

ROAD SAFETY AUDIT

North Main Street (Route 28) at Matfield Street

West Bridgewater, MA

August 2019

Prepared For:

West Bridgewater, MA

Prepared By:

Old Colony Planning Council
70 School Street, Brockton, MA 02301
Prepared under MassDOT Contract 88826

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The Road Safety Audit

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 North Main Street (Route 28) at Matfield Street intersection in West Bridgewater was conducted by the Old Colony Planning Council upon request by the Town of West Bridgewater Town Administrator over concerns regarding numerous crashes and congestion at this intersection. This report documents the findings of the RSA, includes manual turning movement counts, level-of-service analysis, signal warrant analysis, and crash data compilation and crash analyses.

The Road Safety Audit Meeting and Team

The Road Safety Audit took place on June 27, 2019 at the West Bridgewater Town Hall, (McDonald/Brown Conference Room). The meeting was facilitated by OCPC staff. OCPC provided a collision diagram and the latest three year crash experience based on crash reports provided by the West Bridgewater Police Department.

The RSA meeting consisted of three components. The first portion of the meeting focused on a discussion of the issues and concerns. The participants then departed the office and visited the intersection for observations for the second portion of the meeting. The discussion of issues was continued during the site visit as OCPC staff took notes. The third portion of the meeting focused on potential short term and long term potential improvements for the intersection. The agenda and the background materials are included in the appendix to this report. Table 1 lists the names and affiliations of the audit participants. The intersection location is shown in Figure 1.

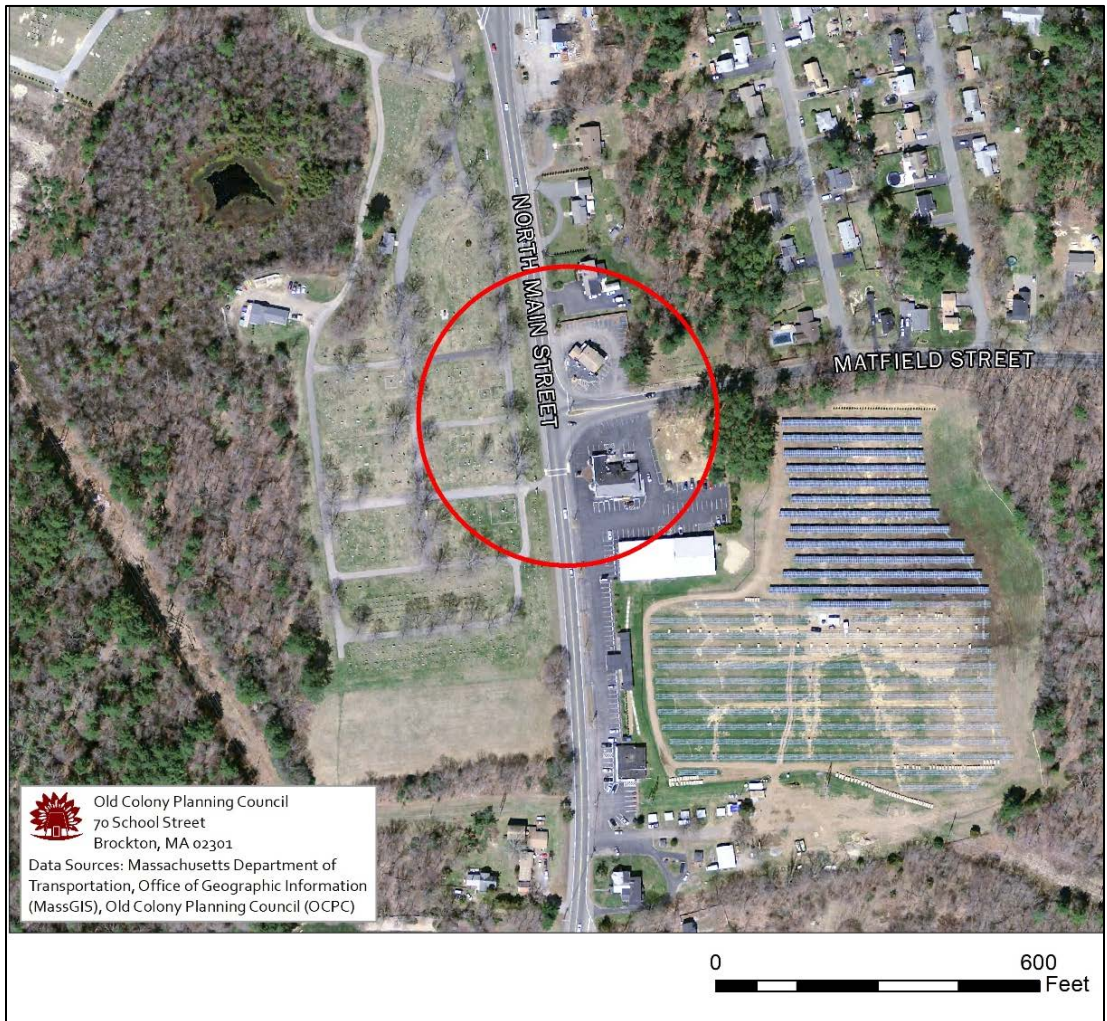


The RSA took place on June 27, 2019 at the West Bridgewater Town Hall, (McDonald/Brown Conference Room).

Table 1. Participating Audit Team Members

Audit Team Member	Agency/Affiliation
Jim Noyes	Matfield Street resident
Linda Torres	Assistant Town Administrator West Bridgewater
Eldon Moreira	Chairman of the West Bridgewater Board of Selectmen
Chris Iannitelli	West Bridgewater DPW Director
Bianca Marshall	Massachusetts Department of Transportation District 5 – Traffic
Jason Walters	Massachusetts Department of Transportation District 5 – Projects
Shawn Bailey	Old Colony Planning Council
Paul Chenard	Old Colony Planning Council
Raymond Guarino	Old Colony Planning Council

Figure 1. Locus Map North Main Street at Matfield Street, West Bridgewater



Project Location and Description

North Main Street (Route 28) at Matfield Street

North Main Street in West Bridgewater is State Route 28 and is under Massachusetts Department of Transportation jurisdiction. It is classified as an urban principal arterial and has a two lane cross section. The land use along North Main Street (Route 28) in West Bridgewater consists of mixed residential and commercial uses. The width of North Main Street (Route 28) is approximately 34 feet wide, but varies. There is a sidewalk on the west side of North Main Street through the North Main Street/Matfield Street intersection. There is a cemetery on the west side of North Main Street, located west of the intersection. A small historic cemetery is located on the north side of Matfield Street, adjacent to the Niko's Restaurant parking lot, which is located at the northeast corner of the intersection. The speed limit is posted at 40 miles per hour on North Main Street (Route 28) in the southbound direction at the West Bridgewater/Brockton line. It is posted at 40 miles per hour on North Main Street (Route 28) northbound direction north and south of the Matfield Street intersection.

Matfield Street is a two lane cross section. It is classified as an urban minor arterial and is under local West Bridgewater jurisdiction. It is approximately 24 feet wide and there is a sidewalk with a raised curb and buffer provided on the south side of the road. Matfield Street provides east west connection between North Main Street (Route 28) and Pleasant Street in West Bridgewater. The land use along Matfield Street is residential. There is no parking along Matfield Street in the vicinity of the intersection with North Main Street. The speed limit is posted at 25 miles per hour on the Matfield Street westbound approach to the North Main Street (Route 28)/Matfield Street intersection.

