ROAD SAFETY AUDIT

Intersection of Grove Street at Lawrence Street

City of Brockton, MA

March 3, 2025

Prepared For:

City of Brockton

Prepared under MassDOT Contract #126742 By:
Old Colony Planning Council
70 School Street, Brockton, MA 02301

OLD COLONY
PLANNING COUNCIL

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Background

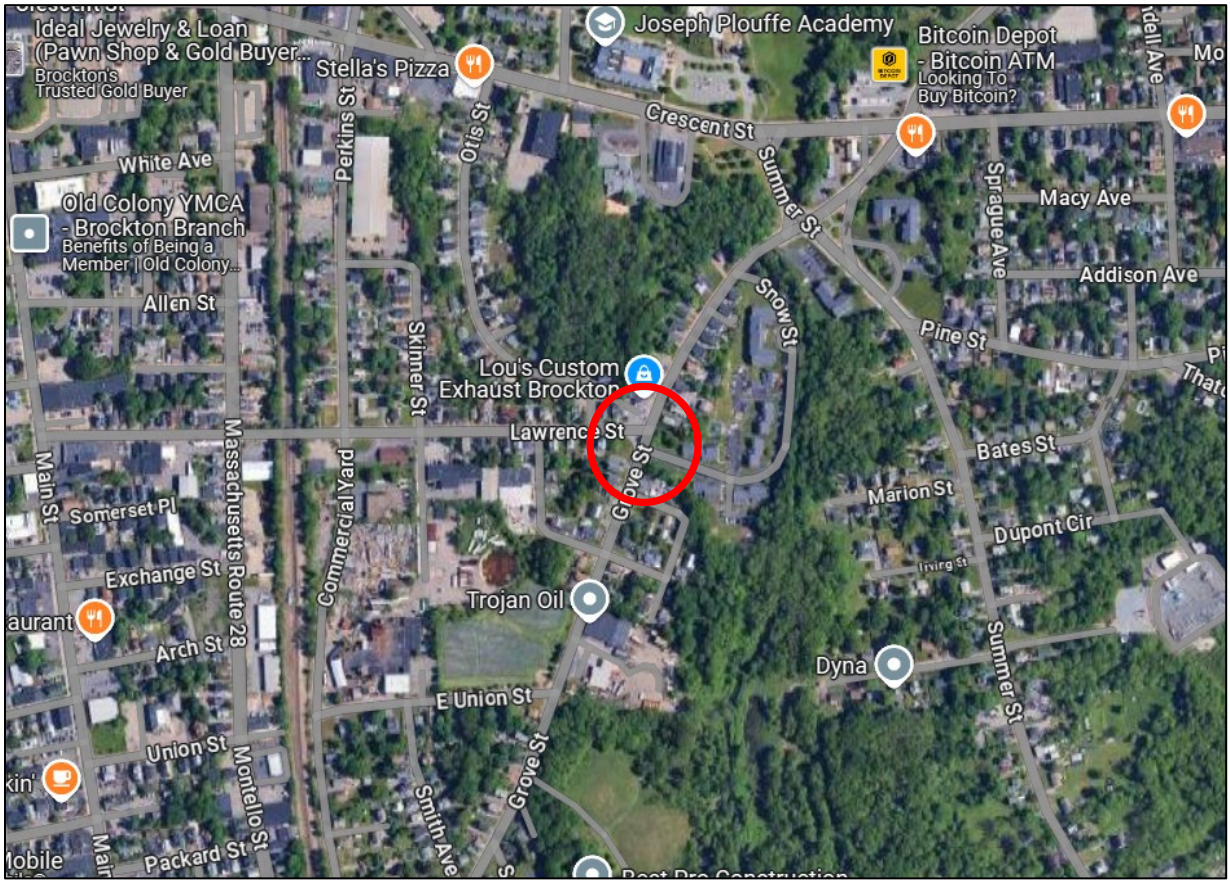
This Road Safety Audit (RSA) was requested by the City of Brockton's Traffic Commission. It was held on March 3, 2025, facilitated by the Old Colony Planning Council (OCPC) at the OCPC office at 70 School Street in Brockton. The study request was initiated due to a recent crash involving a pedestrian and the need for enhanced safety accommodation for pedestrians. The study area consists of the intersection of Grove Street and Lawrence Street in Brockton. The location of the study area is shown in Figure 1.

The Grove Street at Lawrence Street Road Safety Audit was held on March 3, 2025, and facilitated by the Old Colony Planning Council.

The Federal Highway Administration defines the RSA as a proactive, formal examination that focuses on road safety conducted by an independent multi-disciplinary team. In the RSA, the safety of all road users is considered, including vulnerable road users. The potential improvements from this study are categorized by timeframe and cost assisting the responsible agencies in their decisions to move forward with potential improvements.

The objectives of this RSA include a review of the crash history at the intersection study area, identifying potential risks to all road users, and improving safety and mobility, particularly for vulnerable roadway users (pedestrians, transit riders, bicyclists, and people using mobility assistance devices). The findings of this audit will assist the jurisdiction agencies (City of Brockton) in implementing potential short-term and long-term safety improvements (as well as low-cost, medium-cost, and high-cost improvements).

Figure 1: Locus Map



This Road Safety Audit consisted of an open discussion in the meeting room to discern observations and concerns, with a field visit to the site to observe and document the location's physical and operational attributes as a group. Participants capped off the meeting with a discussion and documentation of potential short-term and long-term improvements. Participants included an interdisciplinary team of planners, engineers, public safety officials, and government officials. The members of the audit team were comprised of representatives from local and state agencies including first responders, local officials, state representatives, the Brockton Traffic Commission, and transportation planners and engineers. A list of the audit team members is provided in Table 1 and is included in the appendix with their contact information.

Table 1: Participating Audit Team Members

Audit Team Member	Agency/Affiliation
Kenneth Galligan	Brockton Traffic Commission
Michelle DuBois	State Representative
Rita Mendes	State Representative
Jed Hresko	Brockton Bikes
Jim Terlizzi	MassDOT Traffic and Safety
Kevin Fitzgerald	MassDOT HQ Traffic and Safety
Jason Walters	MassDOT District 5 Projects
Derek Jackson	MassDOT District 5 Projects
Aleksander Pelletier	MassDOT District 5 Projects
Thanhsang Ha	MassDOT District 5 Projects
Majtoba Moharrer	MassDOT Traffic
Mary Waldron	Executive Director OCPC
Charles Kilmer	Deputy Director/Transportation Program Manager OCPC
Guoqiang Li	OCPC
Kyle Mowatt	OCPC
Matt Dyer	OCPC
Shawn Bailey	OCPC
Ray Guarino	OCPC

Project Location, Description, and Background Data

The Grove Street/Lawrence Street Intersection

The Grove Street at Lawrence Street intersection is a four-way intersection with a stop sign control on the Lawrence Street eastbound approach. The Trinity Village Apartment Drive on the westbound approach is also stop sign controlled and is not directly aligned with the eastbound Lawrence Street approach. Lawrence Street is classified as a local street under the jurisdiction of the City of Brockton. It is a two-way residential street connecting Main Street and Grove Street. The speed limit on Lawrence Street is 30 miles per hour based on the prima facie 30 miles per hour speed limit in a thickly settled area. Lawrence Street is approximately 27 feet wide, provides two lanes of travel, one lane for each direction of travel, and traffic is separated with a double yellow center line.

Grove Street provides two lanes, one lane for each direction of travel, and is classified as an urban minor arterial in Brockton. As an urban minor arterial, Grove Street is eligible for federal aid funding. It connects Main Street with Lyman Street and Crescent Street (Route 27) in Brockton. It is approximately 30 feet wide, and the speed limit is posted at 30 miles per hour. The land use along Grove Street is mainly residential with some commercial development. Parking is prohibited along Grove Street in the vicinity of Lawrence Street.

