

ROAD SAFETY AUDIT

Intersection of Bay Road, Chestnut Street, Depot Street,
Standish Street, and Washington Street
(Hall's Corner)

Duxbury, Massachusetts

October 16, 2023

Prepared For:
Town of Duxbury



Prepared under MassDOT Contract 123116 By:
Old Colony Planning Council
70 School Street, Brockton, MA. 02301



OLD COLONY
PLANNING COUNCIL

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Background

This Road Safety Audit was completed by Old Colony Planning Council at the request of the Town of Duxbury's Planning Department. The objective of the RSA was to review crash history at this five-way intersection in the Duxbury Village area known as Hall's Corner, identify potential risks to all travelers and visitors, and improve safety and mobility, particularly for vulnerable roadway users (pedestrians, cyclists, and persons using mobility assistance devices). The findings of this audit will supplement planning visioning for the town village area and assist the Town in implementing potential short term and long term safety improvements (low cost as well as medium and high cost).

Project Data

This Road Safety Audit was held on October 16, 2023, with an in-person meeting and remote virtual access at the Duxbury Police Station and field safety audit visit to the site. Some participants joined virtually by way of video conferencing. The Audit meeting consisted of three parts including an open discussion in the meeting room to discern observations and concerns, a field visit to the site to observe the location as a group for its physical and operational attributes, and a final discussion to document potential improvements. Audit participants included an interdisciplinary team of planners, engineers, public safety officials, and government officials.

Table 1: Participating Audit Team Members

Audit Team Member	Agency/Affiliation
Rene Reed	Duxbury Town Manager
Sheila Sgarzi	Duxbury DPW Director
Chief Rob Reardon	Duxbury Fire Chief
Alex Merry	Duxbury Fire Department
Chief Michael Carbone	Duxbury Police Department
Chris Mori	Duxbury Police Department
Paul Bragna	Duxbury Highway Safety Committee
Jeff Lewis	Duxbury Highway Safety Committee
Mojtaba M. Moharrer	MassDOT District 5
Michelle Deng	MassDOT Traffic Safety
Susan Moran	Office of State Representative Josh Cutler
Michael Murphy	Office of State Senator Patrick O'Connor
Guoqiang Li	Old Colony Planning Council
Ray Guarino	Old Colony Planning Council
Bill McNulty	Old Colony Planning Council

Project Location and Description

Hall's Corner is a traditional New England village center located in eastern Duxbury. The area is located around the intersection of Bay Road, Chestnut Street, Depot Street, Standish Street, and Washington Street which intersect at a non-traditional traffic circle that circulates around a flagpole in the center of the circle. Four of the approaches (Bay Road, Depot Street, Washinton Street, and Standish Street) are controlled by STOP signs, while Chestnut Street is controlled by pavement marking painted YIELD control. A YIELD sign is not posted on the Chestnut Street approach due to a lack of curb (and defined travel way) and a striped angled parking space on the Chestnut Street approach.

