

ROAD SAFETY AUDIT

Turnpike Street at Depot Street

Town of Easton

June 2021

Prepared For:

The Town of Easton, MA

Prepared By:

Old Colony Planning Council
70 School Street, Brockton, MA 02301

Prepared under MassDOT Contract # 112307

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The Road Safety Audit Overview

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 the RSA is to identify potential safety issues and possible opportunities for safety improvements considering all roadway users. The RSA is intended to be a proactive process based on collaborative, qualitative, and quantitative analyses.

This Road Safety Audit (RSA) for the Turnpike Street/Depot Street intersection in Easton was conducted by the Old Colony Planning Council through its Road Safety Audits at Multiple Locations program and funded through the Old Colony Metropolitan Planning Organization's (MPO) FFY 2021 Unified Planning Work Program (UPWP). This report includes crash data compilation and analyses. The Turnpike Street/Depot Street intersection location is included in Easton's Complete Streets Priority Plan.

The Road Safety Audit Meeting and Team

The Road Safety Audit took place on Tuesday, March 30, 2021 as a virtual meeting with OCPC staff remotoring from the Turnpike Street/Depot Street intersection in Easton to the meeting to support the meeting discussions. The meeting was facilitated by OCPC staff. OCPC provided a collision diagram and the latest four-year crash experience based on crash reports provided by the Easton Police Department.

The RSA meeting consists of three components. The first portion of the meeting focuses on a discussion of safety deficiency issues and concerns. The second portion of the meeting is a site visit; however, for the remote RSA meetings, live observations from the intersection were viewed remotely via OCPC staff stationed in the field to support the discussion in lieu of the site visit. OCPC staff also takes notes to document deficiencies and potential recommendations. The final portion of the meeting focuses on potential short-term and long-term improvements for the intersection. The agenda and the background materials are included in the appendix to this report (Appendix A and Appendix C). Table 1 lists the names and affiliations of the audit participants. The intersection location is shown in Figure 1.

Table 1. Participating Audit Team Members

Audit Team Member	Agency/Affiliation
Claire Cronin	State Representative
Hanna Buntich	Senator Timilty's Chief of Staff
Dottie Fulginiti	Chair Easton Board of Selectmen and OCPC Economic Recovery Planner
Craig Barger	Vice-Chair Easton Board of Selectmen
David Field	Director of Easton Department of Public Works
Greg Swan	Town of Easton Town Engineer
Stephanie Danielson	Easton Director of Planning and Economic Development
Ben Muller	MassDOT Planning Liaison
Bianca Marshall	MassDOT District 5 Traffic
Jason Walters	MassDOT District 5 Projects
Michelle Deng	MassDOT Traffic Safety
Dakota DelSignore	MassDOT Traffic Safety
Jonathan Carroll	Easton Fire Department
Jonathan Brown	MassDOT Traffic Safety
Mary Waldron	Executive Director Old Colony Planning Council
Charles Kilmer	Assistant Director Old Colony Planning Council
William McNulty	Old Colony Planning Council
Shawn Bailey	Old Colony Planning Council
Kyle Mowatt	Old Colony Planning Council
Raymond Guarino	Old Colony Planning Council

Figure 1. Locus Map



Project Location and Description

Turnpike Street at Depot Street

Turnpike Street is under Easton jurisdiction and is classified as an urban minor arterial. It is a two-lane cross section in Easton and runs south to north from Easton to Brockton with connections to Route 24. The land use along Turnpike Street is residential and commercial. The pavement width is approximately 25 to 26 feet-wide and sidewalks are provided intermittently mostly on the west side. Turnpike Street provides two twelve-foot travel lanes with one to two-foot shoulders on each side of the road. The speed limit is posted at 40 miles per hour on Turnpike Street south of the Turnpike Street/Depot Street intersection in the northbound direction. The speed limit is 40 miles per hour in the vicinity of the Depot Street intersection. The average daily traffic on Turnpike Street is 13,184 vehicles per day (VPD) north of the Depot Street intersection, based on a 2019 OCPC traffic count. The average daily traffic for the year 2020 on Turnpike Street south of Depot Street is 7,023 VPD based on MassDOT estimates of previous traffic counts at this location (speed and heavy vehicle data not available for Turnpike Street locations).