North Main Street (Route 28) meets Matfield Street in West Bridgewater to form a "T"-type intersection. There are sidewalks on the east side of North Main Street (Route 28) through the intersection and on the south side of Matfield Street. The intersection is stop sign controlled on the Matfield Street westbound approach. There is an island in the center of the Matfield Street approach, and this approach has two stop signs, one on the island and one on the right side of the road, along with pavement markings, which include a stop bar and the word "stop" painted on the approach. Although all three approaches to the intersection provide a single shared lane, the Matfield Street westbound approach widens as it intersects North Main Street (Route 28), allowing for vehicles to turn right around left turn vehicles that are stopped at the stop sign, as vehicles wait for a gap in the North Main Street traffic to turn left.

There are several businesses along the east side of North Main Street (Route 28), including a restaurant on the northeast corner and a restaurant on the southeast corner of the intersection. There are no curbs on the northeast or southeast corners of the intersection to separate the parking lots of the restaurants from vehicle turning movements through the intersection. The only curb through the intersection is on the west side of North Main Street, which contains a raised sidewalk. Although the south side of Matfield Street does have a curb with a raised sidewalk, the curb and sidewalk begin approximately 150 feet east of the North Main Street (Route 28) intersection. There is one crosswalk located across North Main Street, south of the intersection near an entrance to the cemetery.

There is a landscaped island on the Matfield Street westbound approach to the intersection with raised curbs. A utility pole and street light are located in the island.

Morning and afternoon peak hour turning movement counts were conducted in April 2019 at the intersection by OCPC. The counts are included in the appendix to this report. The counts show that there were heavy left turns from Matfield Street westbound to North Main Street southbound during the morning peak hour (289 vehicles). There were 144 right turn movements from the Matfield Street approach during the morning peak hour. There were also heavy right turns on the North Main Street northbound approach (162 vehicles) during the morning peak hour. There were 380 through movements on the northbound approach during the morning peak hour. The southbound North Main Street approach had 110 vehicles turning left and 334 vehicles going through.

During the afternoon peak hour, there were there were heavy vehicle volumes turning left from Matfield Street westbound to North Main Street southbound (203 vehicles), and from North Main Street southbound to Matfield Street eastbound (237 vehicles). There were 677 through vehicles on the North Main Street southbound approach and 524 through vehicles on the North Main Street northbound approach. The North Main Street northbound approach also had 195 right turn movements during the afternoon peak hour to Matfield Street eastbound. The Matfield Street westbound right turn movement had 125 right turns during the afternoon peak hour.

The existing peak hour level-of-service (LOS) for the westbound Matfield Street movements, left turns and right turns to North Main Street, is “F”, during the morning and afternoon peak hour at the intersection, which is “forced flow” conditions with very long delays.

Crash Details and Overview

Crash reports were compiled from the West Bridgewater Police Department for the latest three year period, (2016, 2017, and 2018). The crashes are included in the appendix to this report. There were a total of 15 crashes at the North Main Street/Matfield Street intersection. Three of the 15 crashes (approximately 20 percent) at the intersection resulted in personal injury. Seven of the crashes (approximately 46 percent) were angle type crashes. The collision diagrams and a summary of the crash data for the intersection are included in the appendix of this report.

Audit Observations and Potential Safety Enhancements

During the RSA meeting prior to the field visits, an introduction of the RSA process and a summary of the crash information for the intersection was presented to the audit participants. Following the presentation, the members of the audit team were asked to discuss the existing issues that may affect safety. The audit team then visited the intersection as a group, at which time observations, safety concerns, and deficiencies were identified and documented by OCPC staff.

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

Safety Issue: Long delays and long queues on the Matfield Street westbound approach.

During the morning and afternoon peak hours, traffic entering the intersection on the Matfield Street approach (left turns and right turns), experience congestion and queues during the morning and afternoon peak hours. The queues on Matfield Street are due to a lack of adequate gaps in the North Main Street (Route 28) traffic. The level-of-service (LOS) is at “F” for the Matfield Street critical movement (left turns), creating “forced flow” conditions whereby the Matfield Street traffic forces itself into the North Main Street traffic flow. The North Main Street (Route 28) traffic is forced to slow down to avoid crashes with vehicles entering the intersection from Matfield Street. This forced flow also occasionally leads to



Right turning vehicles on the westbound stop sign controlled Matfield Street approach use the shoulder, which has no curb or sidewalk, as a de-facto right turn lane to bypass traffic waiting to turn left from Matfield Street to North Main Street.

crashes when vehicles cannot stop in time. There is a lack of channelization of vehicles entering the intersection. The paved shoulder and a portion of the restaurant parking lot adjacent to Matfield Street (there is a lack of curbs and sidewalks on the approach), become a “de-facto” right turn lane as right turning traffic use this area to bypass vehicles on Matfield Street waiting to turn left.

Enhancement: Install traffic signals, provide geometric improvements, and add an exclusive left turn lane on the North Main Street southbound approach and exclusive left turn and right turn lanes on the Matfield Street westbound approach. Installing traffic signals at the intersection will reduce delays and queues and improve the LOS to LOS “B” in the morning and “C” during the afternoon peak hour. The intersection satisfies Warrants 1, 2, and 3 of the *Manual on Uniform Traffic Control Devices* (MUTCD). The signal warrant analysis is included in the appendix to this report. Signal heads should be overhead mounted on all approaches. Opticon should be included for emergency vehicle preemption and transit signal priority technologies for buses. In addition, as part of the signalization, would be the inclusion of signal detection to the cemetery access off of North Main Street opposite Matfield Street.

Enhancement: In the short term, as funding and design for signalization is taking place, an overhead flashing beacon can be utilized, (flashing yellow for the North Main Street approaches and flashing red for the Matfield Street approach), to enhance intersection visibility and awareness. In addition, temporary barriers can be utilized to improve channelization and access management in the interim before full intersection reconstruction (adding curbing) and signalization.

Safety Issue: The Stopping Sight Distance and sight lines on the Matfield Street westbound approach are poor.

Vehicles on the Matfield Street approach waiting to turn right or left to North Main Street encroach across the stop line due to poor sight distances looking to the north. The sight lines are blocked by the restaurant building as well as vehicles parked in front of the restaurant off of North Main Street and Matfield Street. Other impediments to sight distance include snow from the snow plows for the adjacent businesses, which pile up the snow too close to the intersection and impede sight lines. Also, the business sign and parking on the southeast corner of the intersection impeded sight lines from the Matfield Street approach looking south toward oncoming traffic on North Main Street.

Enhancement: The location of the stop line should be evaluated and the stop signs, and other signs should be evaluated for MUTCD compliance (proper height, etc.).

Enhancement: The Town should work with the businesses to relocate parking in front of the establishments and business sign to help improve sight lines.

Enhancement: Prohibit piling of snow next to the intersection that impacts traffic operation.

Safety Issue: Lack of Access Management.

There is a lack of curbing at the intersection, (except for the western side of North Main Street), a lack of delineation between the travel way and the parking lots on the southeast and northeast corners, and vehicles cut through the parking lots to avoid queues at the intersection. Vehicles turn right at high speeds on the northbound North Main Street approach to Matfield Street eastbound due to the lack of curbing (they encroach on the parking lot to widen the turning radius). Pavement markings for travel lanes and parking stalls in the adjacent lots are faded.

Enhancement: Reconstruct the intersection to add curbing throughout including sidewalks and reconfigure or remove the island. Adding curbing will square off the intersection preventing northbound right turns from utilizing part of the parking lot to change the turning radius and turning at the corner at high speeds. Improvements to the intersection should include the collaboration and cooperation of local businesses and property owners.

Enhancement: Reconfigure access management to adjacent properties. This will require background research in previous State access permits as well as collaboration and cooperation with business and property owners of adjacent properties to reassess property access and internal circulation. There is potential for the establishment of a service road behind the businesses on the east side of North Main Street (Route 28) south of Matfield Street. This road can possibly be constructed behind the buildings between the solar farm and the commercial properties. Figure 2 illustrates the potential for adding a service road.