Although the Grove Street at Lawrence Street intersection operates mainly as a three-way intersection, the private driveway access to the Trinity Village Apartments is in close proximity to the intersection, creating a fourth approach to the intersection. The intersection operates mainly as a three-way intersection based on two factors, vehicles making through movements from Lawrence Street to Trinity Village Apartments are forced to make a "jogging movement" right on Grove Street southbound and then a quick left to the apartment driveway, and vehicles from the apartment driveway going straight through to Lawrence Street also must make a "jogging" movement right turn onto Grove Street then quick left to Lawrence Street. In addition, the volume of vehicle movements in and out of the Trinity Village Apartment driveway are small and have a minor impact on overall operations (Figure 2 shows the turning movements at the intersection). The Trinity Village Apartments complex has an additional driveway off of Grove Street north of the Lawrence Street intersection. Lawrence Street is a two-lane road; however, the Lawrence Street eastbound approach opens up to two lanes as it intersects Grove Street with a shared right-turn/through lane, and a left-turn lane.

The Lawrence Street eastbound approach showing the shared left and through lane and the right-turn lane. It also shows the large turning radius from Grove Street southbound right turn to Lawrence Street.

Based on traffic counts taken by OCPC in 2025, the average daily traffic on Grove Street just north of Lawrence Street is 13,382 vehicles per day (VPD), the 85-percentile speed was recorded at 29 MPH, and the percentage of heavy vehicles in the traffic flow is 9.2 percent. Based on the OCPC traffic counts taken in January 2025, the average daily traffic on Grove Street south of Lawrence Street is 9,812 vehicle per day (VPD), the 85th percentile speed is 35 miles per hour, and the percentage of trucks in the traffic flow is 10 percent. Based on the traffic counts taken by OCPC in January of 2025, the average daily traffic on Lawrence Street west of Grove Street is 5,492 vehicles per day, the 85-percentile speed was recorded at 33 MPH, and the percentage of heavy vehicles in the traffic flow is 6.8 percent. In addition to the automatic traffic counts, a turning movement count was also taken at the intersection of Grove Street at Lawrence Street on January 22, 2025, between 6 am and 6 pm. Figure 2 shows the automatic traffic count and turning movement count results.

Figure 2: Traffic Counts

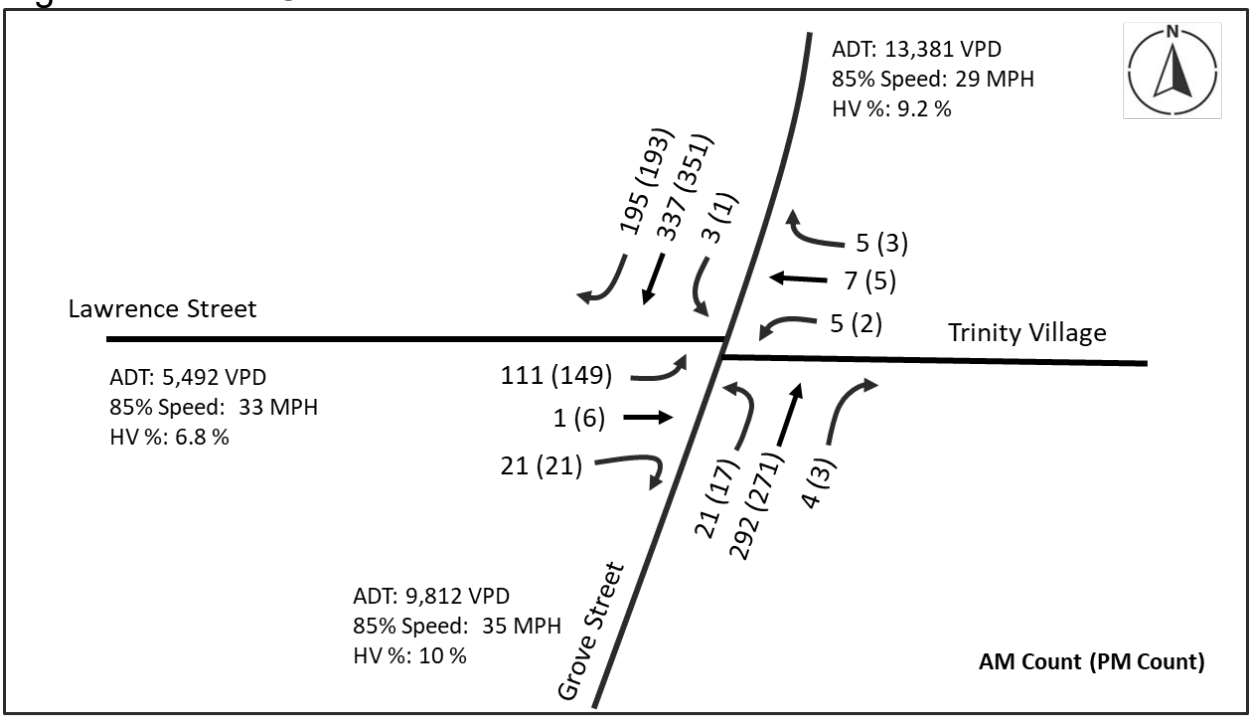


Figure 2 shows that heaviest movements occur on the Grove Street northbound and southbound through movements through the intersection during both the weekday AM and PM peak hours. In addition, there are heavy turning movement volumes from Grove Street southbound turning right onto Lawrence Street and also on the Lawrence Street eastbound approach turning left to Grove Street northbound. Figure 2 also shows that the smallest volumes at the intersection are turning in and out of the Trinity Village Apartment driveway.

In addition to traffic data collection, OCPC also conducted weekday AM and PM peak hour levels-of-service (LOS) for the Grove Street at Lawrence Street intersection. The LOS analysis was for a stop sign controlled intersection with the LOS for the minor streets Lawrence Street and Trinity Village Apartment Complex driveway critical movements (left, through, and right turn movements). The existing AM peak hour levels-of-service were LOS "D" for the eastbound Lawrence Street approach and LOS "C" for the westbound Trinity Village Apartment Complex driveway. The PM existing peak hour levels-of-service were LOS "E" for the eastbound Lawrence Street approach and LOS "C" for the westbound Trinity Village Apartment Complex driveway. Field observations by the RSA participants on March 3, 2025, further determined that traffic delays and long queues at the signalized Grove Street/Summer Street/Lyman Street intersection located further north of the Grove Street at Lawrence Street intersection back into the Grove Street/Lawrence Street intersection interfering with traffic operations at the Grove Street at Lawrence Street intersection.

In addition to level-of-service analysis, OCPC conducted signal warrant analysis and all way stop warrant analysis for the Grove Street at Lawrence Street intersection. The analysis indicated that the intersection volumes met the thresholds for Warrant 1 and 2 of the Manual on Uniform Traffic Control Devices (MUTCD) for signal installation and for the installation of all-way stop sign control at the intersection.

The MUTCD states that a full engineering study needs to be conducted before signal installation. The warrant analyses summary is included in the appendix to this report.

OCPC compiled crash data for the completion of this Road Safety Audit. This crash data, which is included in the appendix to this report, is based on two sources, crash reports and incident reports made available to OCPC from the Brockton Police Department for the years 2021, 2022, 2023, and 2024 and crash data available from the MassDOT on-line Crash Portal IMPACT for the same years. The crash data for the years 2022, 2023, and 2024 from IMPACT have not been closed out by MassDOT and are subject to audit and change.

