



CAPE COD
COMMISSION

Eastham Road Safety Audit

Route 6 and Governor Prence Road Intersection

September 24, 2012





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Prepared by the Cape Cod Commission
In cooperation with The Town of Eastham, and
MassDOT Highway Division Traffic Safety and District 5 Offices



Table of Contents

Background	1
Introduction	1
Project Data	2
Multidisciplinary Team.....	2
Project Location and Description.....	3
Road Safety Audit: Route 6 at Governor Prence Road, Eastham.....	5
Audit Observations and Potential	7
Safety Enhancements.....	7
Safety Issue #1. Speed	7
Safety Issue #2. Conflicting Volumes.....	8
Safety Issue #3. Bicycle and Pedestrian Accommodation.....	9
Safety Issue #4. Signage	10
Safety Issue #5. Pavement Level and Markings	12
Safety Issue #6. Sight Distance.....	13
Summary of Road Safety Audit	14
List of Appendices	
Appendix A. RSA Meeting Agenda	16
Appendix B. RSA Audit Team Contact List	18
Appendix C. Detailed Crash Data.....	20
Appendix D. Additional Information.....	24
Appendix E. Road Safety Audit References.....	34
List of Figures	
Figure 1. Locus Map.....	3
Figure 2. Route 6 at Governor Prence Road Intersection (southerly)	4
Figure 3. Rte. 6 at Gov. Prence Rd. image (southerly)	4
Figure 4. Rte. 6 at Gov. Prence Rd. image (northerly)	4
Figure 5. Route 6 at Governor Prence Road Intersection (northerly)	4
List of Tables	
Table 1. Participating Audit Team Members.....	2
Table 2. Potential Safety Enhancements Summary.....	15



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Background

All levels of government—local, regional, state, and federal—have been considering locations where crashes are most severe for many years. Several years ago the national consensus was that there should be goals to reduce crashes, and in the 2005 federal legislation: *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU), there was more emphasis on improving highway safety along with a dedicated funding program—the Highway Safety Improvement Program (HSIP). The latest federal legislation: *Moving Ahead for Progress in the 21st Century* (MAP-21), signed into law on July 6, 2012, has consolidated many highway programs while retaining the Highway Safety Improvement Program (HSIP) as one of the five core highway programs.

In an effort to reduce the number of crash-related fatalities and incapacitating injuries, Massachusetts developed a Strategic Highway Safety Plan in 2006. The mission of the Safety Plan is to “Develop, promote, implement, and evaluate data-driven, multidisciplinary strategies to maximize safety for users of the roadway system.” One of the many strategies noted in the Safety Plan is to “conduct Road Safety Audits (RSA) at high-crash locations throughout the Commonwealth.” MassDOT incorporated the RSA as a requirement for securing Federal funding (Highway Safety Improvement Program [HSIP] funds) for safety projects.

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 an RSA is to identify potential safety issues and possible opportunities for safety improvements while considering all roadway users.

The Cape Cod Commission, serving as the regional planning agency for the fifteen towns on Cape Cod, has reviewed many transportation locations over the years during various processes, including the Regional Transportation Plan, the Transportation Improvement Program, and Developments of Regional Impact, considering the existing safety issues and potential improvements. In addition, the CCC began looking at specific safety locations annually through safety studies and Road Safety Audits (RSAs). A portion of the federal HSIP funds are allocated for improvements to the region’s highest crash locations.

Introduction

The Town of Eastham has 5,646 residents as of the 2010 United States Census of Population, and begins the outer Cape Cod arm that includes the Cape Cod National Seashore. Many historic properties and businesses line the main roadway through the town, now called Route 6 and part of the National Highway System. As with most Cape Cod towns, there are visitors in town, particularly in the summer months, resulting in about 25,000 people in town. Large numbers of additional visitors traverse Route 6 through Eastham on the way to the three other outer Cape Cod towns. Route 6 in



Eastham carries average daily traffic volumes of approximately 19,000, with the summer traffic volumes higher at times.

In March 2012, CCC staff presented a safety update and potential Road Safety Audit (RSA) locations to the Cape Cod Joint Transportation Committee (CCJTC), and the resulting 2012 RSA locations selected by the CCJTC included the Route 6 intersection with Governor Prence Road in Eastham. This intersection has long been a concern of the Town of Eastham, with many previous discussions regarding safety, including the safety of bicyclists and pedestrians crossing Route 6 in the vicinity.

Project Data

CCC staff prepared a graph of the traffic volume data, and printed out the Turning Movement Count (TMC) data for this intersection. The crash reports were requested from the Town of Eastham for this Road Safety Audit and were supplied by the Eastham Police Department. The crash data were reviewed and a crash diagram was developed. The crash diagram, summary data, and the TMC data are included in the appendices.

The Town of Eastham was contacted for a list of RSA participants in July 2012, and the Road Safety Audit was scheduled with MassDOT and the Town.

The Road Safety Audit meeting was held on Wednesday, July 18, 2012, beginning around 10:00 a.m., at the Eastham Town Hall. The multidisciplinary team also visited the site: Route 6 at Governor Prence Road intersection, during the RSA meeting and then reconvened at the Town Hall.

Multidisciplinary Team

Table 1. Participating Audit Team Members

Audit Team Member	Agency/Affiliation
Neil Andres	Superintendent, Eastham Department of Public Works
Ed Kulhawik	Chief, Eastham Police Department
Lisa Schletzbaum	MassDOT Highway Div.– Traffic Safety
Lisa Juan	MassDOT Highway Div.– Traffic
Susannah Barnes	MassDOT Highway Div.– Traffic
Ed Feeney	MassDOT Highway Div.– District 5
Barbara Lachance	MassDOT Highway Div.– District 5
Daniel Alexander	Cape Cod National Seashore
Clay Schofield	Transportation Engineer, Cape Cod Commission
Priscilla N. Leclerc	Senior Transportation Planner, Cape Cod Commission



Project Location and Description

Route 6 in the Town of Eastham is a four-lane undivided highway that extends between the Eastham /Orleans Rotary and the Wellfleet Town Line. Route 6 alignment is in a north-south direction. The speed limit is posted at 40 miles per hour, and the police presence for enforcement is evident.

Governor Prence Road, is a two-lane roadway, that loops easterly off of state Route 6 at a fork-like angle toward the Fort Hill Area, then arcs westerly back to Route 6, and across Route 6 at an offset intersection. Governor Prence Road then continues westerly and connects with the Cape Cod Rail Trail bikeway.