Depot Street is also a two-lane cross section. It is classified as a major collector and under Easton jurisdiction. The pavement width of Depot Street is approximately 28 feet wide, with two eleven-foot travel lanes and shoulders approximately three feet wide on each side of the road. Sidewalks are not provided on either side of the road. The posted speed limit for Depot Street is 35 miles per hour. The average daily traffic for Depot Street, (based on a traffic count by OCPC) was 6,209 vehicles per day in 2020 with the 85th percentile speed at 38 miles per hour, and 8.7 percent of the traffic was heavy vehicle traffic. Depot Street connects between Turnpike Street and Washington Street (Route 138), continues

west beyond Washington Street to connect to Route 106, and then continues as Bay Road connecting to I-495. The land use along Depot Street is a mix of residential uses. Depot Street and Turnpike Street are often used as an alternative route between Route 24 and I-495 to the I-495/Route 24 interchange.

Crash Details and Overview

Crash reports were compiled from the Easton Police Department for the years 2017, 2018, 2019, and 2020. There were no reported crashes for this location in 2017. There was a total of eight crashes at the Turnpike Street/Depot Street intersection during this time period. The majority of these crashes, six of the eight (75 percent) were angle type crashes. There was one fatality, three of the crashes resulted in personal injury, and the remaining four crashes resulted in property damage only. The collision diagrams and a summary of the crash data for the intersection are included in Appendix C of this report.

Audit Observations and Potential Safety Enhancements

During the RSA meeting, an introduction of the RSA process and a summary of the crash information and background data for the intersection was presented to the audit participants. The meeting was held virtually with participants remoting in. Following the presentation, the members of the audit team were asked to discuss the existing issues that affect safety. The intersection was visited remotely from live feed to the meeting via OCPC staff stationed at the intersection. Observations, safety concerns, and deficiencies were identified by the RSA participants and documented by OCPC staff.

The following sections list the safety concerns and the potential enhancements that were identified during the RSA.

Safety Issue: Poor sight distance at the Depot Street approach looking north toward Turnpike Street.

Vehicles approaching the intersection on Depot Street have a limited sight line view looking north at the southbound traffic on Turnpike Street. The sight line is blocked by a berm and vegetation on the northwest side of the intersection. Vehicles approaching the stop sign and stop line on the Depot Street approach need to stop beyond the stop line to get a clear view of oncoming southbound Turnpike Street traffic. As these drivers wait to turn left from Depot Street onto Turnpike Street, they encroach into the southbound travel lane in the path of southbound traffic. In addition, drivers stopping beyond the stop line create turning movement conflict issues for northbound vehicles on Turnpike Street that turn left onto Depot Street. A fatal crash that occurred at this intersection involved a left turning vehicle from Depot Street and a southbound vehicle on Turnpike Street.



Sight line blocked on the Depot Street approach by a berm and vegetation looking north toward Turnpike Street.

Enhancement: Remove vegetation from the northwest side of the intersection on Turnpike Street.

Safety Issue: There are sight distance limitations on the Turnpike Street southbound approach to the intersection due to an ascending grade and a curve approaching the intersection. There is slight horizontal curve on Turnpike Street, particularly to the north of the intersection, along with an ascending grade for southbound vehicles approaching the intersection. Vehicles on the Turnpike Street southbound approach have limited visibility of the intersection and vehicles tend to speed on this approach. As vehicles approach from the north, they come up on intersection quickly.

Enhancement: Add advanced intersection warning signs on the Turnpike Street southbound approach.

Enhancement: Add flashing beacons at the intersection to make the intersection more visible to vehicles approaching the intersection, flashing yellow on the Turnpike Street approaches and flashing red on the Depot Street approach.

Enhancement: Enhance speed enforcement on Turnpike Street.

Safety Issue: The House directly opposite the Depot Street approach has bollards to prevent vehicles from striking the building and the bollards have evidence of prior crashes.



Bollards across from the Depot Street approach.

Enhancement: Replace bollards with the installation of guard rail compliant with MassDOT standards, (AASHTO Manual for Assessing Safety Hardware, MASH/NCHRP 350).