Based on the crash data made available to OCPC from its sources, there were nineteen crashes at the Grove Street/Lawrence Street intersection. There were five angle type collisions, two side swipe collisions (same direction), five single vehicle crashes (where the vehicle left the travel lane and hit a fixed object), two crashes involving a vehicle hitting a pedestrian, and two crashes where the manner of collision was unknown. Thirteen of these crashes resulted in property damage only, five of the crashes resulted in personal injury, and there was one crash where the extent of damage or injury was unknown. Four of the single vehicle crashes where the vehicle left the travel lane and hit a fixed object occurred on the Lawrence Street eastbound approach to the intersection with the vehicles attempting the same movement, a left turn from Lawrence Street eastbound to Grove Street northbound. Two of the crashes occurred with vehicles attempting a right turn from the Grove Street southbound approach making a wide turn and hitting a vehicle on the Lawrence Street eastbound approach attempting to turn left to Grove Street northbound.

Audit Observations and Potential Safety Enhancements

Following an introduction to the RSA process and a discussion of the background traffic, crash experience, intersection geometry, and traffic operations, the RSA participants were asked to discuss safety concerns at the Grove Street at Lawrence Street intersection. Participant observations and comments were documented by OCPC staff. Audit team members then visited the study area as a team, at which time observations were offered in the field and documented by OCPC staff members.

The following sections discuss in detail the safety issues and potential enhancements that were identified during the RSA. The issues identified require further engineering study and engineering design to determine the feasibility of implementing the recommended improvements.

The collision diagram and a summary of the crash data are included in the appendix to this report. The following lists safety concerns and the potential enhancements that were identified during the RSA for the Grove Street at Lawrence Street intersection.

Safety Issue: Roadway Activity

The intersection lacks sufficient pedestrian accommodation. There are no marked crosswalks at the intersection. In addition, there is a school bus stop at the south leg of the intersection adjacent to the Trinity Village Apartment driveway that picks up and drops off at least two full busloads of students, which was observed by the RSA participants during the field visit. The crest in the grade on the northbound Grove Street approach limits the sight distance for Grove Street northbound vehicles making

it difficult to see the intersection and pedestrians crossing just south of the intersection. The crash data shows two crashes involving pedestrians in this leg of the intersection. Many of the students crossed Grove Street and then crossed Lawrence Street to the northside sidewalk on Lawrence Street for access to the neighborhood. In addition to a lack of pedestrian accommodation, the intersection lacks accommodation for bicycle use and rolling stops have been observed by vehicles at the Lawrence Street stop sign approach.

Enhancement: Consider adding a crosswalk and a Rapid Rectangular Flashing Beacon across the Grove Street northbound approach at the Trinity Village Apartment Complex.

Enhancement: Evaluate the school bus stops at the intersection, consider adding a school bus stop on Lawrence Street to prevent them needing to cross the Grove Street and Lawrence Street intersection diagonally. In addition, implement training and discussion with school bus drivers regarding the positioning of buses at stops.

Enhancement: Consider adding pedestrian and bicycle accommodation at the intersection, including ADA-compliance, bump-outs, crosswalk locations, road narrowing (road diet), refuge islands, and speed management treatments. Bicycle accommodation should be incorporated in the town/corridor wide bike facilities.

Enhancement: Consider strict enforcement of existing stop sign control.

Safety Issue: Speed

There are speed-related issues along both Grove Street and Lawrence Street on three approaches to the intersection (Lawrence Street eastbound, Grove Street southbound, and Grove Street northbound). Audit participants cited that Lawrence Street is a connector between Main Street and Grove Street to Lyman Street and Route 27. This entices vehicles to speed along Lawrence Street (in both directions) and through the intersection eastbound due to Lawrence's alignment with Grove Street, which is in effect similar to a "Y" type intersection as vehicles turn left from Lawrence Street to Grove Street (there were four run off the road or lane departure crashes eastbound turning left from Lawrence Street to Grove Street northbound). The reverse movement, southbound on Grove Street right turn to westbound on Lawrence Street also experiences high speeds due to the larger turning radius at the northwest corner. There were two angle crashes involving vehicles turning right from Grove Street southbound to Lawrence westbound that departed the lane and hit a vehicle on the Lawrence Street eastbound approach in the left lane. Both movements, left from Lawrence Street to Grove Street and right from Grove Street to Lawrence Street were shown to be heavy morning and afternoon peak volume movements based on the turning movement count. In addition, the northbound Grove Street approach experiences high speeds as vehicles enter the intersection due to the descending grade from a crest in the road on the northbound approach.

Enhancement: Consider realigning the intersection so that Lawrence Street intersects Grove Street at a 90 degree angle. Consider using temporary barriers to realign the intersection at 90 degrees as an interim fix.

Enhancement: Consider moving the curb to shorten the turning radius at both the northwest corner and southwest corner of the intersection so that vehicles slow for turning movements. Temporary barriers can be used as an interim low cost solution.

Enhancement: Consider adding intersection ahead warning signs on the northbound Grove Street approach to slow vehicles and place the posted speed in advance of the intersection.

Enhancement: Consider providing enhanced speed enforcement.

Enhancement: Consider speed management strategies such as reducing lane widths.

Enhancement: Consider installing speed feedback signs.

Safety Issue: Intersection Road Alignment and Cross Section

The intersection has limitations in sight distance for access points into the intersection. The sight distance for Lawrence Street eastbound right turns looking toward the north is blocked by vehicles on the same approach in the left-turn lane. In addition, the sight distance for the Lawrence Street eastbound right-turn/through lane looking south on Grove Street is limited due to the intersection alignment and the grade on the Grove Street northbound approach. Some vehicles turning right from Lawrence Street to Grove Street were observed by RSA participants as making a "rolling stop" at the stop sign. The Grove Street southbound approach also has limited sight lines approaching the intersection due to road curvature. Trucks parked in the exhaust shop on the northwest corner limit sight lines for both the Lawrence Street eastbound approach and the Grove Street southbound approach (these trucks are sometimes parked on the sidewalk on the corner). In addition, the crest in the grade on the northbound Grove Street approach limits the sight distance for Grove Street northbound vehicles making it difficult to see the intersection and pedestrians crossing just south of the intersection. The crash data shows two crashes involving pedestrians on this leg of the intersection.

The view from the Grove Street southbound approach shows the sight lines to the intersection blocked due to trucks parked in the exhaust shop lot as well as the grade on the Grove Street northbound approach.

Access to and from the exhaust shop on the northwest corner of the intersection interferes with traffic operation at the intersection creating additional conflict points. There was one crash at the intersection involving a vehicle exiting the shop with traffic making turns through the intersection. The Trinity Village Apartment Complex driveway westbound approach is not directly aligned with Lawrence Street at the intersection. Vehicles making through movements from Lawrence Street to Trinity Village Apartments are forced to make a "jogging movement" right on Grove Street southbound and then a quick left to the apartment drive, and vehicles from the apartment driveway going straight through to Lawrence Street also must make a "jogging" movement right turn onto Grove Street then quick left to Lawrence Street.

Enhancement: Consider realigning the Lawrence Street approach to 90 degrees to eliminate the right-turn/through lane so that there is one approach lane for left, through, and right turning vehicles. Flexible barriers for temporary turning radius can be used as an interim fix.

Enhancement: Consider installing overhead flashing beacons for intersection visibility with red on the stop sign approaches (Lawrence Street and the Trinity Village Apartment Complex driveway) and flashing yellow on the Grove Street approaches.

Enhancement: Consider changing the access flow at the Trinity Village Apartment Complex driveway to right turn in and right turn out only, (the apartment complex has an additional access point to the north off of Grove Street).