Figure 2. Potential Service Road



Safety Issue: The pavement striping is faded, and although there is a single street light on the utility pole in the island at the intersection, the lighting is poor.

Enhancements: Additional street lights should be installed at the intersection.

Enhancement: The stop line, parking stalls, and pavement markings should be restriped.

Safety Issue: The intersection lacks pedestrian and bicycle amenities.

There is a lack of crosswalks, except for the crosswalk across North Main Street on the northbound approach from the cemetery. This crosswalk lacks proper signage for pedestrians. There is a lack of any pavement markings, designated bike lanes, or signage for bicycle use. The *Old Colony Bicycle and Pedestrian Connectivity and Livability Study*, completed by OCPC in 2018, states that the Town of West Bridgewater does not have an established bicycle network. The study proposed adding bicycle lanes to both North Main Street (Route 28) and Matfield Street.

Enhancement: Add pedestrian signs to the crosswalk across North Main Street on the northbound approach.

Enhancement: Add crosswalks and pedestrian signals (conforming to MUTCD and ADA requirements) across the intersection approaches and consider installing a Rapid Rectangular Flashing Beacon at the crosswalk in the interim before signalization. Sidewalks should have ADA compliant ramps and detectable tactile surfaces.

Enhancement: Add bicycle lanes or consider widening the sidewalks to create a multi-use path along North Main Street and Matfield Street.

Safety Issue: There is a lack of warning signs and posted speed limit signs on North Main Street.

Enhancement: Add intersection ahead warning signs and post speed limit signs on North Main Street (40 miles per hour based on approved special speed regulations).

Summary of Road Safety Audit

Based on the review of data, on-site field observations and group discussion, the RSA team identified possible enhancements that could improve safety at the two intersections. Further study and design work will need to be conducted to determine the feasibility of making some of the improvements. Table 2 summarizes the estimated time frame and costs breakdown and Table 3 summarizes the safety issues, possible enhancements, estimated safety payoff, time frame, cost, and 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 Cost 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 – North Main Street/Matfield Street

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Agency
Long delays and queues on the Matfield Street westbound approach.	Install overhead traffic signals, geometric improvements, and add an exclusive left turn lane North Main Street southbound and exclusive left turn and right turn lanes on the Matfield Street westbound approach. Opticon should be included for emergency vehicle preemption as well as transit signal priority for buses and signal detection to the cemetery access off of North Main Street opposite Matfield Street.	High	> 3 Years	High	MassDOT/ West Bridgewater
	In the short term, as funding and design for signalization is taking place, overhead flashing beacons can be used, (flashing yellow for the North Main Street and flashing red for Matfield Street), to enhance intersection visibility and awareness. In addition, temporary barriers can be utilized to improve channelization and access management in the interim before full intersection reconstruction (adding curbing) and signalization. Blocking intersection sight lines due snow plowing snow should be prohibited.	Medium	1-3 Years	Medium	MassDOT/ West Bridgewater
The Stopping Sight Distance and sight lines on the Matfield Street westbound approach are poor.	The location of the stop line should be evaluated and the stop signs, and other signs should be evaluated for MUTCD compliance (proper height, etc.).	Medium	< 1 Year	Low	MassDOT/ West Bridgewater
	Work with the businesses to relocate parking in front of the establishments and relocate business sign to help improve sight lines.	Medium	< 1 Year	Low	West Bridgewater
Lack of Access Management.	Reconstruct the intersection to add curbing throughout including sidewalks and reconfigure or remove the island. Square off the intersection to prevent northbound right turns from turning at the corner at high speeds. Improvements to the intersection should include the collaboration and cooperation of local businesses and property owners.	High	> 3 years	High	MassDOT/ West Bridgewater
	Reconfigure access management to adjacent properties. Research previous State access permits and work in cooperation with business and property owners to reassess access and internal circulation. Consider a service road behind the businesses on the east side of North Main Street (Route 28) south of Matfield Street.	High	> 3 years	High	MassDOT/ West Bridgewater

Table 3: Potential Safety Enhancement Summary – North Main Street/Matfield Street (continued)

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Agency
The pavement striping is faded.	The stop line, parking stalls, and pavement markings should be restriped.	Medium	< 1 Year	Low	MassDOT/ West Bridgewater
Although there is a single street light on the utility pole in the island at the intersection, the lighting is poor.	Add additional street lights at the intersection.	Medium	1-3 Years	Medium	MassDOT/ West Bridgewater
The Intersection lacks pedestrian and bicycle amenities.	Add pedestrian signs to the crosswalk across North Main Street on the northbound approach.	Medium	< 1 Year	Low	MassDOT
	Add crosswalks and pedestrian signals (conforming to ADA requirements) across the intersection approaches and consider installing a Rapid Rectangular Flashing Beacon at the crosswalk in the interim before signalization. Sidewalks should have ADA compliant ramps and detectable tactile surfaces.	High	> 3 Years	High	MassDOT
	Add bicycle lanes or consider widening the sidewalks to create a multi-use path along North Main Street and Matfield Street (beyond the intersection if possible). The <i>Old Colony Bicycle and Pedestrian Connectivity and Livability Study</i> recommends regional bicycle connectivity on North Main Street and Matfield Street.	Medium	1-3 Years	Medium/ High	MassDOT
There is a lack of warning signs and posted speed limit signs on North Main Street.	Add intersection ahead warning signs and properly posted speed limit signs on North Main Street (40 miles per hour based on State special speed regulation).	Medium	< 1 Year	Medium	MassDOT

Appendix A. RSA Meeting Agenda

Agenda	Road Safety Audit West Bridgewater, MA North Main Street (Route 28) at Matfield Street Meeting Location: West Bridgewater Town Hall MacDonald/Brown Conference Room 65 North Main Street (Route 28) West Bridgewater, MA 02379 Thursday, June 27, 2019 10:00 AM – 12:00 PM
	Type of meeting: Road Safety Audit Attendees: Invited Participants to Comprise a Multidisciplinary Team Please bring: Thoughts and Enthusiasm
10:00 AM	Welcome and Introductions
10:05 AM	Review of Site Specific Material - Review and Discuss Project <ul style="list-style-type: none">• Review of Traffic Data• Existing Conditions and Known Challenges
10:45 AM	Visit the Intersection and Discussion <ul style="list-style-type: none">• Identify deficiencies at the study area location• OCPC staff will document all observations and comments
11:30 AM	Wrap up Site Visit and Post Visit Discussion Meeting <ul style="list-style-type: none">• Discuss issues and document and finalize potential improvements
12:00 PM	Adjourn for the Day
Instructions for Participants: <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, (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

