

EASTON STATE NUMBERED ROUTES STUDY

PREPARED UNDER CONTRACT #4034021





Easton State Numbered Routes Corridor Study

ROUTE 138, ROUTE 123, AND ROUTE 106 CORRIDORS IN EASTON

August 2007



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



UPWP Task 3600 Easton State Numbered Route Corridor Study (2006)
UPWP Task 3200 Regional Traffic Studies (2007)

This report was prepared under Contract with the Massachusetts Highway Department and with the cooperation of the Executive Office of Transportation and Public Works, the Federal Highway Administration, and the Federal Transit Administration, under contract 4034021.



Acknowledgements

The Old Colony Transportation Staff would like to thank the Old Colony Metropolitan Planning Organization (MPO), the Federal Highway Administration (FHWA), and the Massachusetts Highway Department (MassHighway), for providing the funding and support for this important transportation planning activity.

This planning level study was prepared by the following members of the Old Colony Planning Council staff under the direction of Pat Ciaramella, Executive Director, and the supervision of Charles Kilmer, Transportation Program Manager.

Report Preparation

Ray Guarino, Transportation Planner
rguarino@ocpcrpa.org

Data Collection and Analysis

Jed Cornock, Transportation Planner
jcornock@ocpcrpa.org

Bruce Hughes, Economic Development Specialist/Community Development Planner
bhughes@ocpcrpa.org

Ray Guarino, Transportation Planner
rguarino@ocpcrpa.org

William McNulty, Transportation Planner
wmcnulty@ocpcrpa.org

Mapping and Graphics

Susan McGrath, GIS Coordinator
smcgrath@ocpcrpa.org



OLD COLONY METROPOLITAN PLANNING ORGANIZATION

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Robert Wing	Chairman, Board of Selectmen, Abington
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Luisa Paiewonsky	Commissioner, MassHighway
Reinald Ledoux, Jr.	Administrator, BAT
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BAT	Kathy Riddell
DEP	Leah Weiss
FHWA	Michael Chong
FHWA	Edward Silva
FTA	Andrew Motter
FTA	Donna Laidley
Brockton Traffic Commission	Captain John Gomes

OCPC TRANSPORTATION STAFF

Charles Kilmer	Transportation Program Manager
Jed Cornock	Transportation Planner
Raymond Guarino	Transportation Planner
William McNulty	Transportation Planner
Susan McGrath	GIS Coordinator
Karen Winger	Transportation Planner



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 Phillip Lindquist

 Brian Van Riper

 James Mulcahy
 Robert E. Kuver
 Nancy Bresciani
 Daniel Salvucci

OCPC STAFF

Pasquale Ciaramella
 Lila Burgess
 Jed Cornock
 Hazel Gauley
 Raymond Guarino
 Patrick Hamilton
 Bruce G. Hughes

Charles Kilmer
 Jane E. Linhares
 Janet McGinty
 Susan McGrath
 William McNulty
 Anne Nicholas
 Norman Sorgman
 Jacqueline Surette
 James R. Watson
 Karen Winger

Executive Director
 Ombudsman Program Director
 Transportation Planner
 Assistant Ombudsman Director
 Transportation Planner
 AAA Administrator
 Economic Development Specialist/Community Development
 Planner
 Transportation Program Manager
 Grants Monitor/ Secretary
 Fiscal Officer
 GIS Coordinator
 Transportation Planner
 Ombudsman Program Assistant
 Assistant Ombudsman Director
 Fiscal Consultant
 Comprehensive Planning Supervisor
 Transportation Planner



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1 EXECUTIVE SUMMARY

STUDY PURPOSE AND SCOPE

The Old Colony Planning Council has undertaken a comprehensive study of the state numbered routes in the Town of Easton in order to identify specific problems in traffic efficiency, circulation, and safety. This study focuses on the Route 138, Route 123, and Route 106 corridors in Easton and on key intersections along these corridors. These routes provide connections between Route 24, in Brockton and West Bridgewater to the east of Easton, and I-495, to the south of Easton. As chronic traffic congestion continues to grow on Route 24 and I-495, more and more motorists have found their way between these two highways via Route 123, Route 138, and Route 106 in Easton. This alternative path has compounded traffic and circulation problems in Easton, along with other traffic generated by new commercial growth along these highway corridors. In addition, traffic incidences along the Route 24 corridor, due to crashes or construction, create significant traffic impacts within the Route 123, Route 138, Route 106 corridors in Easton. The scope of this study includes the Route 138 corridor, from the Stoughton town line to the Raynham town line, Route 106 from the Mansfield town line to the West Bridgewater town line, and Route 123 from the Norton town line to the Brockton city line.

This study includes a review of existing and proposed improvements to the corridors based on improvements programmed in the Transportation Improvements Program (TIP) and on improvement projects proposed as mitigation to proposed and recently completed development.

As part of a public outreach program for this study, a questionnaire was distributed to town officials and other public and private entities in Easton to solicit opinions in regards to traffic and transportation issues. In addition, a steering committee was developed in order to provide guidance for the study process, with representation from the Town of Easton Board of Selectmen, Planning Board, DPW, Planning Department, and Police Department, as well as Stonehill College, the Chamber of Commerce, MassHighway District Five, and the Massachusetts Executive Office of Transportation and Public Works (EOTPW). The steering committee met six times over a one-year period. Recommended improvements were developed based on the committee's review of the data and analyses for road corridors and intersections, as well as through responses to OCPC's questionnaire. Some recommendations were additions to existing TIP projects and existing proposed mitigation recommendations for developments. The committee also discussed various funding sources for the recommendations and strategies for implementation of improvements.

ANALYSES, RECOMMENDED IMPROVEMENTS, AND PROJECT IMPLEMENTATION

Recommended Intersection Improvements

Intersection of Route 138 (Washington Street) at Union Street - Install traffic signals and improve sight distance, intersection alignment, and turning radii. - The Level-of Service (LOS) analysis shows that this intersection operates under failed conditions at LOS "F." Peak hour operating conditions are such that there are very few sufficient gaps in the Route 138 major street traffic to allow left turn movements from Route 138 southbound to Union Street or left turns from Union Street westbound to Route 138 southbound. This situation causes long delays, long queues, and increased crashes due to motorists making critical turning movements utilizing gaps in the major traffic stream that are too short and hazardous. Route 138 provides an alternative north to south route to Route 24. When major incidents occur shutting down the Route 24 corridor, Union Street is used as a major connection allowing traffic to access Route 138 from Brockton and the Route 24 corridor. It is expected that traffic will increase at this intersection in the near future due to proposed residential and retail developments in close proximity along Route 138, and on Union Street.



Environmental Impact Reports for the Roche Brothers Supermarket and proposed commuter rail station off of Route 138 concluded that improvements, including the installation of a traffic signal, are needed to mitigate increased traffic at this intersection. Analyses of future peak hour operating conditions show a substantial improvement in the LOS under signal operation. Warrant analyses were performed for this intersection based on the standards published in the MUTCD, and the results show that this intersection satisfies these warrants. The estimated cost of implementing improvements is approximately \$1,000,000 to \$1,250,000. It is recommended that a Project Notification Form (PNF) be completed to begin the process of implementing improvements at this intersection. The submittal of the PNF should be coordinated with MassHighway District 5, Easton, and OCPC. Improvements at this intersection should be combined under one project with the recommended improvements at the Route 138/Elm Street intersection.

Intersection of Route 138 (Washington Street) at Elm Street - Install traffic signals and improve sight distance, intersection alignment, and turning radii. - This intersection operates under failed conditions, LOS “F” during the morning and afternoon peak hours. The critical turning movements from the side street (Elm Street) are not provided with adequate gaps in the major street (Route 138) traffic stream to allow for safe efficient movement. This situation creates congestion and hazardous conditions. Furthermore, the westbound Elm Street approach to Route 138 is not directly opposite the eastbound Elm Street approach to Route 138. The eastbound approach is offset to the north, which creates a “dog-leg” movement for Elm Street through movements adding to the hazards at this intersection. This intersection has a higher than average crash rate and a fatal crash occurred at this location in 1994 (based on MassHighway’s database).

The Environmental Impact Reports for the Roche Brothers Supermarket and the MBTA Commuter Rail Station concluded that improvements to this intersection are necessary to mitigate future traffic due to both projects. This mitigation consisted of improving turning radii at the Elm Street westbound approach, adding additional turning lanes on the northbound and southbound Route 138 approaches, and installing traffic signals. This intersection should be re-aligned to create a conventional four-way intersection. The re-alignment of the intersection is considered long-term due to the potential cost that may be incurred because of potential right-of-way needs. The estimated cost of implementing improvements is approximately \$1,000,000 to \$1,250,000. It is recommended that a Project Notification Form (PNF) be completed to begin the process of implementing improvements at this intersection. Completion of the PNF should be coordinated with the Town of Easton, OCPC, and MassHighway District 5.

Washington Street (Route 138) at Stonehill College – Provide advanced warning signs on Route 138 for traffic signals and increase speed enforcement. - This intersection has a higher than average crash rate, and Stonehill College officials have cited visibility and speeding problems along Route 138 north and south of the intersection. Sight distance problems exist for vehicles approaching from the south. It is recommended that signal visibility be improved through the review of existing signs approaching the intersection, and proper advanced warning signs be installed (based on the MUTCD) on the northbound and southbound Route 138 approaches. It is further recommended that the signal timing and phasing be reviewed, and that an increase in the “all red” timing be investigated and increased, if necessary, to allow for the proper clearance of turning vehicles. It is recommended that the Town of Easton and Stonehill College coordinate improvements at this intersection with both the OCPC and MassHighway District 5. The improvements are anticipated to be low cost and implemented in the short-term with minor effort.