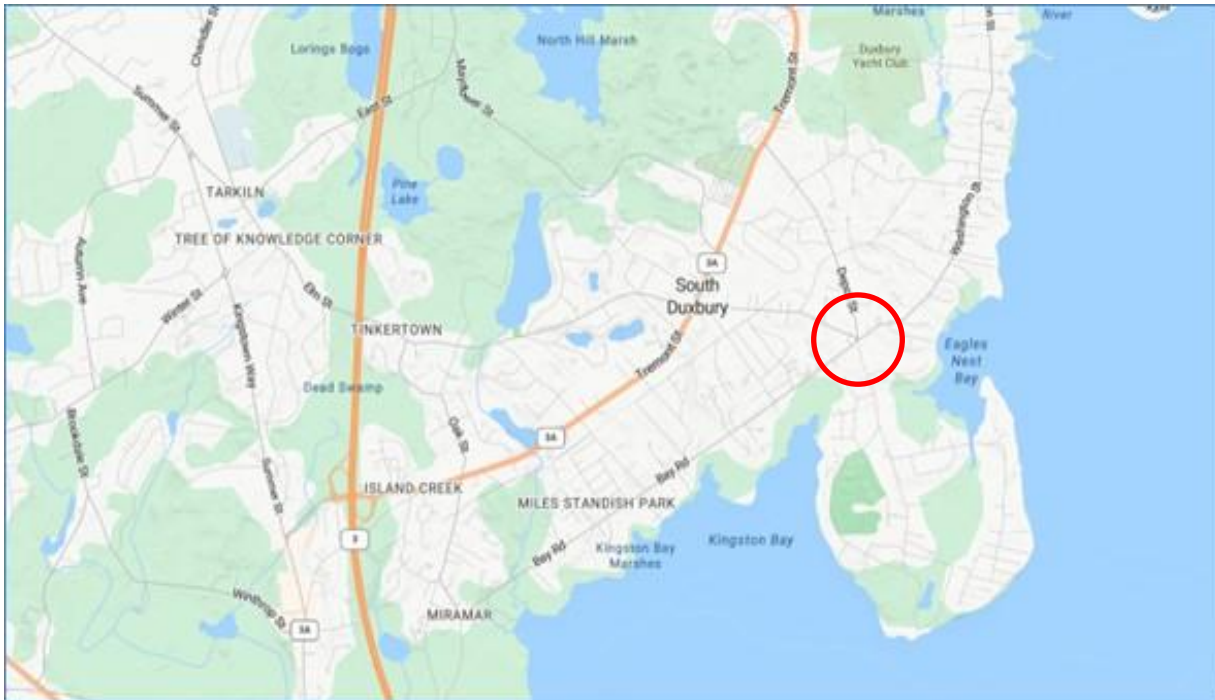
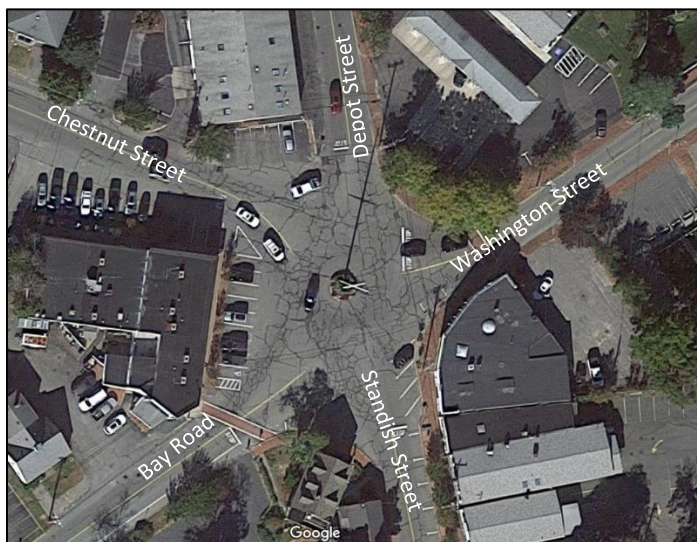


Figure 1: Locus Map

Bay Road is functionally classified as an urban collector under the jurisdiction of the Town of Duxbury. It has a posted speed limit of 30 MPH in the northbound and southbound direction just south of Hall's Corner. Chestnut Street is functionally classified as an urban minor arterial and is under the jurisdiction of the Town of Duxbury. Chestnut Street has a posted speed of 30 MPH; however, it is posted at 20 MPH eastbound just east of Hall's corner. Depot Street is functionally classified as an urban minor arterial and is under the jurisdiction of the Town of Duxbury. It has a posted speed limit of 30 MPH. Standish Street is a local road and not federal-aid eligible under the jurisdiction of the Town of Duxbury. It has a posted speed limit is 20 MPH northbound just before it intersects with Hall's Corner.



Aerial view of Hall's Corner in Duxbury showing traffic circle in the center and five intersecting streets.

Washington Street is functionally classified as an urban minor arterial and is under the jurisdiction of the Town of Duxbury. The posted speed limit is 20 MPH. The area is primarily a village center (coffee shops, retail stores, restaurants), surrounded by suburban single-family home residential development on the commercial district's periphery. There are two crosswalks at the traffic circle, on the Washington Street and Standish Street approaches.

