, and the retirement community, Southport. Due to the lack of bicycle and pedestrian facilities along this corridor, most users are forced to travel by means of vehicle. Crashes, speed, and the lack of pedestrian facilities are noted as being some of the larger issues along this corridor.

To address concerns about mobility and safety along the Route 151 corridor and other important connecting roads in town, the Town of Mashpee is registered to develop a MassDOT “Complete Streets” prioritization plan.



## Project Data

Route 151 within the study area is classified as an Urban Principal Arterial and is under municipal jurisdiction. Frank E Hicks Drive, the northern portion of Algonquin Ave, and Ninigret Ave are town-owned roads and classified as Local roads. Job's Fishing Road and the southern portion of Algonquin Ave are private roads.

Crash data and analysis for this Road Safety Audit were supplied by Stantec. The crash data were reviewed and collision diagrams were developed for the Route 151 intersections with Job's Fishing Road/Frank E Hick Drive, Algonquin Ave, and Ninigret Ave and are included in the appendix.

### Job's Fishing Road/Frank E Hicks Drive intersection crashes

Approaches to this four-way, signalized intersection include:

- Route 151 eastbound approach (1 left-turn lane and 1 right-turn/through lane)
- Route 151 westbound approach (1 left-turn lane and 1 right-turn/through lane)
- Job's Fishing Road approach (1 left-turn lane and 1 right-turn/through lane)
- Frank E Hicks Drive approach (1 left-turn lane and 1 right-turn/through lane)

Crash data showed that 34 crashes occurred at the Job's Fishing Road/Frank E Hicks Drive location between 2013 and 2015 with 21 property-damage-only crashes, 13 injury crashes, and no fatal crashes. Most of the crashes occurred during dry, daylight conditions and were rather evenly dispersed throughout the year. Rear end collisions accounted for 28 of the crashes with four angle collisions also being reported.

### Algonquin Ave intersection crashes

Approaches to this four-way, unsignalized intersection include:

- Route 151 eastbound approach (1 through lane)
- Route 151 westbound approach (1 through lane)
- Algonquin Ave northbound approach (1 multi-purpose lane)
- Algonquin Ave southbound approach (1 multi-purpose lane)

Crash data showed that 15 crashes occurred at the Algonquin Ave location between 2013 and 2015 with nine property-damage-only crashes, six injury crashes, and no fatal crashes. The crashes occurred most frequently on Fridays, but evenly dispersed throughout the year. A majority of the crashes took place during daylight hours. Eight of the crashes were rear-end while three were angle, and one head-on collision.

### Ninigret Ave intersection crashes

Approaches to this three-way, unsignalized intersection include:



- Route 151 eastbound approach (1 through lane)
- Route 151 westbound approach (2 through lanes)
- Ninigret Ave approach (1 multi-purpose lane)

Crash data showed that 32 crashes occurred at the Ninigret Ave location between 2013 and 2015 with 26 property-damage-only crashes, six injury crashes, and no fatal crashes. The crashes appeared to increase steadily each year from six in 2013, 11 in 2014, and 15 in 2015. Of the 32 crashes, 13 of the crashes at this location were rear-end, 11 were angle, and four were sideswipes in the same direction. The majority of crashes were during daylight, dry roadway conditions.

### Traffic volumes

Stantec also prepared reports of the traffic volume data at all intersections throughout the Route 151 Road Safety Audit corridor. Turning movement counts represent the existing 2017 AM and PM peak volumes. The counts show that the Job's Fishing Road/Frank E Hicks Drive intersection carries 1,663 vehicles during the 4-5 PM period. During the 8-9 AM period there were 1,331 vehicles traveling through the intersection.

The counts for the Algonquin Ave intersection show that the intersection carries 2,077 vehicles during the 4-5 PM period. During the 8-9 AM period there were 1,735 vehicles travelling through the intersection.

The counts for the Ninigret Ave intersection show that the intersection carries 1,859 vehicles during the 4-5 PM period. During the 8-9 AM period there were 1,560 vehicles travelling through the intersection. A copy of the turning movement counts can be found in the appendix.

Data was collected in June and August of 2014 as well as September 2015.



# Road Safety Audit Observations and Potential Improvements

On Wednesday, April 11, 2018 the Road Safety Audit Team met at the Mashpee Public Library for a discussion of the existing conditions, visited the sites for field observations, and returned to discuss the safety issues at each intersection. The summary crash data, a collision diagram, and traffic volume reports were brought to the Road Safety Audit team meeting, and are included in the appendix.

The following summary of safety issues were identified through the site visit and discussions with the Road Safety Audit team including a review of the crash data (available in the appendix). The safety issues have been divided into the three distinct intersection locations.

## Intersection: Route 151 @ Job's Fishing Road/Frank E Hicks Drive

### Safety Issue #1. Intersection Control and Signage

#### Observations

- Visibility of the five-head doghouse signal for both the eastbound and westbound travel on Route 151 can be blocked by the placement of the opposite signal heads, as well as the grade in the eastbound travel lane. Visibility of roadway signs can be compromised due to vehicles blocking the sight line.
- There was consistent backup heading eastbound on Route 151 at the intersection. Very few left turns onto Frank E Hicks Drive, but lots of throughs and rights onto Job's Fishing Road.
- Pedestrian signals cycle with constant activation during rain. There are no accessible pedestrian signals at this intersection or tactile warning strips at crossings.
- There are no "Signal Ahead" advance traffic control signs in either direction along Route 151.
- There is a significant amount of right turns onto Job's Fishing Road from Route 151 eastbound accessing Mashpee Commons, or utilizing this road as a cut through to Route 28 to avoid the rotary.
- There is a significant number of left hand turns onto Route 151 from Job's Fishing Road. Many of these vehicles are coming from Mashpee Commons or Route 28 to avoid the rotary.
- The Frank E Hicks Drive street name sign is broken in half probably due to the turning radii.



- The Route 151 street signs that are placed on the overhead signal bar are black-on-white signs, which is inconsistent with other signs in Mashpee, possibly leading to driver confusion.
- Westbound travel along Route 151 has significant sun glare during the pm hours, especially during summertime. There was one crash related to sun glare at this location.



**Figure 3 – Frank E Hicks Drive sign broken on signal pole**



**Figure 4– Motorists queuing on Job's Fishing Road in left turn lane**



## Potential Enhancements

- Update pedestrian signals with ADA-compliant pedestrian push button/signal head (includes countdowns both audible, visual, and vibrotactile).
- Install tactile warning strips to curb ramps on sidewalks.
- Consider better signal timing and coordination with the Market Street signal as well as the Old Barnstable signal on Route 151.
- Consider moving the existing signal heads to avoid them blocking one another at the intersection.
- Evaluate adding a “Signal Ahead” sign on Route 151 approaches to warn motorists of upcoming signalized intersection.
- Add right turn lane on eastbound approach along Route 151.
- Replace broken Frank E Hicks Drive street sign, and consider relocating the new one to overhead signal bar.
- Replace the existing black on white Route 151 street signs along the top of the signal bar with MUTCD-compliant white on green signs on the signal post, or the MA-M1-5 state route signs.
- Consider updating signal with Flashing Yellow Arrow for permissive left-turns.
- Evaluate what causes the pedestrian signal to cycle during rain events. Repair as needed.

## Safety Issue #2. Speed

### Observations

- The speed limit approaching the intersection eastbound along Route 151 is posted at 50 MPH, and due to some of the poor sight lines many vehicles are needing to slow down rapidly to avoiding running a red light; this intersection is prone to many rear-end crashes, presumably due to the differential in speeds when approaching the light. The vertical curve of the roadway could also be a factor in speeding.
- Audit team members noted that many vehicles run red lights to avoid having to wait for the next green light, causing more congestion for the lanes that were now green.



**Figure 5– Vehicles approaching intersection along Route 151 eastbound**

### **Potential Enhancements**

- Increase speed and red light running enforcement at the intersection.
- Conduct a speed study and revise posted speed as appropriate
- Add a “signal ahead” sign on Route 151 approaches to warn motorists of upcoming signalized intersection.
- Evaluate red and yellow clearance of current signals to possibly reduce rear end crashes.

## Safety Issue #3. Pavement Markings & Condition

### **Observations**

- The crosswalks and stop bars at the intersection are worn.
- There is rutting near the stop lines in the eastbound and westbound directions along Route 151.



**Figure 6– Faded crosswalk markings across Route 151**



**Figure 7 - Stop bar, crosswalk, and lane marking worn on Route 151 westbound**



## **Potential Enhancements**

- Repaint the stop bars, crosswalks, and lane marking at the intersection to enhance their visibility to motorists.
- Repair ruts and cracks in pavement

## **Intersection: Route 151 @ Algonquin Ave**

### Safety Issue #1. Speed and Sight Distance

#### **Observations**

- The speed limit approaching the intersection eastbound along Route 151 is posted at 45 MPH, while the westbound approach is at 50 MPH; speeding has been noted as a problem along the corridor.
- There was a car parked in the northeast corner of the intersection blocking the view for travelling motorists. Also noted but unobserved during the RSA is significant visibility issues on that same corner from snow and foliage during the summer, fall, and winter months.
- There are several signs for businesses located on multiple corners of the intersection, often posing problems for vehicles seeing oncoming traffic.



**Figure 8– Car blocking sight distance on northeast corner of intersection**



**Figure 9– Car turning left onto Algonquin Ave, large signs along Route 151 affecting sight distance**



## Potential Enhancements

- Conduct a speed study and revise posted speed as appropriate
- Remove/tow any vehicles that may park on the corner of the intersection.
- Maintain trimming and keep snow banks to a minimum at the corners of the intersection to avoid blocking motorists sight distance.
- Consider asking the local businesses to relocate their signs to avoid obstructing driver's views.
- Increase the frequency of speed enforcement
- Consider reducing the lane width to 11 feet. This may also help with traffic calming efforts.

## Safety Issue #2. Road Alignment and Cross Section

### Observations

- The drainage on the south side of the intersection is non-functioning, and there are large holes in the roadway at the two southern corners.
- The north side of Algonquin Ave is at a downgraded slope towards Route 151, this was noted as being problematic, especially during snow, ice, and rain events.
- Taking left turns out of Algonquin Ave southbound can be very difficult due to sight distance, speed issues, and a tight turn radius.
- There is no shoulder along Route 151.



**Figure 10– Large hole along corner of intersection**



**Figure 11– Downgraded slope approaching intersection from north on Algonquin Ave**

### **Potential Enhancements**

- Expand the radius of the northwest corner of the intersection to allow for an easier right turn onto Route 151.
- Upgrade the drainage at the two southern corners of the intersection to reduce the flooding that occurs during rain events.
- Consider reconstructing the intersection to alleviate the downward grade on the southbound section of Algonquin Ave.
- Consider making the northern leg of Algonquin Ave one-way northbound, and making Ninigret Ave one-way southbound to avoid conflicting movements.

### **Safety Issue #3. Pavement Markings & Condition**

#### **Observations**

- The southeast corner of the intersection experiences flooding around the large hole along the corner of the intersection; the flooding stays on Algonquin Ave, avoiding intrusion to Route 151.
- There is a large pothole on the northern side of the intersection.
- There is significant sand build up along the four corners of the intersection as well as the shoulders approaching the intersection.
- There is rutting along the shoulders of the intersection.
- 50% of crashes at the intersection occurred during wet/snow/ice road conditions.
- The stop bar on the north leg is faded,



**Figure 12 – Car turning left on Route 151, poor pavement conditions along southeast corner**



**Figure 13 – Northeast corner of intersection with poor pavement conditions and parked car blocking sight distance**

### **Potential Enhancements**

- Repair the pothole on the northern side of the intersection, or consider repaving the entire intersection.
- Schedule more regular street maintenance including street sweeping to avoid large amounts of sand from collecting on the roadway.



## Safety Issue #4. Signage

### Observations

- There is no stop sign at the northbound approach (the privately-owned section of Algonquin Ave).
- There is no sign along Route 151, eastbound or westbound, indicating that the motorist is approaching an intersection.
- Business sign in the northwest corner blocks visibility of Algonquin Ave sign travelling eastbound.



Figure 14– No stop sign at Algonquin Ave northbound approach, bent street sign

### Potential Enhancements

- Add stop sign to the northbound approach on Algonquin Ave
- Provide an “intersection ahead” sign on Route 151 approaches to warn motorists of upcoming intersection.



