

ROAD SAFETY AUDIT

Route 16 at Washington St./Emerson St./Maple St. &
Route 16 at North Ave./Main St.

Mendon, Massachusetts

9/11/2018

Prepared For:
MassDOT



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Background

A Road Safety Audit (RSA) was conducted for two locations along the Route 16 corridor in Mendon, Massachusetts. Two locations along the corridor were identified as Highway Safety Improvement Program (HSIP) Clusters within the Central Massachusetts Regional Planning Commission (CMRPC) area from 2013-2015:

- Route 16 at Washington St./Emerson St./Maple St.
- Route 16 at North Ave./Main St.

This indicates that these locations fall within the top 5% of High Crash locations within the region. As defined by the Federal Highway Administration (FHWA), an RSA is a formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. The purpose of the RSA is to identify existing safety issues and determine potential safety improvements for all roadway users that can be evaluated and included as a part of future design efforts.

Project Data

The audit team conducted the RSA for the intersections of Route 16 at Washington, Emerson, and Maple Streets and Route 16 at North Avenue and Main Street on Tuesday, September 11, 2018. The RSA agenda can be found in Appendix A. Table 1 lists the audit team members and their affiliations. Appendix B provides contact information for all team members.

Table 1: Participating Audit Team Members

Audit Team Member	Agency/Affiliation
Kevin T Fitzgerald	MassDOT Traffic and Safety
Michelle Deng	MassDOT Traffic and Safety
Eleanor Roberts	MassDOT Traffic and Safety Intern
Lola Campbell	MassDOT D3 Traffic
Kevin Rudden	Town of Mendon – ADA Coordinator
Alan D Tetreault	Mendon Highway
David H Kurczy	Mendon Police
Kim Newman	Mendon Town Administrator
Craig Burnham	Mendon Fire Department
Alex Siu	HNTB
Michael Tracey	HNTB
Megan Hanshaw	HNTB

Prior to the RSA, in order to begin assessing possible safety issues, the team reviewed collision diagrams and crash detail summaries based on crash records supplied by the Mendon Police Department. From

2011-2015, 40 crashes were reported at the intersection of Route 16 at Washington, Emerson, and Maple Streets. Of these crashes, 16 (or 40%) were angle crashes, 12 (or 30%) were rear-end crashes, 9 (or 23%) were sideswipe crashes, 2 (or 3%) were single vehicle crashes, and 1 (or <1% was a head-on crash). Crashes occurred most frequently during 4PM – 6PM, with 28% of crashes occurring during this period. No crashes involving pedestrians were reported. 2 crashes involving bicycles occurred, with both of these crashes resulting in injuries. In total, 8 crashes resulted in injury, and no fatalities were reported along the study area corridor between 2011-2015. Of the 40 crashes, 68% occurred during daylight hours, 26% occurred during dark-lighted conditions, and 7% occurred during other/unknown conditions. Of the 40 crashes, 75% occurred during clear weather, 13% occurred during cloudy weather, 10% occurred during rain, and 1% occurred during snow.

From 2011-2015, 77 crashes were reported at the intersection of Route 16 at North Avenue and Main Street. Of these crashes, 26 (or 34%) were angle crashes, 37 (or 48%) were rear-end crashes, 3 (or 4%) were head-on crashes, 6 (or 8%) were sideswipe crashes, and 5 (or 6%) were single-vehicle crashes. Crashes occurred most frequently during 2PM – 4PM, with 27% of crashes occurring during this period. No crashes involving pedestrians or bicycles were reported. In total, 15 crashes resulted in injury, and no fatalities were reported along the study area corridor between 2011-2015. Of the 77 crashes, 81% occurred during daylight hours, 14% occurred during dark-lighted conditions, and 5% occurred during other/unknown conditions. Of the 77 crashes, 75% occurred during clear weather, 13% occurred during cloudy weather, 10% occurred during rain, and 1% occurred during snow.

Appendix C provides the detailed crash data for the intersections.

Project Location and Description

The RSA focused on two intersections along Route 16 in Mendon, Massachusetts: Route 16 at Washington, Emerson, and Maple Streets and Route 16 at North Avenue and Main Street, as shown in the aerial image in Figure 1. The intersections are approximately 0.29 miles apart. Detailed descriptions of each of the intersections and roadways contained within the study area are provided below:

Route 16 at Washington St./Emerson St./Maple St. consists of a two-stop controlled intersection at Washington and Emerson, and a Y-junction intersection at Route 16 and Maple Street. The intersections are approximately 160 feet apart. The Route 16 eastbound and westbound approaches consist of one lane each that are free-flowing. The Washington southbound approach is stop-controlled and consists of one lane in each direction. The Emerson northbound approach is stop-controlled and consists of one lane in each direction, with a channelized island separating the left/through and right-turn approaches to the intersection. Maple Street consists of one lane in each direction and meets Route 16 at a skewed angle. This road is stop controlled for vehicles entering Route 16. There is a private driveway prior to the Maple Street at Route 16 intersection that drivers use as a cut through to avoid traffic queues and make easier left-turn movements. There is a sidewalk on the north side of the intersection. There are no bike lanes at any of the intersection legs. There is a shopping plaza along the east side of Route 16 located approximately 400 feet west of the intersection and several other businesses located west of the intersection.

Route 16 at North Ave./Main St. is a signalized intersection with four approaches and is owned and maintained by MassDOT. The southbound North Avenue approach consists of one shared left-turn/through/right-turn lane. The eastbound and westbound Route 16 approaches consist of one general-use lane each. The northbound Main Street approach consists of one through/turn lane with a channelized stop-controlled right turn lane. A former gas station, now a mini mart, is located in the southeast quadrant of the intersection, and a bank is located in the northwest quadrant. There is an elementary school and middle school located on North Avenue approximately .1 miles and 1 mile, respectively, from the intersection. There is a sidewalk on Main Street and on North Avenue, and a crosswalk located on the western side of the intersection with pedestrian indications and push buttons. The intersection operates with three signal phases. The first phase allows the Route 16 eastbound and westbound phases to run. The second phase allows the North Avenue and Main Street phases to run. The third phase is a push-button actuated exclusive pedestrian phase.

Route 16 (Uxbridge Road/Hastings Street/Milford Street) is a rural minor arterial under the jurisdiction of the MassDOT. Route 16 runs east-west from Webster to Revere. Within the vicinity of the study area, Route 16 consists of one lane in each direction. Within this portion of the study area, shoulders are provided along both sides of the roadway that vary between 2 and 4 feet in width. There is a sidewalk present west of North Avenue and Main Street. The speed limit on the Route 16 eastbound approach is 45 mph to the west of the intersection and changes to 35 mph at Washington Street. The speed limit for Route 16 westbound is 50 mph to the east of Main Street, but reduces to 35 mph along the approach from Main Street to Washington Street. It then increases to 45 mph west of Washington Street.

is 35 mph within the study area, but is 45 mph just before the study area intersection. The speed limit on the Route 16 westbound approach is also 35 mph, but prior to North Avenue and Main Street the speed limit is 50 mph.

Washington Street is classified as a local roadway and falls under town jurisdiction. Washington Street runs north-south through Mendon from Northbridge Road to Route 16. It has one lane in each direction and a right shoulder width of approximately two feet. There are no sidewalks or bike lanes on this roadway. There are no posted speed limits on Washington Street, but based on the surrounding land use and characteristics of the roadway, it is assumed to be 30 mph.

Emerson Street is classified as a local roadway under the jurisdiction of the town. Emerson Street runs north-south through Mendon from Route 16 to Blackstone Street. It has two travel lanes and a right shoulder width of two feet. There are no sidewalks or bike lanes on this roadway. There are no posted speed limits on Washington Street, but based on the surrounding land use and characteristics of the roadway, it is assumed to be 30 mph.

Maple Street is classified as an urban minor arterial under the jurisdiction of the town. Maple Street runs from Route 16 to Main Street. It has two travel lanes and no shoulder on either side. There are no sidewalks or bike lanes on this roadway. Prior to the intersection of Maple Street at Route 16 is a private driveway that connects Maple Street and Route 16. This driveway is privately owned but is used as a cut through and is plowed by the Town of Mendon. The speed limit on Maple Street is 30 mph.

Main Street is an urban minor arterial under the jurisdiction of the town. Main Street runs north-south from Route 16 to George Street. It has one lane in each direction and no shoulders or bike lanes. There is a sidewalk on the western side of the roadway that extends from Route 16 to Maple Street. The posted speed limit on Main Street is 25 mph, but there is no speed regulation set by MassDOT.

North Avenue is an urban minor arterial under the jurisdiction of the town. North Avenue runs north-south from Milford Street (Route 16) to the Upton Town Line. It has one lane in each direction and a right shoulder. There is a sidewalk on the western side of the roadway that extends from Route 16 to the Miscoe Hill School. The speed limit is 30 miles per hour (mph).

Figure 1: Locus Map



Audit Observations and Potential Safety Enhancements:

Route 16 at Washington St./Emerson St./Maple St.

Based on field observations of Tuesday, September 11, 2018, the RSA team determined that the Route 16 at Washington St./Emerson St./Maple St. study area has the following issues that affect safety:

- Congestion
- Intersection and roadway geometry
- Bicycle and pedestrian accommodations
- Maintenance

The following sections describe in more detail the safety issues and potential enhancements determined during the RSA. Several of these issues require further study and engineering judgement to determine the feasibility of implementing the improvements to address them.

Safety Issue #1. Congestion

Route 16 consists of one travel lane in each direction and no separated turn lanes. During the day, vehicles looking to make a left turn from Route 16 to Washington Street or Emerson Street have been observed to back up traffic and cause queuing. Other vehicles use the wide lanes to bypass the vehicles waiting to turn. This behavior increases the risk of sideswipe and rear-end collisions. Nine rear-end crashes involving vehicles waiting to turn left or waiting for other vehicles to turn left occurred during the analysis period of 2011 – 2015.

As vehicles wait on Route 16 for a gap to turn left, vehicles in the opposing direction have been noted to slow or stop to allow vehicles to make the turn. It was noted that vehicles on Route 16 sometimes form two lanes, when there are queued or slowed vehicles. This can contribute to courtesy angle crashes. A “courtesy crash” is when a vehicle in an inner lane stops or slows down to allow an opposing vehicle to turn left. However, a vehicle in the outer lane may not see the turning vehicle and continue through the intersection, resulting in an angle collision.

Audit members noted that there is heavy traffic on Route 16 throughout the day. Due to high traffic volumes on Route 16, vehicles entering Route 16 from Washington Street, Emerson Street, or Maple Street must quickly accelerate onto Route 16 to fit into a gap between traffic. This creates the risk of both angled crashes and rear-end crashes. 17 crashes involving vehicles entering from Washington, Emerson, or Maple Streets and colliding with vehicles on Route 16 were reported. These crashes include 14 angled crashes, 2 sideswipes, and one head-on collision with 4 crashes resulting in injury.

Potential Enhancements:

1. Evaluate the need for left turn lanes on Route 16 to allow through vehicles to safely pass those waiting to turn left.
2. Evaluate if a traffic signal is warranted to help improve traffic flow and allow easier turning movements.



Photo 1: Travel lanes on Route 16



Photo 2: Vehicle turning from Maple St onto Route 16

Safety Issue #2. Intersection Geometry

The stop bar on Washington Street is offset from Route 16. As a result, vehicles have an obstructed view of the approaching traffic in both directions. This causes stopped vehicles on Washington Street to encroach into the intersection in order to look for oncoming traffic.