Audit Observations and Potential Safety Enhancements

Crash reports were compiled from the Duxbury Police Department and supplemented with data from MassDOT for the years 2018 through October 2023. The collision diagram and a summary of the crash data for Hall's Corner are included in the appendix of this report.

During the RSA meeting, an introduction of the RSA process and a summary of the crash information and background data for Hall's Corner were presented to the audit participants. Following the presentation, the members of the audit team discussed the existing issues that affect safety at this location. Safety concerns and deficiencies were identified by the RSA participants and documented by OCPC staff. The participants also discussed potential long term and short term treatments to address deficiencies, also documented by OCPC staff. The following sections list these safety concerns and the potential enhancements that were identified during the RSA.

Safety Issue: There is a lack of formalized traffic control and operations leading to driver confusion and conflict as motorists enter the intersection from all five approaches. Although the intersection

has a STOP sign on Bay Road, Standish Street, Washington Street and Depot Street approaches, there is a lack of traffic operation control on the Chestnut Street approach except for a pavement marking on this approach for a YIELD control. The designated angled parking on this Chestnut Street approach encroaches on the travel lane. In addition, the parking spaces and lack of curb delineation result in a lack of location for placement for the YIELD sign on the approach. Vehicles entering the circle on all approaches have only a “keep right” sign at the bottom a short wall around the center flagpole circle to inform of the traffic flow direction around the circle. Tractor trailers lack turning radius for left turn movement as they enter from Chestnut Street to go around the circle and turn left to destinations on Depot Street (Duxbury Marketplace). Crashes have occurred due to the back end of the trailer hitting the circle wall as tractor trailers make this movement. Left turns from Chestnut Street to Depot Street have been observed to happen inside the circle rather than around the center circle.



The only control on the Chestnut Street approach is YIELD pavement markings. The proximity of the angled parking results in no available location to post a YIELD or STOP sign.



The only control indicating traffic flow direction in the circle is a “Keep Right” sign on the low wall around the flagpole in the center.

Enhancement: Consider a formal Intersection Control Evaluation (ICE) for potential “mini-roundabout” (or other potential traffic control such as signals) and retro-fit the approaches and central circle to include a mountable apron, splitter islands, signage, and pavement markings for yielding and channeling traffic. A gasoline station will be reopening at the northeast corner between Washington Street and Depot Street, which should be considered before making any adjustments. Tighten the inner circle wall thereby making it smaller to prevent the back ends of tractor trailers from hitting during left turn movements from Chestnut Street to Depot Street. In addition, adding bike lane and more pedestrian friendly crossings and spaces would enhance the viability of movement at Hall’s Corner for all users.

Enhancement: Consider temporary control plan using temporary traffic control devices (or flexible delineator posts) to channel traffic entering and through the intersection to evaluate the effectiveness of specific configurations.

Safety Issue: A lack of pavement markings for channeling vehicles entering and passing through the intersection.

Enhancement: Evaluate pavement markings, signs on all approaches, advanced warning, and traffic control, to create a traffic control plan.

Safety Issue: There is a wide pavement area on the Bay Road and Washington Street approaches and an extensive wide area of pavement for vehicles to travel through the intersection from all approaches (approximately 160 by 90 feet of width). This wide area in combination with lack of pavement markings creates driver and road user confusion.

Enhancement: Evaluate pavement markings, signs on all approaches, advanced warning, and traffic control, to create a traffic control plan and sign plan for channeling traffic around the circle. Consider street design with geometric changes to accommodate and provide safe movement for all road users.



An illustration of a mini roundabout with mountable apron and mountable splitter islands on approaches. In addition, crosswalks and pedestrian refuge islands are included for safe pedestrian crossings.

Safety Issue: The Northbound Standish Street approach lacks sight distance and awareness of vehicles entering from other approaches. Vehicles tend to speed up into the intersection as it is a straight movement through the intersection to Depot Street.

Enhancement: Install a “mini-roundabout” with splitter island on the approach to slow traffic and channel traffic around the center circle, including signage, and pavement markings for yielding and channeling traffic.