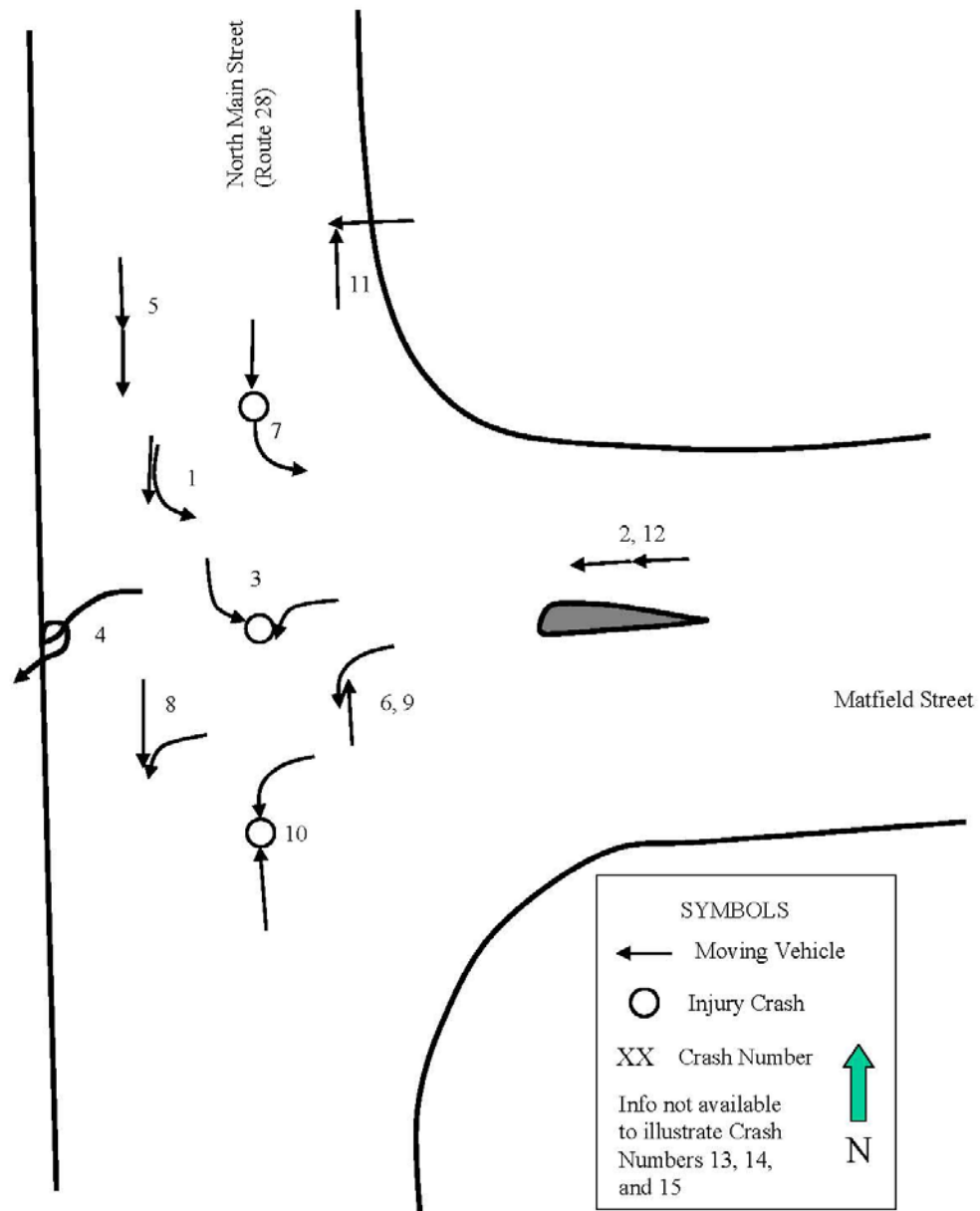
Participating Audit Team Members

Date: June 27, 2019 Location: Town Hall West Bridgewater, MA

Audit Team Members	Agency/Affiliation	Email Address
Jim Noyes	Matfield Street Resident	jm_noyes@yahoo.com
Linda Torres	Assistant Town Administrator	ltorres@wbridgewater.com
Eldon Moreira	Chair of the West Bridgewater Board of Selectmen	Not available
Chris Iannitelli	West Bridgewater DPW	ciannitelli@wbridgewater.com
Bianca Marshall	Massachusetts Department of Transportation District 5 – Traffic	Bianca.marshall@dot.state.ma.us
Jason Walters	Massachusetts Department of Transportation District 5 – Projects	Jason.walters@dot.state.ma.us
Shawn Bailey	Old Colony Planning Council	sbailey@ocpcrpa.org
Paul Chenard	Old Colony Planning Council	pchenard@ocpcrpa.org
Raymond Guarino	Old Colony Planning Council	r Guarino@ocpcrpa.org

Appendix C: Detailed Crash Data

COLLISION DIAGRAM
North Main Street (Route 28) at Matfield Street
Collision Diagram for Crashes (Jan. 2016 to Jan. 2019)
Prepared by OCPC (RG 6/2019) (Source: West Bridgewater Police Department)

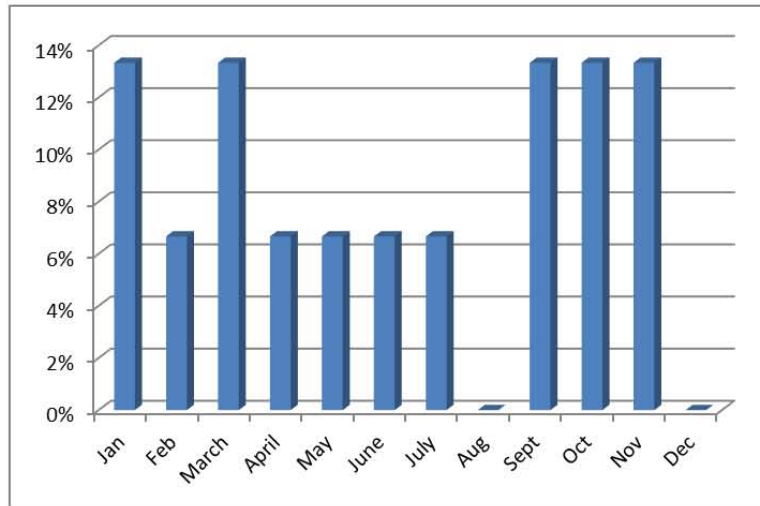


**Crash Data Summary Table
Matfield Street at North Main Street (Route 28) - West Bridgewater**

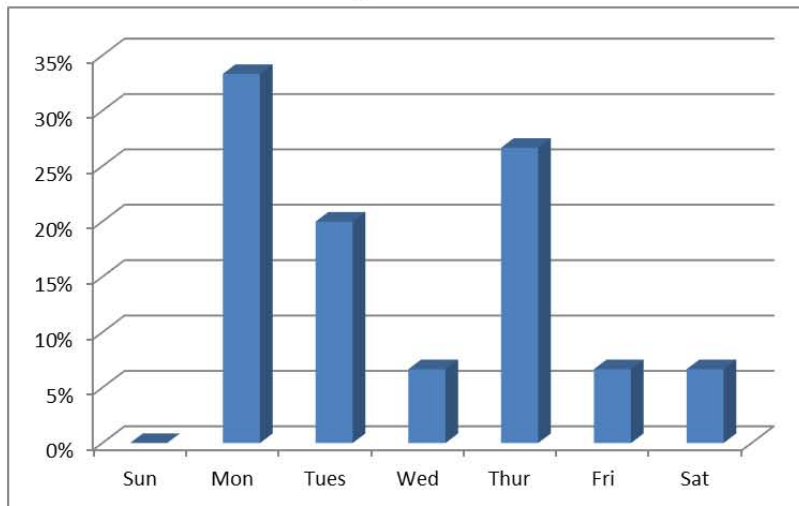
Crash Num	P.D. Code	Crash Date	Crash Day	Time of Day	Manner of Coll	Light Cond	Weather	Road Surf	Age 1	Age 2	Comments	Injury
1	16-86-AC	3/28/2016	Mon	2:32 PM	Sideswipe (same dir)	Daylight	Rain	wet	63	20	Sideswipe SB Veh. Going around a left turning veh waiting to turn.	PDO
2	16-113-AC	4/15/2016	Fri	1:45 PM	Rear-end	Daylight	Clear	dry	67	51	Rear-end westbound on Matfield at Stop sign.	PDO
3	16-183-AC	6/15/2016	Thur	7:14 AM	Angle	Daylight	Clear	dry	17	38	Motorist cited for failing to yield	Inj
4	17-32-AC	2/2/2017	Thur	7:11 AM	Ran off Road	Daylight	Clear	ice	18		Ran off road due to ice	PDO
5	17-266-AC	9/7/2017	Thur	4:45 PM	Rear-end	Daylight	Clear	dry	34	29		PDO
6	17-275-AC	9/18/2017	Mon	7:11 AM	Angle	Daylight	Clear	dry	17	51		PDO
7	17-332-AC	10/29/2017	Mon	7:43 PM	Rear-end	Dark Lighted	Rain	wet	39	20		Inj
8	18-89-AC	3/12/2018	Mon	2:03 PM	Angle	Daylight	Clear	dry	24	73		PDO
9	18-156-AC	5/12/2018	Sat	5:23 PM	Angle	Daylight	Rain	wet	48	18		PDO
10	18-201-AC	7/4/2018	Wed	2:24 PM	Angle	Dark Lighted	Clear	dry	20			Inj
11	18-354-AC	11/13/2018	Tue	3:50 PM	Angle	Daylight	Clear	dry	51		Angle crash with vehicle exiting the parking lot	PDO
12	19-14-AC	1/10/2019	Thur	5:39 PM	Angle	Dark Lighted	Clear	dry	32	34		PDO
13	NA	10/23/2017	Mon	3:03 PM	NA	Daylight	NA	NA	55	37	Crash involving a motorcycle and motor vehicle.	PDO
14	NA	11/28/2017	Tue	3:06 PM	Rear-end	Daylight	NA	NA	18	23		PDO
15	NA	1/15/2019	Tue	3:36 PM	NA	Daylight	NA	NA	60	41		PDO