Washington Street Route 138 at Belmont Street (Route 123) – Revise and update signal timing and phasing, and add pedestrian phase and crosswalks. Add exclusive phasing for eastbound and westbound approaches for safety, add an exclusive left turn lane on the southbound approach, add a left turn lane on the eastbound approach, and extend the median on the westbound approach to prohibit left turns in and out of curb cuts close to the intersection. - The LOS analysis results indicate that this intersection will be at LOS “E” under future afternoon peak hour operating conditions. The steering committee concluded that there has been increased pedestrian traffic at this intersection due to pedestrian activity from Stonehill College and from residential growth in the vicinity of this intersection. This intersection currently lacks crosswalks and pedestrian signals. Furthermore, the number of crashes, along with a high crash rate, at this intersection is due to a commercial drive off of the Belmont Street westbound approach that requires left turn entering vehicles, or vehicles exiting left, to cross two lanes of westbound traffic. This drive is approximately 150 feet east of the intersection and it provides access to a small shopping plaza on the northeast quadrant of the intersection. This plaza is also served by an additional drive off of Route 138 that allows left turns in and out of the property. An extension of the traffic island on the westbound approach that would allow only right turns in and out of this drive will serve to reduce angle collisions at this intersection.

This intersection has been the subject of operational analysis in the EIR completed for the Roche Brothers Supermarket. The Roche Brothers Supermarket EIR concluded that future improvements to this intersection should include widening and adding lanes at all four of the intersection approaches. It is anticipated that a proposed 40R mixed-use development to be located on Route 138 in close proximity of this intersection will have significant impacts on the operation and safety at this intersection. The Town of Easton, MassHighway, and OCPC, through the site plan review process and the MEPA process, should review plans and proposals, and require mitigation of impacts for this intersection. The estimated cost of implementing improvements is approximately \$1,500,000 to \$2,000,000. It is recommended that MassHighway coordinate improvements at this intersection with OCPC, the Town of Easton, Stonehill College, and other stakeholders.

Washington Street Route 138 at Plymouth Drive – Install traffic signals at this location and coordinate the signals with the existing signal at the Central Street/Washington Street Route 138 intersection. - Plymouth Drive provides access to the Easton Industrial Park to and from Route 138. This intersection is un-signalized and during the morning and afternoon peak hours, access to and from the industrial park is congested. Left turn movements to and from Route 138 into Plymouth Drive are inhibited by the lack of sufficient gaps in the mainstream northbound and southbound traffic on Route 138. Analyses conducted for this intersection indicate that a traffic signal is warranted at this location. Future peak hour LOS completed for this intersection shows that the LOS is improved from LOS “E” and “F”, respectively in the AM and PM future peak hour to LOS ”B” and “B,” respectively, under future signalized peak hour operating conditions. A traffic signal installed at this location should be coordinated with the existing signal at the Central Street/Washington Street Route 138 intersection, due to its close proximity. The estimated cost of implementing improvements is approximately \$1,000,000 to \$1,250,000. It is recommended that a Project Notification Form (PNF) be completed to begin the process of implementing improvements at this intersection. The intersection is under MassHighway’s jurisdiction. The completion of the PNF should be coordinated with the Town of Easton, OCPC, and MassHighway District 5.

Washington Street (Route 138) at Turnpike Street – Re-align the intersection and install traffic signals. - Improvements at this intersection have been approved by MassHighway. The project is included in the TIP 2007-2010 (MassHighway Project ID Number 604098, Appendix section). This intersection is currently stop sign controlled with heavy right turns from Turnpike Street northbound and heavy left turns from Turnpike Street to Route 138 southbound. The intersection currently operates under LOS “E” and “F” conditions. According to MassHighway’s crash data records, this location has been the



site of a fatal crash. The project is under the jurisdiction of MassHighway and is currently in the preliminary design stage. The estimated cost of implementing improvements is approximately \$1,000,000 to \$1,250,000. It is recommended that MassHighway work closely with the Town of Easton and OCPC in the development of the design for improvements at this intersection.

Turnpike Street Route 138 at Foundry Street Route 106 – Add pavement markings to delineate lane use and update timing and phasing for safe turning movements. - Foundry Street Route 106 is an important east west arterial in the region and provides access to Route 24. The LOS is expected to be at LOS “C” and LOS “E” during the future morning and afternoon peak hours respectively. The traffic signal at this intersection currently operates in two phases with the northbound and southbound moving with a green while the eastbound and westbound are stopped, and then the eastbound and westbound moving with a green signal while the northbound and southbound are stopped. If the phasing is changed to allow for a “lead” and “lag” between the northbound and southbound movements and also during the eastbound and westbound phasing, then the LOS will improve to LOS “D” during the future afternoon peak. The installation of pavement markings at this intersection is also recommended to safely channel vehicles through the intersection. The crash rate at this intersection is 1.675 crashes per million entering vehicles, which is 92 percent higher than the 0.87 state average for crash rates for signalized intersections. It is anticipated that the recommended improvements for this intersection can be implemented as part of the approved planned improvements for Foundry Street Route 106 (MassHighway Project Information Number 601333). The recommended improvements involve short-term inexpensive fixes to the timing and phasing of the traffic signal and the installation of pavement markings to designate lane use.

Foundry Street Route 106 at Prospect Street – Install traffic signals. - This intersection is currently under stop sign control and operates at LOS “C” and “F” under existing and future peak hour operating conditions. Safety is a major concern at this intersection. There is limited sight distance along Foundry Street due to the curvature of the road. The crash rate is high at 1.498 crashes per MEV. Past efforts to improve the sight distance by the Easton DPW by removing vegetation from the Foundry Street approaches have resulted in limited success due to the alignment of the road. Analyses conducted for this intersection show that it satisfies the MUTCD warrants for installing a traffic signal. In addition, the LOS is improved from LOS “C” and “F,” during the AM and PM existing and future peak hours, respectively, to LOS “B” and “B” under signalized future AM and PM peak hour conditions. The estimated cost of implementing improvements is approximately \$1,000,000 to \$1,250,000. It is recommended that a Project Notification Form (PNF) be completed to begin the process of implementing improvements. The intersection is under Easton’s jurisdiction. The completion of the PNF should be coordinated with the Town of Easton, OCPC, and MassHighway District 5. It is anticipated that implementation of recommended improvements at this intersection be combined in a single project with recommended improvements to reconstruct the Foundry Street Route 106 corridor from the Five Corners intersection to Morse Road.

Foundry Street Routes 106/123 at Poquanticut Street – Geometric Improvements. - The critical movements at this intersection currently operate at LOS “E” and “F” conditions during the AM and PM peak hours and will continue to operate at this level in the future. This is due mainly to the lack of sufficient gaps in the mainstream of the Foundry Street traffic. Widening the Foundry street approach to allow Foundry Street eastbound through traffic to pass vehicles waiting to turn left onto Poquanticut Street will improve the LOS under future conditions to LOS “D” during the future AM peak hour. It is anticipated that implementation of recommended improvements at this intersection be combined in a single project with recommended improvements to reconstruct the Foundry Street Route 106 corridor from the Eastman Street intersection to the Five Corners intersection. It is recommended that improvements at this intersection be included in a Project Notification Form (PNF) for implementing improvements within the section of Foundry Street between Eastman Street and the Five Corners intersection. This intersection is under Easton’s jurisdiction. The completion of the PNF should be coordinated with the Town of Easton, OCPC, and MassHighway District 5.



Five Corners Intersection, Foundry St (Rte 106) at Depot (Rte 123 Central Street at Depot Street – Geometric improvements including box widening, re-alignment of Bay Road north of Depot Street to create a “T” intersection, add left turn storage lanes on the eastbound and southbound approaches, and upgrade signals. – Improvements for this intersection are included in the TIP 2007-2010 (MassHighway Project ID Number 604658.) The current alignment of this intersection provides five approaches, which causes congestion and confusion due to vehicles entering from Bay Road toward the southeast. The proposed improvements include moving this Bay Road approach further north to create a conventional stop controlled “T” intersection with Depot Street (Route 123). This would make the five corners intersection a conventional four-way signal controlled intersection. The estimated cost of implementing improvements is \$1,000,000. It is recommended that MassHighway work closely with the Town of Easton and OCPC in the development of the design for improvements at this intersection.

Center Street at Depot Street (Route 123) – Geometric improvements, including feasibility for the design of a roundabout leaving the monument intact. - This intersection operates at LOS “F” under existing and future AM and PM peak hour operations. This is due mainly to the heavy volumes of traffic on Depot Street that do not provide adequate gaps within the stream to allow for safe turning movements from the side street (Center Street). In addition, the intersection contains an historic Civil War monument. The monument is located at the center of the intersection, which creates a modified “T” type intersection operation. As Center Street approaches the monument, it is split into two segments, with right turning vehicles passing to the right and left turning vehicles passing to the left. Both of these road segments allow two-way traffic for vehicles turning from Depot Street to enter Center Street. This set up adds potential conflicts for vehicles turning in and out of Center Street to and from Depot Street. A study completed for the Town of Easton in March of 2005 stated that minor geometric modifications might be proposed at this intersection, although the study did not specify specifically what the modifications would entail. This intersection has a high number of crashes (37) and a high crash rate (1.615 MEV), due mainly to motorist confusion. It is recommended that the town investigate the feasibility of designing a modern roundabout around the existing monument. The roundabout would be constructed without moving or disturbing in any way the existing Civil War monument. It is anticipated that the recommended improvements for this intersection can be combined with and implemented as part of the approved planned improvements for Depot Street Route 123 (MassHighway Project Information Number 601337).