The view from the Trinity Village Apartment Complex driveway westbound approach not aligned directly across from the Lawrence Street eastbound approach (with a black vehicle approaching on Lawrence Street).

Enhancement: Consider access management for access to and from the exhaust shop on the northwest corner of the intersection by reducing the number of driveways, reducing the width of driveways, or relocating the driveways.

Enhancement: Consider speaking with owner of the exhaust shop about potentially not parking large vehicles on the corner or on the sidewalk that blocks sightlines at the intersection and define the back of sidewalk to ensure vehicles are not parked on the sidewalk.

Enhancement: Consider short term countermeasures such as stop bar location, sight line evaluation, and adjusting the lane marking on Lawrence Street using painting or delineators.

Safety Issue: Signs and Markings

The stop sign on the Lawrence Street approach is not at the stop bar and is not within the correct height as prescribed by the Manual on Uniform Traffic Control Devices (MUTCD). In addition, the stop line is too close to the travel way of Grove Street.

Enhancement: Consider a sign inventory and evaluation study and evaluate the height and placement of the stop sign on the Lawrence Street approach for better visibility and conformity with the MUTCD.

Enhancement: Evaluate methods to increase visibility of the stop sign, including LED borders, far side stop sign or overhead beacon.

Enhancement: Evaluate the placement of the STOP line marking on the Lawrence Street approach to be in conformity with the MUTCD, while still maintaining adequate sight distance

Safety Issue: Traffic Operation

The peak hour level-of-service (LOS) for the Lawrence Street approach is "D" during the morning peak hour and "E" during the afternoon peak hour. Level-of-service "E" is considered that the facility is at capacity with very long delays for the movements coming out of Lawrence Street making a left turn, through, or right turn movement. The level-of-service for the shared movement out of the Trinity Village Apartment Complex driveway is LOS "C" for the AM peak hour and LOS "C" for the PM peak hour. It was observed in the field by RSA participants that left-turning vehicles from Lawrence Street are delayed due to lack of adequate gaps to turn into in the Grove Street traffic flow.

Vehicles on the Lawrence Street approach sometimes make a "rolling stop" to enter Grove Street traffic flow. There are slow moving vehicles and queues on the northbound Grove Street approach as vehicles back up from the Grove Street/Pine Street/Lyman Street intersection. This causes vehicles turning from Lawrence Street to have long delays and some of these vehicles turn onto Grove Street without sufficient gaps.

Enhancement: Evaluate the signal timing and phasing at the Grove Street/Pine Street/Lyman Street intersection to create more gaps in the Grove Street traffic flow and to prevent queuing and backups into the Grove Street/Lawrence Street intersection.

Enhancement: Evaluate alternative intersection control, such as a roundabout, all way stop control or a traffic signal.

Safety Issue: Pavement Condition and Drainage

The pavement is in poor condition, especially on Grove Street on the southbound approach. Defects include excessive roughness or rutting, potholes, block cracking, and inadequate skid resistance. Debris and dirt indicate areas where flooding or sheet flow of water could contribute to safety problems, and poor travel for heavy and oversized vehicles.

Enhancement: Consider pavement reconstruction, rehabilitation, and pavement resurfacing as required.

Enhancement: Ensure catch basins are regularly maintained.

Summary of Road Safety Audit

Based on the review of data, observations of the study area made in the field and group discussion, the RSA team identified possible enhancements that could improve safety at the study area locations. Further engineering 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), mid-term (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	
Short-Term	<1 Year
Mid-Term	1-3 Years
Long-Term	>3 Years

Costs	
Low	<$10,000
Medium	$10,001-$50,000
High	>$50,000

Table 3: Potential Safety Enhancement Summary Grove Street at Lawrence Street

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Roadway Activity	Consider adding a crosswalk and a Rapid Rectangular Flashing Beacon across the Grove Street northbound approach at the Trinity Village Apartment Complex.	Medium	1-3 Years	Medium	Brockton
Roadway Activity	Evaluate the school bus stops at the intersection, consider adding a school bus stop on Lawrence Street to prevent them needing to cross the Grove Street and Lawrence Street intersection diagonally. In addition, implement training and discussion with school bus drivers regarding the positioning of buses at stops.	Medium	< 1 Year	Medium	Brockton
Roadway Activity	Consider adding pedestrian and bicycle accommodation at the intersection, including ADA-compliance, bump-outs, crosswalk locations, road narrowing (road diet), refuge islands, and speed management treatments.	Medium	1 -3 Year	Medium	Brockton
Roadway Activity	Consider strict enforcement of existing stop sign control.	Medium	< 1 Year	Low	Brockton
Speed	Consider realigning the intersection so that Lawrence Street intersects Grove Street at a 90-degree angle.	Medium	>3 Years	High	Brockton
Speed	Consider using flexible barriers for temporary turning radius at 90-degree angle can be used as an interim fix.	Medium	< 1 Year	Low	Brockton
Speed	Consider moving the curb to shorten the turning radius at both the northwest corner and southwest corner of the intersection so that vehicles slow vehicles.	Medium	>3 Years	High	Brockton
Speed	Consider using temporary barriers to shorten the turning radius and slow vehicles.	Medium	< 1 Year	Low	Brockton
Speed	Consider adding intersection ahead warning signs on the northbound Grove Street approach to slow vehicles and place the posted speed in advance of the intersection.	Medium	< 1 Year	Low	Brockton
Speed	Consider providing enhanced speed enforcement.	Medium	< 1 Year	Low	Brockton
Speed	Consider speed management strategies such as reducing lane widths.	Low	< 1 Year	Low	Brockton
Speed	Consider installing speed feedback signs.	Medium	< 1 Year	Medium	Brockton

Table 3: Safety Enhancement Summary Grove Street at Lawrence Street (continued)

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Intersection Road Alignment and Cross Section	Consider realigning the Lawrence Street approach to 90 degrees to eliminate the right-turn/through lane so that there is one approach lane for left, through, and right turning vehicles.	Medium	1-3 Years	Medium	Brockton
Intersection Road Alignment and Cross Section	Consider using temporary barriers for realigning the Lawrence Street approach to 90 degrees to eliminate the right-turn/through lane so that there is one shared approach lane.	Medium	< 1 Year	Low	Brockton
Intersection Road Alignment and Cross Section	Consider installing overhead flashing beacons for intersection visibility with red on the stop sign approaches (Lawrence Street and the Trinity Village Apartment Complex driveway) and flashing yellow on the Grove Street approaches.	Medium	1-3 Years	High	Brockton
Intersection Road Alignment and Cross Section	Consider changing the access flow at the Trinity Village Apartment Complex driveway to right turn in and right turn out only, (the apartment complex has an additional access point to the north off of Grove Street).	Low	< 1 Year	Low	Brockton
Intersection Road Alignment and Cross Section	Consider access management for access to and from the exhaust shop on the northwest corner of the intersection.	Medium	< 1 Year	Low	Brockton
Intersection Road Alignment and Cross Section	Consider speaking with owner of the exhaust shop about potentially not parking large vehicles on the corner or on the sidewalk that blocks sightlines at the intersection and define the back of sidewalk to ensure vehicles are not parked on the sidewalk.	Medium	< 1 Year	Low	Brockton
Intersection Road Alignment and Cross Section	Consider short term countermeasures such as stop bar location, sight line evaluation, and adjusting the lane marking on Lawrence Street using painting or delineators.	Medium	< 1 Year	Low	Brockton
Signs and Markings	Consider a sign inventory and evaluation study and evaluate the height and placement of the stop sign on the Lawrence Street approach for better visibility and conformity with the MUTCD.	Medium	< 1 Year	Low	Brockton