## Intersection: Route 151 @ Ninigret Ave

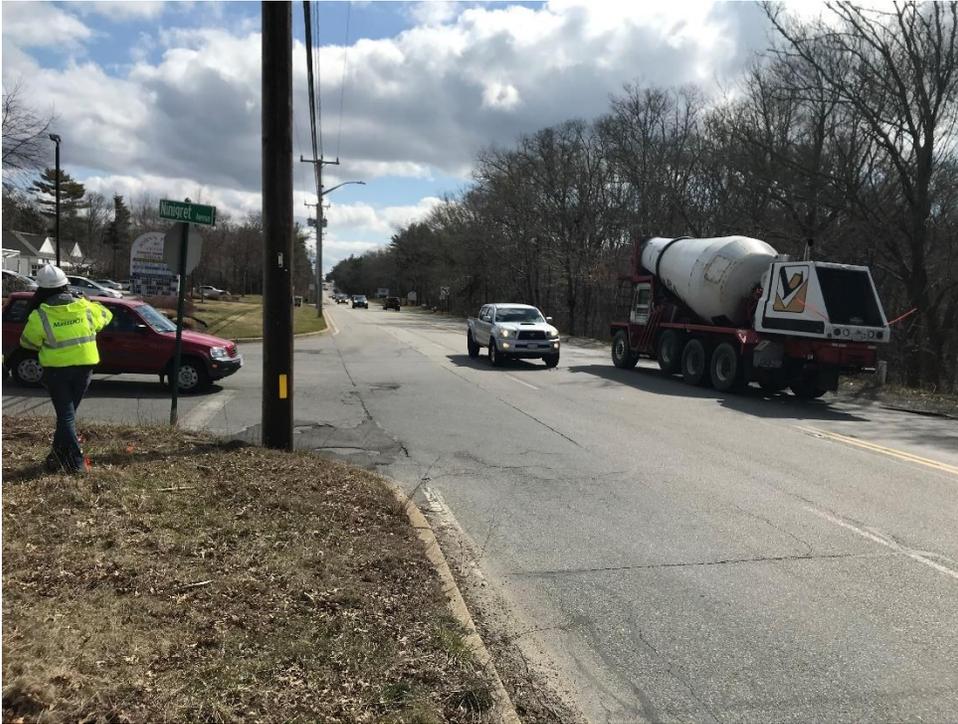
### Safety Issue #1. Speed and Sight Distance

#### Observations

- The speed limit approaching the intersection from both directions on Route 151 is 45 MPH, and was likely established prior to much of the adjacent commercial development. The posted speed limit may be too fast for a commercial area.
- The two-lane (westbound only) section of Route 151 encourages vehicles to operate at faster speeds than necessary throughout the corridor. The two-lane section begins just west of the John's Pond Center driveway and extends 800 feet west just past Massasoit Ave.
- Due to the wide pavement many vehicles were observed passing other vehicles waiting to take lefts onto Ninigret Ave along the gravel shoulder on the eastbound direction on Route 151. This could partly be responsible for the numerous rear end crashes at this location.
- There are a significant number of weeds and other obstructions blocking sight distance down Route 151 in the vacant lot in the northwest corner of the intersection.
- There is driver confusion regarding blinker usage; vehicles changing lanes on Route 151 westbound give the illusion they are taking a right turn onto Ninigret Ave by using their blinker. This could be responsible for the numerous angle crashes at this intersection.



**Figure 15– Debris on northwest corner of intersection causing sight distance issues**



**Figure 16– Two-lane travel along Route 151 westbound**



**Figure 17– Vehicles travelling eastbound along Route 151**



## Potential Enhancements

- Conduct a speed study and revise posted speed as appropriate
- Increase frequency of speed enforcement.
- Repave shoulders along the south side of Route 151.
- Consider construction of a vertical curb along the south side of Route 151 to discourage motorists from using the gravel shoulder to pass turning vehicles.
- Consider reducing Route 151 westbound from two to one lane along this corridor.
  - Widen shoulder with extra pavement from “road diet”
  - Reconfigure the roadway layout (i.e. center turn lane)
- Trim overgrown vegetation at the corner of the intersection to provide clear sight lines.
- Add pedestrian and bicycle facilities.

## Safety Issue #2. Road Alignment and Cross Section

### Observations

- There is significant puddling on the northeast corner of the intersection near the drainage system.
- The Shell gas station entrance/exit is negatively offset to Ninigret Ave, posing issues for vehicles trying to get onto the mainline of Route 151 as well as vehicles taking lefts into Shell and onto Ninigret Ave.
- Ninigret Ave is one wide lane; however, left-turns and right-turns wait side by side in the lane, blocking the view of each other pulling onto Route 151.
- Provide a left-turn pocket into Ninigret Ave to reduce the number of rear end crashes.



**Figure 18– Drainage on northeast corner leads to puddling during large storm events**



## Potential Enhancements

- Upgrade the existing drainage system to alleviate puddling on the northeast corner of the intersection.
- Consider realignment of the intersection to make a more natural four-way intersection with Ninigret Ave and the Shell gas station entrance/exit.
- Add left and right turn lanes on Ninigret Ave.
  - Or, consider a “lane diet” (reducing the amount of pavement in a lane) to discourage cars from sitting next to each other while waiting to pull onto Route 151.
- Consider looking into traffic signal warrants and conducting a 12-hour vehicle count to see if the intersection would warrant a traffic signal or roundabout to eliminate the number of angle crashes. Consider the realignment with the gas station for a signal.
- Consider making the northern leg of Algonquin Ave one-way northbound, and making Ninigret Ave one-way southbound to avoid conflicting movements.

## Safety Issue #3. Pavement Markings & Condition

### Observations

- The pavement along the Shell driveway is in poor condition. There are several patches, cracks, and small potholes along the Ninigret Ave approach to the intersection as well.
- The pavement along the eastbound shoulder is significantly compromised due to vehicles passing along the shoulder.
- The stop bar along Ninigret Ave is worn.
- The broken white lines delineating the travel lanes on Route 151 westbound are worn and very difficult for drivers to see, particularly at night.
- The fog lines along the shoulder of Route 151 are significantly worn.



**Figure 19– Patched pavement and worn pavement marking on Ninigret Ave**



**Figure 20– Worn white dashed line along Route 151**

### **Potential Enhancements**

- Repave the entrance/exit to the Shell gas station.
- Repave Ninigret Ave/repair potholes and cracks in the pavement.
- Repaint all pavement markings including stop bar on Ninigret Ave, white dashed line along Route 151 westbound, and fog lines on both sides of Route 151.
- Review placement of stop bar on Ninigret Ave.



## Safety Issue #4. Signage and Lighting

### Observations

- The stop sign at Ninigret Ave is undersized and bent backwards slightly.
- There is a faded “Do Not Enter” sign at the Dunkin Donuts exit.
- There is a “No Left Turn” sign approaching the Dunkin Donuts entrance eastbound on Route 151, but there is a Dunkin Donuts sign indicating a left turn to enter the drive thru.
- There are no intersection ahead warning signs on Route 151 approaches.
- There are overhead lights east and west of the intersection, but no street lights above the intersection.



Figure 21– Undersized and bent stop sign at Ninigret Ave

### Potential Enhancements

- Update stop sign to MUTCD (Manual on Uniform Traffic Control Devices) standards on Ninigret Ave.
- Consider relocating and updating “Do Not Enter” sign at the Dunkin Donuts exit to MUTCD standards.
- Remove the Dunkin Donuts sign that encourages vehicles to take a left into the drive thru on the Route 151 eastbound approach.



- Consider adding overhead LED lights to intersection to enhance visibility at night.
- Add an “intersection ahead” sign on Route 151 approaches to warn motorists of upcoming intersection.

## Safety Issue #5. Clear Zones and Crash Barriers

### Observations

- Wooden posts used as a crash barrier along the south side of Route 151 are not up to standard.
- There is no curb or sufficient shoulder along south side of Route 151, encouraging vehicles to pass on gravel shoulder.
- Utility poles are very close to roadway on north side of Route 151 and could disrupt sight lines.



**Figure 22– Utility poles very close to roadway on north side of Route 151**



## **Potential Enhancements**

- Replace wooden posts along south side of intersection with guardrail to prevent vehicles from running off the road and into the wetland area south of Route 151.
- Consider constructing a vertical curb along south side of Route 151.
- Consider relocating utility poles along north side of Route 151 for better visibility and overall safety.
- Consider providing a shoulder along Route 151 as well as adding pedestrian and bicycle accommodations.



## Summary of Road Safety Audit

The summary list of the Road Safety Audit observations and enhancements is provided in the following table to assist in the design and/or implementation of potential improvements elicited during the process. It is also recommended that any design process for more involved geometric changes include further analysis and public input.

Safety payoff estimates are subjective judgement of the potential effectiveness of the potential enhancement. Where available, documented crash reduction factors were used to develop these safety payoff estimates.

The time frame is categorized as short-term (<1 year), medium-term (1 to 3 years), or long-term (>3 years). The costs are categorized as low (<\$10,000), medium (\$10,001 to \$50,000), or high (>\$50,000)

## Potential Safety Enhancement Summary

Route 151 @ Job's Fishing Road/Frank E Hicks Drive					
Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Intersection Control & Signage	Update pedestrian signals with ADA-compliant pedestrian push button/signal head (includes countdowns both audible, visual, and vibrotactile). Evaluate rain cycle of pedestrian signal	High	Medium	Medium	Town
Intersection Control & Signage	Install tactile warning strips to curb ramps on sidewalks	Low	Short	Low	Town
Intersection Control & Signage	Consider better signal timing and coordination with the Market Street and Old Barnstable Road signals	Low	Short	Low	Town
Intersection Control & Signage	Consider moving existing signal heads to avoid them from blocking one another	Low	Medium	Medium	Town
Intersection Control & Signage	Consider a right turn lane on eastbound approach along Route 151	Medium	Long	High	Town
Intersection Control & Signage	Replace broken Frank E Hicks Drive street sign and consider relocating it to overhead signal bar	Low	Short	Low	Town
Intersection Control & Signage	Replace existing Route 151 street signs on signal bars with MUTCD-compliant white on green signs on signal post, or the MA-M1-5 state route signs	Low	Short	Low	Town
Intersection Control & Signage	Consider updating signal with Flashing Yellow Arrow for permissive left-turns	Medium	Short	Low	Town
Speed	Increase frequency of speed enforcement	Medium	Ongoing	Low	Town



Route 151 @ Job's Fishing Road/Frank E Hicks Drive					
Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Speed	Conduct a speed study and revise posted speed as appropriate	Medium	Short	Low	MassDOT/Town
Speed	Add "signal ahead" sign on Route 151 approaches to warn motorists of upcoming signalized intersection	Medium	Short	Low	Town
Speed	Evaluate red and yellow clearance of current signals to possibly reduce rear end crashes	Medium	Short	Low	Town
Pavement Markings & Condition	Repaint stop bars, crosswalks, and lane markings	Medium	Short	Low	Town
Pavement Markings & Condition	Repair ruts and cracks in pavement	Low	Short	Low	Town

Route 151 @ Algonquin Ave					
Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Speed & Sight Distance	Conduct a speed study and revise posted speed as appropriate	Medium	Short	Low	MassDOT/Town
Speed & Sight Distance	Maintain trimming and keep snow banks to a minimum on the corners of the intersection	Medium	Ongoing	Low	Town
Speed & Sight Distance	Consider having local business relocate their sign for roadway visibility purposes	Low	Short	Low	Town/Private
Speed & Sight Distance	Increase the frequency of speed enforcement	Medium	Ongoing	Low	Town

Route 151 @ Algonquin Ave					
Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Speed & Sight Distance	Consider reducing the lane width to 11 feet.	Medium	Medium	Medium	Town
Road Alignment & Cross Section	Expand the radius of the northwest corner of the intersection to allow for an easier right turn onto Route 151.	Medium	Long	High	Town
Road Alignment & Cross Section	Upgrade drainage at the intersection	Medium	Long	High	Town
Road Alignment & Cross Section	Consider making the northern leg of Algonquin Ave one-way northbound, and making Ninigret Ave one-way southbound to avoid conflicting movements	High	Long	Medium	Town
Pavement Markings & Condition	Repair potholes or consider intersection repavement	Medium	Short/Long	Low/High	Town
Pavement Markings & Condition	Schedule more regular street maintenance including street sweeping to avoid large amounts of sand from collecting on the roadway	Medium	Ongoing	Low	Town
Signage	Add stop sign on northbound approach on Algonquin Ave	Low	Short	Low	Town/Private
Signage	Provide an "intersection ahead" sign on Route 151 approaches	Medium	Short	Low	Town