North Main Street (Route 28) at Matfield Street – West Bridgewater

Crash Month

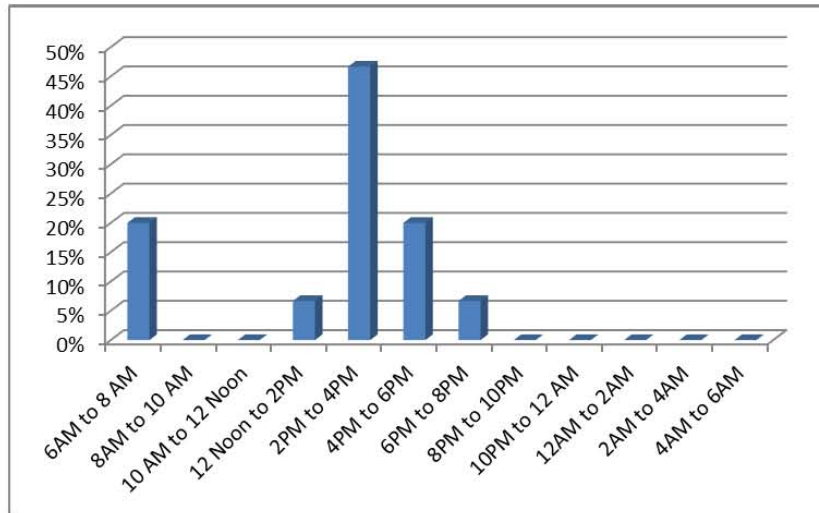


Day of the Week

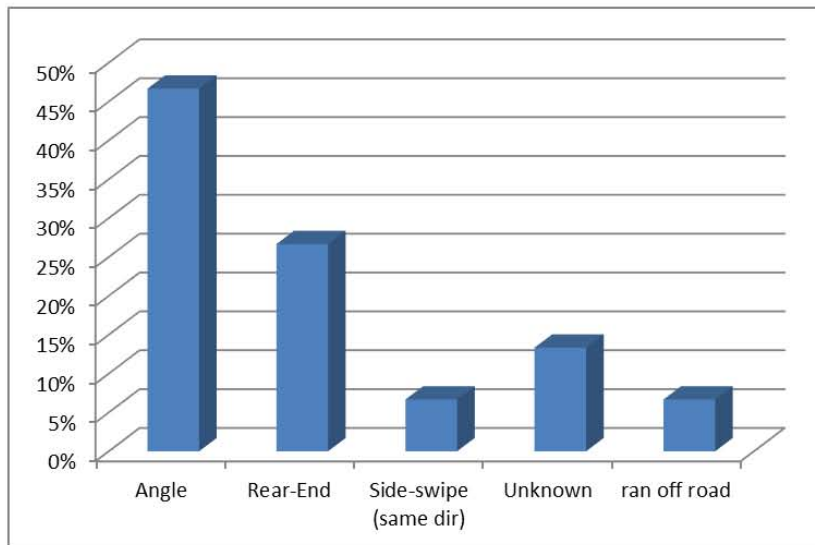


North Main Street (Route 28) at Matfield Street – West Bridgewater

Time of Day

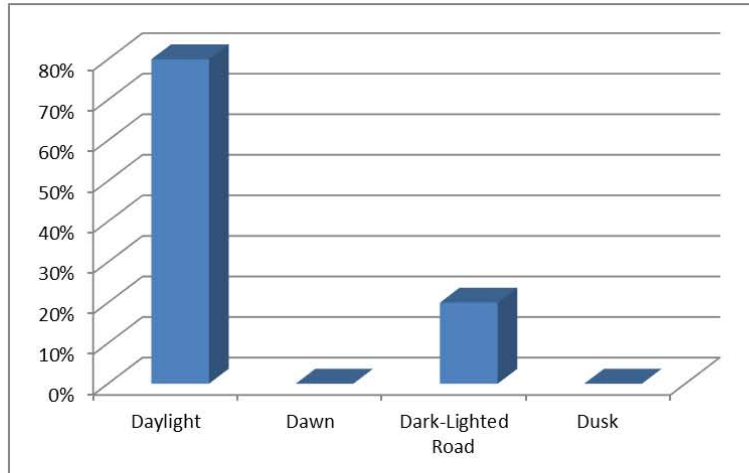


Manner of Collision

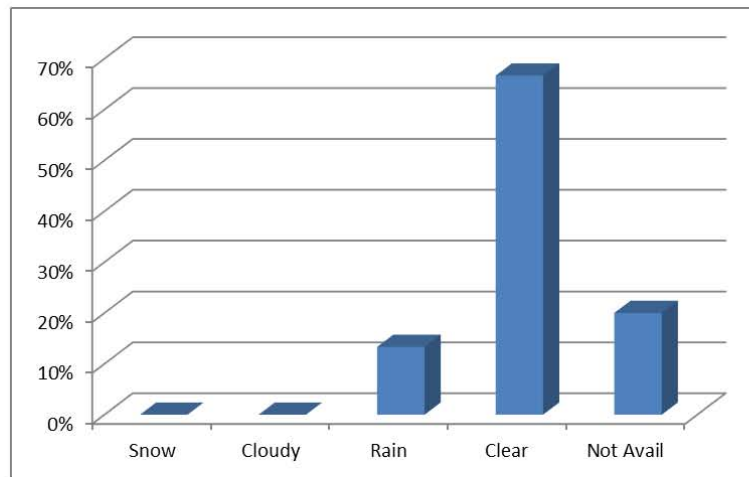


North Main Street (Route 28) at Matfield Street – West Bridgewater

Light Conditions

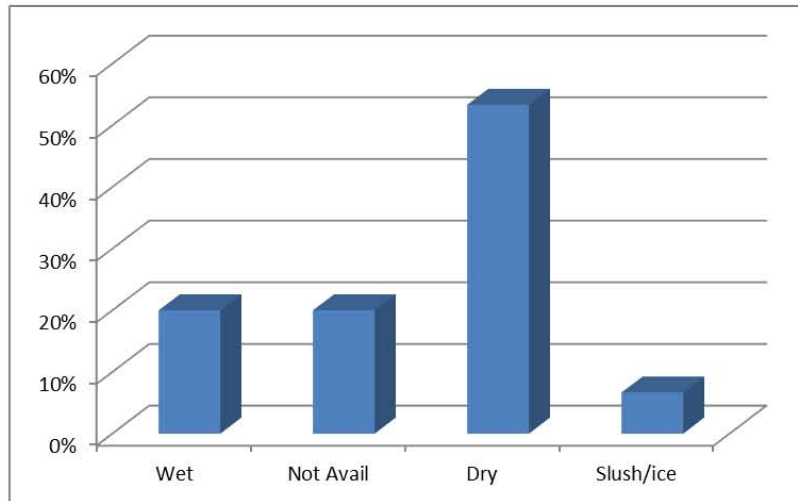


Weather Conditions

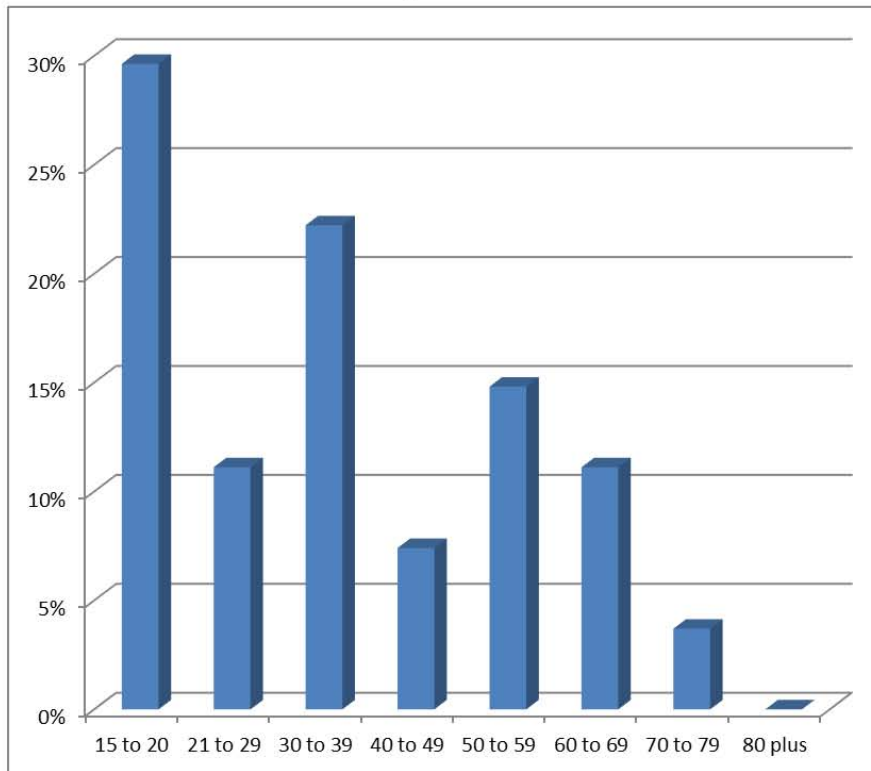


North Main Street (Route 28) at Matfield Street – West Bridgewater

Road Surface Conditions



Age



North Main Street (Route 28) at Matfield Street – West Bridgewater

Appendix D: Additional Information

- Intersection Turning Movement Counts
- Automatic Traffic Counts
- Intersection Peak Hour Levels-of-Service
- Signal Warrant Analysis

Road Safety Audit— North Main Street (Route 28) at Matfield Street – West Bridgewater Prepared by Old Colony Planning Council – *Final*

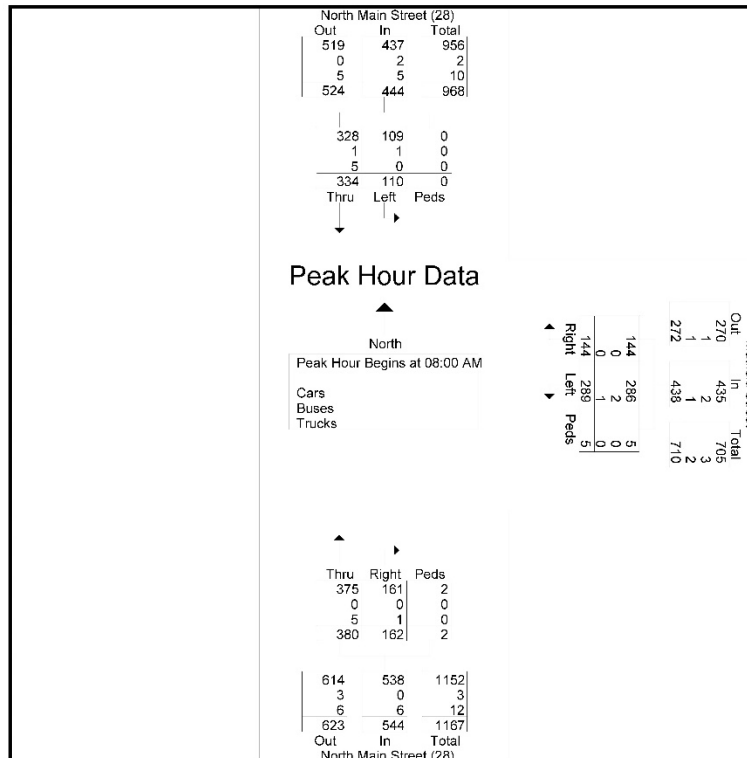


Old Colony Planning Council
 70 School Street