Table 3: Safety Enhancement Summary Grove Street at Lawrence Street (continued)

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Jurisdiction
Signs and Markings	Evaluate methods to increase visibility of the stop sign, including LED borders, far side stop sign, or overhead beacon.	Medium	< 1 Year	Medium	Brockton
Signs and Markings	Evaluate the placement of the Stop line on the Lawrence Street approach to be in conformity with the MUTCD and maintain adequate sight distance.	Medium	< 1 Year	Medium	Brockton
Traffic Operations	Evaluate the signal timing and phasing at the Grove Street/Pine Street/Lyman Street intersection to create more gaps in the Grove Street traffic flow and to prevent queuing and backups into the Grove Street/Lawrence Street intersection.	Medium	< 1 Year	Low	Brockton
Traffic Operations	Evaluate alternative intersection control, such as a roundabout, all way stop control or a traffic signal.	Medium	1-3 Years	Medium	Brockton
Pavement	Consider pavement reconstruction, rehabilitation, and pavement resurfacing as required.	Low	1-3 Years	High	Brockton
Pavement	Ensure catch basins are regularly maintained.	Low	< 1 Year	Low	Brockton

Appendix A. RSA Meeting Agenda

Road Safety Audit

Agenda

Brockton, MA

For the Intersection of
Grove Street at Lawrence Street
Meeting Location:
Old Colony Planning Council
70 School Street, Brockton, MA 02301
Monday, March 3, 2025
1 PM – 3 PM

Type of meeting:	**Road Safety Audit**
Attendees:	**Invited Participants to Comprise a Multidisciplinary Team**
Please bring:	**Thoughts and Enthusiasm**
1:00 PM	**Welcome and Introductions**
1:05 PM	**Review of Site-Specific Material - Review and Discuss Project** • Review of traffic and crash data • Review and documentation of operational and physical known challenges
1:30 PM	**Field Road Safety Audit** • RSA in a group • Car-pool recommended
2:30 PM	**Meeting Discussion** • Return to OCPC Office for discussion of findings, document improvement strategies and action plan
3:00 PM	**Adjourn for the Day**

Instructions for Participants:

- **Before attending the RSA, participants are encouraged to drive through the 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.**
- **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 (774) 539-2989, rguarino@ocpcrpa.org or Guoqiang Li, OCPC, 774-539-5149 gli@ocpcrpa.org**

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

Appendix B. RSA Audit Team Contact List

Participating Audit Team Members

Date: March 3, 2025 Location: Brockton, MA

Audit Team Members	Agency/Affiliation	Email Address	Phone Number
Name	Agency	Email	xxx-xxx-xxxx
Kenneth Galligan	Brockton Traffic Commission	KFGBFD@yahoo.com	(508) 922-3183
Michelle DuBois	State Representative	Michelle.Dubois@mahouse.gov	(774) 274-1344
Rita Mendes	State Representative	Rita.mendes@mahouse.gov	(781) 964-1567
Jed Hresko	Brockton Bikes	info@brocktonbikes.org	(617) 510-6213
Jim Terlizzi	MassDOT Traffic and Safety	james.terlizzi@dot.state.ma.us	
Kevin Fitzgerald	MassDOT HQ Traffic and Safety	kevin.t.fitzgerald@dot.state.ma.us	
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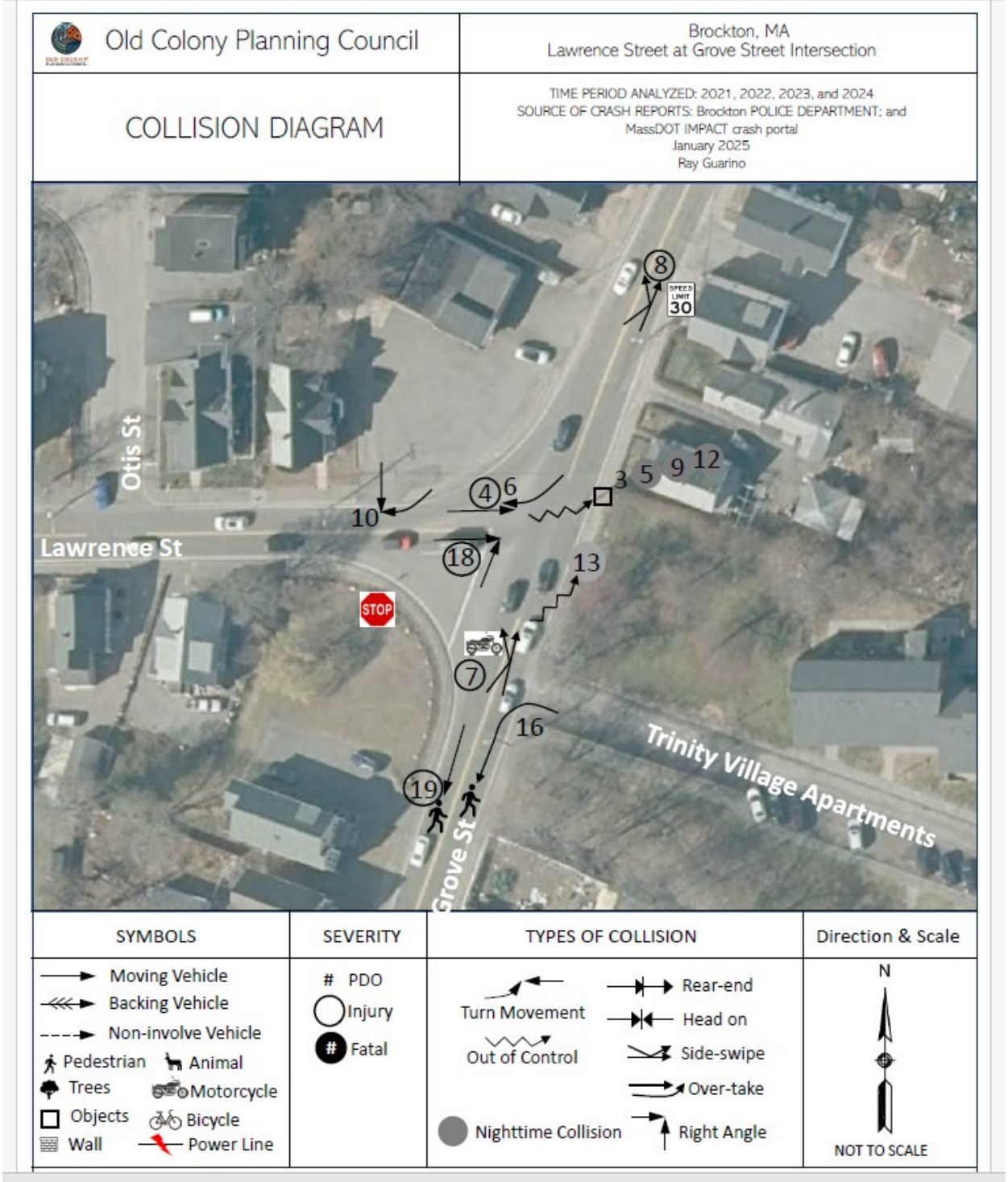
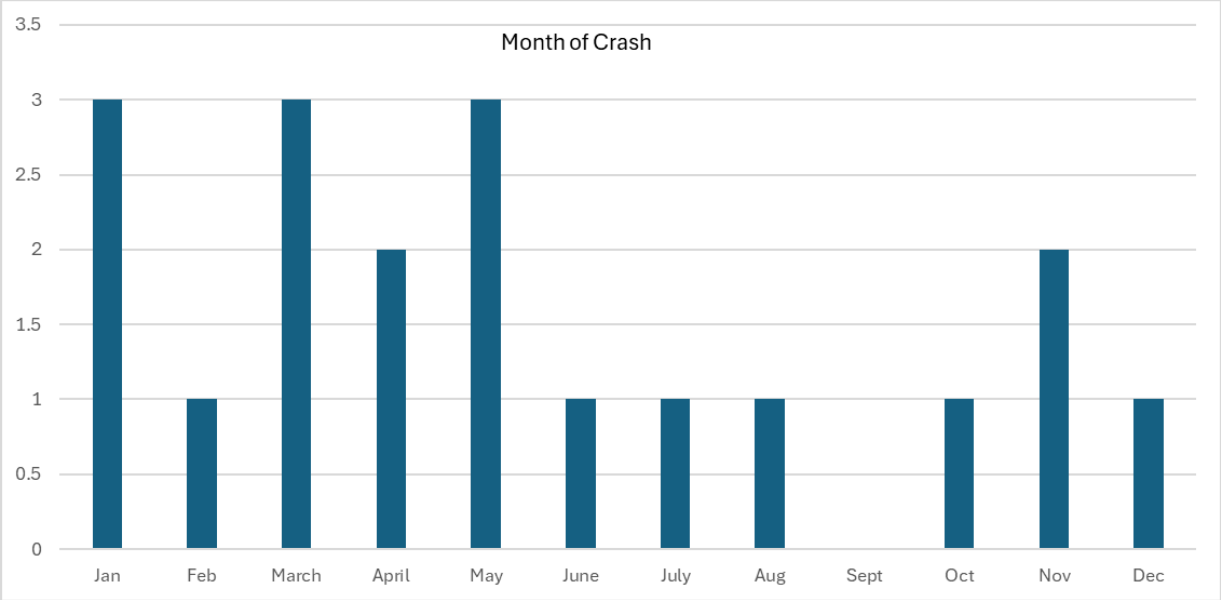
Guoqiang Li	OCPC	gli@ocpcrpa.org	
Kyle Mowatt	OCPC	kmowatt@ocpcrpa.org	
Matt Dyer	OCPC	mdyer@ocpcrpa.org	
Ray Guarino	OCPC	rguarino@ocpcrpa	