Route 151 @ Ninigret Ave					
Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Speed & Sight Distance	Conduct a speed study and revise posted speed as appropriate	Medium	Short	Low	MassDOT/Town
Speed & Sight Distance	Increase the frequency of speed enforcement	Medium	Ongoing	Low	Town
Speed & Sight Distance	Repave shoulders along the southside of Route 151	High	Medium	Medium	Town
Speed & Sight Distance	Consider construction of a vertical curb along the southside of Route 151 to discourage motorists from using the gravel shoulder to pass	Medium	Long	High	Town
Speed & Sight Distance	Consider reducing Route 151 westbound from two to one lane	Medium	Short	Medium	Town
Speed & Sight Distance	Trim overgrown vegetation at corner of the intersection to provide clear sight lines	Low	Ongoing	Low	Town
Speed & Sight Distance	Add pedestrian and bicycle facilities	High	Long	High	Town
Road Alignment & Cross Section	Upgrade existing drainage system to reduce the amount of puddling there is during large storm events	Medium	Long	High	Town
Road Alignment & Cross Section	Consider intersection realignment to make a more natural four-way intersection with Ninigret Ave and the Shell gas station	High	Long	High	Town
Road Alignment & Cross Section	Add left and right turn lanes on Ninigret Ave	Medium	Medium	Medium	Town

Route 151 @ Ninigret Ave					
Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Road Alignment & Cross Section	Consider traffic signal or roundabout, if warranted. Consider intersection reconfiguration	High	Long	High	Town
Road Alignment & Cross Section	Consider making the northern part of Algonquin Ave one-way northbound, and making Ninigret Ave one-way southbound to avoid conflicting movements	High	Long	Medium	Town
Road Alignment & Cross Section	Consider adding left-turn pockets into Ninigret Ave	High	Long	Medium	Town
Pavement Markings & Condition	Repave the driveway entrance to the Shell gas station	Medium	Medium	Medium	Town
Pavement Markings & Condition	Repave Ninigret Ave and repair potholes and cracks in the pavement	Medium	Medium	High	Town/Private
Pavement Markings & Condition	Repaint all pavement markings	Short	Short	Low	Town
Signage & Lighting	Update stop sign on Ninigret Ave	Medium	Short	Low	Town
Signage & Lighting	Consider relocating and updating "Do Not Enter" sign at the Dunkin Donuts driveway	Medium	Short	Low	Town/Private
Signage & Lighting	Remove Dunkin Donuts sign that indicates left turns along Route 151 eastbound	Medium	Short	Low	Town/Private
Signage & Lighting	Consider adding overhead LED lights to intersection to enhance visibility	High	Medium	High	Town
Signage & Lighting	Add an "intersection ahead" sign on Route 151 approaches	Medium	Short	Low	Town



Route 151 @ Ninigret Ave					
Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Clear Zones & Crash Barriers	Replace wooden posts along south side of Route 151 with a guardrail	High	Medium	Medium	Town
Clear Zones & Crash Barriers	Consider construction of a vertical curb along the south side of Route 151 to discourage motorists from using the gravel shoulder to pass	Medium	Long	High	Town
Clear Zones & Crash Barriers	Consider relocating utility poles along north side of Route 151	Low	Long	High	Town
Clear Zones & Crash Barriers	Consider providing a shoulder along Route 151 as well as adding pedestrian and bicycle accommodations	High	Long	High	Town

# Appendices

Road Safety Audit Team Members' Contact Information

Road Safety Audit Meeting Agenda

Crash Diagrams

Traffic Data

**Participating Audit Team Members – Contact Information**

<b>Audit Team Member</b>	<b>Contact Information</b>
John Phelan	jphelan@mashpeema.gov
Bryan Burke	bburke@mashpeema.gov
Robert Palermo	rpalermo@mashpeema.gov
Catherine Laurent	claurent@mashpeema.gov
Jason Steiding	jason.steiding@mwtribe-nsn.gov
Alan Cloutier	alan.cloutier@stantec.com
Michelle Deng	michelle.deng@state.ma.us
Lisa Schletzbaum	lisa.schletzbaum@state.ma.us
Kevin T. Fitzgerald	kevin.t.fitzgerald@state.ma.us
Jason Walters	jason.walters@state.ma.us
Daniel Reutzel	daniel.reutzel@state.ma.us
Steven Tupper	stupper@capecodcommission.org
David Nolan Jr.	david.nolan@capecodcommission.org

# Agenda

## Road Safety Audit

Mashpee, MA

**Rt.151 at Ninigret Avenue; Rt.151 at Algonquin Avenue;  
Rt.151 at Frank E. Hicks Drive & Job's Fishing Road**

Meeting Location: Mashpee Public Library, Conference Room

64 Steeple Street, Mashpee, MA 02649

Wednesday, April 11<sup>th</sup>, 2018

9:00 AM – 12:00 PM

Type of meeting:

High crash location – Road Safety Audit

Attendees:

Invited participants to comprise a multidisciplinary team

Please bring:

Thoughts and enthusiasm!!

9:00 AM

Welcome and Introductions

9:15 AM

Discussion of Safety Issues

- Crash history, speed regulations, recent and existing projects – all provided in advance
- Existing geometries and conditions

10:00 AM

Site Visit

- Drive/Walk to the three study intersections of Route 151
- As a group, identify areas for improvement

11:00 AM

Discussion of Potential Improvements

- Discuss observations and finalize safety issue areas
- Discuss potential improvements and finalize recommendations

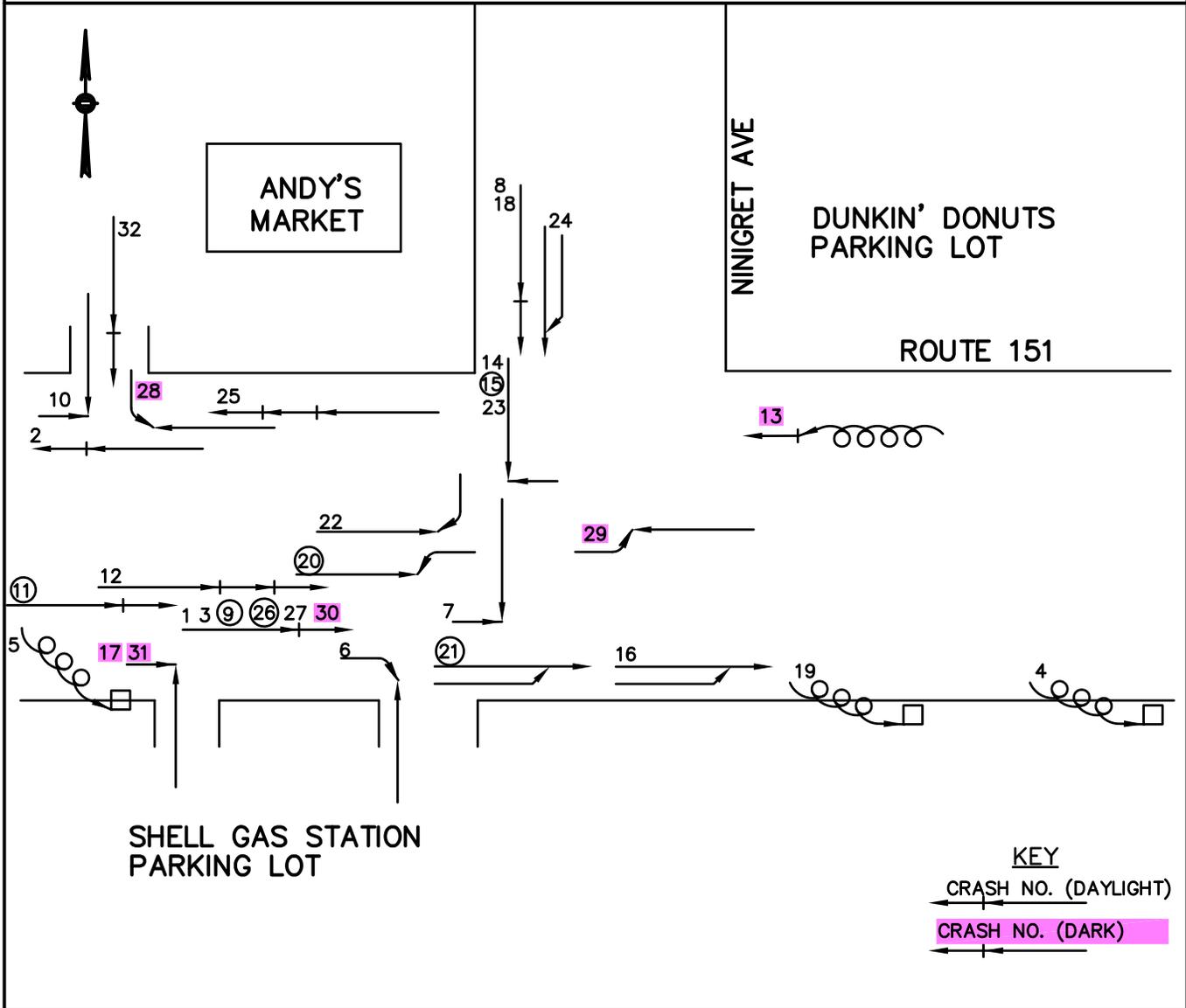
12:00 PM

Adjourn for the Day – but the RSA has not ended

### Instructions for Participants:

- Before attending the RSA on April 11<sup>th</sup>, participants are encouraged to drive/walk through the intersection and complete/consider elements on the RSA Prompt List with a focus on safety.
- All participants will be actively involved in the process throughout. Participants are encouraged to come with thoughts and ideas, but are reminded that the synergy that develops and respect for others' opinions are key elements to the success of the overall RSA process.
- After the RSA meeting, participants will be asked to comment and respond to the document materials to assure it is reflective of the RSA completed by the multidisciplinary team.

INTERSECTION: NATHAN ELLIS HWY (RTE 151) AND: NINIGRET AVE  
 PERIOD: 2013-2015 FROM: JANUARY TO: DECEMBER  
 CITY/TOWN: MASHPEE PREPARED BY: STANTEC



SYMBOL	ACCIDENT TYPE		
←	MOVING VEHICLE	←   ←	REAR END
← >>>	BACKING VEHICLE	←   ←	HEAD ON
←	NON-INVOLVED VEHICLE	← / ←	SIDE - SWIPE
← - - -	PEDESTRIAN	← >>>	OUT OF CONTROL
▭	PARKED VEHICLE	← ↘	LEFT TURN
◼	FIXED OBJECT	← ⊥	RIGHT ANGLE
●	FATAL ACCIDENT		
○	INJURY ACCIDENT		