Emerson Street and Washington Street are slightly skewed. Vehicles looking to cross Route 16 are required to make an awkward maneuver when going through the intersection in addition to looking for gaps in traffic. Two angle crashes were reported by drivers looking to cross from Washington Street to Emerson Street who collided with Route 16 vehicles. These crashes are likely due to the geometry of the intersection

Maple Street meets Route 16 at a skewed angle. Drivers must turn their heads over 90-degrees to look for approaching vehicles. This harsh angle makes it difficult for vehicles on Maple Street to see cars approaching on Route 16 westbound and judge gaps in traffic. 12 crashes involved vehicles exiting Maple Street and entering Route 16 westbound. Deficient sightlines may have contributed to these crashes.

An audit member noted that vehicles have been observed to use a private driveway (located approximately 125 feet east of the Maple Street intersection) as a cut-through to bypass queues and make easier left-turning movements onto Route 16. This cut-through is not marked with any signage and is only wide enough to fit one vehicle at a time. Multiple crashes occurred at this location.

Due to the east-west direction of Route 16, solar glare is a frequent issue. Audit team members reported that the sun could be “blinding” to drivers. Three reported crashes stated solar glare as a contributing issue. All three reported crashes involved vehicles entering Route 16 west from Maple Street.

Potential Enhancements:

1. Relocate the stop bar and stop sign on Washington Street to improve sightlines.
2. Better align Washington Street and Emerson Street to allow for safer crossing with improved sightlines and potentially reduce solar glare.
3. Evaluate the feasibility of a roundabout to provide traffic calming and allow for safer entering and exiting from Route 16.
4. Consider realigning Maple Street to meet Route 16 closer to a 90-degree angle to improve sightlines and simplify turning movements.



Photo 4: Stop bar on Washington Street



Photo 5: Geometry of Maple Street

Safety Issue #3. Bicycle and Pedestrian Accommodations

None of the intersection approaches have a designated bike lane or a bike path. Audit team members stated most cyclists ride in the traffic lanes rather than the shoulder. There were two crashes involving cyclists traveling east on Route 16 being hit by vehicles entering from Washington and Emerson Streets. It was noted that this is likely due to vehicles having to look for gaps and oncoming traffic and not paying attention to cyclists.

There is a sidewalk on the north side of Route 16. Located 800 feet west of the intersection is a shopping plaza with restaurants and stores. Audit team members mentioned that pedestrians walk on the strip of grass on the south side of Route 16.

Pedestrians on the south side of Route 16 are unable to safely cross Route 16 to reach the sidewalk, as there are no crosswalks at this intersection. Audit team members noted that if there were crosswalks, pedestrians would utilize them, but they have not seen any unsafe crossing by pedestrians.

Potential Enhancements:

1. Consider providing bike accommodations on Route 16 such as a wider shoulder, designated bike lanes, or a shared-use path.
2. Consider providing pedestrian accommodations on the south side of the Route 16 including sidewalks to offer a safe and protected walkway from vehicles.
3. Evaluate pedestrian desire lines and consider adding crosswalks with pedestrian warning measures to the intersection to allow for safe crossing.



Photo 6: Sidewalk on north side of Route 16 & lack of bicycle accommodations.



Photo 7: Strip of grass where pedestrians walk

Safety Issue #4. Maintenance

The signage at the study area is outdated. An audit team member noted that the stop sign on Washington Street is old and needs to be refreshed as it may have lost some of its reflectivity. In addition to the location of the stop bar on Washington Street, it was also noted that visibility of westbound Route 16 vehicles was difficult due to overgrown trees.

The cut through on Maple Street is not marked with any signage dictating that it is a private driveway, if it is one-way, and if you can turn both directions out of it. Audit team members noted that vehicles frequently use the cut-through improperly. There was one reported crash involving the cut-through where a driver was listening to their GPS and took a fast left onto the cut through.

There is no signage warning vehicles on Maple Street that oncoming vehicles do not stop. There were 16 collisions on Maple Street at the stop sign or entering Route 16. Some of the collisions may be attributed to the limited signage in the area.

Potential Enhancements:

1. Update the signage at the intersection to meet MUTCD and retroreflectivity standards.
2. Trim back trees along the Route 16 westbound approach to Washington Street in order to improve visibility of oncoming traffic.
3. Add signage to the private driveway to clearly dictate usage whether for one-way use or private driveway-use only.
4. Consider using signage to increase safety on Maple Street, such as “Oncoming vehicles do not stop” to warn drivers before they enter Route 16.



Photo 8: Lack of signage on Maple Street cut-through



Photo 9: Trees blocking sightlines from Washington Street

Route 16 at North Ave./Main St.

Based on field observations of Tuesday, September 11, 2018, the RSA team determined that the Route 16 at North Ave./Main St. study area has the following issues that affect safety:

- Congestion
- Intersection and roadway geometry
- Speed
- Bicycle and pedestrian accommodations
- Maintenance

The following sections describe in more detail the safety issues and potential enhancements determined during the RSA. Several of these issues require further study and engineering judgement to determine the feasibility of implementing the improvements to address them.

Safety Issue #1. Congestion

Route 16, Main Street, and North Avenue each consist of one travel lane in each direction and no separated turn lanes. The approach lanes are quite wide and vary between 14 and 18 feet. During the day, vehicles turning left at any of the approaches have been observed to back up traffic and cause queuing. Vehicles use the wide lanes to queue in two lanes at each approach, most notably from the Main Street northbound approach. A portion of the island on Main Street between the through/left lane and channelized right lane was paved to allow two lanes and bypassing. Including the paved portion, this approach is approximately 20 feet wide. 10 of the 77 total crashes were conflicts between vehicles turning left and oncoming vehicles traveling straight.



Photo 10: Paved portion of the island on Main Street

Audit team members also noted that during peak hours vehicles wait several light cycles before an opportunity arises to turn left during peak hours. The congestion causes vehicles to pull into the intersection and wait for the signal to become red before turning. Audit team members also noted that many drivers get frustrated sitting in congestion, which can lead to vehicles running red lights to get through the traffic. Ten of the 77 crashes were a result of drivers failing to yield the right-of-way. There were also seven crashes that were reported with a driver operating a vehicle in an erratic, reckless, careless negligent, or aggressive manner.



Photo 11: Vehicles passing in two lanes on Route 16

On the Main Street approach, there is a stop ahead sign approaching the signal, which audit team members noted confuses drivers. This sign is conflicting with the signal ahead. There is also severely faded signal ahead sign on the northbound approach. There were three rear-end crashes at this point that could be related to the signage.

Potential Enhancements:

1. Consider adding exclusive left-turn lanes at all approaches to reduce congestion and queuing.
2. Consider providing left-turn traffic signal phases in order to help process left-turning vehicles through the intersection.
3. Evaluate the traffic signal timings to increase the flow of traffic.
4. Evaluate the yellow and red clearance times to ensure that vehicles can safely slow when approaching the intersection during the yellow interval and are able to clear the intersection during the red interval.
5. Consider adding a red signal ahead sign on Main Street to warn drivers to slow down before the signal.

Safety Issue #2. Intersection and Roadway Geometry

The stop bar on the channelized right lane on Main Street is offset from the intersection. As a result, vehicles have an obstructed view of the approaching traffic. This causes vehicles to roll through the stop. Two rear-end collisions were reported between 2011-2015 at this stop sign.

There are heavy vehicles and school buses passing through the intersection on a daily basis. The geometry of the intersection makes it difficult for heavy vehicles to make right turns and even some left turns. Trucks frequently drive over the curb on the corner of Route 16 and North Avenue when taking a right-turn from Route 16 westbound to North Avenue. Audit team members noted that the signal post has been hit several times. Audit team members also noted that the stop bars on Main Street and Route 16 headed east are close to the intersection making it difficult for tractor-trailers to make turns.

The geometry at the DB Mart was also noted by audit team members. The driveway opening at the DB Mart is flush with the road surface along the entire property with no formal entrances or exits. There were three angled collisions between 2011-2015 involving vehicles turning in and out of the DB Mart. Audit team members noted that vehicles drive in and out of the parking area in any direction, which often conflicts with northbound Main Street vehicles using the channelized right-turn lane. Vehicles have also been observed to cut across the southern side of the channelized right lane to turn left onto Main Street in order to avoid going through the intersection. Part of this driveway area is a privately owned by the antique shop next door. There is no separation between the DB Mart lot and the private driveway, and vehicles frequently cross in the driveway. There was one reported crash at this location between 2011-2015.



Photo 12: Offset stop bar on Main Street



Photo 13: Curb at the eastern corner of North Avenue and Route 16

Potential Enhancements:

1. Relocate the stop bar on the channelized right-turn lane on Main Street to improve sightlines
2. Consider removing the channelization of the right-turn lane on Main Street and include the right-turn movement to the traffic signal to improve sightlines.
3. Provide overhead signals or relocate the signal posts to prevent trucks from hitting the them and to provide better signal visibility.
4. Consider increasing the intersection width or a truck apron to allow heavy vehicles to turn without tracking over the curb.

5. Define the curb and driveway at the DB Mart and antique shop to provide safe and predictable entrances and exits from the driveways, or consider a right-in right-out entrance and exit.
6. Reset the existing curb with vertical curbing to discourage vehicles from using the island as a second lane.

Safety Issue #3. Speed

According to the state speed regulation record, no part of Route 16 in Mendon has a speed limit above 45 miles per hour. The current posted speed limit on Route 16 eastbound is 50 miles per hour, which appears to be signed incorrectly. The speed drops to 35 miles per hour (mph) just after the downward hill on Route 16 eastbound (Milford Street). An audit team member noted that most drivers do not obey the speed change and approach the intersection traveling over the 35-mph speed limit. One of the 77 recorded crashes was due to the driver driving too fast for the conditions.



Photo 14: Speed limit on westbound approach

Potential Enhancements:

1. Evaluate the location of speed regulations and consider installing a reduce speed ahead sign to prepare drivers for the speed change.
2. Provide enforcement to better regulate speeds along the corridor.
3. Consider temporarily using a speed feedback sign to increase driver awareness of their rate of speed.
4. Consider “gateway” treatments to indicate to drivers that they are entering a built-up area of town.

Safety Issue #4. Cyclist and Pedestrian Access

There are no bike lanes in this area. Audit team members noted that there is not frequent biking in this area, but that the town has a Complete Streets grant. Bikers who do ride in the area ride in the traffic lanes rather than on the shoulder. From 2011-2015 there were no crashes involving cyclists that were reported at this location. However, the current conditions are not bicycle friendly.

The sidewalks at the intersection are in poor condition and the wheelchair ramps at the crosswalks are ADA compliant. The audit team noted that students do not use the sidewalks or crosswalks to get to or from school due to their narrow width, poor condition and heavy adjacent vehicle traffic. There is only heavy pedestrian activity during events. An audit team member noted that there is discussion of a new development within the northwest quadrant of the intersection. This area has been discussed for an affordable housing unit and a set of sports fields. The team member emphasized this development will likely be built in the next ten years. If this area was built upon, it would increase pedestrian foot traffic in the area. From 2011-2015 there were no collisions involving pedestrians in the study area.