 Brockton, MA 02301
 (508) 583-1833
 www.ocpcrpa.org

Community: West Bridgewater
 Weather: Clear
 Board # & Staff: DB-400 (6) / JP
 Traffic Control: Stop Sign

File Name : North Main Street (28) & Matfield Street_AM
 Site Code : 322
 Start Date : 4/25/2019
 Page No : 4

Start Time	North Main Street (28) Southbound				Right	Matfield Street Westbound			North Main Street (28) Northbound				Int. Total
	Thru	Left	Peds	App. Total		Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	49	37	0	86	28	60	2	90	43	85	0	128	304
08:15 AM	71	21	0	92	35	74	1	110	40	110	2	152	354
08:30 AM	97	25	0	122	36	52	0	88	38	81	0	119	329
08:45 AM	117	27	0	144	45	103	2	150	41	104	0	145	439
Total Volume	334	110	0	444	144	289	5	438	162	380	2	544	1426
% App. Total	75.2	24.8	0		32.9	66	1.1		29.8	69.9	0.4		
PHF	.714	.743	.000	.771	.800	.701	.625	.730	.942	.864	.250	.895	.812
Cars	328	109	0	437	144	286	5	435	161	375	2	538	1410
% Cars	98.2	99.1	0	98.4	100	99.0	100	99.3	99.4	98.7	100	98.9	98.9
Buses	1	1	0	2	0	2	0	2	0	0	0	0	4
% Buses	0.3	0.9	0	0.5	0	0.7	0	0.5	0	0	0	0	0.3
Trucks	5	0	0	5	0	1	0	1	1	5	0	6	12
% Trucks	1.5	0	0	1.1	0	0.3	0	0.2	0.6	1.3	0	1.1	0.8