Central Street at Depot Street – Geometric improvements. - This intersection is described as the most congested intersection in the Depot Street corridor in a 2005 Request for Project Initiation study completed by VHB for the Town of Easton. The LOS for the AM peak hour under existing and future conditions is LOS “F.” The VHB study recommended a wider pavement cross-section to allow through vehicles to maneuver around stopped vehicles on Depot Street waiting to turn left. Recommended improvements for this intersection can be implemented as part of the approved planned improvements for Depot Street Route 123 (MassHighway Project Information Number 601337).

Belmont Street Route 123 at Stonehill College Entrance – Add pedestrian signals and crosswalks. - The signals at this intersection do not currently provide pedestrian signals or actuation for crossing Belmont Street. In addition, this intersection does not have any crosswalks for pedestrians to safely cross Route 123. Pedestrian activity, mainly from Stonehill College is significant due to students crossing at this intersection to access public transportation on Belmont Street. It is recommended that the Town of Easton and Stonehill College coordinate improvements at this intersection with both the OCPC and MassHighway District 5. The improvements are anticipated to be low cost and implemented in the short-term with minor effort.



Recommended Corridor Improvements

Central Street from Washington Street (Route 138) to Depot Street (Route 106) – Resurface Central Street. - Central Street will require resurfacing after the bridge is replaced over the Queset Brook. The estimated cost of implementing improvements is \$700,000. A Project Notification Form (PNF) should be completed for implementing improvements to the surface pavement on Central Street. This project is under Easton's jurisdiction. The completion of the PNF should be coordinated with OCPC, and MassHighway District 5.

Eastman Street (Route 106) from Mansfield Town Line to Foundry Street – Resurface pavement. - This section of roadway contains areas of longitudinal cracking. Although the overall condition of the pavement surface is good, a pavement overlay is recommended to extend the life cycle of the surface and to maintain a consistency of the surface for Route 106 in Easton. The estimated cost of implementing improvements is \$1,400,000. A Project Notification Form (PNF) should be completed for implementing improvements to Eastman Street. This project is under Easton's jurisdiction. The completion of the PNF should be coordinated with OCPC, and MassHighway District 5.

Foundry Street (Route 123) from Eastman Street (Route 106) to the Five Corners intersection – Reconstruct and resurface pavement. - This section of Foundry Street is signed as both Route 106 and Route 123. The surface pavement is in poor condition with extensive alligator cracking in certain sections. According to a 2005 engineering study, this section of Foundry Street lacks formal drainage. The Town of Easton recently applied for a Public Works Economic Development (PWED) grant for the reconstruction of this section of Foundry Street. Recommended improvements include resurfacing and drainage updates to include catch basins. The estimated cost of implementing improvements is \$1,500,000. It is recommended that a Project Notification Form (PNF) be completed for implementing improvements to Foundry Street. This project is under Easton's jurisdiction. The completion of the PNF should be coordinated with OCPC, and MassHighway District 5.

Foundry Street Route 106 from the Five Corners to Morse Road – Resurface and widen roadway, add sidewalks. - Although the overall condition of the pavement surface is good, pavement improvements are recommended to extend the life cycle of the surface and to maintain the consistency of the surface for the entire corridor Route 106 in Easton. An engineering study recommended the widening of shoulders and the installation of a sidewalk along Route 106 as part of this project. The intersection of Foundry Street at Prospect Street is a major intersection along this route. It is recommended that a traffic signal be installed at this intersection in order to improve safety and peak hour traffic operations, which are currently at LOS "F" during the afternoon peak. The estimated cost of implementing improvements is \$1,830,000. It is recommended that a Project Notification Form (PNF) be completed for implementing improvements to this section of Foundry Street Route 106. This project is under Easton's jurisdiction. This project should include alignment improvements and traffic signal installation at the intersection of Foundry at Prospect Street. The completion of the PNF should be coordinated with OCPC, and MassHighway District 5.



Turnpike and Washington Street (Route 138) from the Raynham town line to Belmont Street (Route 123) – Reconstruct and resurface the roadway. - The pavement surface in this section of Route 138 is in poor condition, based on an evaluation conducted using OCPC's pavement management system. Aquaria water LLC has received a permit from MassHighway to add pipeline on Route 138 in Easton. This pipeline project totals 16.5 miles and will extend from the Taunton River Desalination Plant in Dighton through Taunton, Raynham, Easton, and West Bridgewater, to connect to Brockton's water supply system. The pipeline in Easton will extend from the Raynham line along Route 138 to the intersection of Washington Street and Turnpike Street. The estimated cost of implementing improvements is \$4,000,000. The reconstruction and the repaving of the Route 138 surface in Easton should be coordinated with the implementation of the pipeline project.



2 INTRODUCTION

2.1 Study Purpose and Scope

This study was undertaken as part of the FFY 2006 and FFY 2007 Unified Planning Work Program (UPWP). The purpose of this study is to identify specific and general problems and to derive feasible actions that will enhance the circulation and traffic flow efficiency for the state numbered routes in the town of Easton. This study will assist Easton in developing the appropriate strategies for improving traffic circulation and traffic access to and from surrounding communities. The findings and recommendations contained in this report will serve as a basis for including projects in the region's Transportation Improvement Program (TIP) and Regional Transportation Plan (RTP).

The main tasks included in this study process include:

- Documenting existing traffic operating conditions, and identifying circulation and safety problems.
- Forecasting future operating conditions and potential problems for the study area.
- Developing traffic flow and circulation alternatives and analysis.

A steering committee for this study was established to guide the study process. The committee includes representatives from the Easton Public Works Department, the Easton Police Department, Easton Public Schools, Stonehill College, Easton Town Administrator's office, the Easton Chamber of Commerce, and the Executive Office of Transportation. The appendix to this report includes a list of the committee members.

The study scope includes the Route 138 corridor, from the Stoughton town line to the Raynham town line, Route 106 from the Mansfield town line to the West Bridgewater town line, and Route 123 from the Norton Town line to the Brockton City Line. Figure 1 shows the location of the study area in Easton.

2.2 Study Methodology and Process

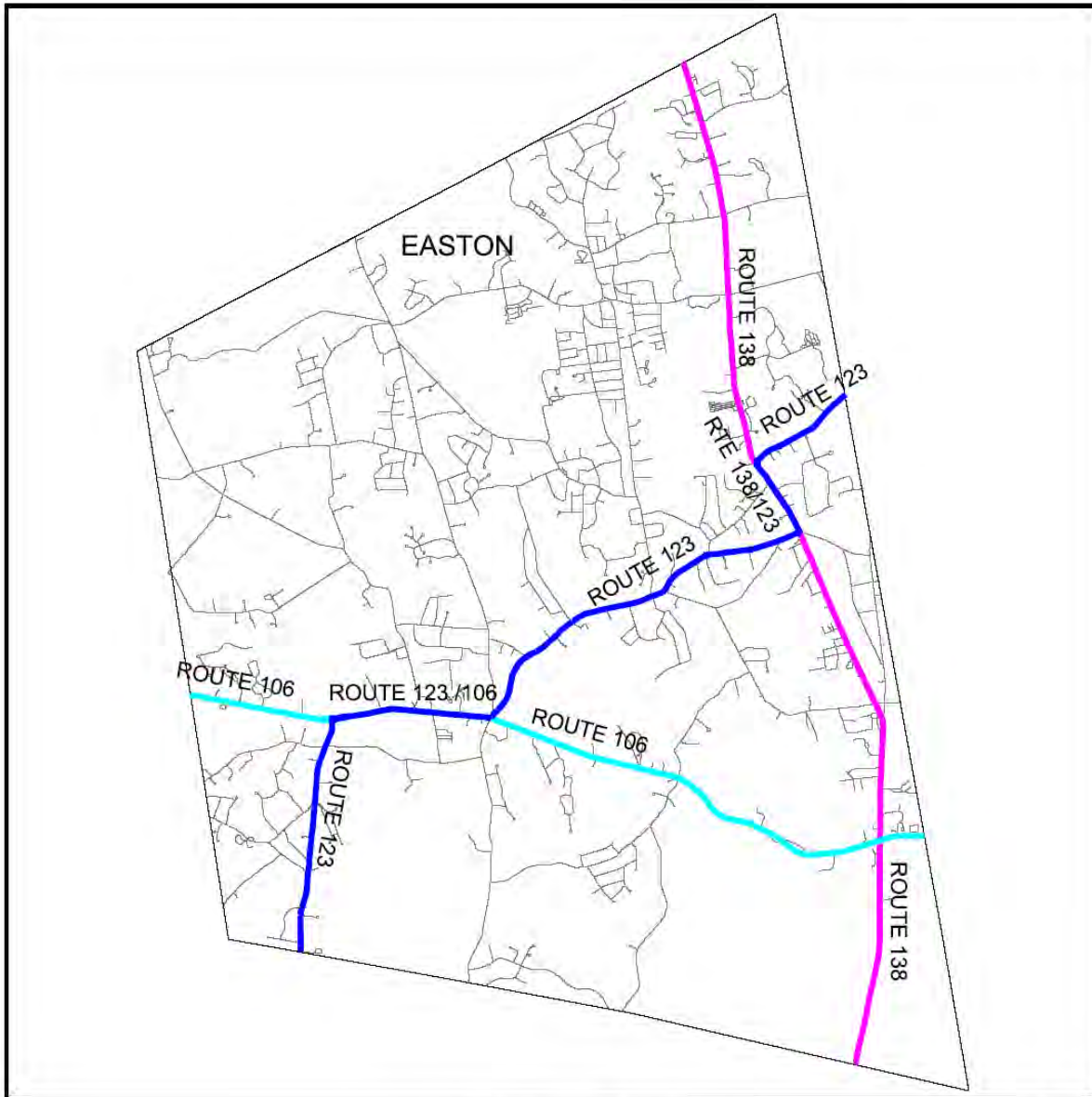
This study includes traffic data collection (48-hour counts and peak hour turning movements), travel time runs, an inventory of physical conditions (pavement width, lane use, traffic control), a review of land use and community goals, and a review and analysis of crash data within the corridors. In addition, traffic forecasts and level-of-service analyses for existing and future (five-year horizon) peak hour conditions were performed for this study. Traffic analyses were completed utilizing standard practices published in the ITE Highway Capacity Manual. A variety of traffic analysis software was used to complete this study including Highway Capacity Software (HCS), SYNCHRO, and SimTraffic. In addition to data collection, other information was obtained from the Massachusetts Registry of Motor Vehicles, the Massachusetts Highway Department (MassHighway), the Executive Office of Transportation and Public Works (EOTPW), the Federal Highway Administration (FHWA), and the Massachusetts Geographic Information System (MassGIS).