There is one crosswalk connecting the northwest corner of the intersection and the southwest corner. An audit team member noted that the pedestrian signal is not always functional.

Potential Enhancements:

1. Add bike accommodations such as a wider shoulder, designated bike lanes, or a shared-use path.
2. Add sidewalks along all approaches to the intersection on both sides of the roadway to provide a safe and protected walkway from vehicles.
3. Update wheelchair ramps to meet ADA guidelines.
4. Add crosswalks to all sides of the intersection to provide access from all directions.
5. Repair the existing pedestrian signal
6. Upgrade the existing pedestrian signal to provide accessible pushbuttons and countdown signals.



Photo 15: Existing crosswalks and pedestrian pushbutton and indication



Photo 16: Non ADA-compliant wheelchair ramp and sidewalk

Safety Issue #5. Maintenance

The signage at the study area is outdated and do not meet current standards. The school zone signs are not compliant with the Manual on Uniform Traffic Control Devices (MUTCD). Many of the signs are faded and have lost their reflectivity. The one-way sign on the channelized right turn lane is faded and chipping.

The street name signs are mounted very low and often get hit. The signs are mounted lower than the standard 7-feet from the ground to the bottom of the sign.

Potential Enhancements:

1. Update the signage including the signal warning signs, add lane use signage on each approach, and update the signage to be MUTCD compliant to improve safety for vehicles and reduce driver confusion.
2. Relocate street name signs to improve visibility, reduce driver confusion, and avoid vehicle strikes.
3. Ensure the visors on the traffic signal heads of the eastbound and westbound approaches are maintained and correctly aligned to improve visibility to drivers.



Photo 17: Outdated school zone sign



Photo 18: Faded one-way sign

Summary of Road Safety Audit

A summary of the safety concerns and possible enhancements, as identified by the RSA Audit Team can be found in Table 3. The enhancements are then classified by estimated safety payoff, time frame, cost and responsible agency. Safety payoff estimates are subjective and based on engineering experience. Details about the estimated time frame and cost breakdown is described in Table 2.

Table 2: Estimated Time Frame and Costs Breakdown

Time Frame		Costs	
Short-Term	<1 Year	Low	<\$10,000
Mid-Term	1-3 Years	Medium	\$10,001-\$50,000
Long-Term	>3 Years	High	>\$50,000

Table 3: Potential Safety Enhancement Summary for Route 16 at Washington St./Emerson St./Maple St.

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Congestion	Evaluate the need for left turn lanes on Route 16 in order to allow through vehicles to safely pass those waiting to turn left.	High	Mid-term	Medium	MassDOT
Congestion	Evaluate if a traffic signal is warranted to help improve traffic flow and allow easier turning movements.	High	Mid-term	Medium	MassDOT
Intersection geometry	Relocate the stop bar and stop sign on Washington Street to improve sightlines.	Low	Short-term	Low	Town of Mendon
Intersection geometry	Better align Washington Street and Emerson Street to allow for safer crossing with improved sightlines and potentially reduce solar glare	High	Long-term	High	Town of Mendon/ MassDOT
Intersection geometry	Evaluate the feasibility of a roundabout to provide traffic calming and allow for safer entering and exiting from Route 16.	High	Mid-term	High	MassDOT

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Intersection geometry	Realign Maple Street to meet Route 16 closer to a 90-degree angle to improve sightlines and simplify turning movements.	High	Long-term	High	Town of Mendon/ MassDOT
Bicycle and pedestrian accommodations	Consider providing bike accommodations on Route 16 such as a wider shoulder, designated bike lanes, or a shared-use path	Medium	Long-term	High	MassDOT
Bicycle and pedestrian accommodations	Consider providing pedestrian accommodations on the south side of the Route 16 including sidewalks to offer a safe and protected walkway from vehicles.	Low	Long-term	High	MassDOT
Bicycle and pedestrian accommodations	Evaluate pedestrian desire lines and consider adding crosswalks with pedestrian warning measures to the intersection to allow for safe crossing.	Medium	Mid-term	High	Town of Mendon/ MassDOT

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Maintenance	Update the signage at the intersection to meet MUTCD and retroreflectivity standards.	Low	Short-term	Low	Town of Mendon/ MassDOT
Maintenance	Trim back trees along the Route 16 westbound approach to Washington Street in order to improve visibility of oncoming traffic.	Low	Short-term	Low	Town of Mendon/Private Owner
Maintenance	Add signage to the private driveway to clearly dictate usage whether for one-way use or private driveway-use only.	Medium	Short-term	Low	Town of Mendon
Maintenance	Consider using signage to increase safety on Maple Street, such as “Oncoming vehicles do not stop” to warn drivers before they enter Route 16.	Medium	Short-term	Low	Town of Mendon/ MassDOT

Table 4: Potential Safety Enhancement Summary for Route 16 at North Ave./Main St.

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Congestion	Consider adding exclusive left-turn lanes at all approaches to reduce congestion and queuing.	High	Long-term	High	MassDOT/Town of Mendon
Congestion	Consider providing left-turn traffic signal phases in order to help process left-turning vehicles through the intersection.	High	Long-term	High	MassDOT
Congestion	Evaluate the traffic signal timings to increase the flow of traffic	High	Mid-term	Medium	MassDOT
Congestion	Evaluate the yellow and red clearance times to ensure that vehicles can safely slow when approaching the intersection during the yellow interval and are able to clear the intersection during the red interval	High	Mid-term	Medium	MassDOT
Congestion	Consider adding a red signal ahead sign on Main Street to warn drivers to slow down before the signal.	Medium	Short-term	Low	Town of Mendon/MassDOT

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Intersection and Roadway Geometry	Relocate the stop bar on the channelized right-turn lane on Main Street to improve sightlines	Medium	Low	Low	MassDOT/Town of Mendon
Intersection and Roadway Geometry	Consider removing the channelization of the right-turn lane on Main Street and include the right-turn movement to the traffic signal to improve sightlines	High	Long-term	High	MassDOT/Town of Mendon
Intersection and Roadway Geometry	Provide overhead signals or relocate the signal posts to prevent trucks from hitting the them and to provide better visibility	High	Long-term	High	MassDOT
Intersection and Roadway Geometry	Increase the width of the intersection or consider a truck apron to allow heavy vehicles to turn without tracking over the curb.	High	Long-term	High	MassDOT/Town of Mendon

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Intersection and Roadway Geometry	Define the curb and driveway at the DB Mart and antique shop to provide safe and predictable entrances and exits from the driveways or consider a right-in right-out entrance and exit.	High	Long-term	High	Town of Mendon/ MassDOT
Intersection and Roadway Geometry	Reset the curb with vertical curbing to discourage vehicles from using the island as a second lane.	High	Mid-term	Medium	Town of Mendon/MassDOT
Speed	Evaluate the location of speed regulations and consider installing a reduce speed ahead sign to prepare drivers for the speed change	Low	Short-term	Low	MassDOT
Speed	Provide enforcement to better regulate speeds along the corridor.	Low	Short-term	Low	Town of Mendon
Speed	Consider temporarily using a speed feedback sign to make drivers aware of their rate of speed	Low	Short-term	Low	Town of Mendon/MassDOT
Speed	Consider “gateway” treatments to indicate to drivers that they are entering a built-up area of town.	Low	Short-term	Low	Town of Mendon/MassDOT

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Bicycle and Pedestrian Accommodations	Add bike accommodations such as a wider shoulder, designated bike lanes, or a shared-use path.	Medium	Long-term	High	Town of Mendon/MassDOT
Bicycle and Pedestrian Accommodations	Add sidewalks along all approaches to the intersection on both sides of the roadway to provide a safe and protected walkway from vehicles.	Medium	Long-term	High	Town of Mendon/ MassDOT
Bicycle and Pedestrian Accommodations	Update wheelchair ramps to meet ADA guidelines.	High	Long-term	High	MassDOT
Bicycle and Pedestrian Accommodations	Add crosswalks to all sides of the intersection to provide access from all directions.	High	Long-term	High	MassDOT
Bicycle and Pedestrian Accommodations	Repair the existing pedestrian signal	High	Short-term	Low	Town of Mendon/ MassDOT

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Bicycle and Pedestrian Accommodations	Upgrade the existing pedestrian signal to provide accessible pushbuttons and countdown signals.	High	Long-term	High	Town of Mendon/MassDOT
Maintenance	Update the signage including the signal warning signs, adding lane use signage on each approach, and updating the signage to be MUTCD compliant. This will improve safety for vehicles and reduce confusion amongst drivers	Medium	Short-term	Low	Town of Mendon /MassDOT
Maintenance	Relocate street name signs to improve visibility, reduce driver confusion, and avoid getting hit.	Low	Short-term	Low	Town of Mendon/ MassDOT
Maintenance	Ensure the visors on the traffic signal heads of the eastbound and westbound approaches are maintained and correctly aligned to improve visibility to drivers.	Low	Short-term	Low	Town of Mendon/ MassDOT

Appendix A. RSA Meeting Agenda

Agenda	Road Safety Audit Mendon, MA Route 16 at Washington St./Emerson St. and North Ave./Main St. Meeting Location: Mendon Town Hall 20 Main Street, Mendon, MA September 11, 2018 9:45 AM – 12:00 PM
Type of meeting: Attendees: Please bring:	High Crash Location – Road Safety Audit Invited Participants to Comprise a Multidisciplinary Team Thoughts and Enthusiasm!!
9:45 AM	Welcome and Introductions
9:50 AM	Discussion of Safety Issues <ul style="list-style-type: none">• Crash history, Speed Regulations – provided in advance• Existing Geometries and Conditions
10:30 AM	Site Visit <ul style="list-style-type: none">• Walk to Route 16• As a group, identify areas for improvement
11:15 AM	Discussion of Potential Improvements <ul style="list-style-type: none">• 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
<u>Instructions for Participants:</u> <ul style="list-style-type: none">• Before attending the RSA on September 11, 2018, participants are encouraged to drive/walk through the corridor/intersections 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.	