Safety Issue: Consider an area wide plan for pedestrian, walking, and biking activities. There is a lack of safe pedestrian crossings and ADA compliance.

Enhancement: Install ADA compliant crosswalks with refuge islands on all approaches with proper MUTCD signage for pedestrians crossing.

Safety Issue: There is a lack of bicycle accommodation with no markings and/or signage.

Enhancement: Evaluate the potential for pavement markings and signage to accommodate bicycle accessibility through the intersection.

Safety Issue: There is a lack of visibility for street name signs as vehicles travel around the circle.

Enhancement: Evaluate As part of a sign plan, consider placement and size (MUTCD Compliant) of all street signs at the intersection.

Safety Issue: Although street lighting is available, it is lacking through the entire intersection.

Enhancement: Evaluate lighting and enhance lighting as appropriate.

Summary of Road Safety Audit

Based on the review of data, observations of the intersections and study area, and group discussion, possible enhancements that could improve safety at the study location were identified by RSA participants. 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 Tables 3 through 8 summarize 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

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
There is a lack of formalized traffic control and operations leading to driver confusion as motorists enter the intersection from all five approaches.	Install a “mini-roundabout” by retro-fitting the approaches and central circle to include a mountable apron, splitter islands, signage, and pavement markings for yielding and channeling traffic. Tighten the inner circle wall thereby making it smaller to prevent the back ends of tractor trailers from hitting during left turn movements from Chestnut Street to Depot Street.	High	> 3 Years	High	Municipality
There is a lack of formalized traffic control and operations leading to driver confusion as motorists enter the intersection from all five approaches.	Consider installing temporary traffic devices (plastic delineator posts) to channel traffic through the intersection to evaluate the effectiveness of specific configurations.	Medium	1-3 Years	Low	Municipality
There is a lack of pavement markings for channeling vehicles through the intersection.	Evaluate pavement markings, signs on all approaches, advanced warning, and traffic control, to create a traffic control and sign plan.	Medium	1-3 Years	Medium	Municipality
There is a wide pavement area on the Bay Road and Washington Street approaches and a wide area of pavement for vehicles to travel through the intersection from all approaches.	Evaluate pavement markings, signs on all approaches, advanced warning, and traffic control, to create a traffic control and sign plan for channeling traffic around the circle.	Medium	1-3 Years	Medium	Municipality
The Northbound Standish Street approach lacks sight distance and awareness of vehicles entering from other approaches. It is a straight movement through the intersection to Depot Street.	Install a “mini-roundabout” with splitter island on the approach to slow traffic and channel traffic around the center circle, including signage, and pavement markings for yielding and channeling traffic.	High	> 3 Years	High	Municipality

Table 4: Potential Safety Enhancement Summary (continued)

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
There is a lack of safe pedestrian crossings and ADA compliance.	Install ADA compliant crosswalks with refuge islands on all approaches with proper MUTCD signage for pedestrians crossing.	High	1-3 Years	Medium	Municipality
There is a lack of bicycle accommodation with no markings and/or signage.	Evaluate the potential for pavement markings and signage to accommodate bicycle accessibility through the intersection.	High	1-3 Years	Low/Medium	Municipality
There is a lack of visibility for street name signs as vehicles travel around the circle.	Evaluate As part of a sign plan, consider placement and size (MUTCD Compliant) of all street signs at the intersection.	Medium	1-3 Years	Low	Municipality
Although street lighting is available, it is lacking through the entire intersection.	Evaluate lighting and enhance lighting as appropriate.	Medium	1-3 Years	Low/Medium	Municipality