Public participation was achieved through the establishment of the study steering committee in order to provide a cooperative study process between OCPC, EOTPW, MPO, MassHighway, local communities, and the public. Periodic updates were provided to the Old Colony Joint Transportation Committee and the MPO over the course of the study. The steering committee has met on six occasions to review existing and future analyses, to provide input and information on safety and operating conditions within the study area, and to develop alternative improvement strategies. The findings and recommendations of the committee are included in this final report. The minutes of the steering committee meetings are included in the appendix to this report.




Easton State Numbered Routes

Figure 1



- Route 123
- Route 106
- Route 138
- Easton Town Bounds
- Easton Roads



 Old Colony Planning Council
70 School Street
Brockton, MA 02301

GIS Data Sources:
MassGIS, MHD, OCPC Field Data



3 EXISTING CONDITIONS AND PROBLEM IDENTIFICATION

3.1 Function, Jurisdiction, and Land Use

The three state numbered routes within the Town of Easton are part of an inter-regional highway network, and are important for traffic circulation within the town providing access to local commercial and residential land uses. Figure 2 shows the jurisdiction for the state numbered routes in Easton, and Figure 3 shows their eligibility for federal aid programs. These routes provide connections between Route 24, in Brockton and West Bridgewater to the east of Easton, and I-495, to the south of Easton. As chronic traffic congestion continues to grow on Route 24, more motorists have found their way between Route 24 and I-495 via Route 123, Route 138, and Route 106 in Easton. This alternative path has compounded traffic congestion and circulation problems in Easton, along with other traffic generated by new commercial growth along these highway corridors. In addition, traffic incidences along the Route 24 corridor, due to crashes or construction, create significant traffic impacts within the Route 123, Route 138, Route 106 corridors in Easton.

As shown in Figure 1, Route 138 runs north south through the eastern portion of town from Stoughton to Raynham. The speed limit varies from 40 miles per hour to 45 miles per hour. Route 138 provides two lanes of travel, one for each direction of travel, except for a small segment of the road in the vicinity of Plymouth Drive, which serves the industrial park. This segment of Route 138 is from Depot Street to Belmont Street is four lanes with two lanes for each direction of travel. Route 138 connects to I-495 in Norton to I-93 (Route 128) in Canton. This highway is an important connection for local communities to the interstate network. It connects with I-495 in Raynham and runs parallel to Route 24 north through Stoughton to I-93 (Route 128). Route 138 is often used as an alternative to Route 24, especially when incidents and back-ups occur on Route 24. Land use along Route 138 varies with multiple driveways and side roads serving residential, commercial, and institutional uses (Stonehill College). There are a number of retail plazas along Route 138 and an industrial park off of Plymouth Drive located to the east of the road. Route 138 is eligible for federal funding under the Surface Transportation Program (STP) within the SAFETEA-LU statute. Federal funding programs require a state or local 20 percent funding match to an 80 percent federal funding. A portion of Route 138, between Depot Street and Belmont Street, is part of the National Highway System (NHS) and eligible for funding under this federal aid SAFETEA-LU program. Route 138 is classified as an “Urban Minor Arterial,” (except for the “Principal Arterial” section between Depot Street and Belmont Street where Route 138 joins with Route 123) based upon MassHighway’s Road Inventory. According to MassHighway’s Road Inventory, Route 138 in Easton is under the jurisdiction of MassHighway.

Route 123 runs northeast in Easton from Norton to Brockton. This route connects Route I-495 at the Norton/Taunton line to Route 24 in Brockton. The speed limit varies along the route, which is posted at 40 miles per hour to 45 miles per hour. The speed limit is lower, 30 to 35 miles per hour, in the vicinity of Central Street. Route 123 joins Route 106 between the Eastman Street intersection and the Depot Street intersection. This stretch of the road is part of both Route 106 and Route 123. Route 123 splits from Route 106 at the Depot Street intersection and runs east to Route 138, where it joins with Route 138 north to Belmont Street. Route 123 splits from Route 138 at the Belmont Street intersection and runs east along Belmont Street to Brockton, providing access to Route 24. The land use varies along Route 123 with residential uses in the south west of the town (this section is becoming increasingly commercial with a retail plaza at the Eastman Street intersection and a new pharmacy and supermarket plaza in the vicinity of the Depot Street/Bay Road/Foundry Street intersection.) There are commercial and institutional uses along Route 123 where Route 138 joins Route 123 (along Washington Street) and on Belmont Street, which provides access to Stonehill College to the north and the industrial park to the south. Route 123 is classified as “Principal Arterial,” according to MassHighway’s road inventory, and provides two lanes, one for each direction of travel, except for the section where it joins with Route 138 between Depot Street

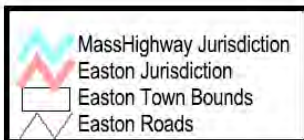
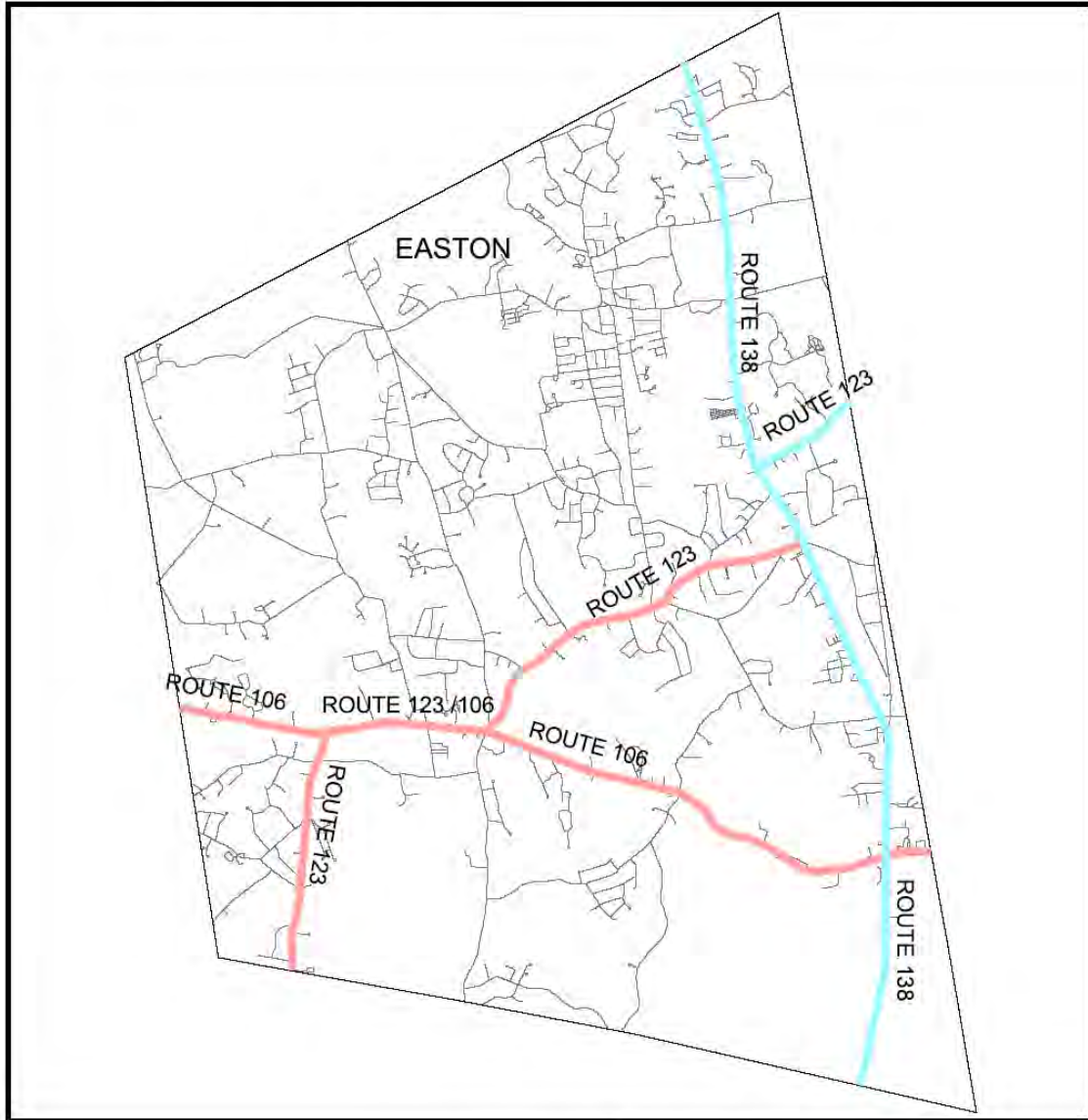


and Belmont Street, and on Belmont Street east of Route 138. Route 123 is under the jurisdiction of the Town of Easton except for the segment where it joins with Route 138 north of Depot Street, and also as it continues along Belmont Street to Brockton. These segments of Route 123 are under the jurisdiction of MassHighway. Route 123 is eligible for federal aid funding under the NHS portion of the SAFETEA-LU legislation. This federal funding program requires a state or local 20 percent funding match, with the federal funds applied to the remaining 80 percent of the cost.