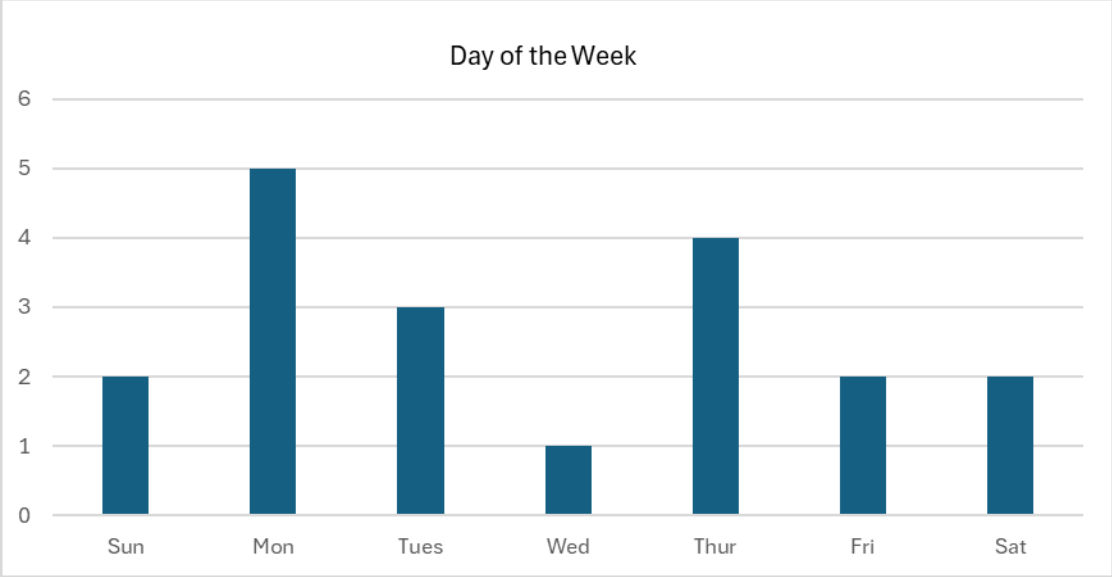
Appendix C. Detailed Crash Data

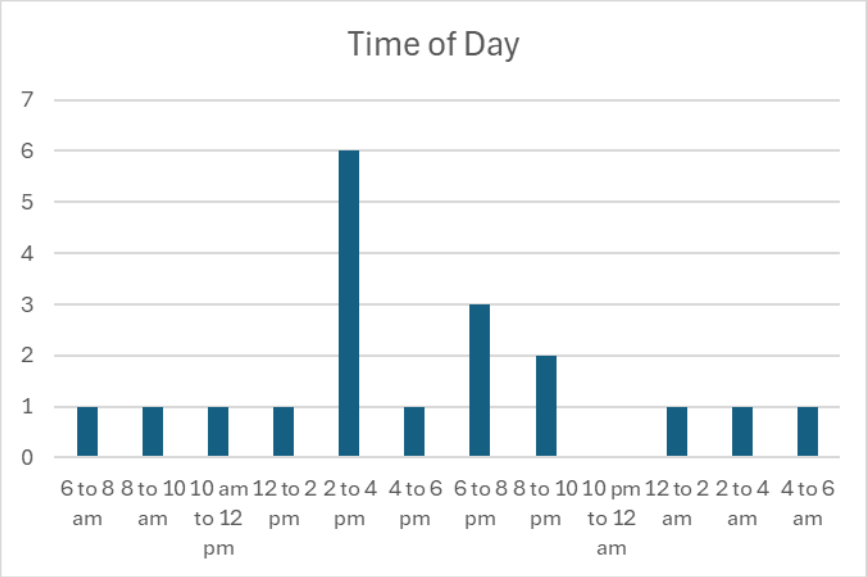

Old Colony Planning Council
Brockton, MA
Lawrence Street at Grove Street Intersection
COLLISION DIAGRAM
TIME PERIOD ANALYZED: 2021, 2022, 2023, and 2024
SOURCE OF CRASH REPORTS: Brockton POLICE DEPARTMENT; and MassDOT IMPACT crash portal
January 2025
Ray Guarino
Otis St
Lawrence St
Grove St
Trinity Village Apartments
STOP
SPEED LIMIT 30
8
10
4
6
3
5
9
12
18
13
7
16
19
SYMBOLS
Moving Vehicle
Backing Vehicle
Non-involve Vehicle
Pedestrian
Animal
Trees
Motorcycle
Objects
Bicycle
Wall
Power Line
SEVERITY
PDO
Injury
Fatal
TYPES OF COLLISION
Turn Movement
Out of Control
Nighttime Collision
Rear-end
Head on
Side-swipe
Over-take
Right Angle
Direction & Scale
N
NOT TO SCALE