Safety Issue: There are long delays at the Depot Street approach and congestion during the peak hour. During the peak hour, there is a lack of sufficient gaps in the Turnpike Street traffic for vehicles making a left turn from Depot Street to Turnpike Street northbound. The majority of crashes at this intersection are due to drivers at Depot Street failing to yield the right of way to drivers on Turnpike Street. In addition, the Depot Street approach is wide enough to allow de-facto right turn lane as right turning vehicles go around vehicles waiting to take a left turn on the Depot Street approach and this situation can limit the sight line for right turning vehicles, which adds more risk for angle crash. In addition, vehicles at the Depot Street eastbound stop sign approach often do not come to a complete stop when entering Turnpike Street.

Enhancement: Consider reducing the corner radii at the intersection to square up the Depot Street approach and provide more perpendicular alignment.

Enhancement: Install flashing LED Stop sign at Depot Street to increase driver awareness.

Enhancement: Install flashing beacons with yellow facing the Turnpike Street northbound and southbound approaches and red facing the Depot Street eastbound approach.

Enhancement: Install traffic signals at the intersection (installing signals requires additional bicycle and pedestrian accommodation).

Safety Issue: Truck exclusion signs are not completely visible until vehicles have already begun making the turn onto Depot Street. There are two signs that prohibit heavy vehicles on Depot Street posted back-to-back on the northwest corner of the intersection for southbound and northbound vehicles (Commercial vehicles over 2 ½ tons excluded). This sign is not completely visible until vehicles have already begun turning into the intersection.



Heavy Vehicle Exclusion sign.

Enhancement: Post advanced warning signs for truck exclusion with MUTCD compliance on the northbound and southbound Turnpike Street approaches.

Safety Issue: There is a lack of sidewalks and safe crossings for pedestrians. South of the intersection, there are sidewalks with a bituminous curb on the west side of Turnpike Street. There are no sidewalks on the east side of Turnpike Street south of the intersection, and there are no sidewalks on either side of the road north of the intersection. In addition, there are no crosswalks or ADA accommodations.

Enhancement: Add additional sidewalks on Turnpike Street and Depot Street, crosswalks, and ADA compliant ramps.

Safety Issue: The intersection lacks bicycle lanes, markings, and signage.

Enhancement: Add bicycle accommodations including lane markings and signage considering separated or buffered bike lanes.

Summary of Road Safety Audit

Based on the review of data, observations of the intersection made in the field, and group discussion, the RSA team identified possible enhancements that could improve safety at the intersection. Further study and design work will need to be conducted to determine the feasibility of improvements. Table 2 summarizes the estimated time frame and costs, and Table 3 summarizes the safety issues, possible enhancements, estimated safety payoff, time frame, cost, and jurisdiction responsibility. Safety payoff estimates are based on engineering judgment and are categorized as low, medium, and high. The time frame is categorized as short-term (<1 year), midterm (1 to 3 years), or long-term (typically >3 years). Long-term improvements are typically considered to be substantial improvements with an expected time frame for implementation greater than 3 years. The costs are categorized as low (<\$10,000), medium (\$10,001 to \$50,000), or high (>\$50,000).

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 – Turnpike Street/Depot Street

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Agency
Poor sight distance at the Depot Street approach looking north toward Turnpike Street.	Remove vegetation from the northwest side of the intersection on Turnpike Street.	Medium	< 1 Year	Low	Easton
There are sight line limitations on the Turnpike Street southbound approach to the intersection due to an ascending grade and a horizontal curve approaching the intersection.	Add warning signs intersection ahead on the Turnpike Street southbound approach.	Medium	< 1 Year	Low	Easton
	Add flashing beacons at the intersection to make the intersection more visible to approaching traffic, flashing yellow on the Turnpike Street approaches and flashing red on the Depot Street approach.	Medium	1-3 Years	Medium	Easton
	Enhance speed enforcement by police on Depot Street.	Medium	< 1 Year	Low	Easton
The House directly opposite the Depot Street approach has bollards to prevent vehicles from striking the building and the bollards have evidence of prior crashes.	Replace bollards with the installation of MUTCD compliant guard rail.	Medium	< 1 Year	Low	Easton
There are long delays at the Depot Street approach and congestion during the peak hour. There is a lack of sufficient gaps in the Turnpike Street traffic for vehicles making a left turn from Depot Street to Turnpike Street northbound during the peak hour. The Depot Street approach allows de-facto right turn lane and vehicles on the Depot Street eastbound approach often do not come to a complete stop when entering Turnpike Street.	Consider reducing the corner radii at the intersection to square up the Depot Street approach and provide more perpendicular alignment.	Medium	1-3 Years	Medium	Easton
	Install flashing LED Stop sign at Depot Street to increase driver awareness.	Low	< 1 Year	Low	Easton
	Install flashing beacons with yellow facing the Turnpike Street northbound and southbound approaches and red facing the Depot Street eastbound approach.	Medium	> 3 Years	Medium	Easton
	Install traffic signals at the intersection.	High	> 3 Years	High	Easton