FIGURE 1  
COLLISION DIAGRAM

### Route 151 at Ninigret Avenue (2013-2015)

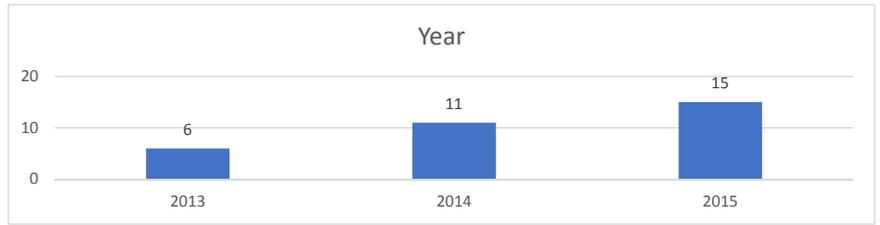
Crash #	Date	Time	Manner of Collision	Road Surface	Light Conditions	Weather Conditions	Driver Contributing Code	Driver Age			Comments
			Type	Type	Type	Type	D1	D2	D3		
1	4/18/2013	4:06 PM	Rear-end	Dry	Daylight	Clear	Inattention	60	18		The operator of Vehicle 2 (EB) was forced to slam the brakes and still rear-ended Vehicle 1 (EB), which stopped quickly because of a vehicle turning left into Ninigret.
2	4/26/2013	3:45 PM	Rear-end	Dry	Daylight	Clear	Followed too closely	36	46		The operator of Vehicle 2 (WB) drove too closely behind Vehicle 1 (WB). Vehicle 1 stopped and Vehicle 2 rear ended Vehicle 1.
3	5/29/2013	3:04 PM	Rear-end	Dry	Daylight	Cloudy	Inattention/Followed too closely	17	26		The operator of Vehicle 1 (EB) took her eyes off the roadway and did not have enough time to stop behind Vehicle 2 (EB), who was stopped to make a left turn onto Ninigret.
4	6/28/2013	12:28 PM	Single Vehicle Crash	Wet	Daylight	Rain/Cloudy	Distracted	71			The operator of Vehicle 1 (EB) attempted to pass an unknown vehicle just ahead, and collided into a "No left turn" sign in the process
5	7/18/2013	11:13 AM	Single Vehicle Crash	Dry	Daylight	Cloudy	Operating defective equipment	61			The operator of Vehicle 1 (EB) had trouble with her throttle, causing the vehicle to accelerate in reverse and collide into a tree
6	8/2/2013	6:01 PM	Angle	Dry	Daylight	Clear	Inattention	34	31		The operator of Vehicle 2 (EB) tried to force a sharp right turn into the Sunoco gas station and struck the driver's side of Vehicle 1 (NB), who was pulling out of the gas station
7	5/4/2014	6:39 PM	Angle	Wet	Daylight	Rain/Cloudy	Operating vehicle in reckless manner/Failed to yield right of way	20	44		The operator of Vehicle 1 (SB) was reckless and cut right in front of Vehicle 2 (EB) as it suddenly drove across the intersection, resulting in an angle crash and further collisions with fixed objects afterwards
8	6/20/2014	9:32 AM	Rear-end	Dry	Daylight	Clear	Inattention	35	55		The operator of Vehicle 1 (SB) drove into the rear bumper of Vehicle 2 (SB) due to inattention and not having enough time to stop from behind
9	6/28/2014	3:42 PM	Angle	Dry	Daylight	Clear	Inattention	60	43		The operator of Vehicle 1 (EB) drove into the rear bumper of Vehicle 2 (EB). Vehicle 2 had just turned (NB Right) from the gas station.
10	8/11/2014	5:03 PM	Sideswipe, same direction	Dry	Daylight	Clear	Visibility obstructed	50	53		The operator of Vehicle 1 (SB) had her vision obstructed by a pickup truck while trying to turn out of Andy's Market parking lot, sideswiping Vehicle 2 (EB) in the process
11	8/14/2014	6:12 PM	Rear-end	Dry	Daylight	Clear	Followed too closely/Glare	56	58		The operator of Vehicle 2 (EB) had trouble seeing Vehicle 1 (EB) due to the glare of the sunlight and collided into the rear bumper of Vehicle 1 in the process
12	8/15/2014	5:55 PM	Rear-end	Dry	Daylight	Clear	Inattention	54	67	46	The operator of Vehicle 1 (EB) was inattentive and rear-ended Vehicle 2 (EB), which had stopped for vehicle 3 (EB), who was turning left onto Ninigret.
13	8/15/2014	1:51 AM	Rear-end	Dry	Dark - lighted roadway	Clear	Operating vehicle in reckless manner	22	n/a		The operator of Vehicle 1 (WB) was caught drunk-driving and had been hemmed in by the police. A rear-end collision occurred after being dragged out of his car and leaving the car in drive, which collided with the police car.
14	9/12/2014	7:17 AM	Angle	Dry	Daylight	Clear	Glare	78	46		The operator of Vehicle 1 (SB) turned right onto Rt 151 in front of a moving Vehicle 2 (WB) due to his visibility being obstructed by the sun, resulting in an angle collision
15	9/24/2014	3:03 PM	Angle	Dry	Daylight	Clear	Failed to yield right of way	17	75		The operator of Vehicle 1 (SB) pulled into the intersection and failed to yield the right of way To Vehicle 2 (WB) travelling across on Route 151, resulting in an angle collision
16	12/12/2014	12:07 PM	Sideswipe, same direction	Dry	Daylight	Clear	Failed to yield right of way	24	n/a		The operator of Vehicle 1 (EB) passed around on the right of Vehicle 2 (EB) as it was trying to turn left at the intersection, resulting in a sideswipe collision. Vehicle 1 then drove away from the scene for hit-and-run incident
17	12/18/2014	10:08 PM	Angle	Dry	Dark - lighted roadway	Clear	Failed to yield right of way	21	18		The operator of Vehicle 1 (NB) attempted to exit the gas station and failed to yield right of way to an oncoming Vehicle 2 (EB), resulting in an angle collision
18	2/13/2015	7:26 AM	Rear-end	Ice	Daylight	Clear	Swerving or Avoiding due to slippery surface	28	17		The operator of Vehicle 1 (SB) drove too closely behind Vehicle 2 (SB) and drove into its rear bumper due to the slippery, icy road conditions
19	3/4/2015	1:06 PM	Single Vehicle Crash	Wet	Daylight	Cloudy	Failed to yield right of way	87			The operator of Vehicle 1 (SB to EB) had her vision obstructed by a snowbank while trying to turn out of Ninigret. They pulled onto Route 151 too fast due to an oncoming car and collided into another snowbank as a result
20	5/11/2015	9:25 AM	Angle	Dry	Daylight	Cloudy	Operating vehicle in reckless manner/Failed to yield right of way	21	68		The operator of Vehicle 1 (WB) turned left from Route 151 to gas station in front of Vehicle 2 (EB), resulting in an angle crash as Vehicle 2 had no time to stop
21	7/14/2015	6:43 PM	Sideswipe, same direction	Dry	Daylight	Cloudy	Inattention/Failed to yield right of way	83	82		The operator of Vehicle 1 (NB to EB) turned right exiting the gas station and failed to yield right of way to an oncoming Vehicle 2 (EB), resulting in a sideswipe collision
22	7/26/2015	11:04 AM	Sideswipe, opposite direction	Dry	Daylight	Cloudy	Inattention	47	69		The operator of Vehicle 1 (SB) turned right onto Route 151 from Ninigret. Turn was not sharp enough and drove across the double yellow line and sideswiped the boat trailer of Vehicle 2 (EB).
23	8/7/2015	2:27 PM	Angle	Dry	Daylight	Clear	Failed to yield right of way	47	18		The operator of Vehicle 1 (SB) failed to yield to an oncoming Vehicle 2 (WB) as it tried to turn left from Ninigret Ave, resulting in an angle crash
24	8/19/2015	11:31 AM	Sideswipe, same direction	Dry	Daylight	Clear	Failure to keep in proper lane	44	77		The operator of Vehicle 1 (SB) did not use care to stay in the correct lane when turning right onto Ninigret Ave, resulting in a sideswipe collision with Vehicle 2 (SB)
25	9/7/2015	11:51 AM	Rear-end	Dry	Daylight	Clear	Inattention	85	63	48	The operator of Vehicle 1 w(WB) as in a rush and drove aggressively to rear-end Vehicle 2 (WB), which was stopped in congested traffic, causing it to also collide into Vehicle 3 from behind
26	10/25/2015	10:26 AM	Rear-end	Dry	Daylight	Cloudy	Followed too closely/Distracted	22	40		The operator of Vehicle 1 (EB) got distracted by her GPS, causing her to collide into the rear-bumper of Vehicle 2 (EB). Vehicle 2 was turning left onto Ninigret.

### Route 151 at Ninigret Avenue (2013-2015)

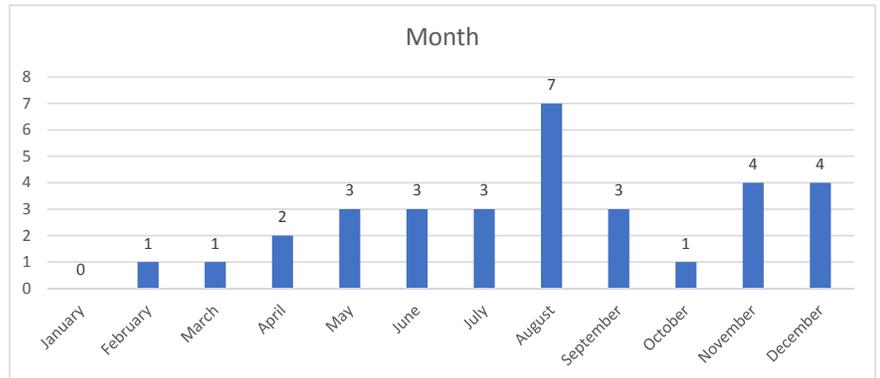
Crash #	Date	Time	Manner of Collision	Road Surface	Light Conditions	Weather Conditions	Driver Contributing Code	Driver Age			Comments
								D1	D2	D3	
	<i>mdy</i>		<i>Type</i>	<i>Type</i>	<i>Type</i>	<i>Type</i>	<i>Type</i>				
27	11/4/2015	8:29 AM	Rear-end	Dry	Daylight	Clear	Inattention	27	21		The operator of Vehicle 2 (EB) drove too closely behind Vehicle 1 (EB) and drove into its rear bumper as Vehicle 1 was stopping to turn left into Ninigret.
28	11/5/2015	5:28 PM	Angle	Dry	Dark - lighted roadway	Cloudy	Failed to yield right of way	35	36		The operator of Vehicle 1 (SB) failed to yield right of way to an oncoming Vehicle 2 (WB) while trying to turn out of Andy's Market parking lot, resulting in an angle collision
29	11/25/2015	5:52 PM	Angle	Dry	Dark - lighted roadway	Clear	Physical impairment/Failed to yield right of way	23	69		The operator of Vehicle 1 (EB) was intoxicated with cough medication, causing him to cut in front of Vehicle 2 (WB) while trying to turn left into Ninigret Ave
30	11/26/2015	6:59 PM	Rear-end	Dry	Dark - lighted roadway	Clear	Followed too closely/Distracted	40	27		The operator of Vehicle 1 (EB) took her eyes off the roadway and did not have enough time to stop behind Vehicle 2 (EB) who was turning left into Ninigret, resulting in a rear-end collision
31	12/1/2015	4:55 PM	Angle	Wet	Dark - lighted roadway	Rain	Failed to yield right of way	70	22		The operator of Vehicle 1 (NB) failed to yield right of way to an oncoming Vehicle 2 (EB) while trying to turn out of the Shell Gas Station, resulting in an angle collision
32	12/9/2015	9:05 AM	Rear-end	Dry	Daylight	Clear	Inattention	19	75		The operator of Vehicle 2 (SB) was inattentive and rear ended Vehicle 1 (SB) while trying to exit out of the Andy's Market Parking Lot

## Nathan Ellis Highway (Route 151) at Ninigret Avenue (2013-2015)

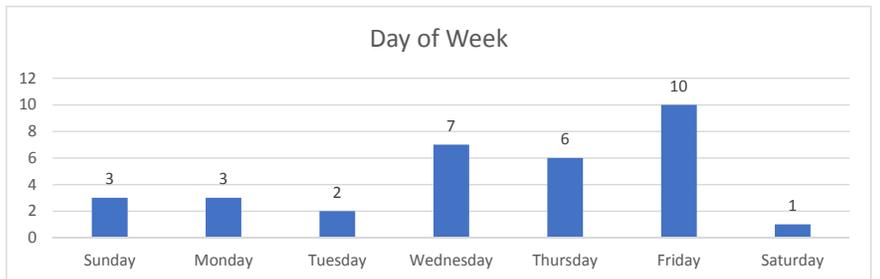
Year	Count
2013	6
2014	11
2015	15
<b>Grand Total</b>	<b>32</b>



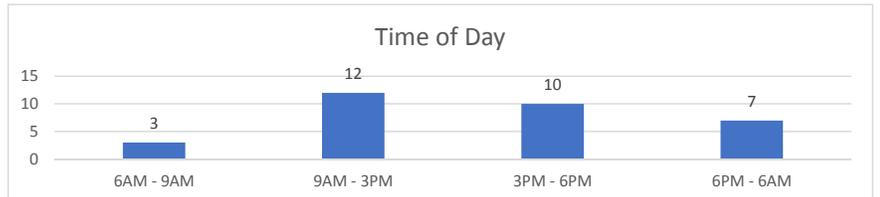
Month	Count
January	0
February	1
March	1
April	2
May	3
June	3
July	3
August	7
September	3
October	1
November	4
December	4
<b>Grand Total</b>	<b>32</b>



Day of Week	Count
Sunday	3
Monday	3
Tuesday	2
Wednesday	7
Thursday	6
Friday	10
Saturday	1
<b>Grand Total</b>	<b>32</b>