Appendix A. RSA Meeting Agenda

Agenda	Road Safety Audit for Intersection of Bay Road, Chestnut Street, Depot Street, Standish Street, and Washington Street (Hall's Corner), Duxbury, MA Monday, October 16, 2023 10:00 AM – 12:00 PM
Contact:	Bill McNulty, Old Colony Planning Council (774) 539-5103 wmcnulty@ocpcrpa.org
Attendees:	Invited Participants Include a Multidisciplinary Team including Duxbury Officials (Chief Elected Officials, Planning, DPW, Police, Fire, Administration), MassDOT, Legislative Delegation
Please Bring:	Thoughts and Suggestions; Weather Appropriate Clothing and Footwear; Safety Vests and Hard Hat (if you have them)
Meeting Location:	Duxbury Police Station 155 Mayflower Street Duxbury, MA. 02332
10:00 AM	Welcome and Introductions
10:10 AM	Review of Crash and Traffic Data, and General Discussion
19:30 AM	Adjourn to Halls Corner Site for Field Visit and Observation
11:15 AM	-Return to Police Station <ul style="list-style-type: none"> • Recap Observations from Site Visit • Identify Potential Short-Term and Long-Term Improvements • Discussion of Next Steps and Adjourn
Instructions For Participants: <ul style="list-style-type: none"> • Before attending the Road Safety Audit, participants are encouraged to familiarize themselves with the study area and make note of existing conditions and any deficiencies they observe. • 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 Road Safety Audit process. • After the meeting, participants will be asked to comment and respond to the document materials to ensure it is reflective of the Road Safety Audit completed by the multidisciplinary team 	