Highway Jurisdiction

Figure 2



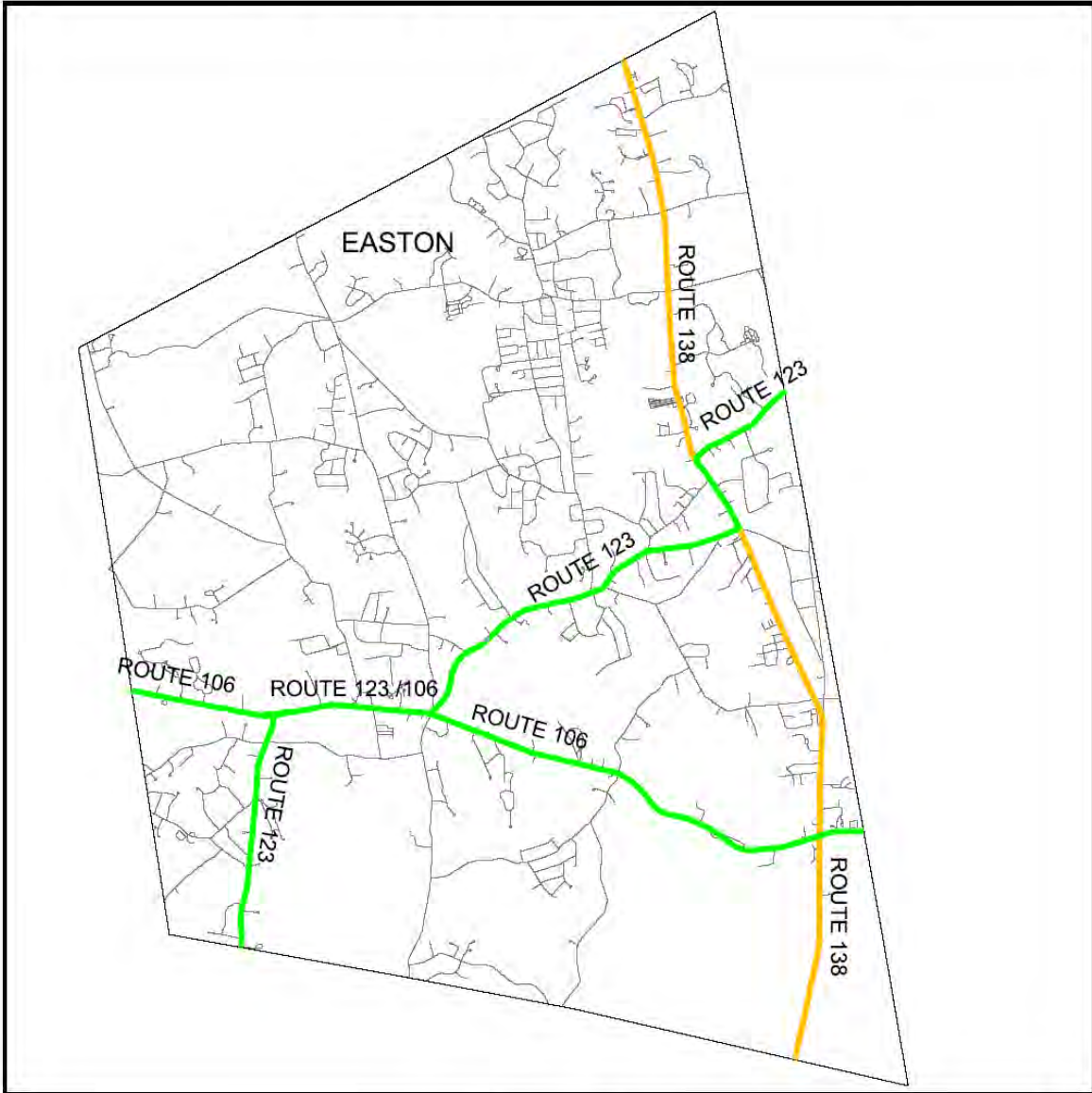
Old Colony Planning Council
70 School Street
Brockton, MA 02301

GIS Data Sources:
MassGIS, MHD, OCPC Field Data



NHS Status

Figure 3



- NHS Roads
- Non-NHS Roads
- Easton Town Bounds
- Easton Roads



-
- Old Colony Planning Council
70 School Street
Brockton, MA 02301
- GIS Data Sources:
MassGIS, MHD, OCPC Field Data



Route 106 runs east west through Easton, from Mansfield to West Bridgewater, providing two lanes, one lane for each direction of travel. Route 106 intersects Route 138 in Easton and connects to Route 24 in West Bridgewater. The speed limit varies from 40 miles per hour to 45 miles per hour, and 30 miles per hour in the vicinity of Prospect Street. The land uses vary, with mostly residential uses along the road and institutional uses, with the Southeastern Regional Vocational Technical High School located off of Route 106 west of the Route 138 intersection. There are a number of commercial uses with two new retail plazas at the Eastman Street intersection where Route 106 joins with Route 123, and located in the vicinity of the Five Corners intersection, where Route 106 splits off from Route 123 and continues east to West Bridgewater. Route 106 is under the jurisdiction of the Town of Easton and is classified as a “Principal Arterial” according to MassHighway’s road inventory. Route 106 is eligible for federal aid funding under the NHS portion of the SAFETEA-LU legislation. This federal funding program requires a state or local 20 percent funding match, with the federal funds applied to the remaining 80 percent of the cost.

3.2 Existing Traffic Volumes

In order to discern the existing traffic circulation, congestion, and peak hour operating conditions, traffic volumes were collected for the study area highways. Traffic counts were conducted in a forty-eight hour period utilizing automatic traffic recorders, to determine the average daily traffic (total traffic within a 24-hour period). In addition, manual turning movement counts were conducted at intersections during the morning and afternoon peak periods (between 7:00 AM and 9:00 AM and between 4:00 PM and 6:00 PM) to determine the morning and afternoon peak hour turning movements.