Appendix B. RSA Audit Team Contact List

Participating Audit Team Members

Date: September 11, 2018

Location: Mendon Town Hall

Audit Team Members	Agency/Affiliation	Email Address	Phone Number
Kevin T Fitzgerald	MassDOT Traffic and Safety	Kevin.T.Fitzgerald@state.ma.us	857-368-9619
Eleanor Roberts	MassDOT Traffic and Safety Intern	Eleanor.roberts@state.ma.us	207-756-2878
Michelle Deng	MassDOT Traffic and Safety	michelle.deng@state.ma.us	857-368-9637
Lola Campbell	MassDOT D3 Traffic	alolade.campbell@state.ma.us	508-929-3887
Kevin Rudden	Town of Mendon – ADA Coordinator	krudden@mendonma.gov	617-480-0497
Alan D Tetreault	Mendon Highway	highwaydpt@mendenma.gov	508-473-0737
David H Kurczy	Mendon Police	dkurczy@mendonma.gov	508-473-0737
Kim Newman	Mendon	knewman@mendonma.gov	508-902-8055
Craig Burnham	Mendon Fire Department	cburnham@mendonma.gov	508-473-5330
Alex Siu	HNTB	asiu@hntb.com	617-532-2221
Michael Tracey	HNTB	mtracey@hntb.com	-
Megan Hanshaw	HNTB	mhanshaw@hntb.com	-

Appendix C. Detailed Crash Data

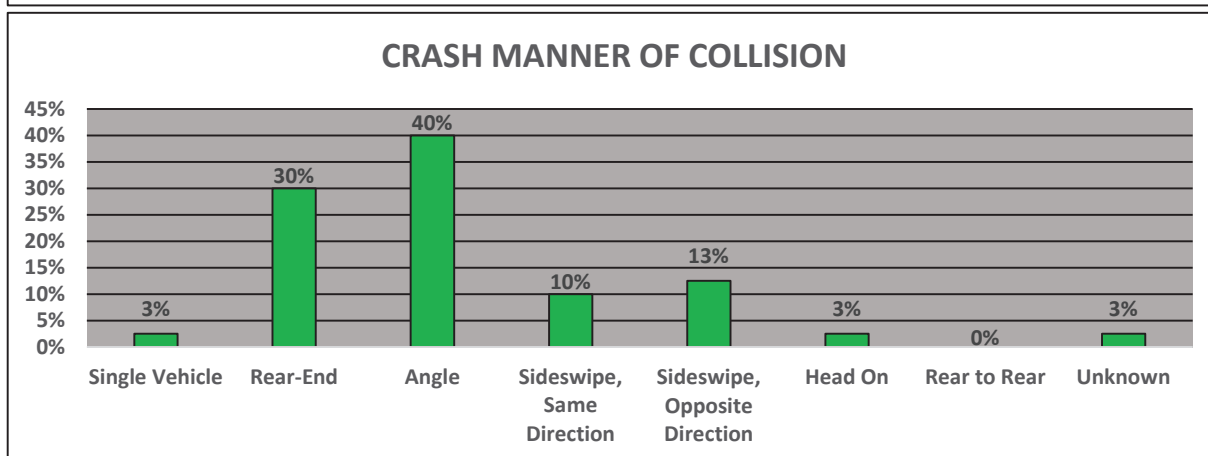
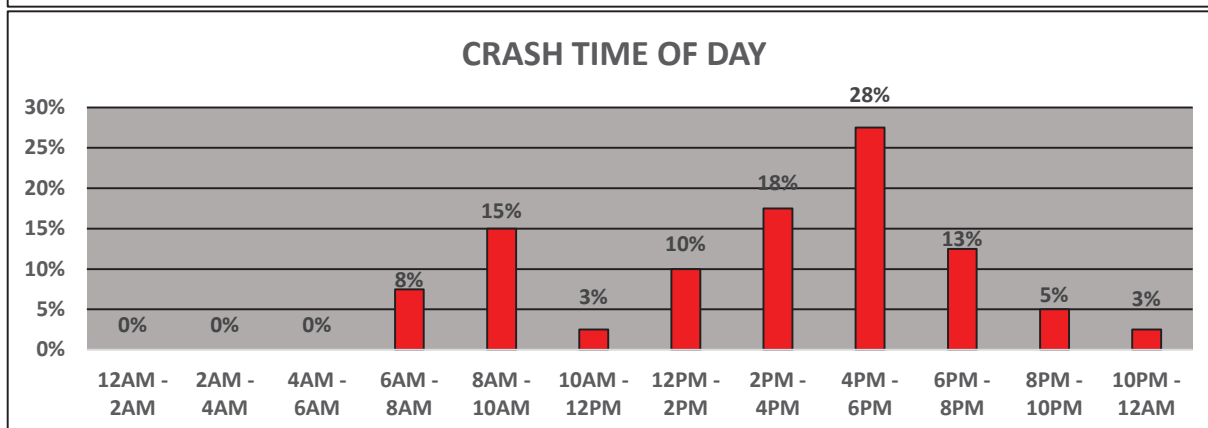
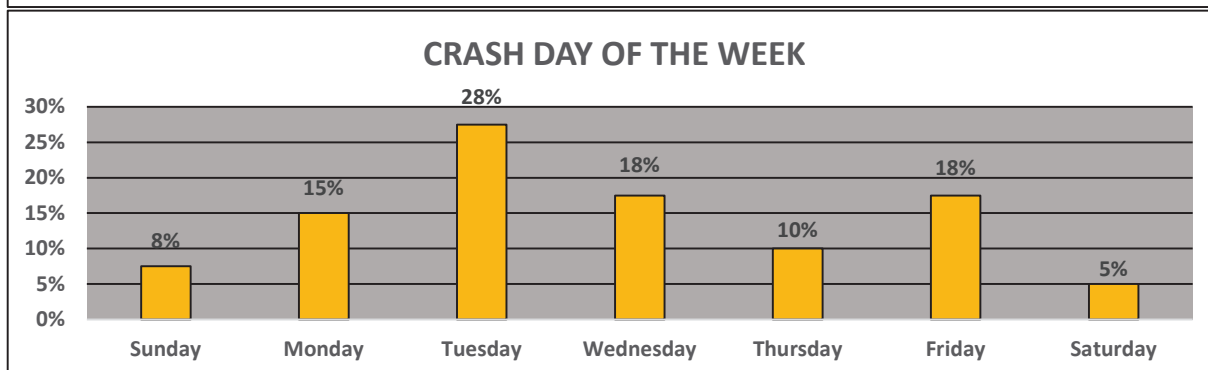
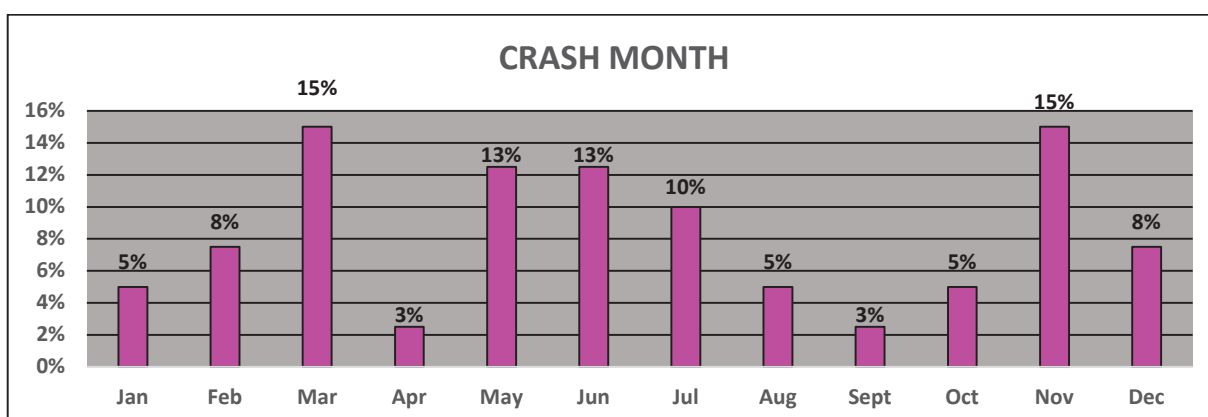
Crash Data Summary Table
Route 16 at Washington Street, Emerson Street Maple Street, Mendon MA
January 2011 - December 2015

Crash Diagram Ref #	Crash Date	Crash Day	Time of Day	Manner of Collision	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Ages			Comments
1	02/08/11	Tuesday	6:12 PM	Rear End	Dark - Lighted Roadway	Clear	Dry	Unknown	24	43		V2 slowed to turn left onto Washington St from Rt 16 east. V1 rear-ended V2.
2	03/08/11	Tuesday	2:08 PM	Angle	Daylight	Clear	Dry	Inattention	48	34		V1 turned left onto Rt 16 west from Emerson St and was struck by V2 which was traveling east on Rt 16.
3	03/24/11	Thursday	7:21 AM	Angle	Daylight	Cloudy	Dry	Inattention	18	50		V1 attempted to continue north onto Washington St from Emerson St and was struck by V2 which was traveling west on Rt 16.
4	06/17/11	Friday	5:46 PM	Angle	Daylight	Cloudy	Dry	Failed to yield right of way	39	21		V1 attempted to enter Rt 16 west from Maple St. V1 struck the passenger side of V2 which was traveling east on Rt. 16.
5	08/09/11	Tuesday	5:23 PM	Sideswipe - Opposite Direction	Daylight	Clear	Dry	Failed to yield right of way	47	57	36	V1 was traveling east on Rt 16, V2 was traveling west on Rt 16. V3 entered Rt 16 west from Maple St and struck V1 which was pushed and struck V2.
6	11/04/11	Friday	3:40 PM	Angle	Daylight	Clear	Dry	Inattention	30	63		V2 was stopped to turn left from Rt 16 east onto Washington Street. V1 rear ended V2, then crossed the center line and struck V3 which was traveling west on Rt 16.
7	11/06/11	Sunday	7:53 PM	Angle	Dark - Roadway not lighted	Clear	Dry	Failed to yield right of way Distracted	22	50		V2 was traveling east on Rt 16. V1 was traveling west on Rt 16 and suddenly turned left onto Maple St in front of V2. V2 struck V1. Operator of V1 was following GPS instructions.
8	05/07/12	Monday	1:09 PM	Angle	Daylight	Clear	Dry	Unknown	45	45		V1 entered Rt 16 west from Maple St and was struck by V2 which was traveling east on Rt 16.
9	07/02/12	Monday	5:16 PM	Rear End	Daylight	Clear	Dry	Inattention	36	35		V1 & V2 were stopped on Maple St waiting to enter Rt 16. V1 began to pull forward and stopped. V2 rear-ended V1.
10	07/15/12	Sunday	9:08 PM	Rear End	Dark - Lighted Roadway	Rain	Wet	No improper driving	18	35		V1 & V2 were traveling east on Rt 16 approaching Emerson St. V2 slowed for turning vehicles and V1 rear ended V2.
11	07/17/12	Tuesday	7:34 AM	Head On	Daylight	Clear	Dry	Inattention	54	33		V2 turned left from Washington St onto Rt 16 east. V1 was traveling north from Emerson St to Washington St and struck V2.
12	09/25/12	Tuesday	4:41 PM	Rear End	Daylight	Clear	Dry	Followed too closely	20	63		V1 & V2 were traveling east on Rt 16 approaching Emerson St. V2 slowed for traffic and was rear-ended by V1.
13	12/11/12	Tuesday	4:32 PM	Rear End	Dusk	Clear	Dry	No improper driving	24	24		V1 was traveling on Rt 16 west. V2 turned left onto Rt 16 west from Maple Street and stopped abruptly in front of V1. V1 rear-ended V2.
14	02/06/13	Wednesday	4:44 PM	Angle	Daylight	Clear	Dry	Glare Failed to yield right of way	36	49		V2 was traveling east on Rt 16. V1 entered Rt 16 west from Maple St and struck V2. Operator of V1 claimed solar glare impaired vision
15	02/24/13	Sunday	10:28 PM	Single Vehicle	Dark - Lighted Roadway	Sleet, Hail, Freezing Rain & Snow	Snow	Unknown	26			V1 was traveling east on Rt 16 and slid off the roadway before striking a utility pole and V2, which was parked at 20 Hastings St.
16	03/19/13	Tuesday	9:11 AM	Sideswipe - Opposite Direction	Daylight	Sleet, Hail, Freezing Rain & Snow	Snow	Unknown	40	40		V2 while stopping on Maple Street slid due to snowy conditions and entered Rt 16. V1 was traveling west on Rt 16 and tried to avoid V2, but could not stop before striking V1.
17	05/06/13	Monday	8:17 AM	Sideswipe - Same Direction	Daylight	Clear	Dry	Inattention	30	45		V1 was traveling east on Rt 16 and turned left into 21 Hastings St. V2 rear-ended V1.
18	05/17/13	Friday	12:02 PM	Sideswipe - Opposite Direction	Daylight	Clear	Dry	Disregarded traffic signs, signals, road markings Failed to yield right of way	65	28		V1 traveling east on Rt 16. V2 attempted to enter Rt 16 west from Maple St and struck V1.
19	06/22/13	Saturday	11:09 AM	Angle	Daylight	Clear	Dry	Failed to yield right of way	22	19		Cyclist was traveling east on Rt 16. V2 entered Rt 16 from Emerson St attempting to reach Washington St. Cyclist struck driver side of V1.
20	06/26/13	Wednesday	2:29 PM	Angle	Daylight	Clear	Dry	Inattention	21	35		V1 entered Rt 16 west from Maple St and was struck by V2 which was traveling east on Rt 16.
21	10/29/13	Tuesday	6:41 PM	Sideswipe - Same Direction	Dark - Unknown Roadway Lighting	Clear	Dry	Failed to yield right of way	17	66		V2 was traveling west on Rt 16. V1 attempted to enter Rt 16 from Maple Street and struck the driver side of V2.
22	12/09/13	Monday	5:52 PM	Rear End	Dark - Lighted Roadway	Rain	Wet	Followed too closely	56	64		V1 was stopped on Rt 16 east waiting to turn left onto Washington St. V2 was traveling east on Rt 16 and rear-ended V1.
23	01/09/14	Thursday	9:52 PM	Rear End	Dark - Lighted Roadway	Clear	Dry	Followed too closely	27	35		V1 & V2 were traveling east on Rt 16 near Washington St. V1 slowed for a left-turning vehicle and was rear-ended by V2.
24	01/15/14	Wednesday	3:39 PM	Sideswipe - Same Direction	Daylight	Cloudy	Dry	Failed to yield right of way	35	21		V2 was turning left from Rt 16 east to Washington St. A truck exited Washington St and cut-off V2 causing the operator to swerve right. At the same time V1 was traveling east on Rt 16 and attempted to pass V2 on the right. V2 struck V1.