Table 3: Potential Safety Enhancement Summary – Turnpike Street/Depot Street (continued)

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Agency
Truck exclusion signs not completely visible until vehicles have already began making the turn onto Depot Street.	Post advanced warning signs for truck exclusion with MUTCD compliance on the northbound and southbound Turnpike Street approaches.	Low	< 1 Year	Low	Easton
There is a lack of sidewalks and safe crossings for pedestrians.	Add additional sidewalks, crosswalks, and ADA compliant ramps.	High	< 3 Year	High	Easton
The intersection lacks bicycle lanes, markings, and signage.	Add bicycle accommodations including lane markings and signage. Consider developing a town-wide multi-modal plan.	High	< 1 Year	Medium	Easton

Appendix A: RSA Meeting Agenda

Agenda	<h2>Road Safety Audit</h2> <h3>Easton, MA</h3> <h3>Turnpike Street at Depot Street Intersection</h3> <p>Meeting Location: Remote Zoom Meeting Old Colony Planning Council Tuesday, March 30, 2021 9:30 AM – 12:00 PM</p> <p>Please register in advance for this meeting: https://us02web.zoom.us/webinar/register/WN_2CoZTSPJSY2qza6fthsYxg After registering, you will receive a confirmation email containing information about joining the webinar.</p>
	<p>Type of meeting: Road Safety Audit (Virtual Remote) Attendees: Invited Participants to Comprise a Multidisciplinary Team Please bring: Thoughts and Enthusiasm</p>
<p>10:00 AM Welcome and Introductions</p> <p>10:05 AM Review of Site-Specific Material - Review and Discuss Project</p> <ul style="list-style-type: none"> • Review of Traffic Data • Existing Conditions and Known Challenges <p>10:45 AM Visit the Intersection Remotely and Discussion</p> <ul style="list-style-type: none"> • Identify deficiencies at the study area location • OCPC staff will document all observations and comments <p>11:30 AM Post Remote Visit Discussion Meeting</p> <ul style="list-style-type: none"> • Discuss project and document and finalize potential improvements <p>12:00 PM Adjourn for the Day</p>	
<p>Instructions for Participants:</p> <ul style="list-style-type: none"> • Before attending the RSA participants are encouraged to drive 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. • 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. • CONTACT: Please direct questions regarding this RSA to Raymond Guarino, OCPC, (603) 321-4583 or (508) 583-1833, Ext 212, rguarino@ocpcrpa.org. Old Colony Planning Council 70 School Street Brockton, MA 02301 	