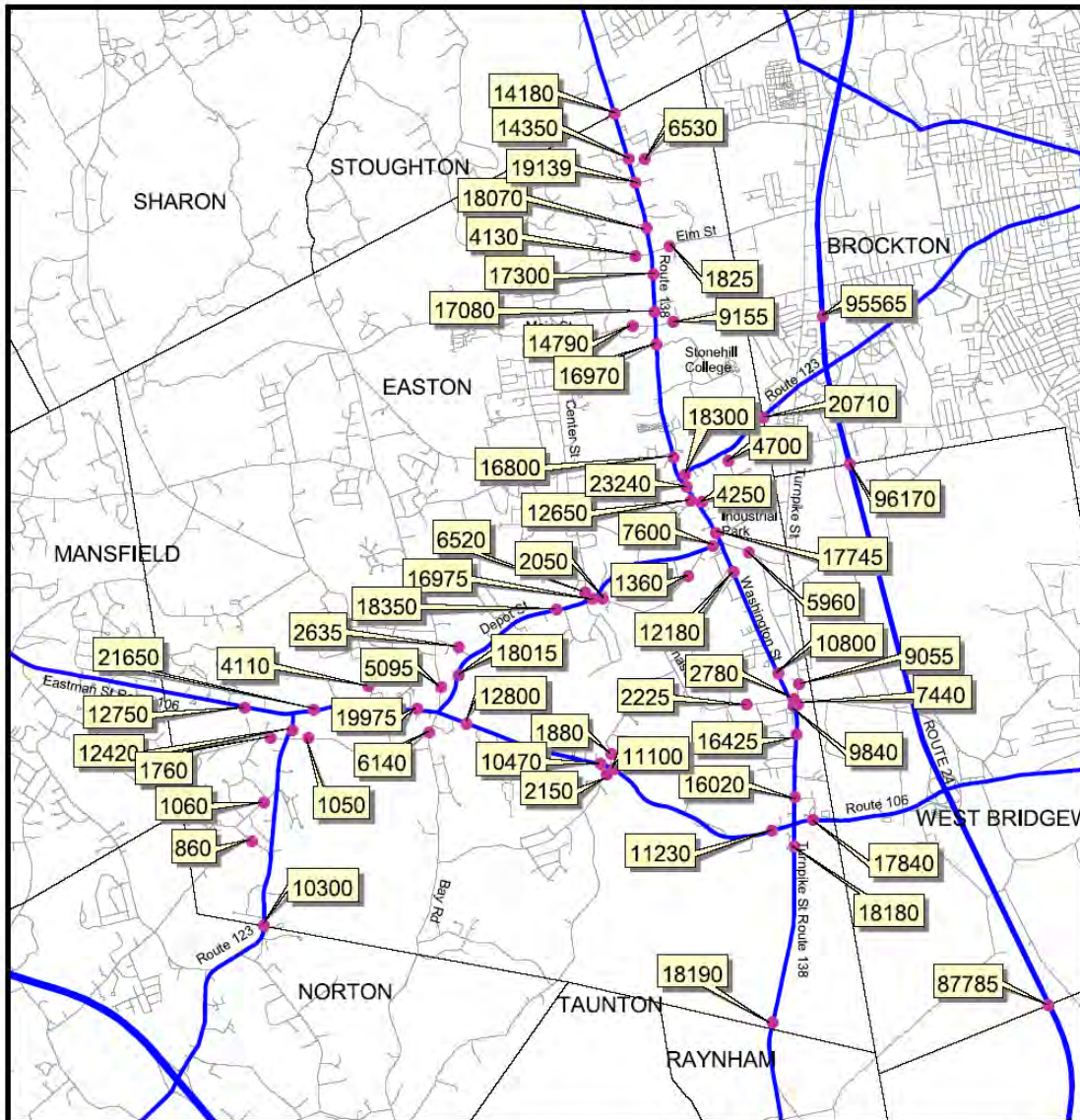
3.2.1 Average Daily Traffic

Automatic traffic recorders were placed at 47 locations on the study area roadways in 2005 and 2006 in order to discern the volume of traffic in the study area. In addition, traffic data from an additional 11 locations in Easton were compiled from previous counts taken in the town prior to 2005. These counts were increased using a growth rate of 1.02 percent to reflect 2006 conditions. Table 1 summarizes the average daily traffic for the study area highways. Figure 4 shows the average daily traffic on the study area roads.



Average Daily Traffic

Figure 4



2 0 2 4 Miles



- Automatic Traffic Count Location
- Community Boundaries
- ~ State Numbered Routes
- ~ Roads

Old Colony Planning Council
 70 School Street
 Brockton, MA 02301

GIS Data Sources:
 MassGIS, MHD, OCPC Field Data

September 2006



Table 1 2006 Average Daily Traffic

Location	Average Daily Traffic (Vehicles per Day)
Route 138 Corridor	
Washington Street Route 138 at the Stoughton line	14,180
Washington Street Route 138 north of Union Street	14,350
Union Street east of Washington Street Route 138	6,530
Washington Street Route 138 south of Union Street	19,139
Washington Street Route 138 north of Elm Street	18,070
Elm Street west of Washington Street Route 138	4,130
Elm Street east of Washington Street Route 138	1,825
Washington Street Route 138 south of Elm Street	17,300
Washington Street Route 138 north of Main Street	17,080
Main Street west of Washington Street Route 138	14,790
Main Street east of Washington Street Route 138	9,155
Washington Street Route 138 south of Main Street	16,970
Washington Street Route 138 north of Belmont Street Route 123	16,800
Washington Street Route 138/123 south of Belmont Street Route 123	23,240
Central Street west of Washington Street Route 138	12,650
Plymouth Drive east of Washington Street Route 138	4,250
Washington Street Route 138/123 north of Depot Street Route 123	17,745
Depot Street east of Washington Street Route 138	5,960
Washington Street Route 138 south of Depot Street Route 123	12,180
Washington Street Route 138 north of Purchase Street	10,800
Purchase Street west of Washington Street Route 138	2,225
Purchase Street east of Washington Street Route 138	2,780
Turnpike Street north of Purchase Street	9,055
Turnpike Street south of Purchase Street	7,440
Washington Street Route 138 south of Purchase Street	9,840
Turnpike Street Route 138 south of Washington/Turnpike Street	16,425
Turnpike Street Route 138 north of Foundry Street Route 106	16,020
Turnpike Street Route 138 south of Foundry Street Route 106	18,180
Turnpike Street Route 138 at the Raynham line	18,190
Route 123 Corridor	
Belmont Street Route 123 at the Brockton line	20,710
Bristol Drive south of Belmont Street Route 123	4,700
Depot Street Route 123 west of Washington Street Route 138	7,600
Church Street east of Purchase St, south of Depot Street Route 123	1,360
Church Street west of Purchase Street	2,050
Depot Street Route 123 west of Church Street	16,975
Center Street north of Depot Street Route 123	6,520
Depot Street Route 123 west of Center Street	18,350
Cross Street west of Depot Street Route 123	2,635
Depot Street Route 123 south of Cross Street	18,015
Bay Road west of Depot Street Route 123	5,095
Foundry Street Route 123 south of Eastman Street Route 106	12,520

**Table 1 2006 Average Daily Traffic (continued)**

Location	Average Daily Traffic (Vehicles per Day)
Highland Street east of Foundry Street Route 123	1,050
Highland Street west of Foundry Street Route 123	1,760
Old Foundry Street west of Foundry Street Route 123	1,060
Norton Street west of Foundry Street Route 123	860
Foundry Street Route 123 at Norton line	10,300
Route 106 Corridor	
Eastman Street Route 106 west of Foundry Route 123	12,750
Foundry Street Route 106/123 east of Eastman Street Route 123	21,650
Poquanticut Ave. north of Foundry Street Route 106/123	4,110
Foundry Street Route 106/123 west of Depot Street Route 123	19,975
Bay Road south of Foundry Street Route 106/123	6,140
Foundry Street Route 106 east of Depot Street Route 123	12,800
Foundry Street Route 106 west of Prospect Street	10,470
Prospect Street north of Foundry Street Route 106	1,880
Prospect Street south of Foundry Street Route 106	2,150
Foundry Street Route 106 east of Prospect Street	11,100
Foundry Street Route 106 west of Turnpike Street Route 138	11,230
Foundry Street Route 106 east of Route 138	17,840

As shown in Figure 4, the highest traffic volumes in the study area corridors were recorded on Washington Street Route 138/123 between Belmont Street Route 123 and Depot Street Route 123. This location carries approximately 23,240 vehicles on an average weekday. Belmont Street Route 123 east of Route 138, which provides access to Route 24, carries 18,300 vehicles per day (vpd) and 20,700 vpd at the Brockton line. Washington Street Route 138 carries a range of 16,970 to 19,139 vpd north of Belmont Street Route 123 and south of Union Street. Washington Street Route 138 volumes are lower, in the 14,000 vpd range north of Union Street to the Stoughton line, with a substantial amount of traffic, 6,530 vpd, using Union Street. Elm Street west of Washington Street provides a significant volume of vehicles, 4,130 vpd, to and from Washington Street Route 138; however, Main Street carries a significant volume of traffic at its intersection with Washington Street Route 138, with 14,790 vpd west of Washington Street Route 138, and 9,155 east of Washington Street Route 138. Central Street, west of Washington Street Route 138/123 carries 12,650 vpd. To and from the west and Depots Street Route 123 carries 7,600 vpd to and from the west. Washington Street Route 138 traffic is lower south of Depot Street Route 123, with 12,180 vpd, and reaches its lowest point 9,840 vpd, just south of Purchase Street. Route 138 volumes increase south of Turnpike Street with 16,425 vpd south of Turnpike Street. Turnpike Street north of Route 138 provides 9,055 vpd to and from Route 138 in Easton. Route 138 volumes increase at the Raynham town line with 18,190 vpd with the influence of Route 106 to and from Route 24 to the east and I-495 in Raynham to the south.

Foundry Street Route 123 carries 10,300 vpd at the Norton town line and 12,420 just south of Eastman Street Route 106. Foundry Street Route 123/106, between Eastman Street Route 106 and Depot Street Route 123, carries 19,975 to 21,650 vpd. This range presents the second highest volumes on the study area highways next to the 23,240 vehicles per day recorded on Washington Street Route 138/123 between Belmont Street Route 123 and Central Street. As Route 123 continues east as Depot Street, the traffic volumes north of Foundry Street Route 106 range from 18,015 to 16,975 vpd just west of Central Street. Central Street carries 12,650 vpd between Depot Street Route 123 and Washington Street Route 138. Depot Street carries 7,600 vpd between Central Street and Washington Street Route 138.

Eastman Street Route 106 carries 12,750 vpd west of Foundry Street Route 123. Foundry Street Route 106 east of Depot Street Route 123 carries 12,800 vpd. This volume decreases in the vicinity of Prospect Street with 10,470 vpd on Foundry west of Prospect, and 11,100 vpd east of Prospect Street. Foundry



Street Route 106 volumes are higher in the vicinity of Turnpike Street Route 138 with 11,230 vpd on Foundry Street Route 106 west of Turnpike Street Route 138, and 17,840 east of Turnpike Street Route 138.

3.2.2 Existing Turning Movements

Manual peak hour turning movements counts were conducted for 28 intersections in the state numbered corridors in Easton. The results of the turning movement counts are included in the appendix to this report.

3.2.3 Existing Traffic Operations

Level-of-service analyses (LOS) were completed for the study area intersections to determine the operating conditions during the morning and afternoon peak hours. Level-of-service analysis is a qualitative and quantitative measure based on the analysis techniques published in the Highway Capacity Manual by the Transportation Research Board. Level-of-service is a general measure that summarizes the overall operation of an intersection or transportation facility. It is based upon the operational conditions of a facility including lane use, traffic control, and lane width, and takes into account such factors as operating speeds, traffic interruptions, and freedom to maneuver.

Level-of-service represents a range of operating conditions and is summarized with letter grades from “A” to “F”, with “A” being the most desirable. Level-of-service “E” represents the maximum flow rate or the capacity on a facility. The following describes the characteristics of each level-of-service:

LOS "A" represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.

LOS "B" is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is still relatively unaffected.

LOS "C" is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. Occasional backups occur behind turning vehicles.