Crash Data Summary Table
Route 16 at Washington Street, Emerson Street Maple Street, Mendon MA
January 2011 - December 2015

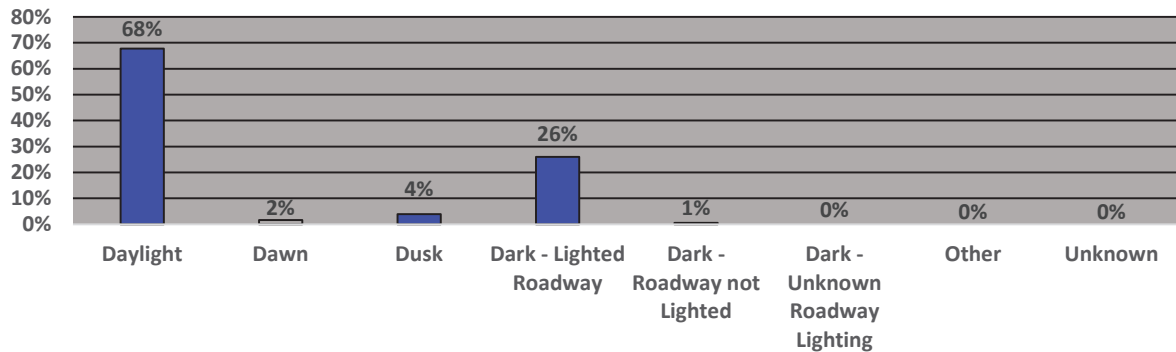
Crash Diagram Ref #	Crash Date	Crash Day	Time of Day	Manner of Collision	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Ages		Comments
25	03/13/14	Thursday	9:28 AM	Rear End	Daylight	Rain	Snow	Driving too fast for conditions	50	22	V1 was stopped on Maple St at Rt 16. V2 rear-ended V1. Operator of V1 stated "brakes locked up" due to snow.
26	03/14/14	Friday	9:05 AM	Rear End	Daylight	Clear	Dry	Inattention	25	27	V2 was stopped on Maple St at Rt 16. V1 rear-ended V2.
27	05/06/14	Tuesday	5:27 PM	Rear End	Daylight	Clear	Dry	Inattention	20	37	V1 & V2 were traveling west on Rt 16 at Washington St. V2 stopped to allow an oncoming vehicle to turn left onto Washington St. V1 rear-ended V2.
28	05/28/14	Wednesday	3:50 PM	Rear End	Daylight	Rain	Wet	Followed too closely Inattention	33	49	V1 was stopped on Maple St at Rt 16 and rear-ended by V2.
29	06/13/14	Friday	8:51 AM	Angle	Daylight	Cloudy & Rain	Wet	No improper driving	46	60	V1 was traveling east on Rt 16. V2 was pulling a trailer and attempted to enter Rt 16 west from Maple St. V1 struck the trailer of V2.
30	07/16/14	Wednesday	6:09 PM	Unknown	Daylight	Clear	Dry	Unknown	54	40	V2 & V1 were stopped waiting to turn right from Maple St to Rt 16 east. Operator of V1 claimed V2 backed into V1. Operator of V2 claimed V1 rear-ended V2.
31	08/02/14	Saturday	8:32 AM	Angle	Daylight	Cloudy & Rain	Wet	Failed to yield right of way	27	43	V1 was traveling south on Washington St to Emerson St. Cyclist was traveling east on Rt 16 and struck by V1.
32	10/22/14	Wednesday	4:55 PM	Angle	Daylight	Cloudy & Rain	Wet	Failed to yield right of way	43	40	V2 was traveling east on Rt 16. V1 entered Rt 16 west from Maple St and struck the passenger side of V2.
33	11/11/14	Tuesday	3:35 PM	Sideswipe - Opposite Direction	Daylight	Clear	Dry	Glare	17	74	V2 was traveling east on Rt 16. V1 entered Rt 16 west from Maple St and struck V2. Operator of V1 stated solar glare impaired vision.
34	11/14/14	Friday	7:15 AM	Angle	Daylight	Cloudy	Wet	Inattention	40	17	V1 was traveling east on Rt 16. V2 was traveling north on Emerson St to Washington St. V2 struck V1 in the intersection of Rt 16 and Washington St.
35	12/23/14	Tuesday	12:56 PM	Sideswipe - Same Direction	Daylight	Cloudy	Wet	Inattention	72	42	V2 was traveling east on Maple St from Rt 16 east. V1 turned left from Rt 16 west onto the Maple St cut through and then turned left onto Maple St. Passenger side of V1 struck the driver side of V2.
36	03/23/15	Monday	4:59 PM	Angle	Daylight	Clear	Dry	Glare Inattention	62	51	V1 entered Rt 16 west from Maple St and was struck by V2 which was traveling east on Rt 16. V1 claimed glare impaired vision.
37	04/06/15	Monday	3:43 PM	Sideswipe - Opposite Direction	Daylight	Clear	Dry	Failed to yield right of way	32	37	V2 was traveling east on Rt 16. V1 entered Rt 16 west from Maple St and was struck by V2.
38	06/04/15	Thursday	5:53 PM	Angle	Daylight	Clear	Dry	Failed to yield right of way Visibility Obstructed	28	19	V2 was traveling east on Rt 16. V1 entered Rt 16 west from Maple Street and was struck by V2.
39	11/18/15	Wednesday	7:47 PM	Rear End	Dark - Lighted Roadway	Clear	Dry	Inattention	23	47	V2 stopped to turn left from Rt 16 east onto Washington St. V1 rear-ended V2.
40	11/27/15	Friday	1:13 PM	Angle	Daylight	Cloudy	Dry	Operating vehicle in erratic, reckless, careless, negligent or aggressive manner	50	80	V2 was traveling east on Rt 16. V1 attempted to enter Rt 16 west from Maple St and struck V2.

2011 – 2015 Crash Data Summary Charts
Route 16 at Washington Street, Emerson Street, and Maple Street, Mendon, MA

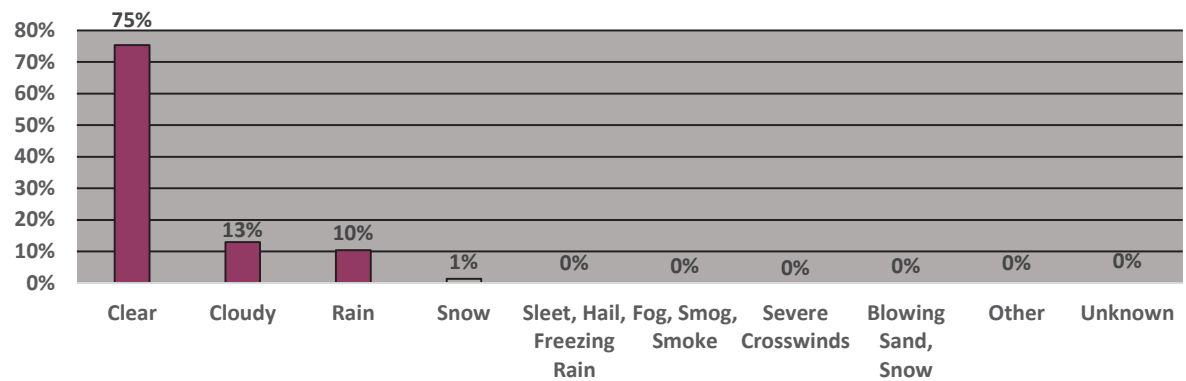


2011 – 2015 Crash Data Summary Charts
Route 16 at Washington Street, Emerson Street, and Maple Street, Mendon, MA

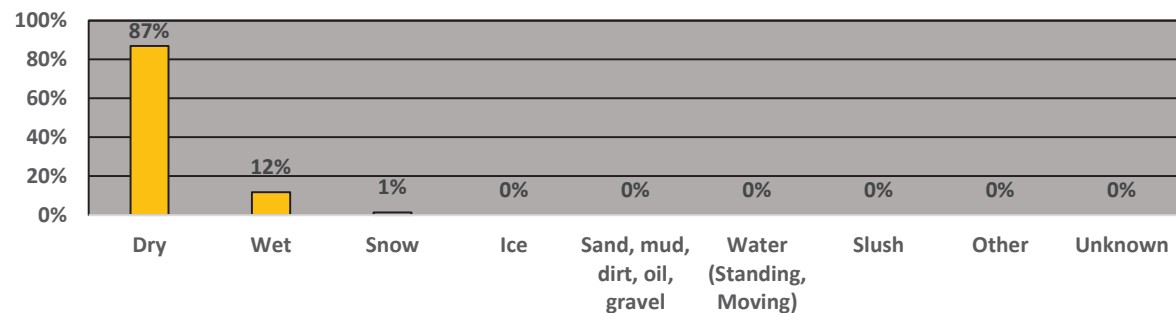
CRASH LIGHT CONDITION



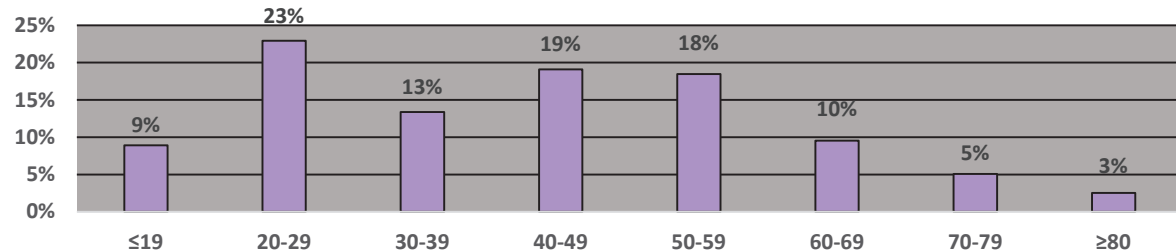
CRASH WEATHER CONDITION



CRASH ROAD SURFACE



CRASH DRIVER AGES



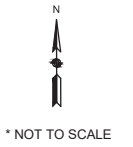


MENDON, MA
ROUTE 16 AT NORTH AVENUE AND MAIN STREET
REGION: CENTRAL MASS. REGIONAL PLANNING COMMISSION

COLLISION DIAGRAM

TIME PERIOD ANALYZED: JANUARY 2011 - DECEMBER 2015
SOURCE OF CRASH REPORTS: MENDON POLICE DEPARTMENT
DATE PREPARED: JULY 19, 2018
PREPARED BY: MT

SYMBOLS	MANNER OF CRASH	SEVERITY
Moving Vehicle	Rear End	Injury
Backing Vehicle	Head On	Fatal
Non-Involved Vehicle	Angle	Night Time Crash
Pedestrian	Turning Movement	
Bicycle	Sideswipe	
Animal	Out of Control	
Parked Vehicle		
Fixed Object		



*Crash # 60 involved single car fire.