Time of Day	Count
6AM - 9AM	3
9AM - 3PM	12
3PM - 6PM	10
6PM - 6AM	7
<b>Grand Total</b>	<b>32</b>

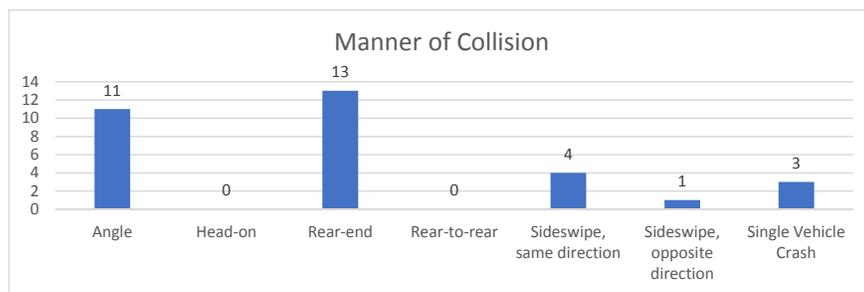


Crash Severity	Count
Property Damage Only	26
Non-fatal Injury	6
Fatal Injury	0
<b>Grand Total</b>	<b>32</b>

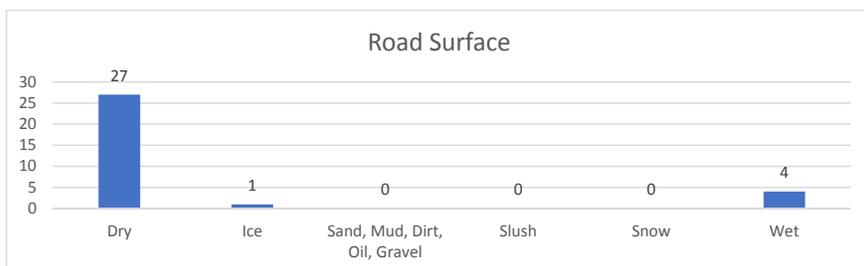


## Nathan Ellis Highway (Route 151) at Ninigret Avenue (2013-2015)

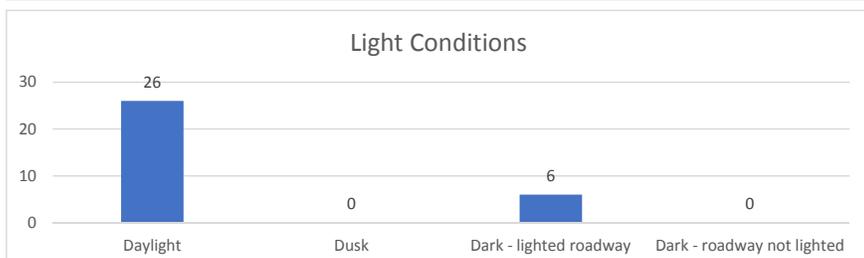
Manner of Collision	Count
Angle	11
Head-on	0
Rear-end	13
Rear-to-rear	0
Sideswipe, same direction	4
Sideswipe, opposite direction	1
Single Vehicle Crash	3
<b>Grand Total</b>	<b>32</b>



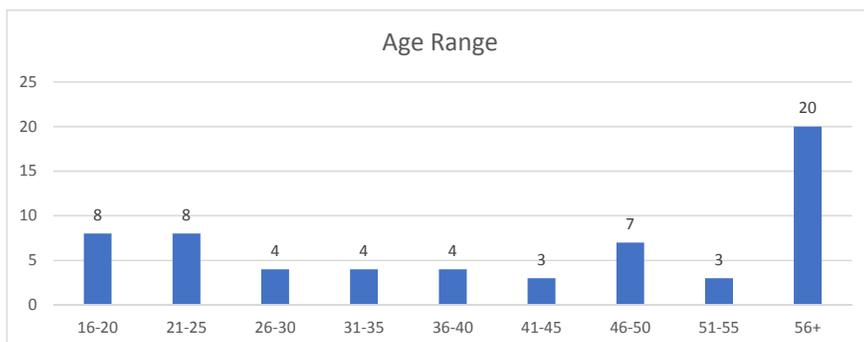
Road Surface	Count
Dry	27
Ice	1
Sand, Mud, Dirt, Oil, Gravel	0
Slush	0
Snow	0
Wet	4
<b>Grand Total</b>	<b>32</b>



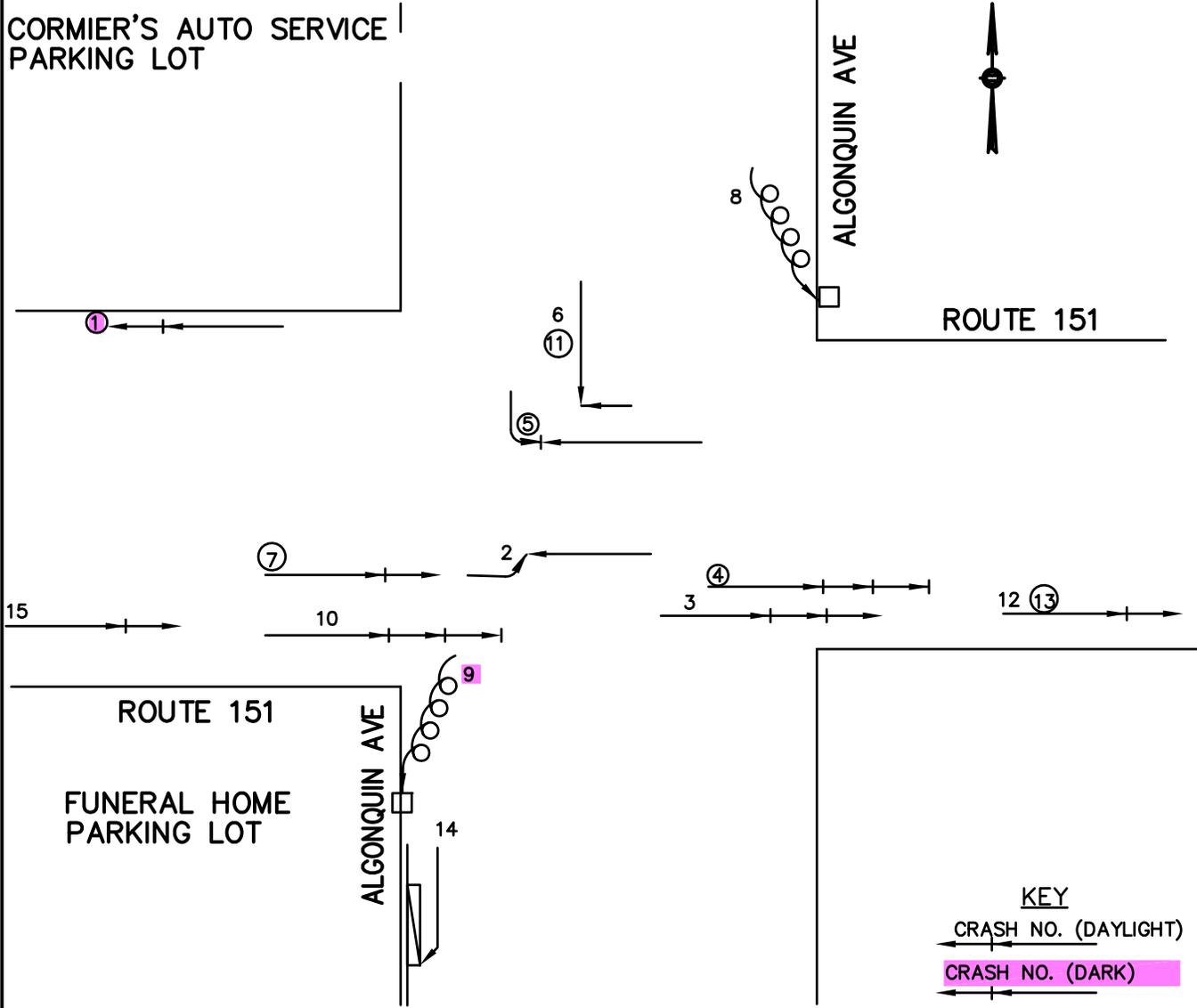
Light Conditions	Count
Daylight	26
Dusk	0
Dark - lighted roadway	6
Dark - roadway not lighted	0
<b>Grand Total</b>	<b>32</b>



Age Range	Count
16-20	8
21-25	8
26-30	4
31-35	4
36-40	4
41-45	3
46-50	7
51-55	3
56+	20
<b>Grand Total</b>	<b>61</b>



INTERSECTION: NATHAN ELLIS HWY (RTE 151) AND: ALGONQUIN AVE  
 PERIOD: 2013-2015 FROM: JANUARY TO: DECEMBER  
 CITY/TOWN: MASHPEE PREPARED BY: STANTEC



SYMBOL	ACCIDENT TYPE
	REAR END
	HEAD ON
	SIDE - SWIPE
	OUT OF CONTROL
	LEFT TURN
	RIGHT ANGLE

FIGURE 2  
COLLISION DIAGRAM

### Route 151 at Algonquin Avenue (2013-2015)

Crash #	Date	Time	Manner of Collision	Road Surface	Light Conditions	Weather Conditions	Driver Contributing Code	Driver Age			Comments
			Type	Type	Type	Type	D1	D2	D3		
1	6/18/2013	10:12 PM	Rear-end	Wet	Dark - lighted roadway	Cloudy/Rain	Operating vehicle in reckless manner	17	23		The driver of Vehicle 2 (WB) stopped to assist a vehicle that was pulled over, while the driver of Vehicle 1 (WB) failed to pay close attention to the stopped Vehicle 2 (WB) in front of him, resulting in a rear-end collision
2	7/26/2013	8:56 AM	Angle	Wet	Daylight	Rain	Failed to Yield Right of Way	95	51		Operator of Vehicle 1 (EB) misread the flashing light of Vehicle Two's (WB) headlights. Vehicle 1 took a left turn in front of V2. Operator of Vehicle 2 had no time to stop and struck the passenger side of Vehicle 1.
3	7/26/2013	12:51 PM	Rear-end	Wet	Daylight	Rain	Inattention	21	36	21	Due to inattention, the operator of Vehicle 1 (EB) rear-ended Vehicle 2 (EB), who was stopped in traffic, causing it to rear-end Vehicle 3 just ahead of it
4	9/7/2013	12:15 PM	Rear-end	Dry	Daylight	Clear	D1:(Glare)	79	68	62	Due to inattention, the operator of Vehicle 1 (EB) rear-ended Vehicle 2 (EB), causing it to rear-end Vehicle 3 and then Vehicle 4 ahead of it
5	11/27/2013	11:46 AM	Head-on	Wet	Daylight	Rain	Failed to Yield Right of Way/ Improper Turn	54	37		The Operator of Vehicle 1 (WB) slowed down while still travelling on Route 151 to yield to an emergency vehicle., which confused Vehicle 2 (SB) into thinking that Vehicle 1 was turning right instead of still going through.
6	3/3/2014	7:45 AM	Angle	Snow	Daylight	Snow/Cloudy	Swerving or Avoiding due to slippery surface	26	43		The operator of Vehicle 2 (SB) lost control while driving on Algonquin Ave. due to snow, causing him to collide into Vehicle 1 travelling westbound on Route 151
7	10/6/2014	4:33 PM	Rear-end	Dry	Daylight	Clear	Followed too closely	48	69		The Operator of Vehicle 1 (EB) rear ended Vehicle 2 (EB) when Vehicle 2 turned left into Algonquin.
8	2/13/2015	7:28 AM	Single Vehicle Crash	Ice	Daylight	Clear	Swerving or Avoiding due to slippery surface	18			The Operator of Vehicle 1 (SB) lost control of the wheel along Algonquin Ave and swerved into a snowbank in the process.
9	3/23/2015	11:32 PM	Single Vehicle Crash	Dry	Dark - lighted roadway	Clear	Operating vehicle in reckless manner	22			The Operator of Vehicle 1 (SB) lost control of the wheel along Algonquin Ave and swerved into a snowbank in the process.
10	4/3/2015	1:38 PM	Rear-end	Wet	Daylight	Rain	Followed too closely	27	70		The operator of Vehicle 1 (EB) didn't have time to slow down behind Vehicle 2 (EB) and rear-ended due to following it too closely. Vehicle 2 was turning left onto Algonquin.
11	5/27/2015	7:23 AM	Angle	Dry	Daylight	Clear	Failed to Yield Right of Way	18	37		The operator of Vehicle 1 (SB) attempted to make a left turn from Algonquin Ave., and did not see Vehicle 2 travelling westbound as he struck it on the passenger side
12	5/29/2015	12:54 PM	Rear-end	Dry	Daylight	Clear	Inattention	47	44		Due to inattention, the operator of Vehicle 1 (EB) rear-ended Vehicle 2 (EB) as it slowed for traffic
13	6/19/2015	3:54 PM	Rear-end	Dry	Daylight	Cloudy	Inattention/followed too closely	18	27		The operator of Vehicle 1 (EB) didn't have time to slow down behind Vehicle 2 (EB) and rear-ended it as it was following it too closely in traffic
14	9/9/2015	4:39 PM	Sideswipe, same direction	Dry	Daylight	Clear	Inattention	70	n/a		The operator of Vehicle 1 (SB) was about to turn into COLE AND GLEASON FUNERAL HOME, and sideswiped Vehicle 2, which was parked legally on the side of the road
15	11/20/2015	11:07 AM	Rear-end	Wet	Daylight	Cloudy	Followed too closely	73	23		The operator of Vehicle 1 (EB) didn't have time to slow down behind Vehicle 2 (EB) and rear-ended it as it was following it too closely in traffic