Figure 1. Locus Map

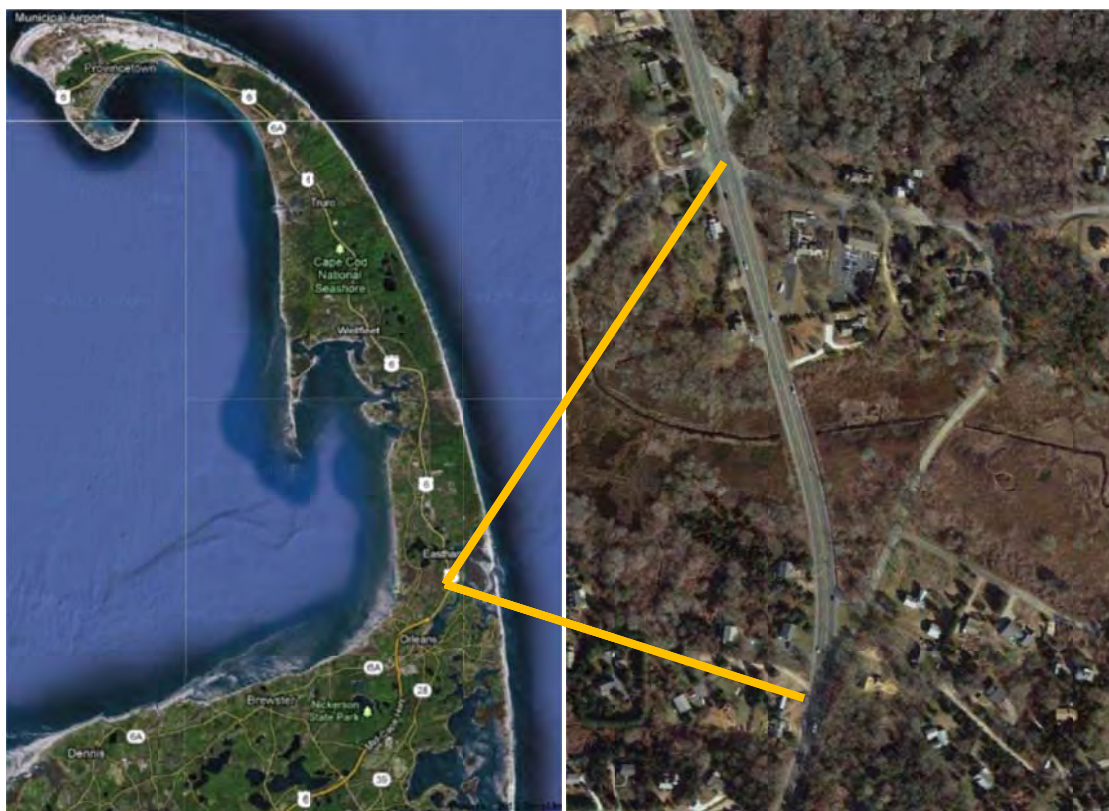




Figure 2. Route 6 at Governor Prence Road Intersection (southerly intersection)



Figure 3. Rte. 6 at Gov. Prence Rd. image (southerly intersection)



Figure 4. Rte. 6 at Gov. Prence Rd. image (northerly intersection)



Figure 5. Route 6 at Governor Prence Road Intersection (northerly intersection)





Road Safety Audit: Route 6 at Governor Prence Road, Eastham

Route 6 is a major roadway cutting through Eastham, a state highway with local access, and is functionally classified as an Urban Extension of a Rural Principal Arterial. Route 6 on Cape Cod is also designated as part of the National Highway System (NHS). The Road Safety Audit is focused on Route 6 and the Governor Prence Road intersection area.

The RSA Team reviewed the crash diagram, the crash summary, the traffic volumes, and discussed the existing conditions. Additional crash reports and the speed regulations were provided during the team meeting.

There were 12 crashes from 2009-2011 on Route 6 near or at the intersection with Governor Prence Road in Eastham, with four injury crashes and no fatal crashes. Of the injury crashes, 50% were angle and 50% were side swipe crashes. Overall crashes by type are 42% of the crashes were single vehicle crashes, 25% were angle, 25% side swipe, and 8% rear-end crashes.

The intersection has been a concern of the Town of Eastham for some time, and the District 5 Office of MassDOT has made minor improvements in sight distance, and performed signal warrant analyses for the intersection. A Turning Movement Count (TMC) was performed in August 2010. An additional signal warrant analysis was performed by CCC staff, in March 2011. A signal warrant has not been met, so far. Both the TMC data and the signal warrant analysis were brought to the RSA team meeting, and both are included in the Appendices.

The regulatory speed limit for Route 6 in Eastham is 40 miles per hour in both directions for most of Route 6 in the town. The MassDOT Highway Special Speed Regulation #7579-C, provided by Lisa Schletzbaum, MassDOT Safety, states:

“Westbound:

Thence westerly in Eastham;

5.86 miles at 40 miles per hour

0.24 miles at 25 miles per hour to the Orleans Town Line.

Eastbound:

Thence easterly in Eastham;

0.16 miles at 25 miles per hour

5.94 miles at 40 miles per hour to the Wellfleet Town Line.”

The RSA Team met for discussion of the existing conditions, visited the site for field observations, and returned to discuss the safety issues at the location.

Audit observations of the safety issues and potential enhancements, and a summary table follow.



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Audit Observations and Potential Safety Enhancements

SAFETY ISSUE #1. SPEED

Observation: Enforcement by, and visibility of, the Eastham police of Route 6 was mentioned during the RSA Team meeting discussion. It was also noted that there is signage warning travelers of the high traffic enforcement in the area.

However, the design of the roadway with its four lane section, as compared to the two-lane sections of Route 6 connecting to Orleans and Wellfleet, seem to encourage higher speeds by some vehicles at times. The comment was made that once vehicles hit the four lane section in Eastham with an opportunity to pass other vehicles, there is a tendency to accelerate to higher speed in order to pass other vehicles while travelling through the four-lane section.

Warning speed signs at 40 miles per hour (mph) are posted along Route 6. In the field, there was a comment that vehicles on Route 6 seemed to be traveling fast, and that some are likely over the 40 mph posted on the warning sign.

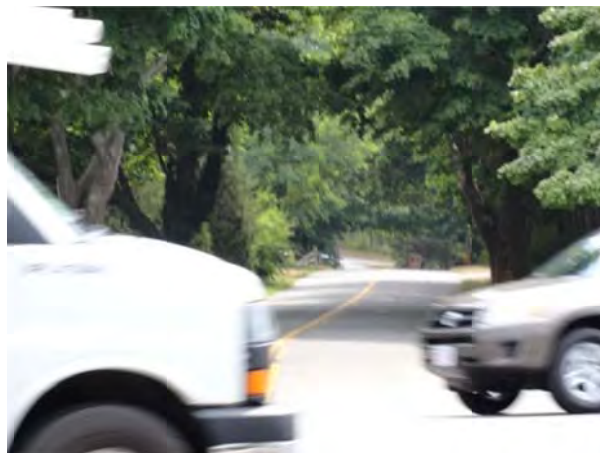
Single vehicle crashes were 42% of the crashes 2009-2011 crashes, and traveling too fast for conditions may be a contributing factor in a portion of those crashes.

Enhancement: Continue police enforcement of traveling speeds along Route 6 and in the vicinity of the intersection to ensure compliance for improved safety.

Consider additional measures, such as a roundabout at Governor Prence Road, or other traffic calming measures in certain areas to reduce speeding and enhance multi-modal safety. A partial median with a crossing for bicyclists and pedestrians in the vicinity of the information booth just north of the Gov. Prence Rd. intersection would calm traffic for that section.



Route 6, Eastham, speed limit sign



Governor Prence Road and Route 6, Eastham



SAFETY ISSUE #2. CONFLICTING VOLUMES

Observation:

Traffic volumes on Route 6 along with the four-lane cross section and traveling speeds make crossing Route 6 from Governor Prence Road difficult for all modes.

The Town of Eastham has been supportive of improved intersection control for many years; however, a signal warrant has not been met for the intersection. A

flashing light is suspended over the intersection; it is flashing red for the Governor Prence Road approaches and flashing yellow as a warning to slow for Route 6 motorists.

Angle crashes account for 25% of all crashes in the years 2009-2011. 58% of the crashes were during daylight hours.

Enhancement: A partial median treatment or a roundabout concept may assist in calming traffic in the vicinity of the intersection. A roundabout, as a possible long-term improvement, would reduce intersection conflicts by removing left turns from the intersection; and slow traffic. This slowing of traffic would also benefit the information booth area.