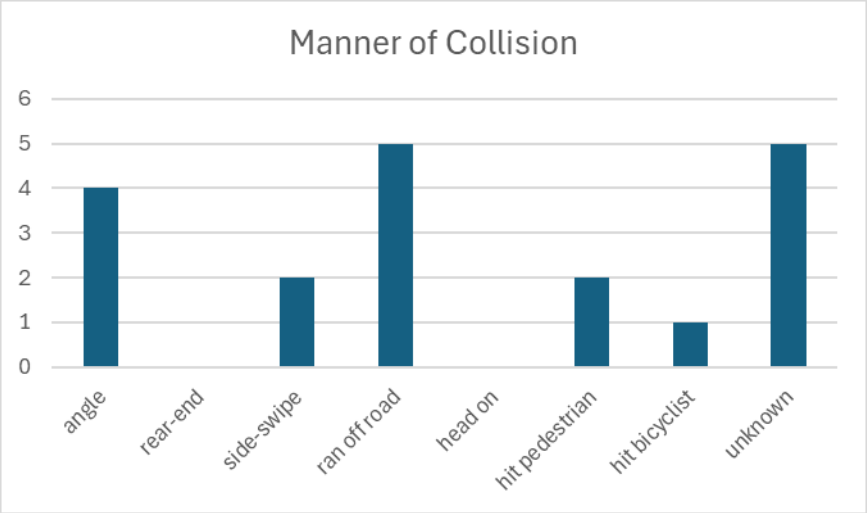
Diag ID	Crash ID	Crash Date	Crash Day	Time of Day	Light Conditions	Weather Cond	Road Surface	Manner of Collision	Driver Contributing Circumstances	Severity	Abbreviated Narrative
1	No report	1/24/2021	Sun	3:06 PM	Daylight	NA	NA	Unknown	Unknown	PDO	No Report
2	No Report	6/26/2021	Sat	9:00 PM	Dark lighted road	NA	NA	Unknown	NA	PDO	Motor vehicle with motorcycle No report
3	21-2632-AC	12/28/2021	Tue	2:24 PM	Daylight	Unknown	Unknown	Single Vehicle Crash (Ran Off Road	Unknown	PDO	Fence around 240 Grove Street was damaged by a vehicle.
4	22-30-AC 5057597	1/6/2022	Thur	7:50 AM	Daylight	Clear	Wet	Angle	Unknown	Injury	Veh 1 turning right from Grove SB to Lawrence slid and crossed line and struck veh 2 EB on Lawrence
5	22-275-AC 5078996	2/14/2022	Mon	1:20 AM	Dark lighted road	Snow	Snow	Single Vehicle Crash (Ran off road)	Driving too fast for conditions	PDO	Vehicle traveling EB on Lawrence and turning left collided with a utility pole on Grove Street.
6	22-377-AC	3/4/2022	Fri	9:27PM	Dark lighted road	Clear	Wet	Angle	Failure to keep in proper lane	PDO	Veh 1 turning right from Grove SB to Lawrence slid and crossed line and struck veh 2 EB on Lawrence not distracted
7	22-670-AC 5108517	4/22/2022	Fri	4:44 PM	Daylight	Clear	Dry	Sideswipe same direction	Operating vehicle erratic, reckless, careless, negligent or aggressive Wrong side or wrong way	Injury	Motorcycle (veh 1) was traveling NB on Grove Street on the wrong side of road as it passed vehicles slowing or stopped in traffic. Veh 2 was turning left onto Lawrence Street when veh 1 struck it.
8	22-1876-AC 5164379	10/17/2022	Mon	3:51 PM	Daylight	Rain	Wet	Sideswipe same direction	Unknown	Injury	Vehicle 2 moved from a parked position on Grove Street while vehicle 1 was passing on the left.
9	23-506-AC5240478	3/26/2023	Sunday	4:35 AM	Dark lighted road	Rain	Wet	Single Vehicle Crash (Ran off road)	No Improper driving	PDO	Vehicle 1, stopped at stop sign, attempted to turn left, when operator stated that she was cut off by an unidentified motor vehicle traveling opposite direction, causing her to collide with a fence.

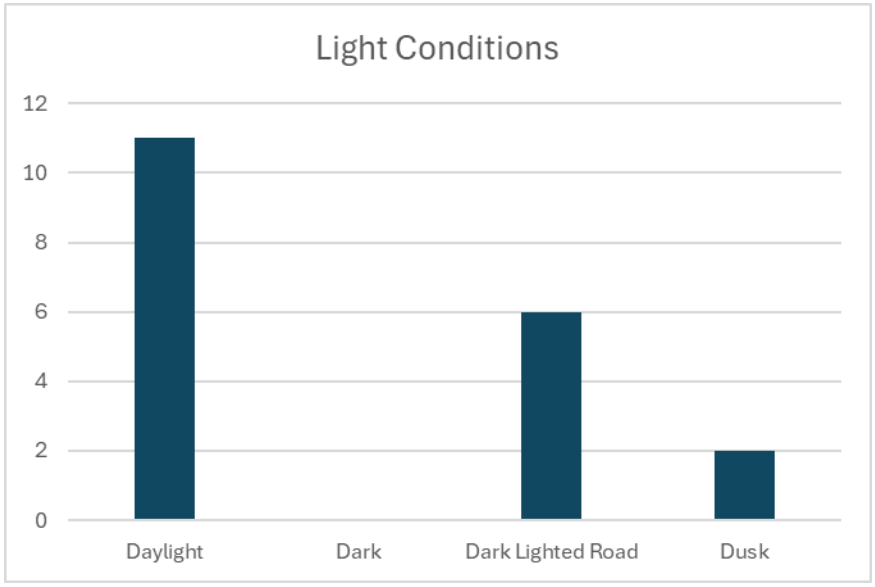
Diag ID	Crash ID	Crash Date	Crash Day	Time of Day	Light Conditions	Weather Cond	Road Surface	Manner of Collision	Driver Contributing Circumstances	Severity	Abbreviated Narrative
10	23-722-AC	4/27/2023	Thurs	1:36 PM	Daylight	Clear	Dry	Angle	Failed to yield ROW	PDO	Veh 1 turning right from Grove SB to Lawrence was struck by Veh 2 exiting a parking lot from Lou's Custom Exhaust. Not distracted Veh 2 Cited
11	No Report	7/3/2023	Mon	6:59 PM	Dusk	NA	NA	Unknown	NA	PDO	No report PDO
12	24-142-AC	1/23/2024	Tues	6:22PM	Dusk	Rain	Wet	Single Vehicle (Ran off road)	Driving too fast for conditions	PDO	Vehicle on Lawrence EB lost control through intersection hit utility pole on Grove. Not Distracted
13	24-536-AC	3/23/2024	Sat	2:01 AM	Dark lighted road	Clear	Dry	Single Vehicle (Ran off road)	Unknown	PDO	Operator traveling Grove NB fell asleep and struck a fence.
14	No Report	5/6/2024	Mon	7:35 PM	Dark lighted road	NA	NA	Unknown	NA	PDO	No report PDO
15	No Report	5/27/2024	Mon	10:24 AM	Daylight	NA	NA	Unknown	NA	PDO	No report PDO
16	24-1007-AC 5411337	5/30/2024	Thur	8:35 AM	Daylight	Cloudy/Rain	Wet	Single Vehicle Crash (Hit Pedestrian)	No Improper Driving	Unknown	The operator of the vehicle pulling out of Trinity Village stated she never saw the pedestrian crossing due to the weather. DRIVER DISTRACTED OTHER ACTIVITY EATING ETC
17	No Report	8/2/2024	Wed	2:15 PM	Daylight	NA	NA	Angle	Hit and Run	PDO	Hit and Run
18	24-2127-AC 5472063	11/7/2024	Thur	2:27 PM	Daylight	Clear	Dry	Angle	Inattention, Failed to yield right of way	Injury	Vehicle 2 traveling on Grove NB and passing Lawrence Street was struck by vehicle 1, operated by a 16 yo without a valid license, turning from Lawrence. Not Distracted
19	24-2217-AC	11/19/2024	Tues	2:22 PM	Daylight	Clear	Dry	Single Vehicle Crash (Hit Pedestrian)	Unknown	Injury	Vehicle heading SB on Grove, with right of way, collided with a Pedestrian (in front of 238 Grpve St, approximately 200 feet south of the intersection)