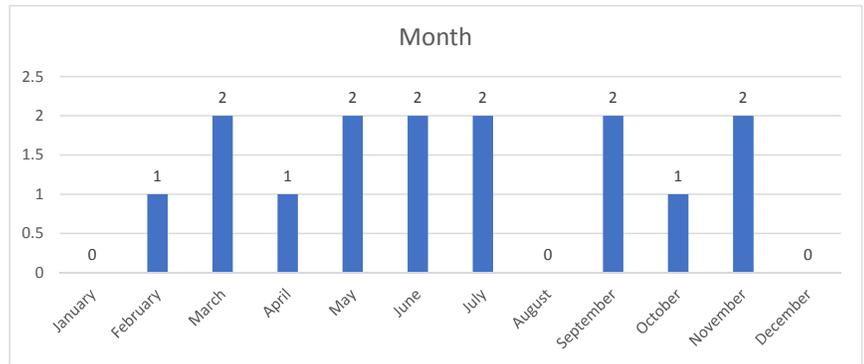
N/A No Description available (Vehicles were moved prior to the arrival of the police)

## Nathan Ellis Highway (Route 151) at Algonquin Ave (2013-2015)

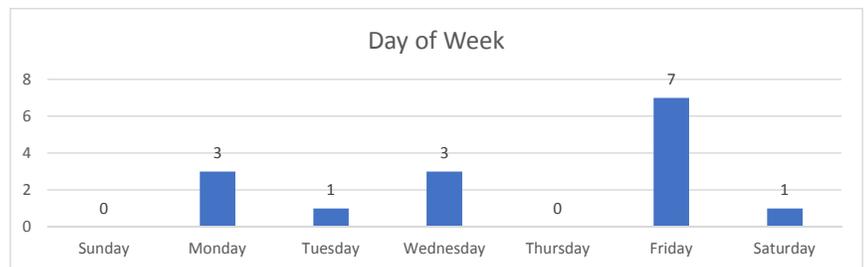
Year	Count
2013	5
2014	2
2015	8
<b>Grand Total</b>	<b>15</b>



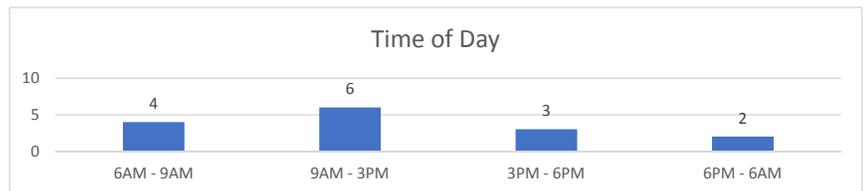
Month	Count
January	0
February	1
March	2
April	1
May	2
June	2
July	2
August	0
September	2
October	1
November	2
December	0
<b>Grand Total</b>	<b>15</b>



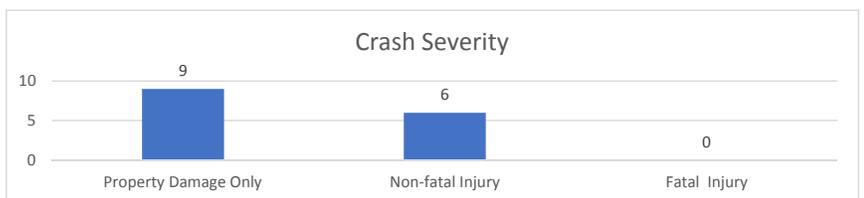
Day of Week	Count
Sunday	0
Monday	3
Tuesday	1
Wednesday	3
Thursday	0
Friday	7
Saturday	1
<b>Grand Total</b>	<b>15</b>



Time of Day	Count
6AM - 9AM	4
9AM - 3PM	6
3PM - 6PM	3
6PM - 6AM	2
<b>Grand Total</b>	<b>15</b>

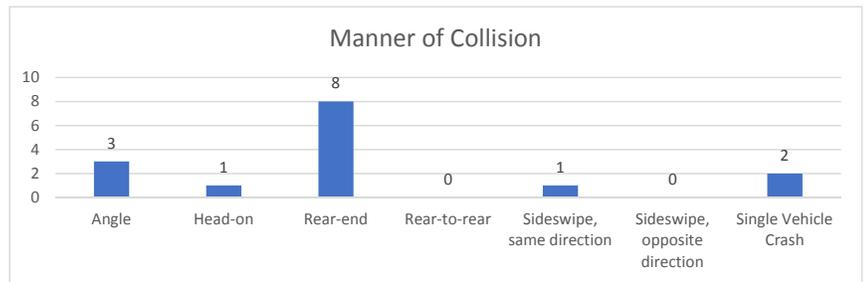


Crash Severity	Count
Property Damage Only	9
Non-fatal Injury	6
Fatal Injury	0
<b>Grand Total</b>	<b>15</b>

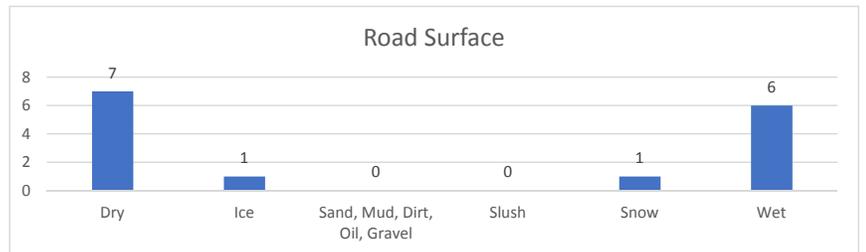


## Nathan Ellis Highway (Route 151) at Algonquin Ave (2013-2015)

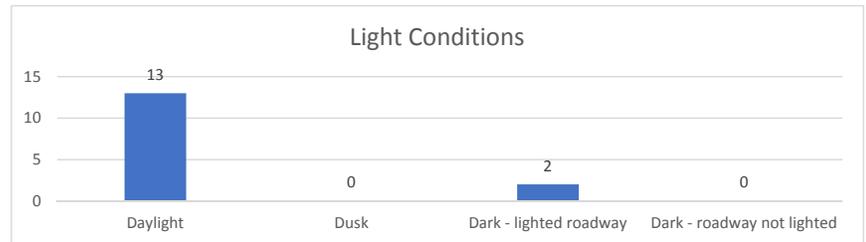
Manner of Collision	Count
Angle	3
Head-on	1
Rear-end	8
Rear-to-rear	0
Sideswipe, same direction	1
Sideswipe, opposite direction	0
Single Vehicle Crash	2
<b>Grand Total</b>	<b>15</b>



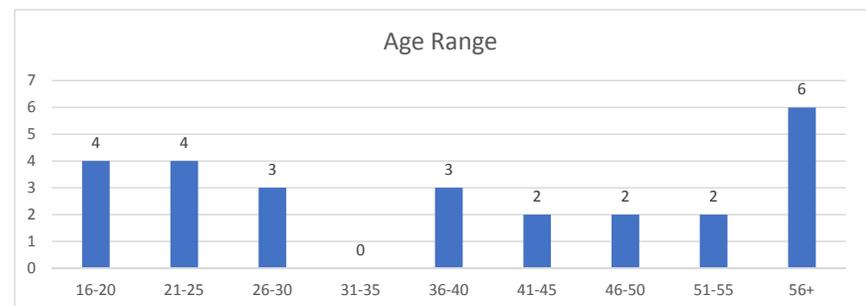
Road Surface	Count
Dry	7
Ice	1
Sand, Mud, Dirt, Oil, Gravel	0
Slush	0
Snow	1
Wet	6
<b>Grand Total</b>	<b>15</b>



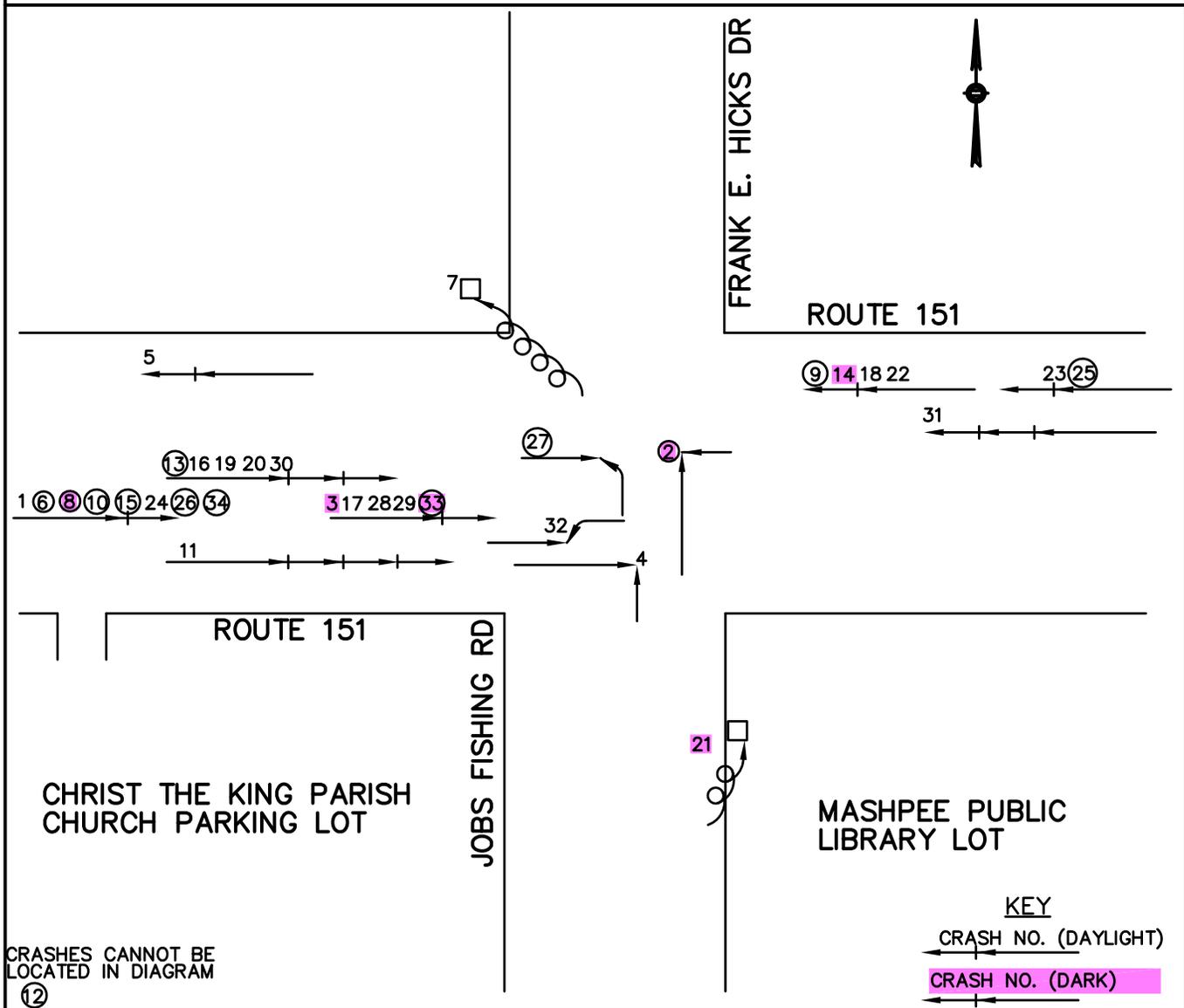
Light Conditions	Count
Daylight	13
Dusk	0
Dark - lighted roadway	2
Dark - roadway not lighted	0
<b>Grand Total</b>	<b>15</b>