Route 6 looking southerly toward Governor Prence Road, Eastham



Route 6 looking northerly toward Governor Prence Road, Eastham



SAFETY ISSUE #3. BICYCLE AND PEDESTRIAN ACCOMMODATION

Observation: Route 6 has an adjacent curbed sidewalk along the westerly side only of the four-lane highway. There is a crosswalk across the Governor Prence Road leg connecting the Route 6 sidewalk on the west side.

The Cape Cod Rail Trail bikeway runs through the Town of Eastham and is located at varying distances of less than a mile to the west of Route 6. Although many bicyclists and pedestrians use that regional connection, there is also demand for bicycle and pedestrian Route 6 crossings to access local destinations. At the Governor Prence Road intersection, there is some demand due to the Fort Hill Area and coastal destinations across Route 6 to the east.

Most of the multidisciplinary team did cross Route 6 as pedestrians during the site visit with the Police Chief stopping the Route 6 traffic. There was consensus that it was extremely uncomfortable as a bicycle / pedestrian crossing. There was also mention that as more people walk and bicycle, especially in the summer on Cape Cod, that improved crossing opportunities are a necessary safety improvement.

Enhancement: Consider a pedestrian beacon north of the intersection at the information booth.

Discussion included the need for a sight distance measurement, and the possibility of a median in the vicinity to slow traffic at the Route 6 crossing.

Consider improved bicycle/pedestrian accommodation when reconstruction for Route 6, or the intersection, is being considered.



*Governor Prence Road west
of Route 6*



*Governor Prence Road east of
Route 6*



Route 6 Northbound views, Eastham



SAFETY ISSUE #4. SIGNAGE

Observation: Signs in the vicinity of the intersection of Route 6 and Governor Prence Road were reviewed in the field.

Intersection warning signs and speed limit signs were observed. All highway signs need to be included in the replacement program for updating to meet retro reflectivity requirements.

STOP signs are located on the Governor Prence Road approaches. Travelling on Route 6, it appears that the STOP sign on Governor Prence Road is facing Route 6 northbound traffic.

From the Fort Hill side of Governor Prence Road approaching the intersection with Route 6, it was noted that the stop sign was not visible to drivers heading westerly toward the intersection.

The street signs for Governor Prence Road should be relocated for improved visibility.

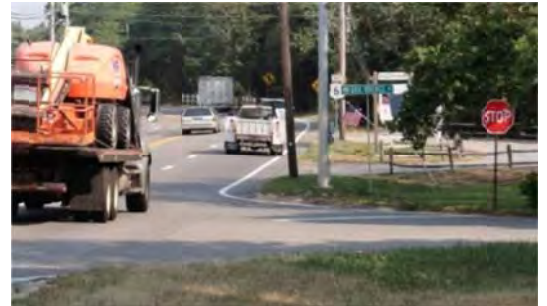
The recreational and cultural interest area guide sign with an arrow to the Fort Hill Area is not visible heading southbound on Route 6 until a vehicle is right at the intersection. Moving the Fort Hill Area sign or adding a duplicate sign on the opposite side of the road for Route 6 southbound vehicles is recommended to aid in providing advance notice to drivers well before the intersection point.



Governor Prence Road looking westerly to Route 6, Eastham



Route 6 at Governor Prence Road, Eastham



Route 6 at Governor Prence Road, Eastham



Governor Prence Road looking easterly to Route 6, Eastham



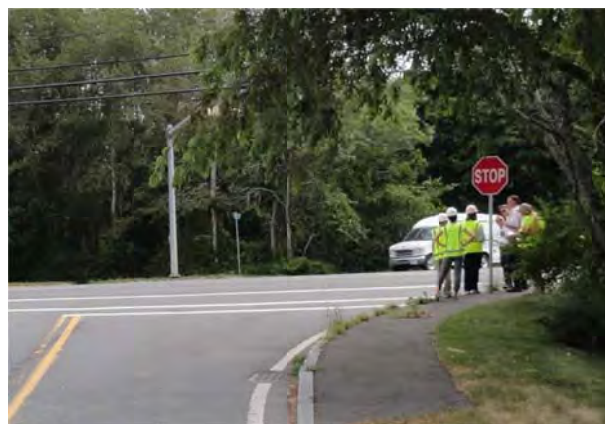
SIGNAGE (continued)



Enhancement:

Reposition the STOP sign to face the vehicles approaching on Governor Prence Road, and install on both sides of the intersection.

Trim brush for improved sight distance of the STOP signs.
Trim on the eastbound Governor Prence Road approach for improved visibility of the flashing light.



Governor Prence Road looking easterly to Route 6, Eastham

Relocate or add another "Fort Hill Area" sign for improved visibility of motorists looking for that destination.



Street signs should be upgraded, with consideration of adding one of the Governor Prence Road street signs to the post for the flashing light.



Existing signs



SAFETY ISSUE #5. PAVEMENT LEVEL AND MARKINGS

Observation: It was mentioned that the approach from the southerly section of Governor Prence Road was lower than Route 6, and therefore, an operator may have to step heavier on the gas pedal to move into traffic.



Another observation was that while travelling southbound on Governor Prence Road, the right turn arrows in the pavement are fading. Cross-hatching lines are painted on the lane south of the turn where the road is one-way in-bound.

Enhancement: Consider leveling the approach as part of roadway improvements or maintenance efforts.

The right turn arrows directing traffic to exit should be repainted, and perhaps an earlier one added. In addition, a sign could be added prior to the turn, such as, an all traffic turn right sign.

It may be possible to narrow the one-way section to further visually deter southbound vehicles.

The mature trees provide much shade but make it difficult to perceive where to drive when facing "Do Not Enter" signs. Providing a sign, such as the "All Traffic →" sign, will assist in directing drivers to the appropriate path back to Route 6.



Route 6 at the southerly section of Governor Prence Road, Eastham



SAFETY ISSUE #6. SIGHT DISTANCE

Observation: Discussion by the multidisciplinary team included observations about the sight distance to and from the intersection approaches.

With note of the high ground and wall to the left of the westbound approach leg of Governor Prence Road, it was stated that there were improvements (2004) to improve sight distance by lowering the adjacent slope. To reduce property impacts, the wall was placed in its current position at that time. However, visibility of Route 6 northbound vehicles by motorists on Governor Prence Road westbound remains a concern due to the vertical curve and the hill.

There was concern about the sight distance for motorists southbound on Route 6 approaching the suggested pedestrian beacon at the information booth.

It was observed that the flashing light was twisted so that you see both the yellow and red lights at the same time. From the Governor Prence Road eastbound approach to Route 6, it was mentioned that the flashing light was partially obscured by vegetation.

Vegetation is impacting sight distance on the Governor Prence Road eastbound approach for drivers both on Gov. Prence Road EB and Route 6 Southbound.

Enhancement: It was noted that further improvements may be required to improve sight distance from Governor Prence Road in the long term, but in the short term keeping the area mowed to reduce obstruction by the vegetative growth is desirable.

The flashing light should be adjusted for improved alignment, and the vegetation trimmed on both approaches of Governor Prence Road.



Route 6 at the southerly section of Governor Prence Road, Eastham



Governor Prence Rd westbound approach, looking south at Route 6.



Gov. Prence Road looking easterly to Route 6



Gov. Prence Road looking westerly to Route 6



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Summary of Road Safety Audit

The following summary list of the Road Safety Audit observations and enhancements is provided to assist in the design and/or implementation of potential improvements elicited during the process. It is also recommended that any design process for more involved geometric changes include further analysis and public input.