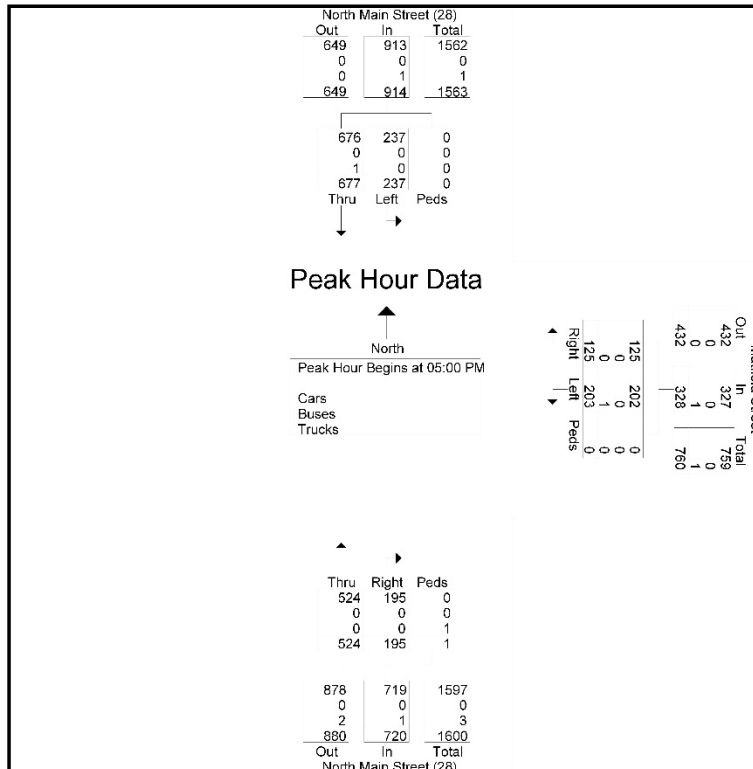


Old Colony Planning Council
 70 School Street
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Community: West Bridgewater
 Weather: Clear
 Board # & Staff: DB-400 (4) / JP
 Traffic Control: Stop Sign

File Name : North Main Street (28) & Matfield Street_PM
 Site Code : 322
 Start Date : 4/11/2019
 Page No : 4

Start Time	North Main Street (28) Southbound				Matfield Street Westbound				North Main Street (28) Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	117	76	0	193	18	47	0	65	62	69	0	131	389
05:15 PM	113	56	0	169	19	56	0	75	58	96	1	155	399
05:30 PM	221	47	0	268	45	45	0	90	28	186	0	214	572
05:45 PM	226	58	0	284	43	55	0	98	47	173	0	220	602
Total Volume	677	237	0	914	125	203	0	328	195	524	1	720	1962
% App. Total	74.1	25.9	0		38.1	61.9	0		27.1	72.8	0.1		
PHF	.749	.780	.000	.805	.694	.906	.000	.837	.786	.704	.250	.818	.815
Cars	676	237	0	913	125	202	0	327	195	524	0	719	1959
% Cars	99.9	100	0	99.9	100	99.5	0	99.7	100	100	0	99.9	99.8
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks	1	0	0	1	0	1	0	1	0	0	1	1	3
% Trucks	0.1	0	0	0.1	0	0.5	0	0.3	0	0	100	0.1	0.2



Road Safety Audit— North Main Street (Route 28) at Matfield Street – West Bridgewater Prepared by Old Colony Planning Council – *Final*

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Community: West Bridgewater
 Com#_UR/FC: 322_U5
 Recorder #: 32540
 Layout: L6 Basic (2)

Station ID:
 Site Code: 322
 Date Start: 24-Apr-19
 Date End: 25-Apr-19
 Metfield St, east of N Main St (28)

Start Time	22-Apr-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	*	*	*	*	27	11	20	10	*	*	*	*	*	*	24	10
01:00	*	*	*	*	10	6	11	5	*	*	*	*	*	*	10	6
02:00	*	*	*	*	4	7	2	5	*	*	*	*	*	*	3	6
03:00	*	*	*	*	13	17	8	12	*	*	*	*	*	*	10	14
04:00	*	*	*	*	11	47	16	50	*	*	*	*	*	*	14	48
05:00	*	*	*	*	43	146	55	125	*	*	*	*	*	*	49	136
06:00	*	*	*	*	149	265	151	307	*	*	*	*	*	*	150	286
07:00	*	*	*	*	282	526	278	487	*	*	*	*	*	*	280	506
08:00	*	*	*	*	266	358	256	390	*	*	*	*	*	*	261	374
09:00	*	*	*	*	225	240	270	276	*	*	*	*	*	*	248	258
10:00	*	*	*	*	218	193	213	263	*	*	*	*	*	*	216	228
11:00	*	*	*	*	215	212	245	258	*	*	*	*	*	*	230	235
12:00 PM	*	*	*	*	268	222	255	278	*	*	*	*	*	*	262	250
01:00	*	*	*	*	291	208	282	259	*	*	*	*	*	*	286	234
02:00	*	*	*	*	365	290	385	325	*	*	*	*	*	*	375	308
03:00	*	*	*	*	395	306	478	355	*	*	*	*	*	*	436	330
04:00	*	*	*	*	531	320	572	314	*	*	*	*	*	*	552	317
05:00	*	*	*	*	522	350	536	357	*	*	*	*	*	*	529	354
06:00	*	*	*	*	355	250	372	289	*	*	*	*	*	*	364	270
07:00	*	*	*	*	270	178	275	189	*	*	*	*	*	*	272	184
08:00	*	*	*	*	176	130	153	147	*	*	*	*	*	*	164	138
09:00	*	*	*	*	113	83	127	64	*	*	*	*	*	*	120	74
10:00	*	*	*	*	70	46	79	60	*	*	*	*	*	*	74	53
11:00	*	*	*	*	34	26	41	25	*	*	*	*	*	*	38	26
Lane Day	0	0	0	0	4853	4437	5080	4850	0	0	0	0	0	0	4967	4645
AM Peak	-	-	-	-	07:00	07:00	07:00	07:00	-	-	-	-	-	-	07:00	07:00
Vol	-	-	-	-	282	526	278	487	-	-	-	-	-	-	280	506
PM Peak	-	-	-	-	16:00	17:00	16:00	17:00	-	-	-	-	-	-	16:00	17:00
Vol	-	-	-	-	531	350	572	357	-	-	-	-	-	-	552	354
Comb. Total	0	0	0	0	9290	9290	9930	9930	0	0	0	0	0	0	9612	9612

Road Safety Audit— North Main Street (Route 28) at Matfield Street – West Bridgewater Prepared by Old Colony Planning Council – *Final*

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Page 1

Community: West Bridgewater
 Com#_UR/FC: 322_L3
 Recorder # 32539
 Layout: L6 Basic (2)

Station ID:
 Site Code: 322
 Date Start: 24-Apr-19
 Date End: 25-Apr-19
 N Main St (28), south of Matfield St