Appendix B. RSA Audit Team Contact List

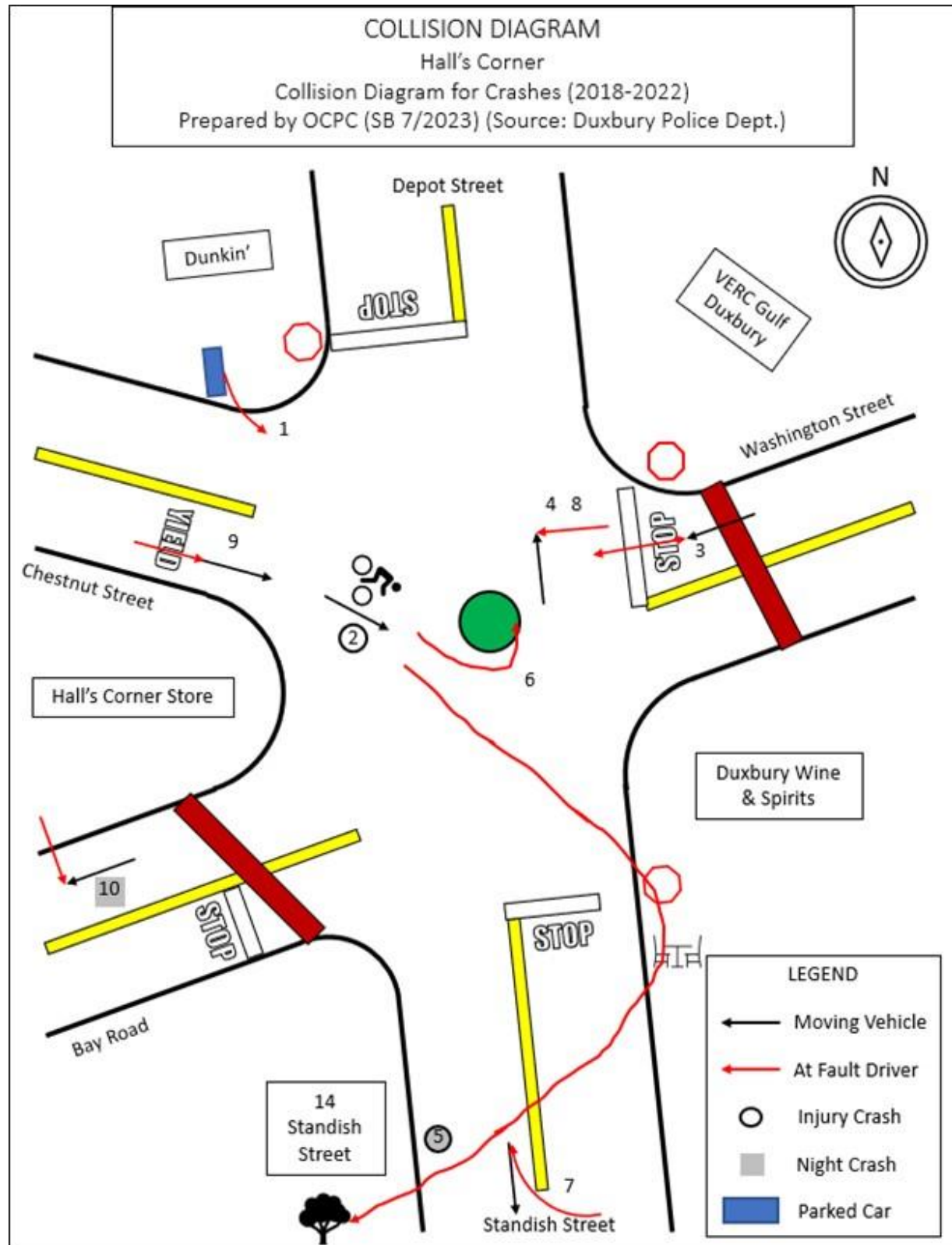
Participating Audit Team Members

Date: October 16, 2023

Location: Duxbury Hall's Coners

Audit Team Members	Agency/Affiliation	Email Address
Rene Reed	Duxbury Town Manager	rread@duxbury-ma.gov
Sheila Sgarzi	Duxbury DPW Director	ssgarzi@duxbury-ma.gov
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Chief Michael Carbone	Duxbury Police Department	mcarbone@duxbury-ma.gov
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Susan Moran	Office of State Representative Josh Cutler	susan.moran@mahouse.gov
Michael Murphy	Office of State Senator Patrick O'Connor	
Guoqiang Li	OCPC	gli@ocpcrpa.org
Ray Guarino	OCPC	rguarino@ocpcrpa.org
Bill McNulty	OCPC	mcnulty@ocpcrpa.org

Appendix C. Detailed Crash Data



Road Safety Audit—Hall's Corner, Duxbury

Prepared by Old Colony Planning Council

FINAL

Crash Diagram Ref #	Crash Date <i>m/d/y</i>	Time of Day	Manner of collision Type	Light condition Type	Weather Type	Road Surface Type	Driver Code Type	Comments
1	8/4/18	7:38 PM	Sideswipe, opposite direction	Dusk	Cloudy	Wet	Inattention	V1 was backing out of their parking space and sideswiped V2, which was parked.
2	8/25/18	10:18 AM	Single Vehicle Crash	Daylight	Clear	Dry	No Improper Driving	EB V1 entered the roundabout at the same time as a cyclist, and both collided in the roundabout.
3	3/24/19	2:00 PM	Rear-end	Daylight	Clear	Dry	Inattention	WB V1 entered the roundabout, saw another vehicle entering the roundabout, then backed up into WB V2, who was stopped behind V1.
4	12/20/19	2:34 PM	Rear-end	Daylight	Clear	Dry	Failed to yield right of way	WB V2 struck NB V1, who was already in the roundabout.
5	1/17/20	12:07 AM	Single Vehicle Crash	Dark - lighted roadway	Clear	Dry	Operating Vehicle in erratic, reckless, careless, negligent, or aggressive manner	EB V1 entered the roundabout, drove up on to the curb striking a street sign and bench, then overcorrected and drove into a driveway, coming to a stop crashing into a natural fence.
6	6/13/20	8:18 AM	Single Vehicle Crash	Daylight	Clear	Dry	Made an improper turn	EB V1 entered the roundabout, turned left to go around the flagpole, then attempted to avoid another vehicle and struck the cinderblock structure.
7	7/27/20	6:08 PM	Angle	Daylight	Clear	Dry	No Improper Driving	WB V2 turned right too wide out of a parking lot and sideswiped SB V1.
8	8/5/20	4:34 PM	Sideswipe, same direction	Daylight	Clear	Dry	Failed to yield right of way	WB V2 struck NB V1, who was already in the roundabout.
9	11/14/20	6:42 PM	Rear-end	Dark - lighted roadway	Clear	Dry	Followed too closely	EB V2 rear ended EB V1, who was yielding to traffic and unsure of where to go.
10	6/25/21	11:13 PM	Angle	Dark - lighted roadway	Clear	Dry	Failed to yield right of way	SB V2 pulled out of a parking lot and collided with WB V1.

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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