Safety payoff estimates, shown in the following list, are subjective and may be based on the relative percent of crashes that may be reduced by the enhancement based on known and documented crash reduction factors, if available, or estimated crash reduction based on a stated source [for example, low (<30%), medium (31% to 70%), and high (>71%)]. The time frame is categorized as short-term (<1 year), mid-term (1 to 3 years), or long-term (>3 years). The costs are categorized as low (<\$10,000), medium (\$10,001 to \$50,000), or high (>\$50,001).

There is a strong desire in the community to improve safety of the Route 6 corridor and to provide improved bicycle / pedestrian crossings, where feasible, for connections between the Cape Cod Rail Trail and destinations across Route 6.



Table 2. Potential Safety Enhancement Summary

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Agency
Speed Continue monitoring Consider traffic calming	Continue enforcement of the speed limit	Medium	Medium-term	Medium	MassDOT, possible partners Town and CCNS
	Consider a roundabout or other traffic calming via a partial median combined with a pedestrian crossing near the information booth	High	Medium-term	High	
Conflicting Volumes Left turns in and out of Gov. Prence Rd conflicting with Route 6 traffic volumes	Install a partial median to calm traffic in the intersection area	Medium	Medium-term	Medium	MassDOT
	Consider a roundabout for this intersection	High	Long-term	High	
Bicycle and Pedestrian Accommodation Lack of safe Route 6 crossing Sidewalk adjacent to street and only on one side	Consider a roundabout for this intersection	High	Long-term	High	MassDOT, possible partners Town and CCNS
	Consider a pedestrian beacon north of the intersection at the information booth, probably with a median.	Medium	Medium-term	High	
	Consider improved bicycle/pedestrian accommodation when reconstruction for Rte. 6 or the intersection is being considered.	Medium	Medium-term	High	
Signage Sign visibility and alignment St. signs and rec/cultural area sign	Upgrade for Retro reflectivity Replace STOP sign and add a STOP to have on both sides of Gov. Prence Rd. Align STOP sign to face Gov. Prence Rd. (Not Rte. 6) Adjust Street and recreation/cultural area signs for improved visibility	Low to Medium	Short-term	Low	MassDOT, Town and CCNS
Pavement Level and Markings Sag areas Gov. Prence Rd. to Route 6 Pavement Markings	Adjust pavement level on the southerly Governor Prence Road leg approach to Route 6	Low	Medium-term	Medium	MassDOT, possible partners Town and CCNS
	Repaint the right turn arrows adding another one before the two existing, and repaint the cross-hatching	Low	Short-term	Low	
Sight Distance Slope near wall at intersection Vegetation Alignment of flashing light	Keep mowed short-term; long-term reduce slope and relocate wall on the southeasterly side of the intersection of Rte. 6 and Gov. Prence Road	Low	Short-term	Low	MassDOT, possible partners Town and CCNS
	Trim vegetation for improved visibility of the STOP signs and flashing light, and adjust alignment of the flashing light	Low	Long-term	High	
		Low	Short-term	Medium	

Appendix A. RSA Meeting Agenda

3225 MAIN STREET • P.O. BOX 226
BARNSTABLE, MASSACHUSETTS 02630

(508) 362-3828 • Fax (508) 362-3136 • www.capecodcommission.org



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Road Safety Audit Meeting

Eastham, Route 6 State Highway at Governor Prence Road

Wednesday, July 18, 2012

10:00 a.m. – 12:00 p.m.

Location: Eastham Town Hall, 2500 State Highway, Eastham, MA 02642

10:00 a.m. Welcome and Introductions

10:10 a.m. Review of Site Specific Material

- Crash, Speed, & Volume Summaries– provided in advance
- Existing Geometries and Conditions

10:45 a.m. Visit the Site

- Assemble as a group at the site for observation of conditions
- As a group, identify areas for improvement

11:15 a.m. Post Visit Discussion / Completion of RSA

- Discuss observations and finalize findings
- Discuss potential improvements and finalize recommendations

12:00 p.m. Adjourn for the Day

Next Steps: After the RSA meeting, CCC staff will prepare a draft document and circulate it to participants. Participants are asked to comment and respond to the draft document to assure it is reflective of the RSA completed by the multidisciplinary team.

With comments submitted, a final document is then produced; the final document is expected to be available in August-September 2012.