Start Time	22-Apr-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	*	*	52	30	41	25	*	*	*	*	*	*	46	28
01:00	*	*	*	*	21	22	23	18	*	*	*	*	*	*	22	20
02:00	*	*	*	*	14	12	9	14	*	*	*	*	*	*	12	13
03:00	*	*	*	*	19	16	20	17	*	*	*	*	*	*	20	18
04:00	*	*	*	*	36	68	43	61	*	*	*	*	*	*	40	64
05:00	*	*	*	*	122	182	117	172	*	*	*	*	*	*	120	177
06:00	*	*	*	*	324	304	317	313	*	*	*	*	*	*	320	308
07:00	*	*	*	*	610	532	588	560	*	*	*	*	*	*	599	546
08:00	*	*	*	*	561	439	595	472	*	*	*	*	*	*	578	456
09:00	*	*	*	*	451	449	528	555	*	*	*	*	*	*	490	502
10:00	*	*	*	*	432	424	392	460	*	*	*	*	*	*	412	442
11:00	*	*	*	*	463	466	482	529	*	*	*	*	*	*	472	498
12:00 PM	*	*	*	*	561	487	462	541	*	*	*	*	*	*	512	514
01:00	*	*	*	*	497	473	488	605	*	*	*	*	*	*	492	539
02:00	*	*	*	*	570	551	550	598	*	*	*	*	*	*	560	594
03:00	*	*	*	*	570	568	593	592	*	*	*	*	*	*	582	580
04:00	*	*	*	*	615	679	658	659	*	*	*	*	*	*	636	669
05:00	*	*	*	*	643	618	634	654	*	*	*	*	*	*	638	636
06:00	*	*	*	*	474	474	495	532	*	*	*	*	*	*	484	503
07:00	*	*	*	*	382	332	356	354	*	*	*	*	*	*	369	343
08:00	*	*	*	*	288	262	245	250	*	*	*	*	*	*	266	256
09:00	*	*	*	*	171	178	238	146	*	*	*	*	*	*	204	162
10:00	*	*	*	*	120	108	139	141	*	*	*	*	*	*	130	124
11:00	*	*	*	*	72	64	83	64	*	*	*	*	*	*	78	64
Lane	0	0	0	0	8068	7780	8066	8332	0	0	0	0	0	0	8082	8056
Day	0	0	0	0	15848	15428	16428	16138	0	0	0	0	0	0	16138	16138
AM Peak	-	-	-	-	07:00	07:00	08:00	07:00	-	-	-	-	-	-	07:00	07:00
Vol.	-	-	-	-	610	532	585	560	-	-	-	-	-	-	599	546
PM Peak	-	-	-	-	17:00	18:00	16:00	16:00	-	-	-	-	-	-	17:00	16:00
Vol.	-	-	-	-	643	679	658	659	-	-	-	-	-	-	638	669
Comb. Total	0	0	0	0	15848	16428	0	0	0	0	0	0	0	16138	16138	

Road Safety Audit— North Main Street (Route 28) at Matfield Street – West Bridgewater Prepared by Old Colony Planning Council – *Final*

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Community: West Bridgewater
 Com#_UR/FC: 322_U3
 Recorder # 25236
 Layout: L6 Basic (2')

Station ID:
 Site Code: 322
 Date Start: 24-Apr-19
 Date End: 25-Apr-19
 N Main St (28), north of Matfield St

Start Time	22-Apr-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	*	*	35	29	29	22	*	*	*	*	*	*	32	26
01:00	*	*	*	*	17	21	20	22	*	*	*	*	*	*	18	22
02:00	*	*	*	*	13	9	8	9	*	*	*	*	*	*	10	9
03:00	*	*	*	*	22	16	23	14	*	*	*	*	*	*	22	15
04:00	*	*	*	*	42	37	47	40	*	*	*	*	*	*	44	38
05:00	*	*	*	*	141	103	132	117	*	*	*	*	*	*	136	110
06:00	*	*	*	*	353	218	353	208	*	*	*	*	*	*	353	213
07:00	*	*	*	*	655	342	634	354	*	*	*	*	*	*	644	348
08:00	*	*	*	*	555	343	629	369	*	*	*	*	*	*	592	356
09:00	*	*	*	*	396	388	476	500	*	*	*	*	*	*	436	444
10:00	*	*	*	*	355	390	408	430	*	*	*	*	*	*	382	410
11:00	*	*	*	*	411	434	480	510	*	*	*	*	*	*	436	472
12:00 PM	*	*	*	*	453	470	448	536	*	*	*	*	*	*	450	503
01:00	*	*	*	*	400	473	440	603	*	*	*	*	*	*	420	538
02:00	*	*	*	*	472	570	495	575	*	*	*	*	*	*	484	572
03:00	*	*	*	*	501	561	473	626	*	*	*	*	*	*	487	594
04:00	*	*	*	*	483	737	508	767	*	*	*	*	*	*	496	752
05:00	*	*	*	*	481	685	526	764	*	*	*	*	*	*	504	730
06:00	*	*	*	*	369	474	387	504	*	*	*	*	*	*	378	489
07:00	*	*	*	*	298	355	267	331	*	*	*	*	*	*	282	343
08:00	*	*	*	*	240	243	218	242	*	*	*	*	*	*	229	242
09:00	*	*	*	*	153	161	218	142	*	*	*	*	*	*	186	152
10:00	*	*	*	*	98	53	122	119	*	*	*	*	*	*	110	106
11:00	*	*	*	*	62	53	74	64	*	*	*	*	*	*	68	58
Lane	0	0	0	0	7005	7215	7355	7868	0	0	0	0	0	0	7199	7542
Day	0	0	0	0	14220	14220	15263	15263	0	0	0	0	0	0	14741	14741
AM Peak	-	-	-	-	07:00	11:00	07:00	11:00	-	-	-	-	-	-	07:00	11:00
Vol.	-	-	-	-	655	434	634	510	-	-	-	-	-	-	644	472
PM Peak	-	-	-	-	15:00	16:00	17:00	16:00	-	-	-	-	-	-	17:00	16:00
Vol.	-	-	-	-	501	737	526	767	-	-	-	-	-	-	504	752

Comb. Total 0 0 14220 15263 0 0 0 14741

HCM 6th TWSC
3: Route 28 & Matfield Street

Route 28 at Matfield Street Study
Existing AM Peak Hour LOS

Intersection						
Int Delay, s/veh	293.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	¶		¶			¶
Traffic Vol, veh/h	289	144	380	162	110	334
Future Vol, veh/h	289	144	380	162	110	334
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	73	73	90	90	77	77
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	396	197	422	180	143	434
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1232	512	0	0	602	0
Stage 1	512	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.12	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.218	-
Pot Cap-1 Maneuver	~ 197	564	-	-	975	-
Stage 1	604	-	-	-	-	-
Stage 2	484	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	~ 159	564	-	-	975	-
Mov Cap-2 Maneuver	~ 159	-	-	-	-	-
Stage 1	487	-	-	-	-	-
Stage 2	484	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	\$ 875.1		0		2.3	
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 209	975	-		
HCM Lane V/C Ratio	-	- 2.838	0.147	-		
HCM Control Delay (s)	-	\$ 875.1	9.3	0		
HCM Lane LOS	-	- F	A	A		
HCM 95th %tile Q(veh)	-	- 52.3	0.5	-		
Notes						
-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon						

HCM 6th TWSC
3: Route 28 & Matfield Street

Route 28 at Matfield Street Study
Existing PM Peak Hour LOS

Intersection						
Int Delay, s/veh	1172.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	FF		FF		FF	
Traffic Vol, veh/h	203	125	524	195	237	677
Future Vol, veh/h	203	125	524	195	237	677
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	82	82	81	81
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	242	149	639	238	293	836
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2180	758	0	0	877	0
Stage 1	758	-	-	-	-	-
Stage 2	1422	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	~ 51	409	-	-	774	-
Stage 1	465	-	-	-	-	-
Stage 2	~ 224	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	~ 15	409	-	-	774	-
Mov Cap-2 Maneuver	~ 15	-	-	-	-	-
Stage 1	~ 136	-	-	-	-	-
Stage 2	~ 224	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	\$ 7182.7		0		3.2	
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 24	774	-		
HCM Lane V/C Ratio	-	- 16.27	0.378	-		
HCM Control Delay (s)	-	\$ 7182.7	12.5	0		
HCM Lane LOS	-	- F	B	A		
HCM 95th %tile Q(veh)	-	- 48.8	1.8	-		
Notes						
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon						

Data Date: 04/11/2019 5:00 pm

Synchro 10 Report
Page 1

Warrants Summary Report

1: Route 28 at Matfield

Intersection Information

	Major Street	Minor Street
Street Name	Route 28	Matfield Street
Direction	NB/SB	WB
Number of Lane:	1	1
Approach Speed	40	35

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	Yes	
Condition A or B Met?	Yes	15 Hours met (8 required)
Condition A and B Met?	Yes	15 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	Yes	15 Hours met (4 required)
Warrant 3, Peak Hour		
	Yes	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	Yes	14 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 E. 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.