LOS "D" represents high-density, but stable, flow. Speed and freedom to maneuver are restricted, and the driver experiences a below average level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.

LOS "E" represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform level. Freedom to maneuver within the traffic stream is extremely limited, and generally requires forcing other vehicles to give way. Congestion levels and delay are very high.

LOS "F" is representative of forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount that can traverse the point, resulting in lengthy queues and delay.

The LOS definitions describe conditions based on a number of operational parameters. There are certain parameters utilized as measures of effectiveness for specific facilities. In the case for intersections, two-lane highways, and arterials, which represent the physical conditions that typify the study area corridors, time delay, average stop delay, and average travel speed are used as measures of operational effectiveness to which levels of service are assigned.

Table 2 shows the signalized and un-signalized LOS for the Route 138, Route 123, and Route 106 study area intersections under existing peak hour conditions. Congestion at intersections in Table 2 (LOS “E” and “F”) is shown in shaded blocks.

**Table 2 2006 Existing Conditions Intersection Level-of-Service Summary**

ID	Intersection	Traffic Control	AM LOS	PM LOS
1	Washington St (Rte 138)/Roche Brothers/Stonehedge Apts	signal	B	B
2	Washington St (Rte 138) at Union Street	stop sign	F	F
3	Washington St (Rte 138) at Elm Street	stop sign	F	F
4	Washington St (Rte 138) at Main Street	signal	C	C
5	Washington St (Rte 138) at Stonehill College	signal	B	B
6	Washington St (Rte 138) at Belmont St (Rte 123)	signal	B	D
7	Washington St (Rte 138) at Central St	signal	B	C
8	Washington St (Rte 138) at Plymouth Dr Easton Industrial Park	stop sign	E	F
9	Washington St (Rte 138) at Depot St (Rte 123)	signal	B	B
10	Washington St (Rte 138) at Purchase St/West St	stop sign	C	F
11	Washington St (Rte 138) at Turnpike St	stop sign	E	F
12	Turnpike St at West St/Purchase St	stop sign	D	F
13	Turnpike St (Rte 138) at Foundry St/West Center St (Rte 106)	signal	B	C
14	FIVE CORNERS Foundry St (Rte 106) at Depot (Rte 123)	signal	E	E
15	Foundry St (Rte 106) at Poquanticut Ave	stop sign	E	F
16	Eastman St (Rte 106) at Foundry St (Rte 123)	signal	C	C
17	Foundry St (Rte 106) at Prospect St	stop sign	C	F
18	Depot St (Rte 123) at Bay Rd (north of 5 Corners)	stop sign	C	E
19	Foundry St (Rte 123) at Highland St	stop sign	E	D
20	Depot St (Rte 123) at Cross Street	stop sign	D	F
21	EASTON CENTER Depot St (Rte 123) at Center St	stop sign	F	F
22	Depot St (Rte 123) at Purchase St	stop sign	F	F
23	Depot St (Rte 123) at Central Street	stop sign	F	N/A
24	Depot St (Rte 123) at Church Street	stop sign	B	B
25	Rte 123 Belmont St at Bristol (Industrial Prk)	stop sign	D	F
26	Rte 123 Belmont St at Stonehill College	signal	B	B
27	Foundry St (Rte 123) at Norton Ave	stop sign	B	C
28	Foundry St (Rte 123) at Old Foundry St	stop sign	D	D

N/A = not available due to construction

Table 2 shows that existing peak hour traffic operations at that the study intersections with signal control were all at a LOS “D” or better except for the Five Corners intersection. The peak hour conditions at this signalized intersection are characterized as LOS “E,” with very long delays. As shown in Table 2, both the Washington Street (Route 138)/Union Street intersection and the Washington Street Route 138)/Elm Street intersection operate under forced flow conditions (LOS “F”) during existing morning and afternoon peak hour operations. The Washington Street (Route 138)/Plymouth Drive intersection operates at LOS “E” and “F” respectively during the existing morning and afternoon peak hours. Other non-signalized intersections operating under failed conditions, LOS “E” and “F,” include: Washington Street (Route 138) at Purchase Street; Washington Street (Route 138) at Turnpike Street; Turnpike Street at West Street and Purchase Street; Foundry Street (Route 106) at Poquanticut; Foundry Street (Route 106) at Prospect Street; Depot Street (Route 123) at Bay Road; Foundry Street (Route 123) at Highland Street; Depot Street (Route 123) at Cross Street; Depot Street (Route 123) at Center Street; Depot Street (Route 123) at Purchase Street; Depot Street (Route 123) at Central Street; and Belmont Street (Route 123) at Bristol Street. These non-signalized intersections experience heavy peak hour traffic on the major road with few gaps in the traffic stream to provide an adequate gap for vehicles from the side streets to enter the



mainstream traffic. This is a particularly difficult problem for critical movements such as a left turning vehicle from the main street to the minor street, and also for vehicles turning left from the minor street to the main street, which require a simultaneous gap in both directions of traffic that allows for a turning movement transition.

3.3 Crash Analysis

Information on reported crashes at the 28 study area intersections was obtained from the Easton Police Department. The data was for the most recent three-year period available (2002, 2003, and 2004). The data was tabulated and analyzed in accordance with the standard practices published by the Institute of Transportation Engineers in the Manual of Traffic Engineering Studies. The purpose for analyzing crash data includes:

- To define and identify high crash locations
- To justify actions for the installation of traffic control devices
- To evaluate the geometric design (including lane use) and proposed changes in traffic regulations
- To justify expenditures for improvements that offer crash reduction or prevention
- To identify a need for traffic enforcement
- To identify needs in pedestrian safety and certain actions causing crashes that can be prevented through driver and/or pedestrian public education

The crash rate indicates the frequency of crashes at intersections and measures the crash exposure. It is based on the number of crashes per million entering vehicles (MEV). The number of crashes often increases as traffic volumes increase. Traffic growth creates more opportunities for crashes to occur thereby increasing exposure. A particular condition that causes crashes at an intersection can become exacerbated with increased traffic, and frequency will therefore rise. The crash rates calculated for intersections in this study are based upon the ITE equation in the Manual of Traffic Engineering Studies. The rate equation is shown in the appendix to this report. The crash rate per million entering vehicles is the number of accidents in a year times one million, divided by the number of vehicles entering the intersection in a year. Table 3 shows the number of crashes and crash rates for the study area intersections. In addition, information on fatal crashes was obtained from MassHighway for the period between 1990 and 2004. The number of fatal crashes at the study area intersections is shown in Table 3 along with the other pertinent crash information. The intersections are listed in Table 3 from north to south.



Table 3 Crashes and Crash Rates at Study Area Intersections

ID	Intersection	Traffic Control	Total Crashes	PDO	Injury Crashes	Cross Movement	Rear End	Side Swipe	Ran off Road	Head on	Bike	Unknown	1990-2004 Fatal	Crash Rate
1	Washington St (Rte 138)/Roche Brothers/Stonehedge Apts	signal	7	4	3	2	2	0	1	0	0	2	0	0.340
2	Washington St Rte 138/Union St	stop	19	15	4	8	8	1	1	1	0	0	1	0.867
3	Washington St Rte 138 /Elm St	stop	21	15	6	11	4	3	1	0	1	1	1	0.928
4	Washington St Rte 138/Main St	signal	42	31	11	21	8	6	0	0	1	6	2	1.323
5	Washington St (Rte 138) at Stonehill College	signal	19	12	7	5	9	1	1	0	0	3	0	0.926
6	Washington St (Rte 138) at Belmont St (Rte 123)	signal	59	44	15	38	11	4	1	0	0	5	1	1.847
7	Washington St (Rte 138) at Central St	signal	33	23	10	24	6	1	0	0	0	2	0	1.125
8	Washington St (Rte 138) at Plymouth Dr Easton Indust. Park	stop	23	12	11	19	3	1	0	0	0	0	0	1.110
9	Washington St (Rte 138) at Depot St (Rte 123)	signal	34	25	9	16	6	7	3	1	0	1	0	1.655
10	Washington St (Rte 138) at Purchase St/West St	stop	24	14	10	18	2	3	0	1	0	0	0	1.710
11	Washington St (Rte 138) at Turnpike St	stop	6	4	2	3	3	0	0	0	0	0	1	0.325
12	Turnpike St at West St/Purchase St	stop	24	14	10	17	3	2	0	0	0	2	0	1.965
13	Turnpike St (Rte 138) at Foundry St/West Center St (Rte 106)	signal	58	40	18	29	10	4	0	0	0	15	0	1.675
14	FIVE CORNERS Foundry St (Rte 106) at Depot (Rte 123)	signal	46	41	6	17	15	1	1	0	0	12	0	1.452
15	Foundry St (Rte 106) at Poquanticut Ave	stop	14	10	4	5	4	1	0	0	0	4	0	0.559
16	Eastman St (Rte 106) at Foundry St (Rte 123)	signal	52	37	15	10	21	0	1	0	0	20	1	2.029
17	Foundry St (Rte 106) at Prospect St	stop	21	15	6	7	3	1	3	0	0	7	0	1.498
18	Depot St (Rte 123) at Bay Rd (north of 5 Corners)	stop	4	3	1	1	0	2	0	0	0	1	0	0.222
19	Foundry St (Rte 123) at Highland St	stop	6	5	1	3	1	0	0	0	0	2	0	0.429
20	Depot St (Rte 123) at Cross Street	stop	10	8	2	1	7	0	0	1	0	1	0	0.468
21	EASTON CENTER Depot St (Rte 123) at Center St	stop	37	26	11	8	19	0	0	1	0	9	0	1.615
22	Depot St (Rte 123) at Purchase St	stop	5	4	1	2	0	0	3	0	0	0	0	0.343
23	Depot St (Rte 123) at Central Street	stop	40	36	6	9	25	1	2	0	0	3	0	1.362
24	Depot St (Rte 123) at Church Street	stop	0	0	0	0	0	0	0	0	0	0	0	0.000
25	Rte 123 Belmont St at Bristol (Ind. Park)	stop	7	2	2	2	3	0	2	0	0	0	0	0.293
26	Rte 123 Belmont St at Stonehill College	signal	9	7	2	3	4	0	0	0	0	2	0	0.359
27	Foundry St (Rte 123) at Norton Ave	stop	6	5	1	1	1	1	0	0	0	3	0	0.494
28	Foundry St (Rte 123) at Old Foundry St	stop	1	1	0	0	0	0	0	0	0	1	0	0.074

Note: The 2005 crash rate averages for Massachusetts are: 0.87 for signalized intersections, and 0.66 for un-signalized intersections. District 5 averages: 0.84 for signalized intersections, and 0.59 for un-signalized intersections.