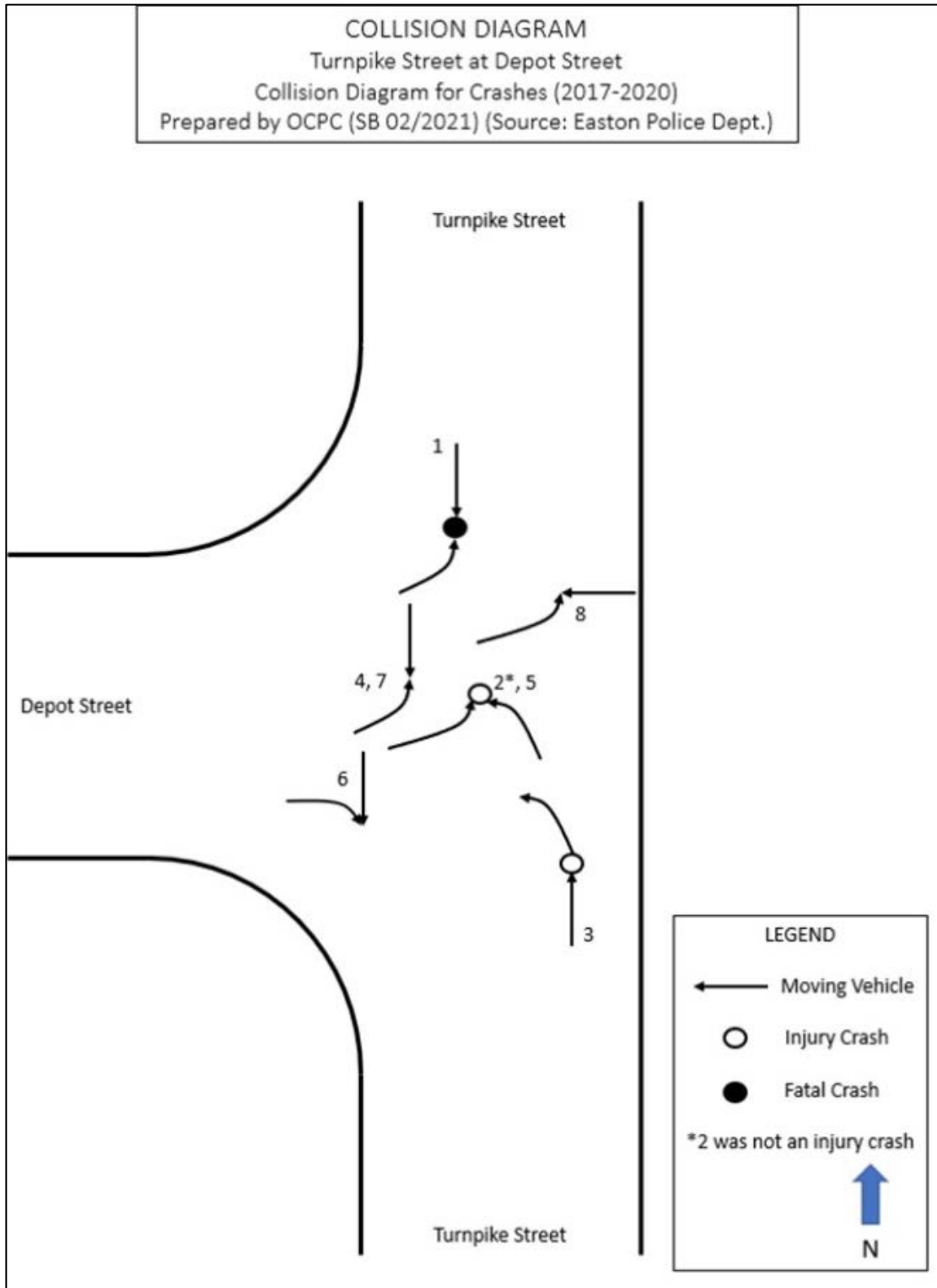
Appendix B: RSA Audit Team Contact List

Participating Audit Team Members

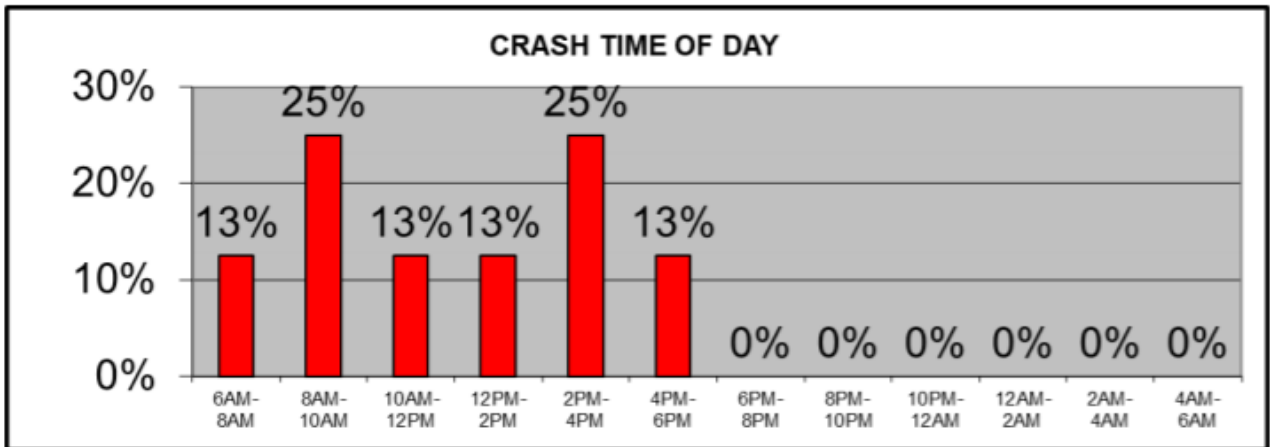
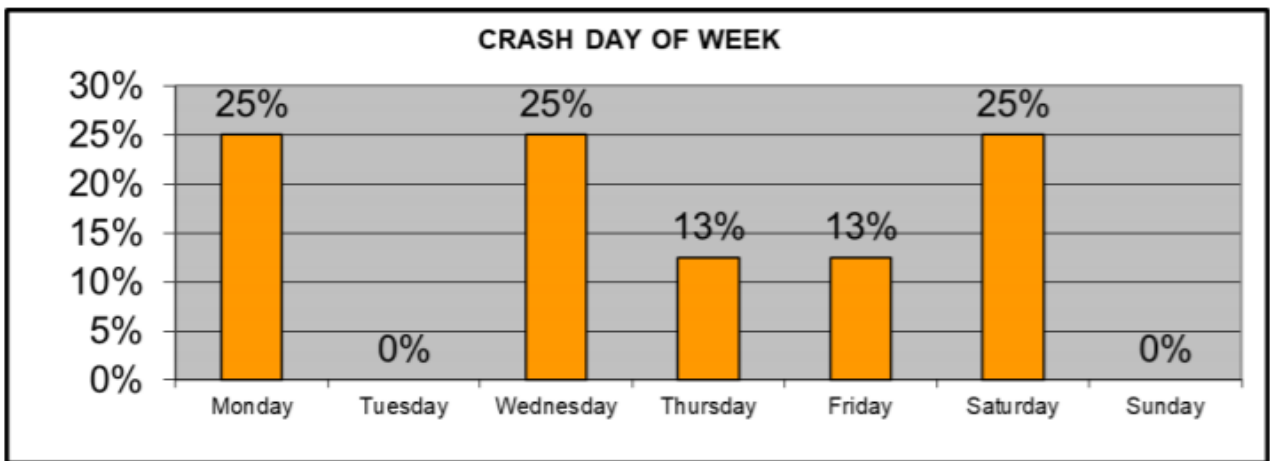
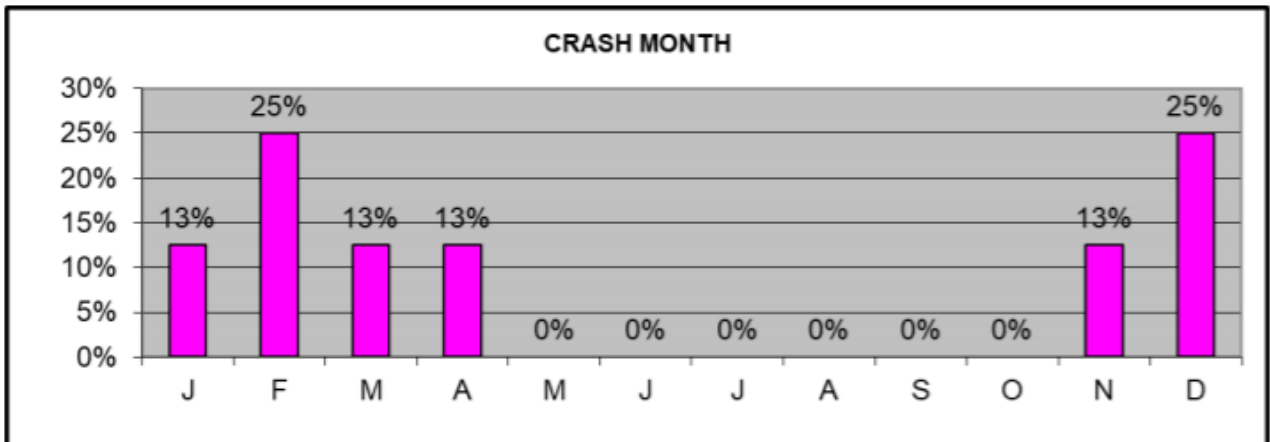
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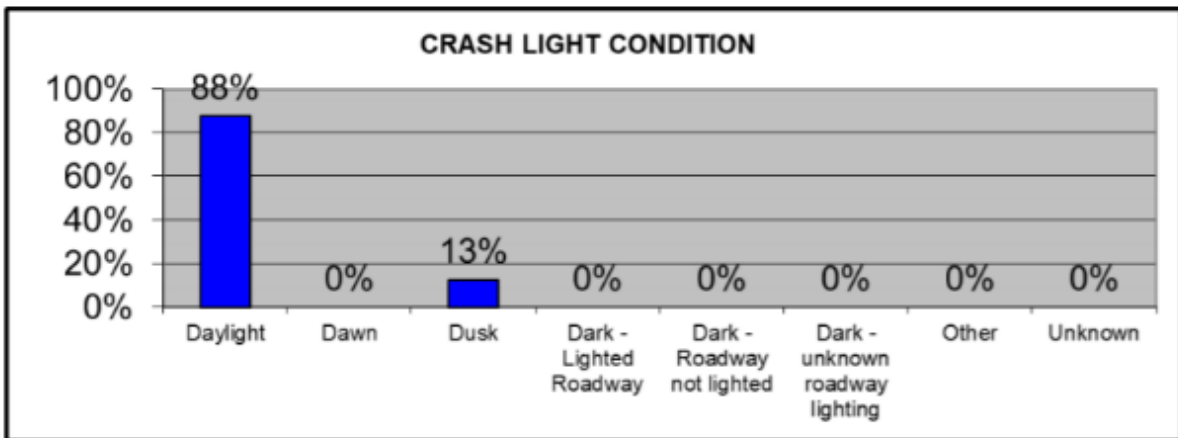
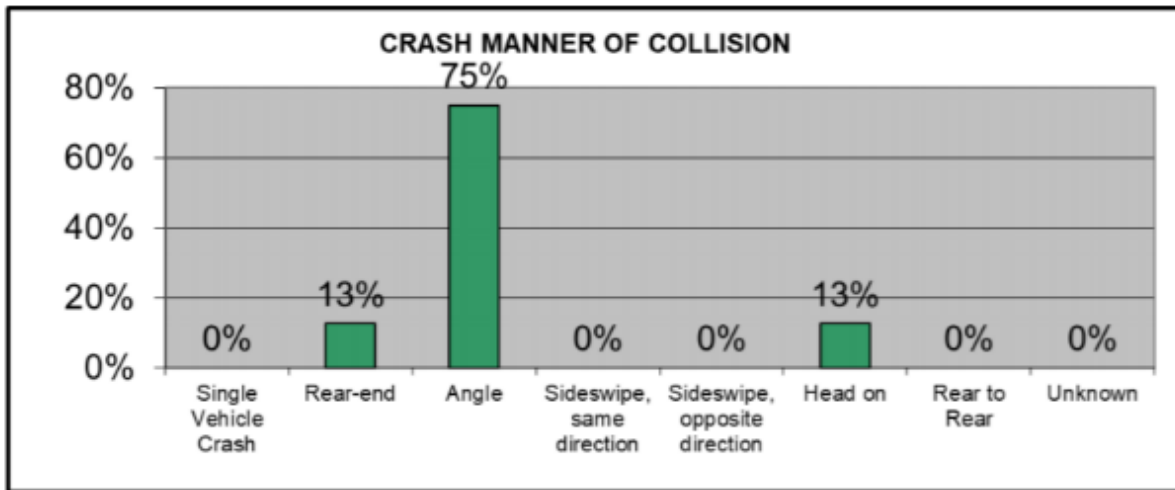
Audit Team Members	Agency/Affiliation	Email Address
Name	Agency	Email
Claire Cronin	State Representative	claire.cronin@mahouse.gov
Hanna Buntich	Chief of Staff Senator Timilty's Office	walter.timilty@masenate.gov