Crash Data Summary Table
Route 16 at Main Street and North Avenue, Mendon MA
January 2011 - December 2015

Crash Diagram Ref #	Crash Date	Crash Day	Time of Day	Manner of Collision	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Ages				Comments
1	02/01/11	Tuesday	9:50 AM	Angle	Daylight	Snow	Snow	Driving too fast for conditions Disregarded traffic signs, signals, road markings	56	58			V1 was traveling east on Rt 16 at Main St and was unable to stop at a red signal due to snow. V1 slid into the intersection and struck V2 which was traveling north from Main St.
2	03/03/11	Thursday	3:42 PM	Rear End	Daylight	Clear	Dry	Inattention	53	47			V2 was stopped in traffic on North St at Rt 16 and was rear-ended by V1.
3	04/04/11	Monday	4:01 PM	Angle	Daylight	Rain	Wet	Failed to yield right of way Driving too fast for conditions	26	64			V1 turned left onto North Ave from Rt 16 east during a yellow signal. V2 was traveling west on Rt 16 and struck V1.
4	04/14/11	Thursday	12:29 PM	Angle	Daylight	Clear	Dry	-	48	83			V2 was traveling west on Rt 16. V1 was traveling north on Main Street to North Ave and was struck by V2.
5	05/20/11	Friday	1:49 PM	Rear End	Daylight	Clear	Dry	Inattention	53	22			V1 was traveling west on Rt 16 approaching North Ave. V1 slowed for traffic and was struck from behind by V2.
6	05/25/11	Wednesday	8:25 AM	Rear End	Daylight	Cloudy	Dry	Inattention	27	38			V1 & V2 was traveling east on Rt 16 at Main St & North Ave. V1 rear-ended V2.
7	06/30/11	Thursday	2:12 PM	Single Vehicle	Daylight	Clear	Dry	Inattention	40				V1 was a tractor-trailer and was traveling south onto Main St at Rt 16. V1 attempted to travel around a car stopped for a red light and struck traffic light on southwest corner.
8	07/28/11	Thursday	1:17 PM	Angle	Daylight	Clear	Dry	Disregarded traffic signs, signals, road markings	31	43			V2 traveled north from Main St onto North Ave. Operator of V1 was traveling east on Rt 16, was distracted by children in the vehicle, ran red light, and stuck the driver side of V2.
9	09/18/11	Sunday	4:05 PM	Rear End	Daylight	Clear	Dry	Followed too closely Inattention	26	36			V1 & V2 were traveling east on Rt 16 at North Ave & Main St. V1 rear-ended V2 and fled the scene.
10	01/03/12	Tuesday	8:12 PM	Rear End	Dark - Lighted Roadway	Clear	Dry	Inattention	35	23			V1 was traveling east on Rt 16 and turning right into 1 Milford St. V2 turned right onto Rt 16 east from Main St and rear-ended V1. Operator of V2 was looking west and not forward at the time of the crash.
11	01/13/12	Friday	6:44 AM	Rear End	Dawn	Rain	Wet	Inattention	49	18			V2 and V1 were stopped on Main St at Rt 16. V2 stalled and rolled backward into the front of V1.
12	04/04/12	Wednesday	3:02 PM	Sideswipe - Opposite Direction	Daylight	Clear	Dry	Inattention	57	65			V1 and V2 were stopped on Rt 16 east at Main St. V1 backed up into V2 to allow tractor-trailed to make a turn. Operator of V1 fled the scene.
13	05/20/12	Sunday	2:04 PM	Angle	Daylight	Clear	Dry	Failed to yield right of way	60	19	30	55	V2 was traveling south on North Ave to Main St. V3 & V4 were traveling north on Main St to North Ave. V1 was traveling east on Rt 16 and ran a red, striking V2, V3, & V4.
14	05/28/12	Monday	5:23 PM	Sideswipe - Opposite Direction	Daylight	Clear	Dry	Inattention	24	55			V2 was parked in the parking lot of 1 Milford St. V2 was a tractor-trailer and sideswiped V2 as it was parked in the parking lot.
15	07/03/12	Tuesday	5:43 PM	Angle	Daylight	Clear	Dry	Inattention	62	17			V1 backed into V2 in the parking lot of 1 Milford St
16	08/04/12	Saturday	12:59 PM	Angle	Daylight	Clear	Dry	Made and improper turn	18	58			V1 turned left from Rt 16 west onto Main St. V2 was a motorcycle. V2 was traveling east on Rt 16 and struck V1.
17	08/05/12	Sunday	4:13 PM	Rear End	Daylight	Cloudy	Dry	No improper driving	88	56			V1 & V2 were traveling east on Rt 16 at Main St. V2 stopped and V1 rear-ended V2. Both vehicles then pulled into the parking lot of 1 Milford St. V1 brakes were inoperable and V1 struck guardrail.
18	08/23/12	Thursday	5:12 PM	Angle	Daylight	Clear	Dry	Failed to yield right of way	61	24			V1 was traveling south on Main St just south of Rt 16. V2 attempted to enter Main St SB from parking lot of 1 Milford St and struck the driver side of V1.
19	09/07/12	Friday	4:58 PM	Angle	Daylight	Clear	Dry	Failed to yield right of way	27	23			V1 turned left from Main St to Rt 16 west. V2 was traveling east on Rt 16 and struck V1.
20	11/22/12	Thursday	7:00 PM	Angle	Dark - Lighted Roadway	Clear	Dry	Failed to yield right of way	17	32			V1 turned left onto Main St from Rt 16 west. V2 was traveling east on Rt 16 and struck the passenger side of V1.
21	12/04/12	Tuesday	9:53 AM	Rear End	Daylight	Cloudy	Dry	Visibility Obstructed	60	71			V1 & V2 were stopped on North Ave at Rt 16. A tractor-trailer turned right from Rt 16 west onto North Ave and required V1 to back up. V1 reversed into the front of V2.
22	12/23/12	Sunday	6:29 PM	Angle	Dark - Lighted Roadway	Clear	Dry	Disregarded traffic signs, signals, road markings	51	35			V1 was traveling north on Main St at Rt 16 and ran a red to turn left onto Rt 16 west. V2 was traveling east on Rt 16 and struck V1.
23	01/10/13	Thursday	3:27 PM	Rear End	Daylight	Clear	Dry	Followed too closely	33	42	49	23	V1, V2, V3, & V4 were traveling west on Rt 16 just past North Ave. V4 rear-ended V3 which was pushed and rear-ended V2. V2 was then pushed and rear-ended V1. Solar glare may have contributed to crash.
24	02/16/13	Saturday	11:46 AM	Sideswipe - Same Direction	Daylight	Cloudy	Dry	No improper driving	71	55			V1 & V2 were traveling north on Main St towards North Ave. V2 was making a left-turn onto Rt 16 west. V1 attempted to pass V2 on the right and sideswiped V2.
25	03/19/13	Tuesday	11:53 AM	Angle	Daylight	Rain	Wet	Disregarded traffic signs, signals, road markings	30	62			V1 was traveling south on North Ave to Main St and did not stop for a red light due to being distracted by a passenger. V2 was traveling west on Rt 16 and struck V1.

Crash Data Summary Table
Route 16 at Main Street and North Avenue, Mendon MA
January 2011 - December 2015