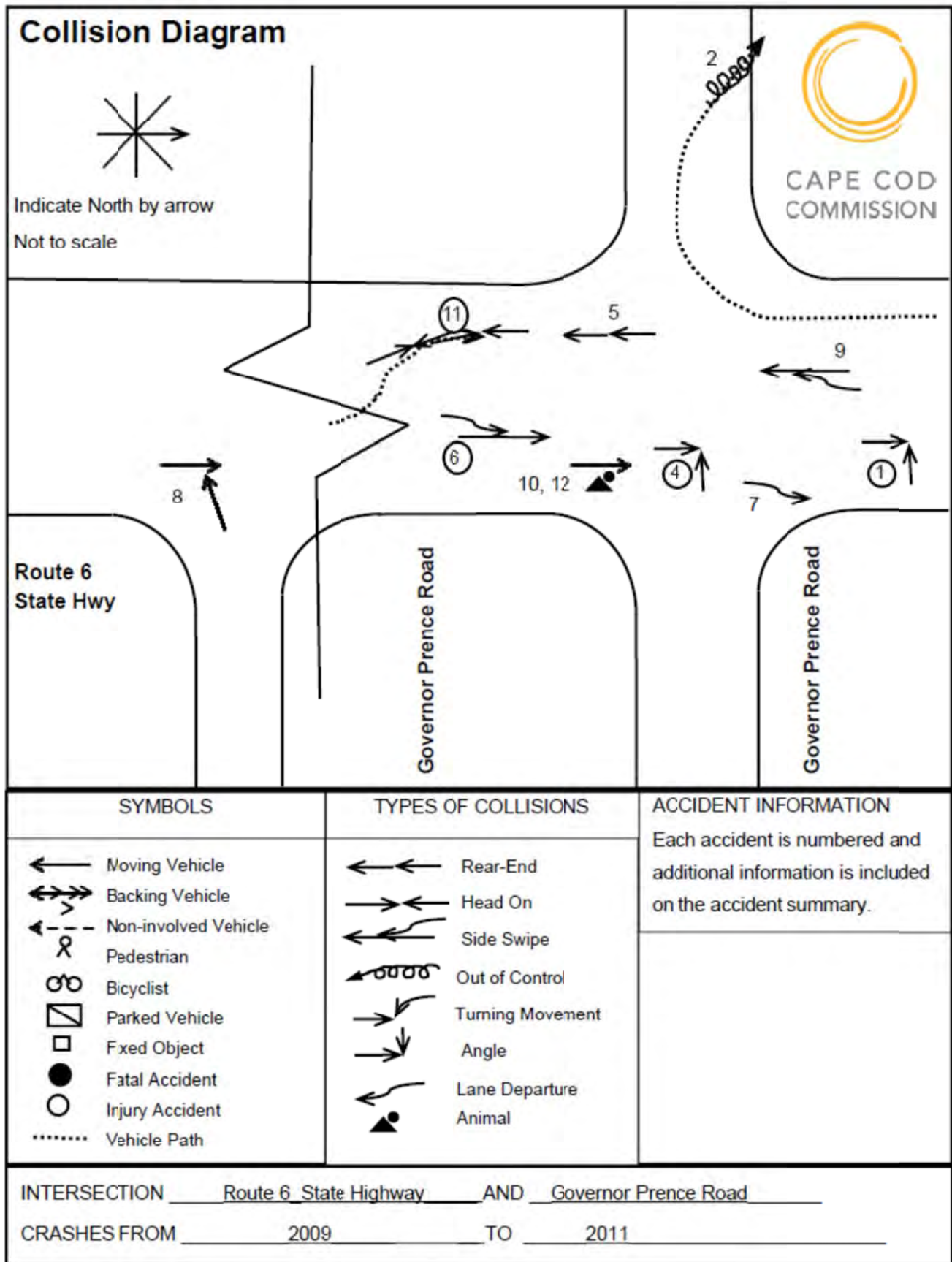
Appendix B. RSA Audit Team Contact List

Participating Audit Team Members

Date: July 18, 2012 Location: Eastham Town Hall and site visit

Audit Team Member	Agency/Affiliation
Neil Andres	Superintendent, Eastham Department of Public Works
Ed Kulhawik	Chief, Eastham Police Department
Lisa Schletzbaum	MassDOT Highway Div.– Traffic Safety
Lisa Juan	MassDOT Highway Div.– Traffic
Susannah Barnes	MassDOT Highway Div.– Traffic
Ed Feeney	MassDOT Highway Div.– District 5
Barbara Lachance	MassDOT Highway Div.– District 5
Daniel Alexander	Cape Cod National Seashore
Clay Schofield	Transportation Engineer, Cape Cod Commission
Priscilla N. Leclerc	Senior Transportation Planner, Cape Cod Commission

Appendix C. Detailed Crash Data



Source: Crash Diagram developed based on 2009-2011 crash reports provided by the Eastham Police Department

Crash Number	Crash Date	Crash Time	# of injuries	# of Vehicles	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Vehicle Sequence of Events	Age of Driver (Veh 1)	Age of Driver (Veh 2)	Road Surface	Weather	Roadway
1	8/18/09	2:40 PM	1	2	Angle	Veh 1 missed turn for Gov. Prence Rd. and attempted a U-turn out of info booth lot	V1:W / V2:N	Veh 1 pulled out of info booth driveway heading to Rte 6 SB crossing the path of Veh 2 NB on Rte 6; Veh 2 hit Veh 1	61	54	dry	clear	Route 6, Eastham at Governor Prence Road
2	8/24/09	6:32 PM	0	1	Single Veh. Crash (Lane Departure)	Veh 1 Rte 6 SB turned right onto Gov. Prence Road	V1: S then W	Veh 1 out of control on Gov. Prence Road (turned too fast from Rte. 6) and off road struck pole	18		dry	clear	Governor Prence Road
3	8/12/10	10:46 AM	0	1	Other -debris from weedwacking	Veh 1 NB Rte 6 (vicinity of 1550 Route 6)	V1: N	Veh 1 rear window shattered by debris from DPW employee using weed wacking equipment at side of road	37		dry	clear	Route 6
4	9/13/10	3:30 PM	2	2	Angle	Veh 1 NB and Veh 2 pulling out of Gov. Prence Rd	V1:N V2:W	Veh 1 attempted to stop 32' skid mark before hitting Veh 2	25	50	dry	clear	Route 6, Eastham at Governor Prence Road
5	12/20/10	5:14 PM	0	2	Rear End	Veh 1 Rte 6 NB and Veh 2 following behind NB, and Veh 3 SB slides into path of Veh 1	V1:N V2:W V3:SB	Veh 1 slowed to avoid Veh 3, and stopped. Veh 2 unable to stop and hits Veh 1.	32	65	snow	snow	Route 6
6	12/27/10	4:40 PM	1	2	Side Swipe, same direction	Veh 1 NB Rte 6 slowly with snow & high winds, Veh 2 NB in passing lane	V1:N V2:N	Veh 1 side swiped by Veh 2. Veh 2 did not stop.	55	(unknown-Subaru SUV)	ice	snow (blowing snow)	Route 6
7	1/27/11	7:47 AM	0	1	Single Veh. Crash (Lane Departure)	Veh 1 Route 6 NB	V1: N	Veh 1 NB on Route 6 and slid off road into snow bank	32		snow	snow	Route 6

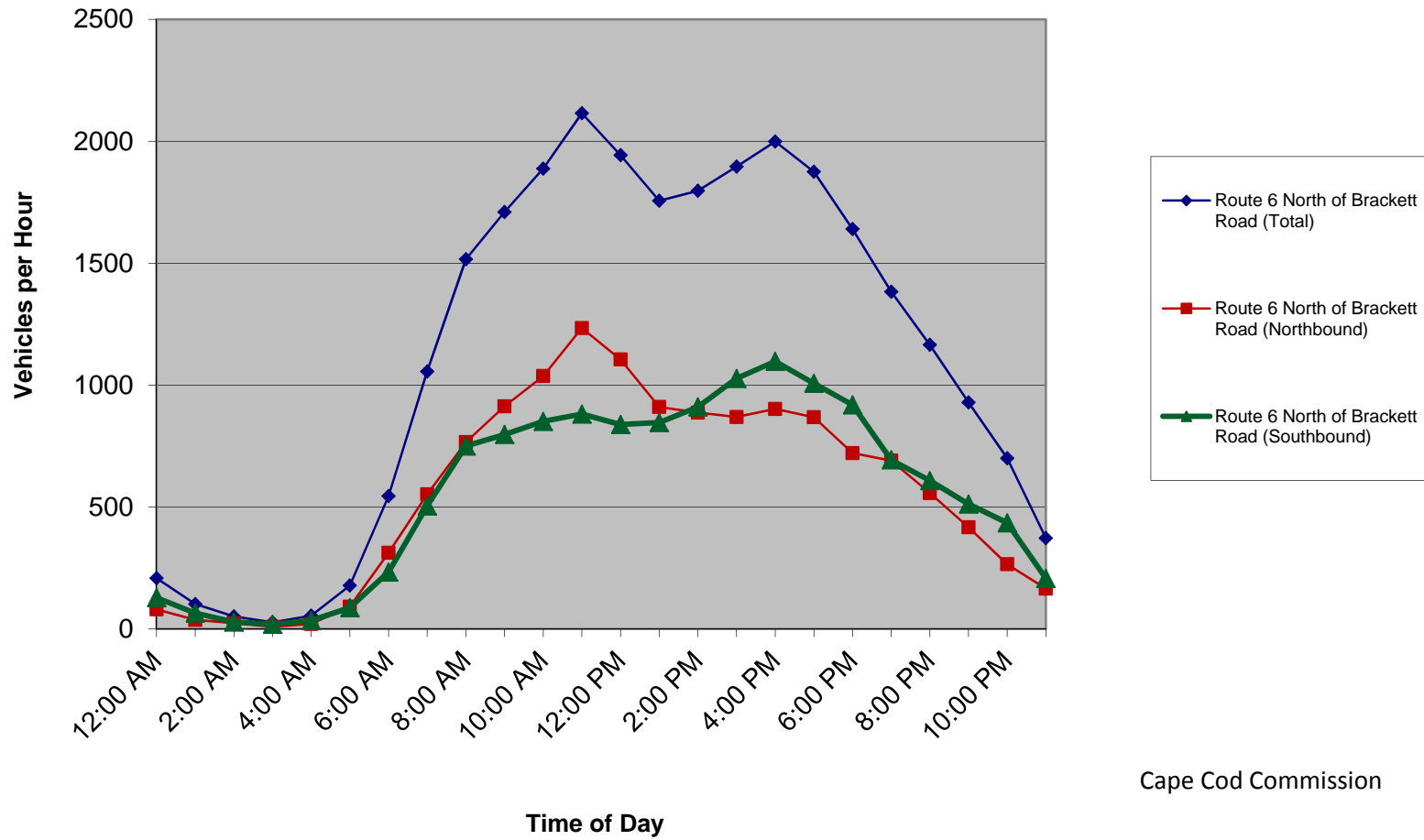
Crash Number	Crash Date	Crash Time	# of injuries	# of Vehicles	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Directions	Vehicle Sequence of Events	Age of Driver (Veh 1)	Age of Driver (Veh 2)	Road Surface	Weather	Roadway
8	6/25/11	7:07 PM	0	2	Angle	Veh 1 wrong way on one-way Gov. Prence Rd, attempting to turn left onto Route 6 SB; Veh 2 NB on Route 6	V1:W / V2:N	Veh 2 travelling NB on Route 6 when Veh 1 drove into the passenger side of Veh 2.	82	41	dry	clear	Route 6, Eastham at Governor Prence Road
9	6/28/11	3:04 PM	0	2	Side Swipe, same direction	Veh 1 SB right lane Veh2 SB in passing lane & third veh stops to turn left onto Gov. Prence Rd	V1:S V2:S	Veh 2 moves into right lane to avoid stopped veh and sideswipes veh 1	29	57	dry	cloudy	Route 6, Eastham at Governor Prence Road
10	11/18/11	10:03 PM	0	1	Single Vehicle Crash (deer)	Veh 1 NB on Rte. 6	V1:N	veh 1 struck deer that jumped out in front of vehicle on Route 6 NB	49		dry	clear	Route 6
11	11/22/11	5:22 PM	4	3	Side Swipe, opposite direction	Veh 1 NB on Rte. 6 crossed over into SB lanes	V1:NB V2: SB V3: SB	Veh 1 NB on Rte. 6 crossed into SB lanes into path of oncoming SB vehicles and hit Veh 2, then hit Veh 3.	58	34	dry	clear	Route 6
12	11/22/11	7:52 PM	0	1	Single Vehicle Crash (deer)	Veh 1: NB on Route 6	V1:N	Veh 1: traveling NB on Route 6 and operator reported that a deer ran into the passenger side	89		dry	clear	Route 6, Eastham at Governor Prence Road