Age Range	Count
16-20	4
21-25	4
26-30	3
31-35	0
36-40	3
41-45	2
46-50	2
51-55	2
56+	6
<b>Grand Total</b>	<b>26</b>



INTERSECTION: NATHAN ELLIS HWY (RTE 151) AND: FRANK E. HICKS DR/JOBS FISHING RD  
 PERIOD: 2013–2015 FROM: JANUARY TO: DECEMBER  
 CITY/TOWN: MASHPEE PREPARED BY: STANTEC



SYMBOL	ACCIDENT TYPE
←	MOVING VEHICLE
← >>>	BACKING VEHICLE
← - - -	NON-INVOLVED VEHICLE
← - - -	PEDESTRIAN
▭	PARKED VEHICLE
□	FIXED OBJECT
●	FATAL ACCIDENT
○	INJURY ACCIDENT
←   ←	REAR END
←   →	HEAD ON
← / ←	SIDE - SWIPE
← ~ ~ ~	OUT OF CONTROL
← ↘	LEFT TURN
← ⊥	RIGHT ANGLE

FIGURE 3  
COLLISION DIAGRAM

### Route 151 at Job's Fishing Road (2013-2015)

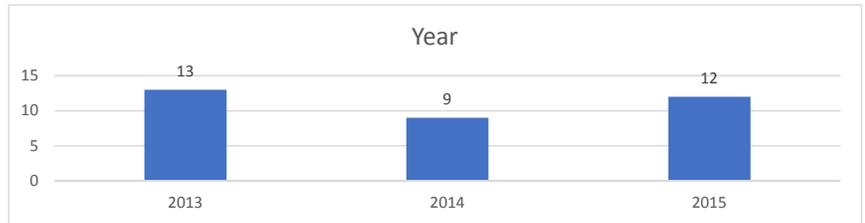
Crash #	Date	Time	Manner of Collision	Road Surface	Light Conditions	Weather Conditions	Driver Contributing Code	Driver Age				Comments
								D1	D2	D3	D4	
	mdy		Type	Type	Type	Type	Type					
1	1/22/2013	2:17 PM	Rear-end	Sand, mud, dirt, oil, gravel	Daylight	Clear	Inattention/Followed too closely	23	48			The operator of Vehicle 1 (EB) was slow to realize the Vehicle 2 (EB) was stopped for traffic directly ahead of him along Route 151 EB, causing him to strike it in the rear bumper
2	1/25/2013	11:43 PM	Angle	Wet	Dark - lighted roadway	Snow/Cloudy	Inattention/Operating vehicle in reckless manner	51	57			The operator of Vehicle 1 (NB) drove into the left passenger side of Vehicle 2 (WB) at the Intersection of Frank Hicks Drive under the influence of alcohol
3	2/10/2013	6:44 PM	Rear-end	Slush	Dark - lighted roadway	Cloudy	Followed too closely	54	37			The operator of Vehicle 1 (EB) drove too closely behind Vehicle 2 (EB) and drove into its rear bumper due to the slippery slushy road conditions
4	3/31/2013	8:00 AM	Angle	Dry	Daylight	Clear	Inattention/Failed to Yield Right of Way	26	42			The operator of Vehicle 1 (EB) had trouble seeing the signal heads due to the sunlight. Vehicle 2 (NB) turned left through a red light at the intersection, striking Vehicle 1 in the process
5	4/26/2013	4:32 PM	Rear-end	Dry	Daylight	Clear	Inattention	23	46			The operator of Vehicle 1 (WB) got distracted by an approaching emergency vehicle and rear-ended Vehicle 2 (WB).
6	5/8/2013	4:59 PM	Rear-end	Dry	Daylight	Clear	Make an improper turn	47	30			The operator of Vehicle 2 (EB) rear-ended Vehicle 1 (EB) when Vehicle 1 stopped quickly for traffic.
7	7/4/2013	6:45 PM	Single Vehicle Crash	Dry	Daylight	Clear	Operating Defective Equipment	22				The operator of Vehicle 1 (NB) attempted to take a left turn onto Route 151 when her steering wheel suddenly locked up, causing her to collide into the traffic signal pole at the corner of the intersection
8	8/20/2013	8:46 PM	Rear-end	Dry	Dark - lighted roadway	Clear	Operating vehicle in reckless manner/Physical Impairment	50	43			The operator of Vehicle 2 (EB) drove into the back bumper of Vehicle 1 (EB) as it was stopped in traffic near the intersection of Frank Hicks Drive. Vehicle 2 operator was arrested for OUI.
9	9/16/2013	1:40 PM	Rear-end	Wet	Daylight	Rain/Cloudy	Disregarded traffic signs, signals, and markings	58	23			The operator of Vehicle 2 (commercial truck) (WB) disregarded the red traffic signals and rear-ended Vehicle 1 (WB) which was rightfully stopped at the red light
10	9/17/2013	9:15 AM	Rear-end	Dry	Daylight	Clear	Followed too closely	65	81			The operator of Vehicle 2 (EB) rear ended Vehicle 1 (EB), which was stopped along Route 151 EB.
11	10/18/2013	5:09 PM	Rear-end	Dry	Daylight	Clear	Followed too closely	17	48	16	18	The operator of Vehicle 4 (EB) was following too closely and rear-ended Vehicle 3 (EB), causing it to also collide into Vehicles 2 (EB) and then Vehicle 1 (EB) from behind
12	11/14/2013	10:11 AM	Rear-end	Dry	Daylight	Clear	Inattention/Followed too closely	33	77			The operator of Vehicle 1 (WB) rear-ended Vehicle 2 (WB) while driving too closely behind it through a work zone, resulting in injuries to the victim. It is unsure exactly where this occurred.
13	11/20/2013	2:30 PM	Rear-end	Dry	Daylight	Clear	Inattention/Followed too closely	27	60	46		The operator of Vehicle 1 (EB) was following too closely and rear-ended Vehicle 3 (EB), causing it to also collide into Vehicles 2 (EB) from behind
14	3/27/2014	8:59 PM	Rear-end	Wet	Dark - lighted roadway	Clear	Followed too closely	21	22			The operator of Vehicle 1 (WB) did not have time to slow down behind Vehicle 2 (WB) as it stopped for a light turning yellow to red, resulting in rear-end collision
15	5/15/2014	3:01 PM	Rear-end	Dry	Daylight	Clear	Inattention/Followed too closely	20	40			The operator of Vehicle 2 (EB) rear-ended Vehicle 1 (EB) because it did not have time to slow down behind it due to the swift stop-and-go traffic
16	5/22/2014	2:40 PM	Rear-end	Wet	Daylight	Cloudy/Rain	Inattention	53	79	49		The operator of Vehicle 3 (EB) was inattentive to the stop-and-go traffic and rear-ended Vehicle 2 (EB), causing it to also collide into Vehicle 1 (EB) from behind
17	6/30/2014	12:31 PM	Rear-end	Dry	Daylight	Clear	Inattention	34	24			The operator of Vehicle 1 (EB) misjudged the distance in which it was driving behind Vehicle 2 (EB) and drove into V2 which was stopped at the light
18	7/6/2014	3:12 PM	Rear-end	Dry	Daylight	Clear	Distracted	55	18			The operator of Vehicle 1 (WB) got distracted by his beverage, causing him to rear end Vehicle 2 (WB), which was stopped.
19	7/16/2014	11:53 AM	Rear-end	Wet	Daylight	Rain	Inattention	50	18	30		The operator of Vehicle 1 (EB) was inattentive to the stop-and-go traffic and rear-ended Vehicle 2 (EB), causing it to also collide into Vehicle 3 from behind
20	9/5/2014	6:45 AM	Rear-end	Dry	Daylight	Clear	Inattention/Followed too closely	23	48	49		The operator of Vehicle 1 (EB) was inattentive to the stop-and-go traffic and rear-ended Vehicle 2 (EB), causing it to also collide into Vehicle 3 from behind
21	11/17/2014	4:30 PM	Single Vehicle Crash	Wet	Dark - roadway not lighted	Rain	Glare	63				The operator of Vehicle 1 (NB) lost control of the wheel and collided with the curb due to the glare of headlights and slippery road conditions
22	12/16/2014	8:54 AM	Rear-end	Dry	Daylight	Cloudy	Inattention	50	27			The operator of Vehicle 2 (WB) misread the traffic signals and inadvertently accelerated into Vehicle 1 (WB), which was rightfully stopped at the red light

### Route 151 at Job's Fishing Road (2013-2015)

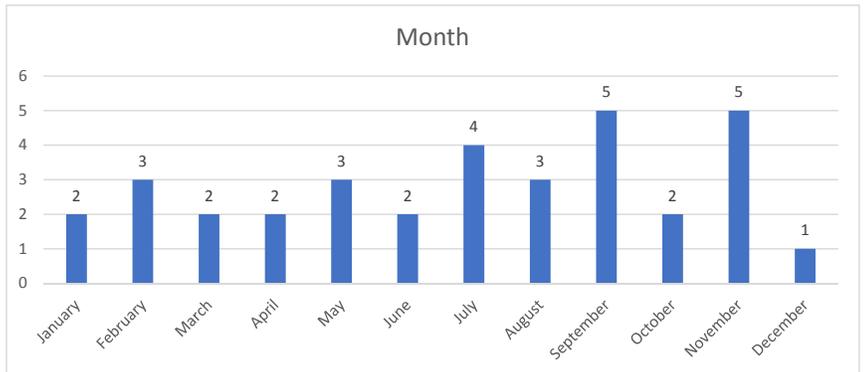
Crash #	Date	Time	Manner of Collision	Road Surface	Light Conditions	Weather Conditions	Driver Contributing Code	Driver Age				Comments
								D1	D2	D3	D4	
	<i>mdy</i>		<i>Type</i>	<i>Type</i>	<i>Type</i>	<i>Type</i>	<i>Type</i>					
23	2/18/2015	12:42 PM	Rear-end	Wet	Daylight	Clear	Distracted	61	56			The operator of Vehicle 2 (WB) rear-ended Vehicle 1 (WB) due to distraction. V1 was stopped for the traffic light.
24	2/28/2015	1:26 PM	Rear-end	Dry	Daylight	Clear	Inattention	25	48			The operator of Vehicle 1 (EB) was following too closely and collided into the rear-bumper of Vehicle 2 (EB) due to being inattentive
25	4/25/2015	3:22 PM	Rear-end	Dry	Daylight	Clear	Inattention/Followed too closely	45	43			The operator of Vehicle 1 (WB) followed too closely and rear-ended Vehicle 2 (WB)
26	6/14/2015	12:15 PM	Rear-end	Dry	Daylight	Clear	Unknown	56	42			The operator of Vehicle 1 (EB) collided into the rear bumper of Vehicle 2 (EB)
27	7/21/2015	7:36 AM	Angle	Dry	Daylight	Cloudy	Disregarded traffic signs, signals, and markings	67	58			The operator of Vehicle 1 (EB) went through a red light on 151 EB, resulting in an angle collision with Vehicle 2 who was travelling NB turning left onto Route 151 on a green light
28	8/1/2015	12:37 PM	Rear-end	Dry	Daylight	Cloudy	Followed too closely/Distracted	21	55			The operator of Vehicle 1 (EB) got distracted by her console, causing her to leave her foot off the brakes and collide into the rear-bumper of Vehicle 2 (EB)
29	8/21/2015	4:58 PM	Rear-end	Dry	Daylight	Clear	Inattention	26	49			The operator of Vehicle 1 (EB) collided into the rear-bumper of Vehicle 2 (EB) when Vehicle 2 was slowing for signal.
30	9/9/2015	12:12 PM	Rear-end	Dry	Daylight	Clear	Inattention	30	21	51		The operator of Vehicle 1 (EB) was inattentive to the stop-and-go traffic and rear-ended Vehicle 2 (EB), causing it to also collide into Vehicle 3 from behind
31	9/9/2015	6:13 PM	Rear-end	Dry	Daylight	Clear	Glare	37	34	32		The operator of Vehicle 1 (WB) had trouble seeing from the glare of the sun and rear-ended Vehicle 2 (WB), causing it to also collide into Vehicle 3 from behind
32	10/19/2015	2:48 PM	Angle	Dry	Daylight	Clear	Disregarded traffic signs, signals, and markings	31	87			The operator of Vehicle 2 (WB left) misjudged turning left on a permissive phase to Jobs Fishing Road and turned left into Vehicle 1 (EB) as it was travelling through on the same green phase
33	11/5/2015	5:06 PM	Rear-end	Dry	Dark	Clear	Inattention/Followed too closely	32	79			The operator of Vehicle 1 (EB) got distracted by his rear-view mirror, causing him to collide into the rear-bumper of Vehicle 2 (EB) as it followed it too closely
34	11/7/2015	1:52 PM	Rear-end	Dry	Daylight	Clear	Inattention	17	56			The operator of Vehicle 1 (EB) was slow to realize the Vehicle 2 (EB) was stopped for traffic directly ahead of him along Route 151 EB, causing him to strike it in the rear bumper