Crash Diagram Ref #	Crash Date	Crash Day	Time of Day	Manner of Collision	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Ages			Comments
26	04/05/13	Friday	12:25 AM	Head On	Dark - Lighted Roadway	Clear	Dry	Made an improper turn Operating vehicle in erratic, reckless, careless, negligent or aggressive manner	24	26		V2 turned left from North Ave to Rt 16 east. V1 was traveling north on Main St to North Ave and struck V2.
27	04/16/13	Tuesday	12:11 PM	Rear End	Daylight	Clear	Dry	Followed too closely	46	59		V1 was slowing for traffic on Rt 16 east at Main Street and was rear-ended by V2.
28	05/03/13	Friday	1:11 PM	Rear End	Daylight	Clear	Dry	Inattention	22	54		V1 was stopped at a stop sign on Main St entering Rt 16. V1 started forward and stopped again. Operator of V2 thought V1 had proceeded forward and rear-ended V1.
29	05/12/13	Sunday	4:24 PM	Angle	Daylight	Clear	Dry	Inattention	41	40		V2 was traveling south on North Ave to Main St. V1 was traveling west on Rt 16. V1 and V2 collided.
30	05/16/13	Thursday	11:01 AM	Rear End	Daylight	Clear	Dry	Inattention	56	23		V1 & V2 were stopped in traffic on North Ave approaching Rt 16. V2 rear-ended V1.
31	06/29/13	Saturday	12:23 PM	Single Vehicle	Daylight	Cloudy	Dry	Unknown	65			V1 was a tractor-trailer which backed into a monument on the corner of Main St and Rt 16 WB
32	07/09/13	Tuesday	8:56 PM	Angle	Dark - Lighted Roadway	Clear	Dry	Failed to yield right of way	28	54		V1 was traveling east on Rt 16 an turned left onto North Ave. V2 was traveling west on Rt 16 and passed a vehicle on the right and struck V1.
33	07/24/13	Wednesday	2:47 PM	Sideswipe - Same Direction	Daylight	Clear	Dry	Unknown	35	40		V1 was traveling south on North Ave and attempted to turn left onto Rt 16 east. V2 was traveling north on Main St and attempted to turn right onto Rt 16 east. The two vehicles collided in the intersection.
34	08/15/13	Thursday	12:38 PM	Rear End	Daylight	Clear	Dry	Inattention	18	40		V1 & V2 were stopped in traffic on North Ave at Rt 16. V1 rear-ended V2.
35	10/08/13	Tuesday	7:33 AM	Rear End	Daylight	Clear	Dry	Operating vehicle in erratic, reckless, careless, negligent or aggressive manner	29	28		V1 & V2 were traveling east on Rt 16 approaching Main St. V2 slowed for traffic. V1 rear-ended V2.
36	10/21/13	Monday	12:54 PM	Single Vehicle	Daylight	Clear	Dry	Inattention	26			V1 was a tractor-trailer and attempted to exit the vacant lot at the northeast corner of North Ave and Rt 16 onto Rt 16 and struck the overhead wires.
37	10/31/13	Thursday	4:52 PM	Rear End	Daylight	Rain	Wet	No improper driving	41	71		V2 was stopped in traffic on Rt 16 west at Main St. V1 rear-ended V2.
38	11/19/13	Tuesday	5:38 PM	Rear End	Dark - Lighted Roadway	Clear	Dry	Distracted	28	34		V1 & V2 were stopped in traffic on Main St approaching Rt 16. Operator of V2 foot slipped of brake. V2 rear-ended V1.
39	12/13/13	Friday	3:31 PM	Rear End	Daylight	Clear	Dry	Inattention	46	17		V1 & V2 were traveling south on North Ave approaching Rt 16. V2 slowed for traffic and was struck from behind by V1. Operator of V1 was driving with revoked license.
40	01/05/14	Sunday	12:41 PM	Angle	Daylight	Clear	Dry	Disregarded traffic signs, signals, road markings	56	22		V1 was traveling south on North Ave to Main St. V2 was traveling east on Rt 16 and ran a red light before hitting V1 on the passenger side.
41	01/24/14	Friday	3:46 PM	Rear End	Daylight	Clear	Dry	Glare	50	47		V2 & V1 were traveling west on Rt 16 at North Ave. V1 was rear-ended by V2. Operator of V2 stated vision was impaired by solar glare.
42	02/07/14	Friday	3:42 PM	Rear End	Daylight	Clear	Dry	Fatigued/asleep	52	21		V2 & V1 were traveling west on Rt 16 at North Ave. V1 was rear-ended by V2. Operator of V2 fell asleep at the wheel.
43	02/28/14	Friday	4:56 PM	Angle	Daylight	Clear	Dry	Inattention	33	50		V2 was traveling east on Rt 16. V1 attempted to enter Rt 16 from 1 Milford St and collided with V2.
44	03/24/14	Monday	5:29 AM	Sideswipe - Opposite Direction	Dawn	Clear	Dry	Disregarded traffic signs, signals, road markings Fatigued/asleep	49	54		V2 was traveling south on North Ave to Main St. V1 was traveling east on Rt 16 and fell asleep, running a red light and striking V2.
45	04/14/14	Monday	2:45 PM	Rear End	Daylight	Clear	Dry	Inattention	19	21		V2 was stopped on Main St waiting to turn right onto Rt 16 eastbound. V1 rear-ended V2.
46	04/30/14	Wednesday	2:29 PM	Rear End	Daylight	Rain	Wet	No improper driving	60	58	36	V1, V2, & V3 were traveling west on Rt 16 at North Ave. V3 rear-ended V2, which was pushed and rear-ended V1.
47	05/16/14	Friday	2:50 PM	Angle	Daylight	Cloudy & Rain	Wet	Failed to yield right of way	47	46		V1 attempted to turn left from Rt 16 west to Main St. An unknown vehicle was turning left onto North Ave from Rt 16 east. V2 attempted to pass unknown vehicle on right and was struck by V1.
48	06/12/14	Thursday	3:30 PM	Sideswipe - Same Direction	Daylight	Clear	Dry	No improper driving	22	-		V1 was waiting in traffic on Rt 16 east at North Ave. V2 attempted to pass V1 on the right and sideswiped V1 before fleeing the scene.
49	07/19/14	Saturday	5:09 PM	Head On	Daylight	Clear	Dry	Failed to yield right of way	22	84		V1 was traveling west on Rt 16 and attempted to turn left onto Main St. V2 was traveling east on Rt 16 and struck the front end of V2 head-on.
50	08/09/14	Saturday	5:54 PM	Head On	Daylight	Clear	Dry	Failed to yield right of way	22	50		V2 was turning left from Rt 16 west onto Main St. An unknown vehicle was turning left from Rt 16 east to North Ave. V1 passed unknown vehicle on left and was struck by V2.
51	09/19/14	Friday	12:06 PM	Angle	Daylight	Clear	Dry	Inattention	63	23		V2 attempted to turn left from Rt 16 west to Main St. V1 was traveling east on Rt 16 and struck by V2.

Crash Data Summary Table
Route 16 at Main Street and North Avenue, Mendon MA
January 2011 - December 2015

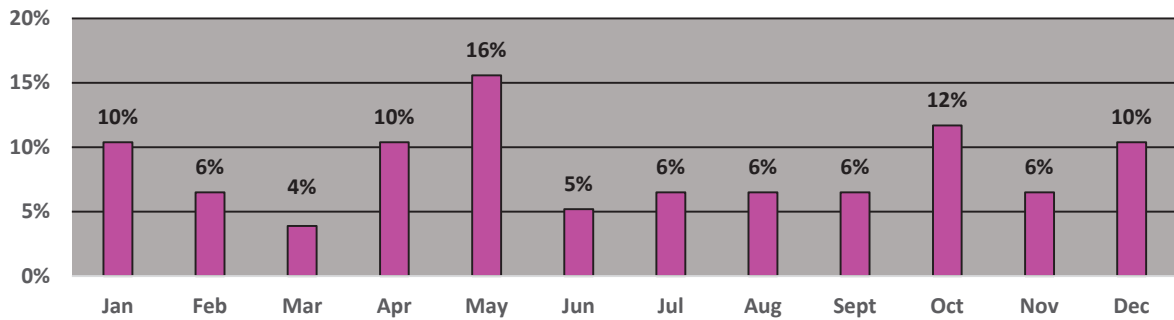
Crash Diagram Ref #	Crash Date	Crash Day	Time of Day	Manner of Collision	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Ages				Comments
52	09/20/14	Saturday	9:49 AM	Angle	Daylight	Clear	Dry	Operating vehicle in erratic, reckless, careless, negligent or aggressive manner	56	17			V1 was traveling west on Rt 16. V2 was traveling south on North Ave to Main St. V1 ran a red light and struck the driver side of V2.
53	10/25/14	Saturday	2:42 AM	Single Vehicle	Dark - Lighted Roadway	Clear	Dry	Physical Impairment Operating in erratic, reckless, careless, negligent or aggressive manner	38				V1 was traveling east on Rt 16 near North Ave and left the roadway before striking a tree at the edge of the parking lot at 1 Milford St. Operator taken into custody, reason not given.
54	10/27/14	Monday	1:51 PM	Angle	Daylight	Clear	Dry	Inattention	83	70			V2 was traveling north on Main St to North Ave. V1 was traveling east on Rt 16 and ran a red light before striking V2.
55	11/22/14	Saturday	1:30 PM	Angle	Daylight	Clear	Dry	Operating vehicle in erratic, reckless, careless, negligent or aggressive manner	47	41			V1 was traveling west on Rt 16. V2 was traveling north on Main St to North Ave and ran a red light, striking V1.
56	12/17/14	Wednesday	12:58 PM	Rear End	Daylight	Clear	Dry	Inattention	47	43			V1 & V2 were stopped on Main St at Rt 16. V1 backed up to allow a tractor-trailer to turn left from Rt 16 west onto Main St. V1 backed up into the front of V2.
57	12/30/14	Tuesday	4:49 PM	Angle	Dark - Unknown Roadway Lighting	Clear	Dry	Made an improper turn Visibility Obstructed	68	21			V1 turned left from Rt 16 east onto North Ave. V2 was traveling west on Rt 16 and was struck by V2.
58	01/07/15	Wednesday	3:30 PM	Angle	Daylight	Cloudy	Dry	Operating vehicle in erratic, reckless, careless, negligent or aggressive manner	61	70			V1 was turning left from Main St to Rt 16 west. V2 ran a red light and turned left from Rt 16 west onto Main St and struck the front passenger side of V1.
59	01/07/15	Wednesday	3:52 PM	Rear End	Daylight	Cloudy	Dry	Unknown	53	63	28	58	V1, V2, V3, & V4 were stopped at a red light near 1 Milford St. V4 rear-ended V3, which was pushed and rear-ended V2. V2 was then pushed and rear-ended V1.
60	01/15/15	Thursday	12:38 PM	Single Vehicle	Daylight	Clear	Dry	No improper driving	66				V1 was traveling west on Rt 16 approaching North Ave. The engine of V1 caught fire and vehicle was towed.
61	02/12/15	Thursday	7:16 AM	Angle	Daylight	Clear	Dry	Failed to yield right of way Visibility Obstructed	36	17			V1 was traveling east on Rt 16. V2 was traveling south on North Ave. V1 struck the rear passenger side of V2. The traffic lights at the intersection were not operating normally and flashing red.
62	04/09/15	Thursday	3:22 PM	Rear End	Daylight	Cloudy & Rain	Wet	Operating vehicle in erratic, reckless, careless, negligent or aggressive manner	47	25			V1 & V2 were slowed in traffic on Rt 16 west near 3 Milford St. V2 rear-ended V1.
63	05/12/15	Tuesday	3:26 PM	Rear End	Daylight	Clear	Dry	Inattention	25	58			V1 & V2 were stopped in traffic on Rt 16 west near North Ave. V1 rear-ended V2.
64	05/12/15	Tuesday	3:26 PM	Rear End	Daylight	Clear	Dry	Inattention	25	34			V1 was disabled on Rt 16 west near North Ave from previous accident. Officer attempted to push V1 out of traffic with a police vehicle. V1 rolled back slightly into the police vehicle prior to pushing V1 out of traffic.
65	05/19/15	Tuesday	2:16 PM	Rear End	Daylight	Cloudy	Wet	Inattention	19	45			V1 & V2 were stopped in traffic on Rt 16 west near North Ave. V1 rear-ended V2.
66	05/20/15	Wednesday	5:55 PM	Rear End	Daylight	Clear	Dry	Followed too closely Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway, etc...	46	79			V1 & V2 were traveling east on Rt 16. An unknown vehicle in front of V2 used its right directional as if to turn right into 1 Milford St but failed to do so. V2 slowed for the unidentified vehicle and was rear-ended by V1.
67	06/06/15	Saturday	2:26 PM	Angle	Daylight	Cloudy	Dry	No improper driving	73	18			V1 was traveling east on Rt 16 and turned right into the parking lot of 1 Milford St as V2 was turning right onto Rt 16 east. V1 & V2 collided at an angle.
68	09/09/15	Wednesday	10:15 AM	Rear End	Daylight	Clear	Dry	Followed too closely Inattention	18	46			V1 & V2 were traveling east on Rt 16 approaching North Ave. V1 rear-ended V2.
69	10/02/15	Friday	4:39 PM	Rear End	Daylight	Rain	Wet	Illness	46	61			V1 was stopped on Rt 16 west at North Ave. V2 failed to stop and rear-ended V1.
70	10/07/15	Wednesday	6:32 PM	Rear End	Dusk	Clear	Dry	Inattention	32	48			V2 was stopped in southbound traffic on North Ave approaching Rt 16. V1 rear-ended V2.
71	10/19/15	Monday	6:42 PM	Rear End	Dark - Lighted Roadway	Clear	Dry	Followed too closely	22	39	25		V1 V2, & V3 were traveling south on North Ave onto Main St. V1 slowed for traffic and was rear-ended by V2. V3 then rear-ended V2 which was pushed and rear-ended V1 a second time.
72	10/27/15	Tuesday	7:44 PM	Rear End	Dark - Lighted Roadway	Clear	Dry	Inattention	28	46			V2 & V1 were stopped in traffic on Rt 16 west approaching North Ave. V1 believed the light turned green and accelerated, rear-ending V2.
73	11/14/15	Saturday	12:11 PM	Rear End	Daylight	Clear	Dry	Distracted Inattention	23	34			V2 was stopped at the traffic light on Rt 16 east at North Ave. V1 was looking at GPS and did not notice V2 stopped and rear-ended V2.