Source: Eastham Police Department crash reports for this location from 2009-2011.

Appendix D. Additional Information

- Hourly Traffic Volumes Graph: Route 6 and Governor Prence Road, Eastham
- Turning Movement Count: Route 6 and Governor Prence Road, Eastham;
Performed on August 25, 2010
- Signal Warrant Analysis

Route 6 State Highway, Eastham, Hourly Traffic Volumes



Cape Cod Commission

August 25, 2010 TMC CARS

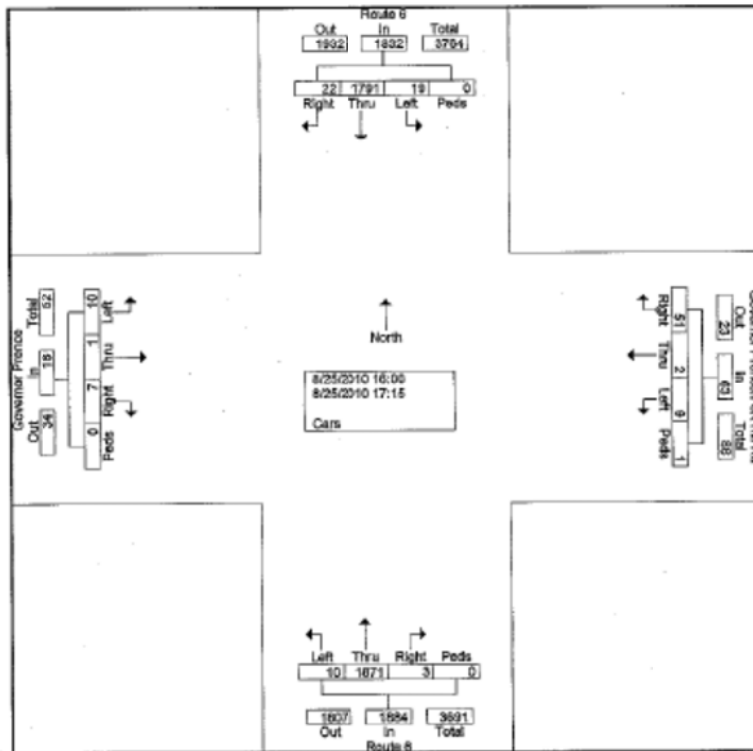
CAPE COD COMMISSION
 3225 Main Street • P.O. Box 226
 Barnstable, MA 02630
 Tel: 508.362.3828 • Fax: 508.362.3136
 E-Mail: trans@cspecodcommission.org

Counter #: 5
 Counted By: Brian M
 Location: Route 6 @ Governor Prence (N)
 Date: 8/25/2010

File Name : GovP@6_08252010
 Site Code : 1255
 Start Date : 8/25/2010
 Page No : 1

Groups Printed- Cars

Start Time	Route 6 From North				Governor Prence/Fort Hill Rd From East				Route 6 From South				Governor Prence From West				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
16:00	3	272	5	0	3	0	10	0	1	321	0	0	3	0	0	0	618
16:15	5	325	2	0	1	0	10	0	2	316	1	0	1	0	2	0	665
16:30	3	363	10	0	2	0	9	0	0	362	0	0	1	0	0	0	690
16:45	4	318	1	0	0	0	10	1	4	307	1	0	0	0	3	0	649
Total	15	1278	18	0	6	0	39	1	7	1246	2	0	5	0	5	0	2622
17:00	2	250	1	0	0	0	7	0	3	306	0	0	3	0	1	0	573
17:15	2	263	3	0	3	2	5	0	0	319	1	0	2	1	1	0	602
Grand Total	19	1791	22	0	9	2	51	1	10	1871	3	0	10	1	7	0	3797
Approch %	1	97.8	1.2	0	14.3	3.2	81	1.8	0.5	99.3	0.2	0	55.6	5.6	38.9	0	
Total %	0.5	47.2	0.8	0	0.2	0.1	1.3	0	0.3	49.3	0.1	0	0.3	0	0.2	0	



August 25, 2010 TMC TRUCKS

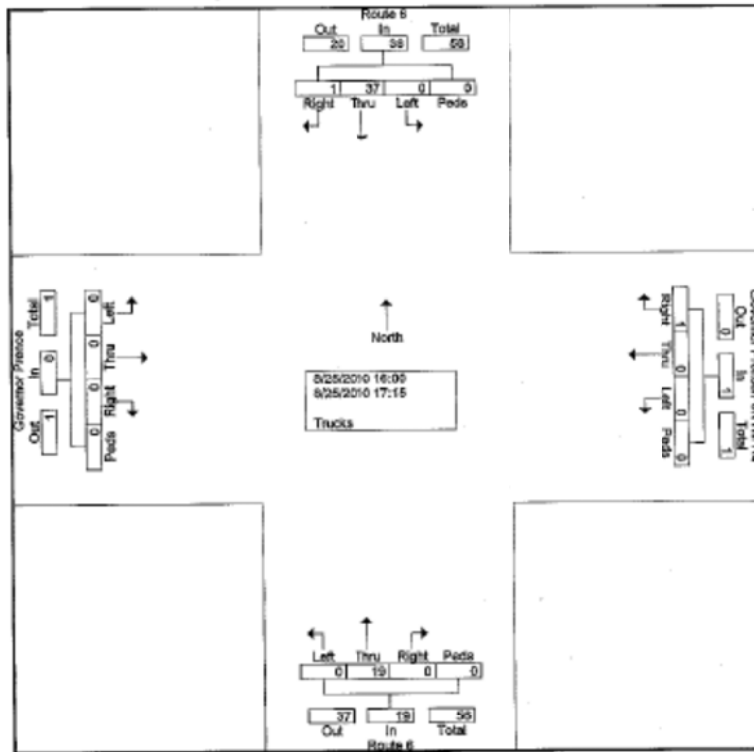
CAPE COD COMMISSION
 3225 Main Street • P.O. Box 226
 Barnstable, MA 02630
 Tel: 508.362.3828 • Fax: 508.362.3135
 E-Mail: trans@capecodcommission.org