Dottie Fulginiti	Chair Easton Select Board and OCPC Economic Recovery Planner	dfulginiti@ocpcrpa.org
Craig Barger	Vice-Chair Easton Select Board	cbarger@easton.ma.us
David Field	Director of Easton Public Works	dfield@easton.ma.us
Greg Swan	Town of Easton Town Engineer	gswan@easton.ma.us
Stephanie Danielson	Easton Director of Planning and Economic Development	sdanielson@easton.ma.us
Ben Muller	MassDOT Planning Liaison	benjamin.muller@dot.state.ma.us
Bianca Marshall	MassDOT District 5 Traffic	bianca.marshall@dot.state.ma.us
Jason Walters	Massachusetts Department of Transportation District 5 – Projects	jason.walters@dot.state.ma.us
Michelle Deng	MassDOT Traffic Safety	michelle.deng@dot.state.ma.us
Dakota DelSignore	MassDOT Traffic Safety	dakota.d.delsignore@dot.state.ma.us
Jonathan Carroll	Easton Fire Dept.	jcarroll@easton.ma.us
Jonathan Brown	MassDOT Traffic Safety	jonathan.a.brown@dot.state.ma.us
Mary Waldron	Old Colony Planning Council	mwaldron@ocpcrpa.org
Charles Kilmer	Old Colony Planning Council	ckilmer@ocpcrpa.org
William McNulty	Old Colony Planning Council	wmcnulty@ocpcrpa.org
Shawn Bailey	Old Colony Planning Council	sbailey@ocpcrpa.org
Kyle Mowatt	Old Colony Planning Council	kmowatt@ocpcrpa.org
Raymond Guarino	Old Colony Planning Council	rguarino@ocpcrpa.org