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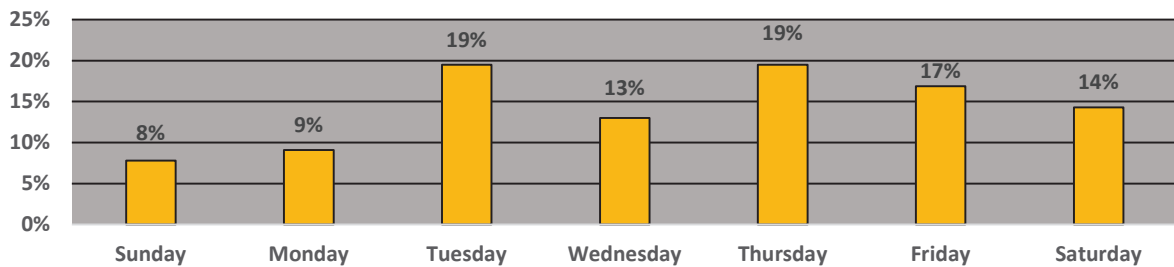
Crash Diagram Ref #	Crash Date	Crash Day	Time of Day	Manner of Collision	Light Condition	Weather Condition	Road Surface	Driver Contributing Code	Ages				Comments
74	11/17/15	Tuesday	3:29 PM	Rear End	Daylight	Clear	Dry	Operating vehicle in erratic, reckless, careless, negligent or aggressive manner	76	30			V2 & V1 were traveling west on Rt 16 near 5 Milford St. V2 stopped in traffic. V1 rear-ended V2. Operator of V1 stated vision was impaired by solar glare.
75	12/05/15	Saturday	11:50 AM	Rear End	Daylight	Clear	Dry	Unknown	41	58			V1 & V2 were traveling south on North Ave to Main St. V1 was rear-ended by V2.
76	12/18/15	Friday	4:25 PM	Angle	Dark - Lighted Roadway	Cloudy	Dry	Disregarded traffic signs, signals, road markings Inattention	57	33			V2 was traveling north from Main St to North Ave. V1 ran a red light and was traveling east on Rt 16. V1 & V2 collided in the intersection.
77	12/31/15	Thursday	4:44 PM	Rear End	Dark - Lighted Roadway	Clear	Dry	Followed too closely Inattention	20	51	19		V1, V2, & V3 were all stopped in traffic on Rt 16 east at North Ave. Operator of V1 foot slipped off brake. V1 rear-ended V2, which was pushed and rear-ended V3.

2011 – 2015 Crash Data Summary Charts
Route 16 at Main Street & North Avenue, Mendon, MA

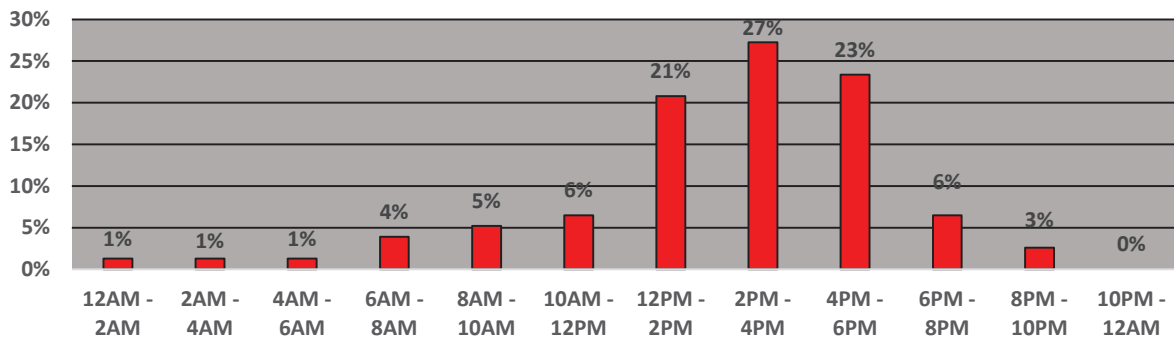
CRASH MONTH



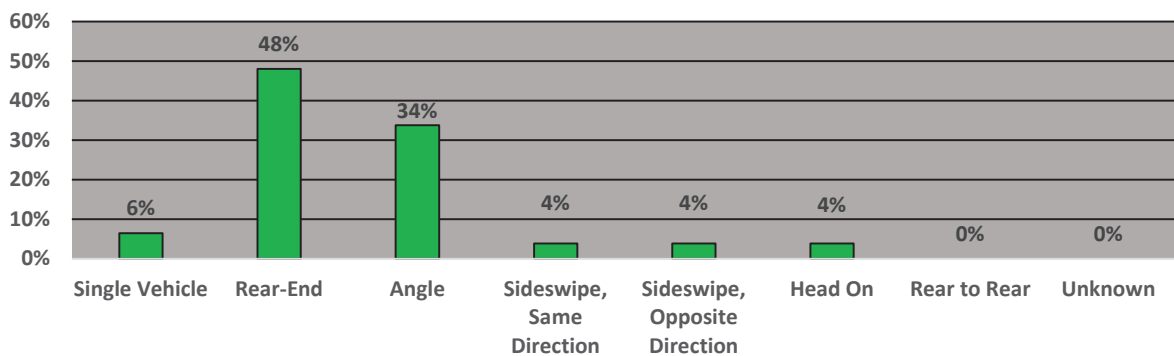
CRASH DAY OF THE WEEK



CRASH TIME OF DAY

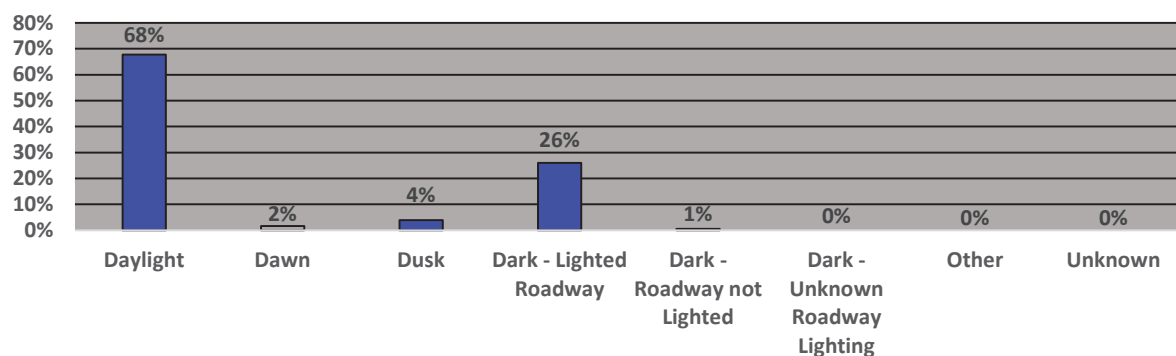


CRASH MANNER OF COLLISION

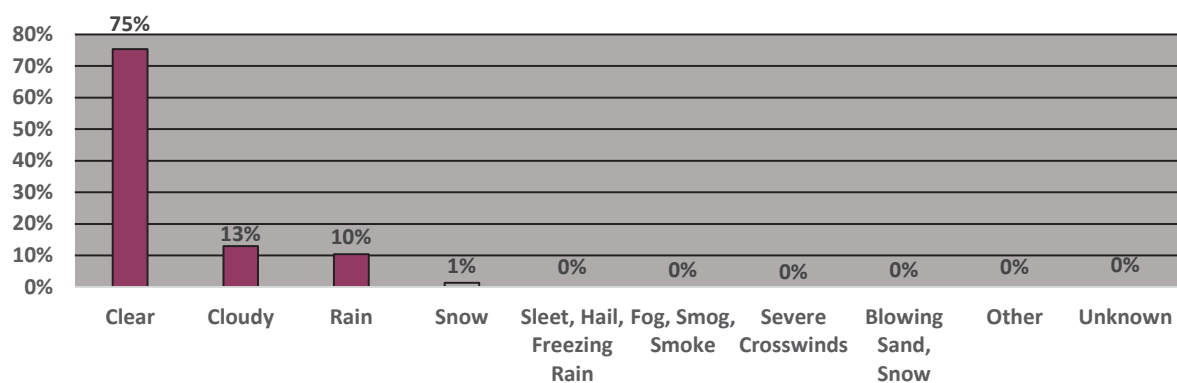


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Route 16 at Main Street & North Avenue, Mendon, MA

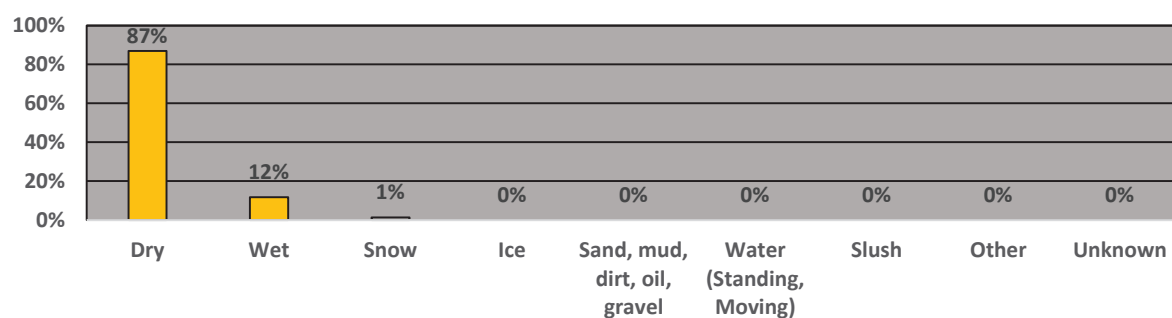
CRASH LIGHT CONDITION



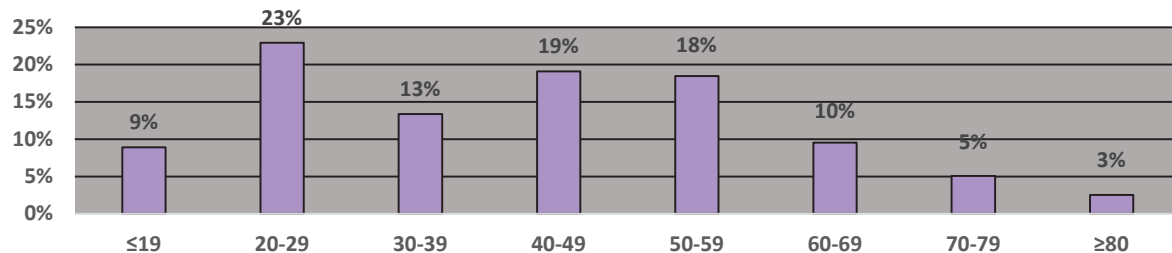
CRASH WEATHER CONDITION



CRASH ROAD SURFACE



CRASH DRIVER AGES



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