Counter #: 5
 Counted By: Brian M
 Location: Route 6 @ Governor Prence (N)
 Date: 8/25/2010

File Name : GovP@6_08252010
 Site Code : 1255
 Start Date : 8/25/2010
 Page No : 1

Groups Printed- Trucks

Start Time	Route 6 From North				Governor Prence/Fort Hill Rd From East				Route 6 From South				Governor Prence From West				Int. Total	
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds		
18:00	0	7	0	0	0	0	1	0	0	5	0	0	0	0	0	0	0	13
18:15	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	5
18:30	0	6	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	8
18:45	0	4	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	8
Total	0	21	0	0	0	0	1	0	0	12	0	0	0	0	0	0	0	34
17:00	0	10	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	12
17:15	0	6	1	0	0	0	0	0	0	5	0	0	0	0	0	0	0	12
Grand Total	0	37	1	0	0	0	1	0	0	19	0	0	0	0	0	0	0	58
Approch %	0	97.4	2.6	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0
Total %	0	63.8	1.7	0	0	0	1.7	0	0	32.8	0	0	0	0	0	0	0	0



August 25, 2010 TMC BIKES

CAPE COD COMMISSION

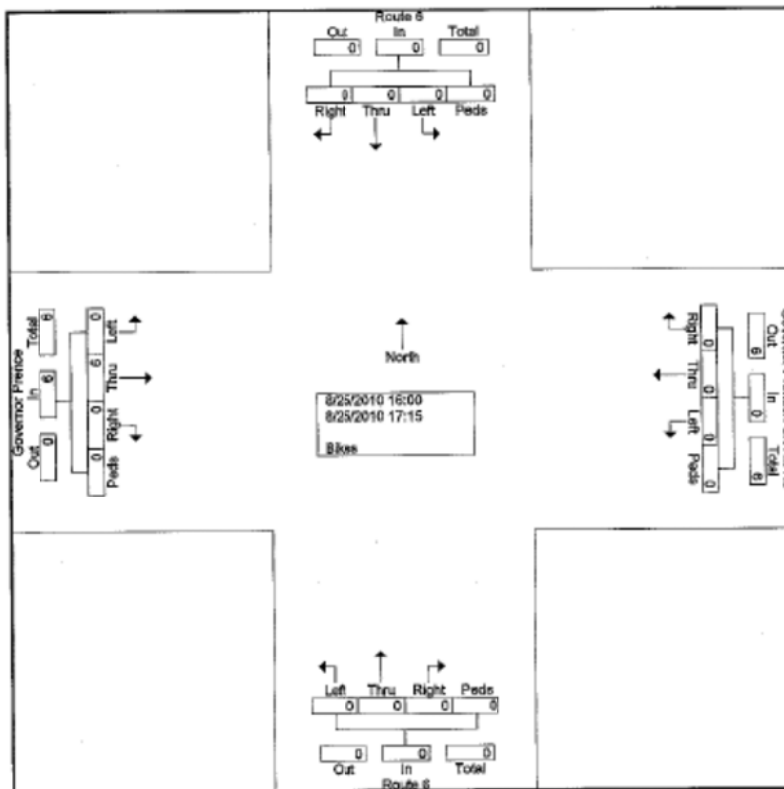
3225 Main Street • P.O. Box 226
 Barnstable, MA 02630
 Tel: 508.362.3828 • Fax: 508.362.3136
 E-Mail: trans@capecodcommission.org

Counter #: 5
 Counted By: Brian M
 Location: Route 6 @ Governor Prence (N)
 Date: 8/25/2010

File Name : GovP@6_08252010
 Site Code : 1255
 Start Date : 8/25/2010
 Page No : 1

Groups Printed- Bikes

Start Time	Route 6 From North				Governor Prence/Fort Hill Rd From East				Route 6 from South				Governor Prence From West				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
*** BREAK ***																	
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6
*** BREAK ***																	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6
*** BREAK ***																	
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6
Approch %	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	



August 25, 2010 TMC CARS and TRUCKS

CAPE COD COMMISSION

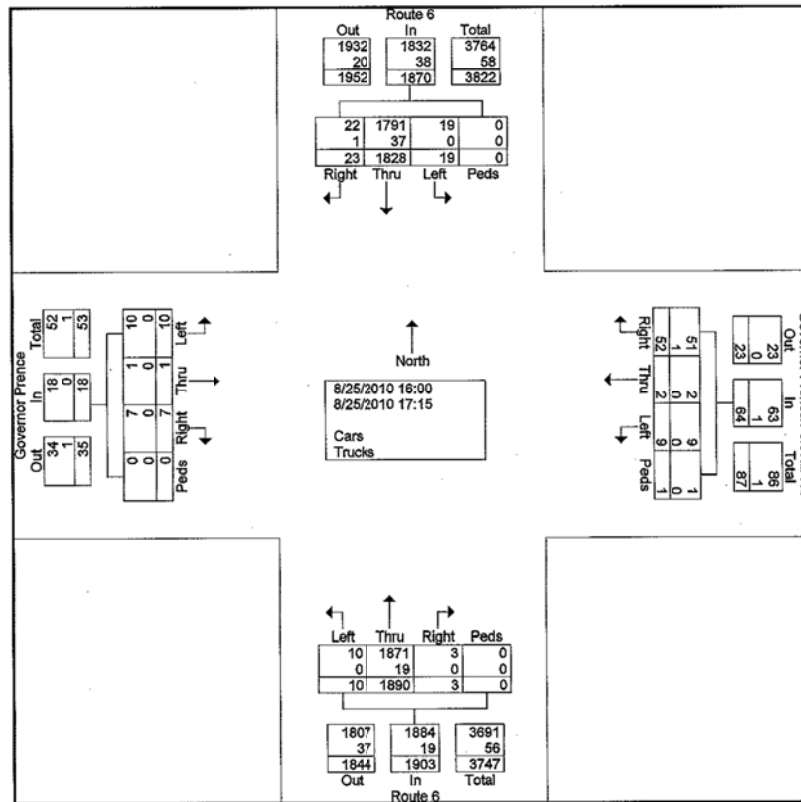
3225 Main Street • P.O. Box 226
 Barnstable, MA 02630
 Tel: 508.362.3828 • Fax: 508.362.3136
 E-Mail: trans@capecodcommission.org

Counter #: 5
 Counted By: Brian M
 Location: Route 6 @ Governor Prence (N)
 Date: 8/25/2010

File Name : GovP@6_08252010
 Site Code : 1255
 Start Date : 8/25/2010
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Route 6 From North				Governor Prence/Fort Hill Rd From East				Route 6 From South				Governor Prence From West				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
16:00	3	279	5	0	3	0	11	0	1	326	0	0	3	0	0	0	631
16:15	5	329	2	0	1	0	10	0	2	317	1	0	1	0	2	0	670
16:30	3	369	10	0	2	0	9	0	0	304	0	0	1	0	0	0	698
16:45	4	322	1	0	0	0	10	1	4	311	1	0	0	0	3	0	657
Total	15	1299	18	0	6	0	40	1	7	1258	2	0	5	0	5	0	2556
17:00	2	260	1	0	0	0	7	0	3	308	0	0	3	0	1	0	585
17:15	2	269	4	0	3	2	5	0	0	324	1	0	2	1	1	0	614
Grand Total	19	1828	23	0	9	2	52	1	10	1390	3	0	10	1	7	0	3855
Apprch %	1	97.8	1.2	0	14.1	3.1	81.2	1.6	0.5	99.3	0.2	0	55.6	5.6	38.9	0	
Total %	0.5	47.4	0.6	0	0.2	0.1	1.3	0	0.3	49	0.1	0	0.3	0	0.2	0	
Cars	19	1791	22	0	9	2	51	1	10	1371	3	0	10	1	7	0	3797
% Cars	100	98	95.7	0	100	100	98.1	100	100	99	100	0	100	100	100	0	98.5
Trucks	0	37	1	0	0	0	1	0	0	19	0	0	0	0	0	0	58
% Trucks	0	2	4.3	0	0	0	1.9	0	0	1	0	0	0	0	0	0	1.5



Governor Prence Warrant Assessment – March 23, 2011

Warrant 1- Eight Hour Vehicular Volumes

The traffic volumes on Governor Prence are well below the minimum for this warrant.