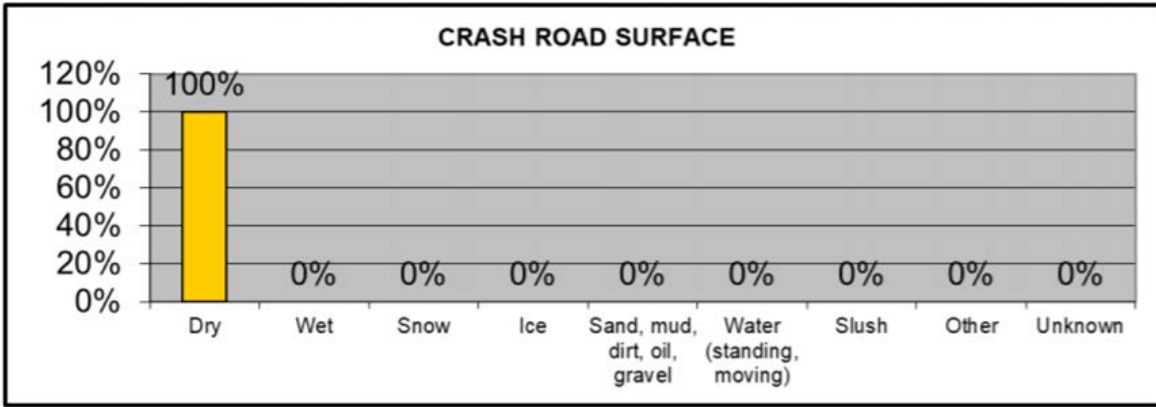
Appendix C: Detailed Crash Data



Crash Diagram Ref #	Crash Date <i>m/d/y</i>	Crash Day	Time of Day	Manner of Collision <i>Type</i>	Light Condition <i>Type</i>	Weather Condition <i>Type</i>	Road Surface <i>Type</i>	Driver Contributing Code <i>Type</i>
1	1/19/18	Friday	7:29 AM	Head on	Daylight	Clear	Dry	Failed to yield right of way
2	11/12/18	Monday	11:10 AM	Angle	Daylight	Clear	Dry	Failed to yield right of way
3	2/16/19	Saturday	8:39 AM	Rear-end	Daylight	Clear	Dry	Unknown
4	4/3/19	Wednesday	3:10 PM	Angle	Daylight	Clear	Dry	Failed to yield right of way
5	12/5/19	Thursday	2:47 PM	Angle	Daylight	Clear	Dry	Failed to yield right of way
6	12/23/19	Monday	9:09 AM	Angle	Daylight	Clear	Dry	Disregarded traffic signs, signals, road markings
7	2/12/20	Wednesday	4:50 PM	Angle	Dusk	Clear	Dry	Failed to yield right of way
8	3/21/20	Saturday	12:03 PM	Angle	Daylight	Clear	Dry	No Improper Driving
9								







Driver Age
Data not available

Appendix D. Road Safety Audit References

Road Safety Audit References

FHWA Office of Safety - Proven Safety Countermeasures, U.S. Department of Transportation, Federal Highway Administration <https://safety.fhwa.dot.gov/provencountermeasures/>.

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