## Nathan Ellis Highway (Route 151) at Job's Fishing Road (2013-2015)

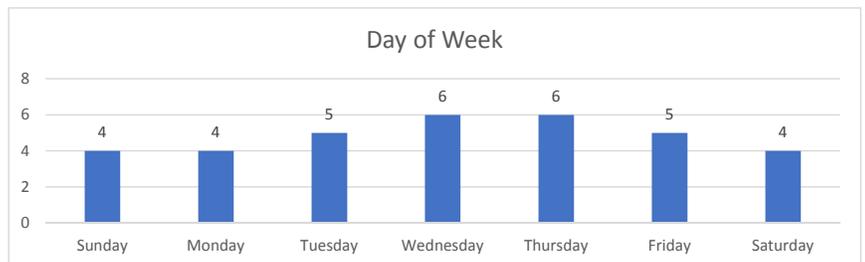
Year	Count
2013	13
2014	9
2015	12
<b>Grand Total</b>	<b>34</b>



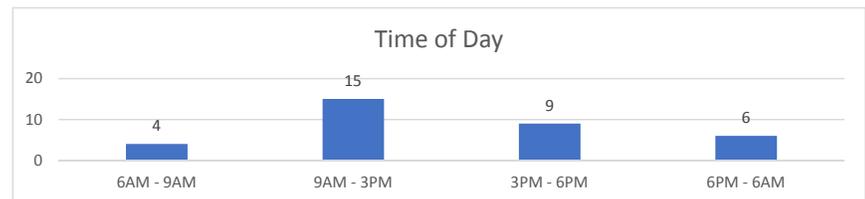
Month	Count
January	2
February	3
March	2
April	2
May	3
June	2
July	4
August	3
September	5
October	2
November	5
December	1
<b>Grand Total</b>	<b>34</b>



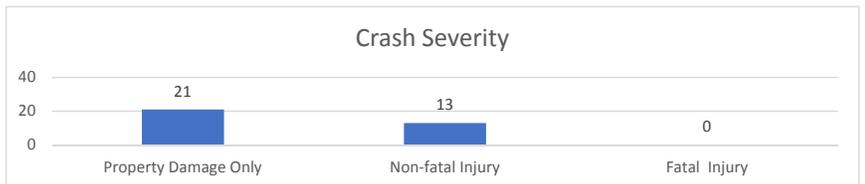
Day of Week	Count
Sunday	4
Monday	4
Tuesday	5
Wednesday	6
Thursday	6
Friday	5
Saturday	4
<b>Grand Total</b>	<b>34</b>



Time of Day	Count
6AM - 9AM	4
9AM - 3PM	15
3PM - 6PM	9
6PM - 6AM	6
<b>Grand Total</b>	<b>34</b>

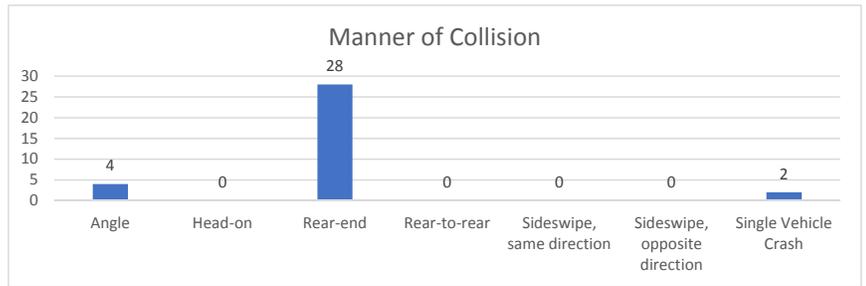


Crash Severity	Count
Property Damage Only	21
Non-fatal Injury	13
Fatal Injury	0
<b>Grand Total</b>	<b>34</b>

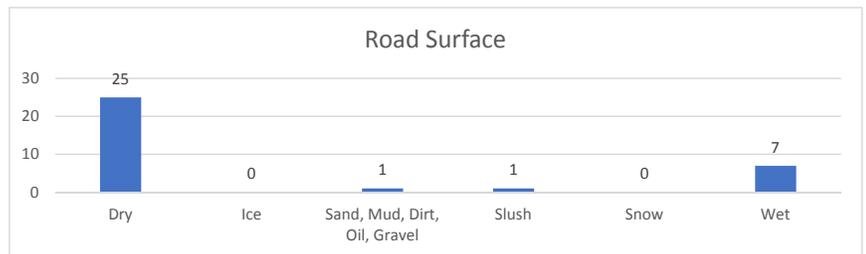


## Nathan Ellis Highway (Route 151) at Job's Fishing Road (2013-2015)

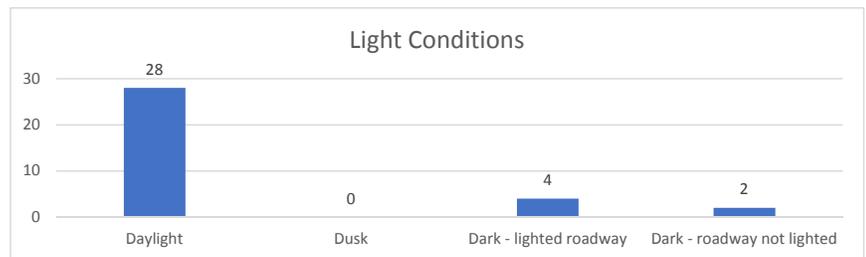
Manner of Collision	Count
Angle	4
Head-on	0
Rear-end	28
Rear-to-rear	0
Sideswipe, same direction	0
Sideswipe, opposite direction	0
Single Vehicle Crash	2
<b>Grand Total</b>	<b>34</b>



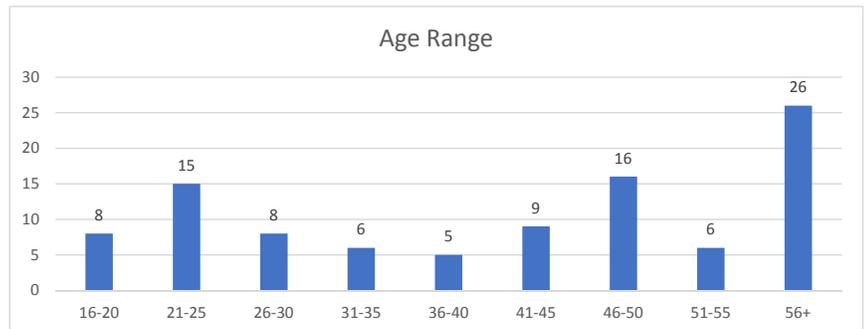
Road Surface	Count
Dry	25
Ice	0
Sand, Mud, Dirt, Oil, Gravel	1
Slush	1
Snow	0
Wet	7
<b>Grand Total</b>	<b>34</b>

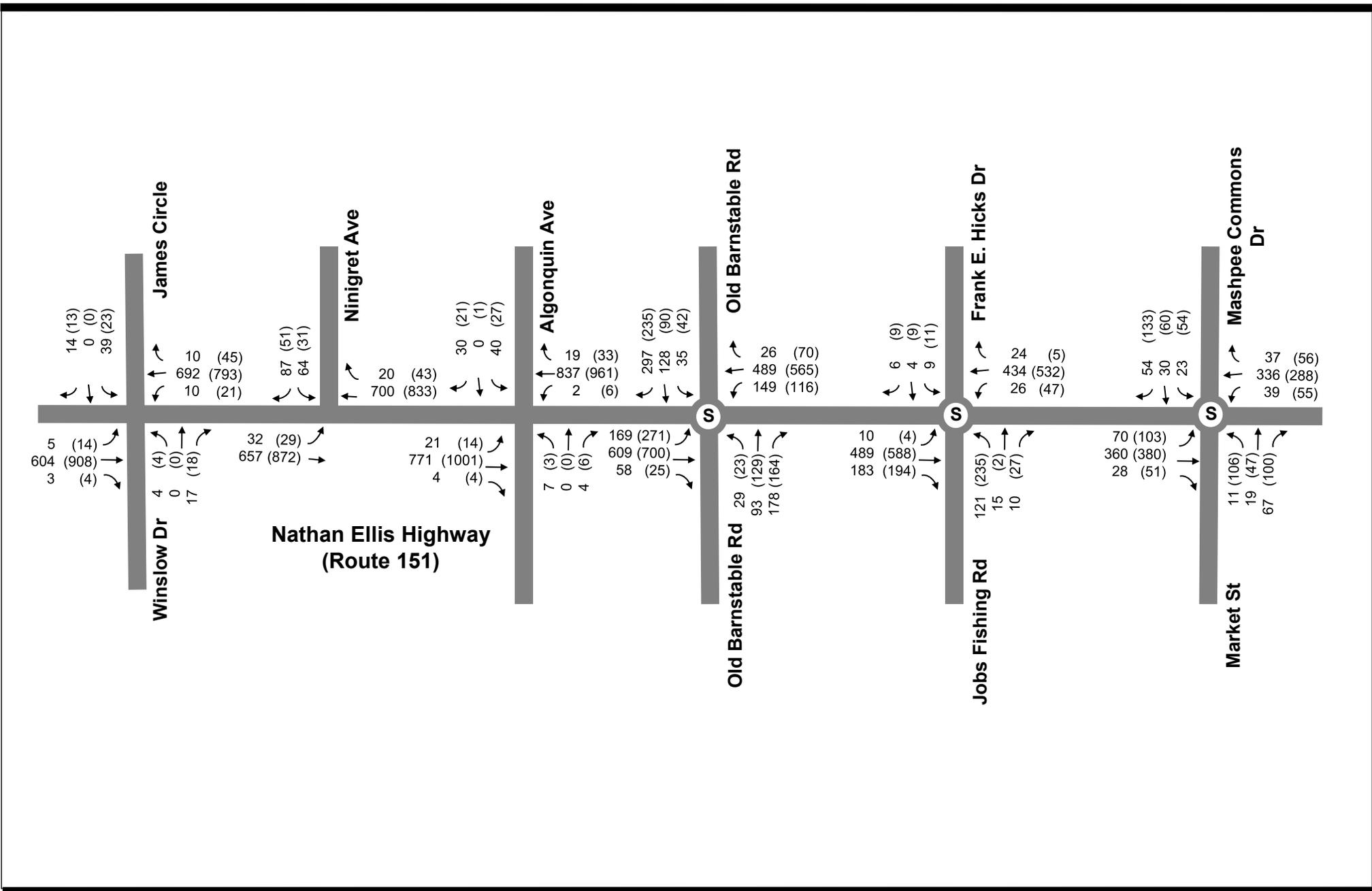


Light Conditions	Count
Daylight	28
Dusk	0
Dark - lighted roadway	4
Dark - roadway not lighted	2
<b>Grand Total</b>	<b>34</b>



Age Range	Count
16-20	8
21-25	15
26-30	8
31-35	6
36-40	5
41-45	9
46-50	16
51-55	6
56+	26
<b>Grand Total</b>	<b>99</b>





Schematic Diagram:  
Not to Scale



**Figure 2**  
**2017 Existing AM (PM)**  
**Peak Hour Traffic Volumes**

*Nathan Ellis Highway (Route 151) Corridor Improvements*  
*Mashpee, Massachusetts*

Data Collected in June/August 2014 & Sept 2015

**S** Signalized Intersection



## CAPE COD COMMISSION

---

3225 MAIN STREET • P.O. BOX 226 • BARNSTABLE, MASSACHUSETTS 02630  
(508) 362-3828 • Fax (508) 362-3136 • [www.capecodcommission.org](http://www.capecodcommission.org)