Warrant 2 - Four Hour Volume

The traffic volumes on Governor Prence are well below the minimum for this warrant.

Warrant 3 – Peak Hour Volume

The traffic volumes on Governor Prence are well below the minimum for this warrant.

Warrant 4 – Pedestrian Volume

One hour ped/bike volume is 7. Average Rte 6 traffic volume is 1349 NB and 1373 SB for the same hour (16:00). Minimum bike/ped threshold is 133/hour.

Warrant 5 – School Crossing – N/A

Warrant 6 – Coordinated signal System – N/A

Warrant 7 – Crash Experience

Requires 5 or more crashes in a year where damage exceeds the reporting threshold. Four “major” (damage over \$1000) were reported in 2008 and only 1 in 2009.

The traffic volumes on Governor Prence also do not meet this warrant requirement.

Warrant 8 – Roadway Network

Must include two or more major routes - Governor Prence is not a major route.

Warrant 9 – Intersection Near a Grade Crossing – N/A

Pedestrian Hybrid Beacon – a potential option

There is a traffic control device called a pedestrian hybrid beacon that is pedestrian activated. A hybrid beacon may be considered for intersections that do not meet traffic signal warrants.

On roads with speed limits above 35mph the minimum pedestrian count/hour is 20. There were 7 pedestrians and bicycles recorded in the peak hour in August 2010. Taking the “if we build it, they will come” philosophy, I think a case can be made that by making the crossing safe, more people will use it and the minimum threshold will be exceeded.

Figure 4F-3. Sequence for a Pedestrian Hybrid Beacon



Appendix E. Previous Route 6 Study related Information

- Excerpt from the CCC Route 6 Outer Cape Traffic Flow & Safety Study, page 36 and page 39

2.6 Signal Warrant Analysis

As mentioned earlier, two hour turning movements were collected and the peak hour was used to review one of the signal warrant's (Warrant 3) applicability to several locations in the study. By relating peak hour information with nearby ATR data, turning movements were factored to more hours which provided data for additional signal warrant analysis (Warrant 1 and Warrant 2). The table below shows a summary of the signal warrant analysis. Detailed information is included in the Appendix.

Table 9 – Signal Warrant Analysis Summary

Roadway Intersections with Route 6	Meets MUTCD Warrant 1 – Eight Hour	Meets MUTCD Warrant 2 – Four Hour	Meets MUTCD Warrant 3 – Peak Hour *
South Eastham Street	No	No	No
Hay Road	No	No	No
Governor Prence Road**	No	No	No
Depot Road	No	No	No
Old State Road	No	No	No
Kingsbury Beach Road	No	No	No
Old Orchard Road	No	No	No
Great Pond Road	No	No	No
McKoy Road	No	No	No
Massasoit Road	Yes	Yes	Yes
Railroad Avenue	No	No	No
Aspinet Road	Yes	No	No
Wellfleet Drive-In	No	No	No
Springbrook Road	No	No	No
West Road	No	No	No
Hemenway Road	No	No	No
Hoffman Lane	No	No	No

* Note that this warrant "...shall be applied only in unusual cases. Such cases include, but are not limited to, office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time" and may not be currently applicable.

** Governor Prence Road is recommended to be signalized based on the 1988 study "Route 6 and Governor Prence Road" (by Bayside Engineering Associates for the Massachusetts Department of Public Works). Traffic which currently accesses Route 6 from South Eastham Street and Hay Road would likely use a safer, access-controlled signal at Governor Prence Road instead. With this consolidation, the Governor Prence Road and Route 6 intersection would meet Warrants 1 and 2.

3. Alternatives Analysis

3.1 Currently Planned Improvements

There are current MassHighway plans for improvements at five intersections. These improvements are detailed in a 1997 MassHighway report prepared by Vollmer Associates.

Proposed improvements for Route 6 intersections include:

- Governor Prence Road: Vegetation removal and re-grading to improve sight distance on southeast quadrant; install pedestrian wheelchair ramps on northwest quadrant; install crosswalk and stop line on eastbound approach
- Samoset Road: Install new actuation system and update signal timing/phasing including a northbound leading left turn phase; modify Eastham Town Hall entrance drive.
- Nauset Road/Salt Pond Road: Install pedestrian signal heads on west side quadrants; replace existing 8" signal heads with 12" signal heads on Route 6 approaches. *Note: CCC Field Observations indicate that sight distance should be improved for the southbound approach of Route 6 north of the intersection.*
- Brackett Road/Old County Road: relocate existing signal pole and install signal heads, pedestrian head, and button on northeast quadrant; Install 8" signal pole and pedestrian head and button on southeast quadrant; install pedestrian heads and buttons on west side quadrants; inspect and replace controller cabinet as necessary.
- Marconi Beach Road: Install 20' mast arm, signal heads and pedestrian head and button on northeast quadrant; on west side: install pedestrian head and button, replace & service signal head, and install second mast arm and signal heads.

Collectively, the improvements listed above are intended to improve safety for motorists and pedestrians using these intersections. The improvements may be completed by summer of 2004.

3.2 Traffic Flow Modeling

The detailed approach used for modeling roadway alternatives is described here. *Synchro-SimTraffic*, a traffic operations software package from Trafficware, was chosen as the program to analyze operations along the Route 6 corridor. The operations model covered the study area from the Orleans Rotary to just north of West Road in Wellfleet.

The first step in the alternative analysis was to develop a baseline which represents future conditions without improvements. To accomplish this, two-hour turning movement counts (broken into 15-minute intervals) were taken at 25 major intersections along the Eastham and South Wellfleet sections of the corridor. Turning movement counts were collected for each 15-minute period from 4 p.m. to 6 p.m. Peak hour traffic volumes for each intersection were then determined and coded into the model network, resulting in an afternoon peak hour model. The network building process also included coding the lane

Appendix F. Road Safety Audit References

Road Safety Audit References

Road Safety Audits. Institute of Transportation Engineers and U.S. Department of Transportation, Federal Highway Administration, www.roadwaysafetyaudits.org.

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

Desktop Reference for Crash Reduction Factors. Report No. FHWA-SA-08-011. U.S. Department of Transportation, Federal Highway Administration, September 2008

MassDOT Highway Division Traffic Engineering and Safety resources online, at <http://www.mhd.state.ma.us/default.asp?pgid=trafficIndex&sid=level2>

U.S. DOT Memorandum from Tony Furst, Acting Associate Administrator for Safety, to Division Administrators, January 12, 2012, Promoting the Implementation of Proven Safety Countermeasures