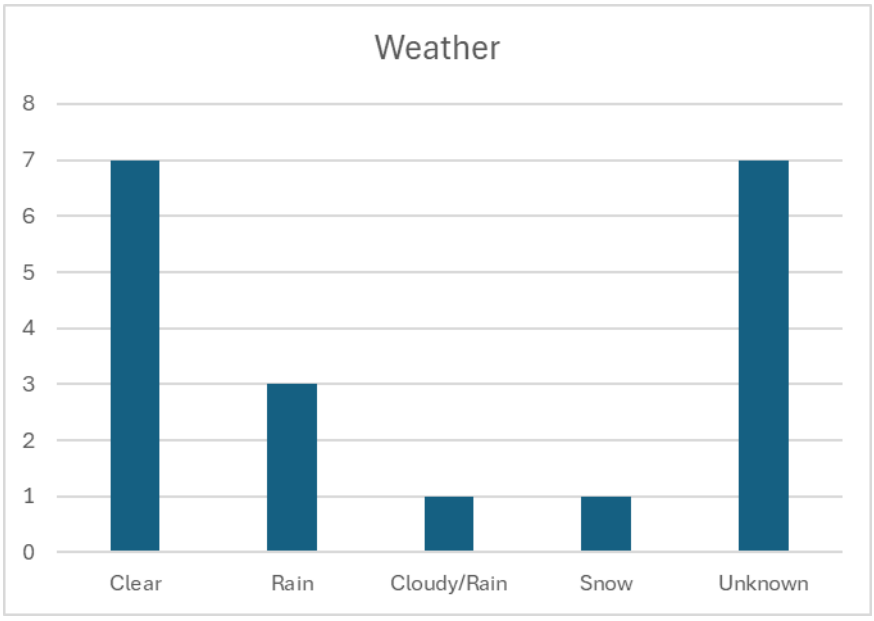

Month of Crash
3.5
3
2.5
2
1.5
1
0.5
0
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec

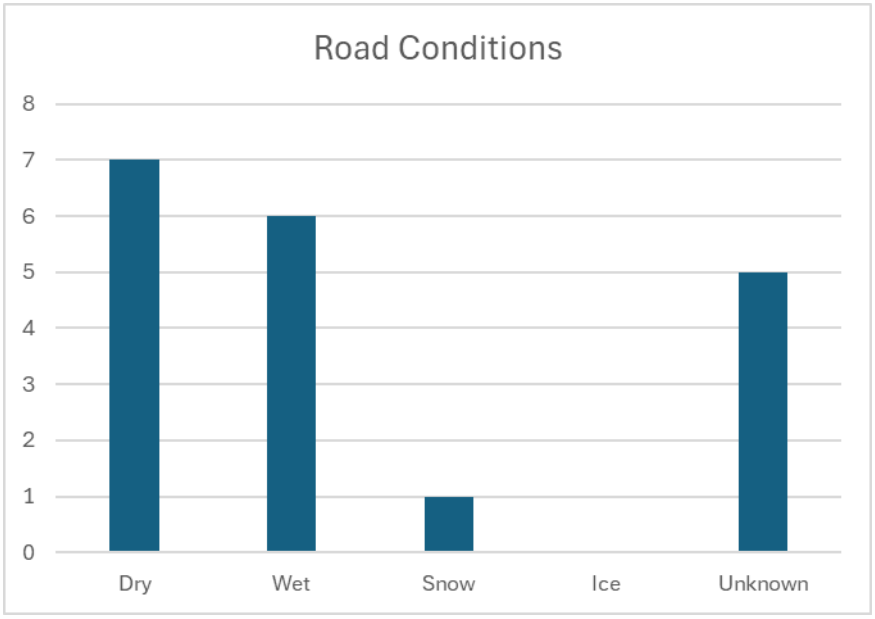

Day of the Week
6
5
4
3
2
1
0
Sun
Mon
Tues
Wed
Thur
Fri
Sat

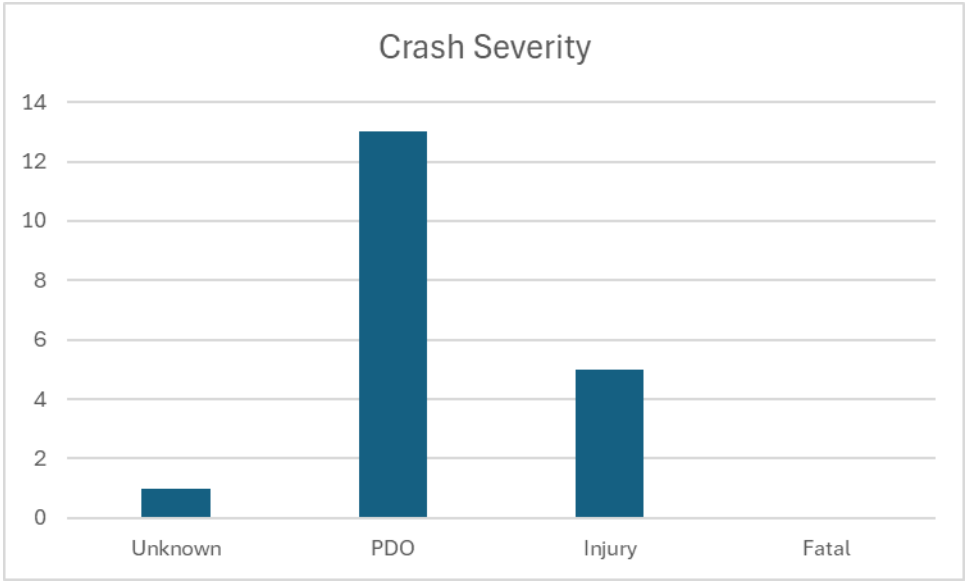

Time of Day
7
6
5
4
3
2
1
0
6 to 8 am
8 to 10 am
10 am to 12 pm
12 to 2 pm
2 to 4 pm
4 to 6 pm
6 to 8 pm
8 to 10 pm
10 pm to 12 am
12 to 2 am
2 to 4 am
4 to 6 am


Manner of Collision
6
5
4
3
2
1
0
angle
rear-end
side-swipe
ran off road
head on
hit pedestrian
hit bicyclist
unknown


Light Conditions
12
10
8
6
4
2
0
Daylight
Dark
Dark Lighted Road
Dusk


Weather
8
7
6
5
4
3
2
1
0
Clear
Rain
Cloudy/Rain
Snow
Unknown


Road Conditions
8
7
6
5
4
3
2
1
0
Dry
Wet
Snow
Ice
Unknown


Crash Severity
14
12
10
8
6
4
2
0
Unknown
PDO
Injury
Fatal

Warrants Summary Report

1: Grove at Lawrence

Intersection Information

	Major Street	Minor Street
Street Name	Grove	Lawrence
Direction	NB/SB	EB/WB
Number of Lanes	1	1
Approach Speed	30	30

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	Yes	
Condition A or B Met?	No	6 Hours met (8 required)
Condition A and B Met?	Yes	9 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	Yes	5 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

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/.

Road Safety Audits, A Synthesis of Highway Practice. NCHRP Synthesis 336. Transportation Research Board, National Cooperative Highway Research Program, 2004.

Road Safety Audits. U.S. Department of Transportation, Federal Highway Administration, https://safety.fhwa.dot.gov/rsa/

FHWA Road Safety Audit Guidelines. U.S. Department of Transportation, Federal Highway Administration, 2006.

Road Safety Audit, 2nd edition. Austroads, 2000.

Road Safety Audits. ITE Technical Council Committee 4S-7. Institute of Transportation Engineers, February 1995.

2024 MassDOT Road Safety Audit Guideline, Massachusetts Department of Transportation