As shown in Table 3, the intersection of Washington Street Route 138 at Belmont Street Route 123 has the highest number of crashes of the study area intersections with 59 crashes within the 2002-2004-study period. The crash rate at this intersection is 1.847 MEV, which is 120 percent higher the MassHighway District 5 average for signalized intersections. The high number of crashes at this intersection can be attributed to the high number of collisions at the retail plaza drive at the northeast quadrant off of Belmont Street. Vehicles traveling in and out of this drive must cross two lanes of traffic headed eastbound on Belmont Street. Other intersections with high numbers of collisions include Turnpike St Route 138 at Foundry St/West Center St Rte 106, with 58, Eastman Street at Foundry Street, with 52, and the Five Corners intersection, with 46. The crashes at the Turnpike Street Route 138/Foundry Street Route 106 intersection can be attributed to the lack of pavement markings delineating lane use and channelization, which leads to confusion for motorists entering the intersection. The Eastman Street/Foundry Street intersection has recently undergone reconstruction, and the crash experience at this intersection should be monitored to ensure that the signalization and lane use improvements have improved safety at this intersection. Likewise, the Five Corners intersection is slated for reconstruction, and the crash experience at this intersection should be monitored after reconstruction.

4 FUTURE CONDITIONS

4.1 Future Traffic

A five-year time horizon has been chosen for analysis of future conditions, which is consistent with state guidelines for traffic studies. A review of traffic growth rates within the Old Colony Region shows that there has been rapid traffic growth in some corridors and little or no growth on other highways. The increases in traffic growth have been mainly due to retail growth in corridors that connect to Route 24, such as Route 106 and Route 123. An annual growth rate of 1.02 percent over a five-year horizon has been applied to the existing turning movement volumes in order to discern the future peak hour turning movements. This average annual growth rate is based on the average growth rate calculated in the Old Colony Planning Council Traffic Volumes Report 2005. The future peak hour turning movement volumes are shown in the appendix to this report.

4.2 Future Traffic Operations

Level-of-service analyses (LOS) were completed for the study area intersections to determine the operating conditions that are expected to occur during the morning and afternoon peak hours under future operating conditions. Table 4 shows the signalized and un-signalized LOS for the Route 138, Route 123, and Route 106 study area intersections for future peak hour conditions. Congestion at intersections in Table 4 (LOS "E" and "F") is shown in shaded blocks.

**Table 4 - 2011 Future Conditions Intersection Level-of-Service Summary**

ID	Intersection	Traffic Control	AM LOS	PM LOS
1	Washington St (Rte 138)/Roche Brothers/Stonehedge Apts	signal	B	B
2	Washington St (Rte 138) at Union Street	stop sign	F	F
3	Washington St (Rte 138) at Elm Street	stop sign	F	F
4	Washington St (Rte 138) at Main Street	signal	C	D
5	Washington St (Rte 138) at Stonehill College	signal	C	C
6	Washington St (Rte 138) at Belmont St (Rte 123)	signal	C	E
7	Washington St (Rte 138) at Central St	signal	B	D
8	Washington St (Rte 138) at Plymouth Dr Easton Indust. Park	stop sign	E	F
9	Washington St (Rte 138) at Depot St (Rte 123)	signal	C	C
10	Washington St (Rte 138) at Purchase St/West St	stop sign	D	F
11	Washington St (Rte 138) at Turnpike St	stop sign	F	F
12	Turnpike St at West St/Purchase St	stop sign	E	F
13	Turnpike St (Rte 138) at Foundry St/West Center St (Rte 106)	signal	C	E
14	FIVE CORNERS Foundry St (Rte 106) at Depot (Rte 123)	signal	F	F
15	Foundry St (Rte 106) at Poquanticut Ave	stop sign	F	F
16	Eastman St (Rte 106) at Foundry St (Rte 123)	signal	C	C
17	Foundry St (Rte 106) at Prospect St	stop sign	C	F
18	Depot St (Rte 123) at Bay Rd (north of 5 Corners)	stop sign	D	F
19	Foundry St (Rte 123) at Highland St	stop sign	F	E
20	Depot St (Rte 123) at Cross Street	stop sign	E	F
21	EASTON CENTER Depot St (Rte 123) at Center St	stop sign	F	F
22	Depot St (Rte 123) at Purchase St	stop sign	F	F
23	Depot St (Rte 123) at Central Street	stop sign	F	N/A
24	Depot St (Rte 123) at Church Street	stop sign	B	B
25	Rte 123 Belmont St at Bristol (Industrial Park)	stop sign	E	F
26	Rte 123 Belmont St at Stonehill College	signal	B	C
27	Foundry St (Rte 123) at Norton Ave	stop sign	B	C
28	Foundry St (Rte 123) at Old Foundry St	stop sign	D	E

5 PLANNED IMPROVEMENTS

Planned improvements within the study area, on road segments and at intersections, are divided into two categories: 1.) Projects approved by the Project Review Committee (PRC), and included in the Transportation Improvement Program, (TIP), and; 2.) Proposed improvements not yet approved by the PRC. These planned improvements have originated from a number of sources including previous studies requested from the town or from proposed mitigation by development proponents. The projects that have been approved by the PRC are in various stages from preliminary design to near completion.



5.1 Approved Projects

There are a number of ongoing improvement projects in Easton that have been approved for funding. These projects are included in the Old Colony Transportation Improvement Program (TIP) 2007 – 2010. These projects are in various stages of implementation. Some projects are nearing completion and others are still in the design stage. Table 5 summarizes the approved ongoing improvement projects for Easton’s state numbered routes. The TIP projects in Table 5 are also shown in Figure 5 in Chapter 5, Recommended Improvements.

Table 5 Approved Improvement Projects

MassHighway Project Info Number	Project Location and Description	Project Type	Project Status
601332	Reconstruction of Route 123 Foundry Street from the Norton Town Line to Route 106 (Eastman Street)	Overlay, shoulders, sidewalks	widen add Under design
	Eastman Street at Foundry Street reconstruct intersection, add turning lanes, and signalize	Intersection improvements	Complete
604658	Reconstruction of the Five Corners intersection including adding turning lanes and relocating Bay Road north of Foundry Street	Intersection improvements	Under design
600398	Resurface Route 123 Depot Street from Five Corners to Black Brook Road	Resurface	Nearing completion
601337	Resurface Route 123 Depot Street from Black Brook Road to Route 138, add sidewalk to Depot Street	Resurface and sidewalk	add Under design
602836	Bridge replacement Central Street over Queset Brook	Replace bridge	Waiting notice to proceed
604098	Intersection improvements at Route 138 at Turnpike St, traffic signals	Intersection Improvements	Preliminary design
601333	Improvements to Foundry Street Route 106	Resurfacing	Design

5.2 Projects Requiring Approval

Table 6 summarizes projects not yet approved but planned because of mitigation for development or from studies completed for the town to address specific safety and congestion problems at specific locations. The conceptual plans cited in Table 6 are included in the appendix to this report.



Table 6 Planned Improvements Not Yet Approved

Project Location and Description	Project Type	Project Status
Improvements to the Washington Street Route 138/Union Street intersection – Widen northbound and southbound Route 138 lanes to two approach lanes, install traffic signals, and improve turning radii on the Union Street approach	Intersection Improvements	Conceptual design in the EIR for Roche Brothers Supermarket. Requires funding source and PRC approval
Improvements to the Washington Street Route 138/Elm Street intersection – Widen northbound and southbound Route 138 lanes to two approach lanes, install traffic signals, and improve turning radii on the Elm Street approaches	Intersection Improvements	Conceptual design in the EIR for Roche Brothers Supermarket. Requires funding source and PRC approval
Improvements to the Washington Street Route 138/Belmont Street Route 123 intersection – Widen the westbound Belmont Street intersection to two left turn lanes and one shared through-right turn lane, widen the Washington Street southbound lane to one exclusive left turn lane, one through lane, and one shared through and right turn lane, widen the CVS drive to one exclusive left turn lane and one shared through and right turn lane, and upgrade the traffic signal	Intersection Improvements	Conceptual design in the EIR for Roche Brothers Supermarket. Requires funding source and PRC approval
Improvements to the Foundry Street Route 106/Prospect Street intersection – Install traffic signals	Intersection Improvements	Warrant analyses provided in the 2005 OCPC study traffic study for this intersection completed for the Town of Easton. Requires funding source and PRC approval

6 RECOMMENDED IMPROVEMENTS

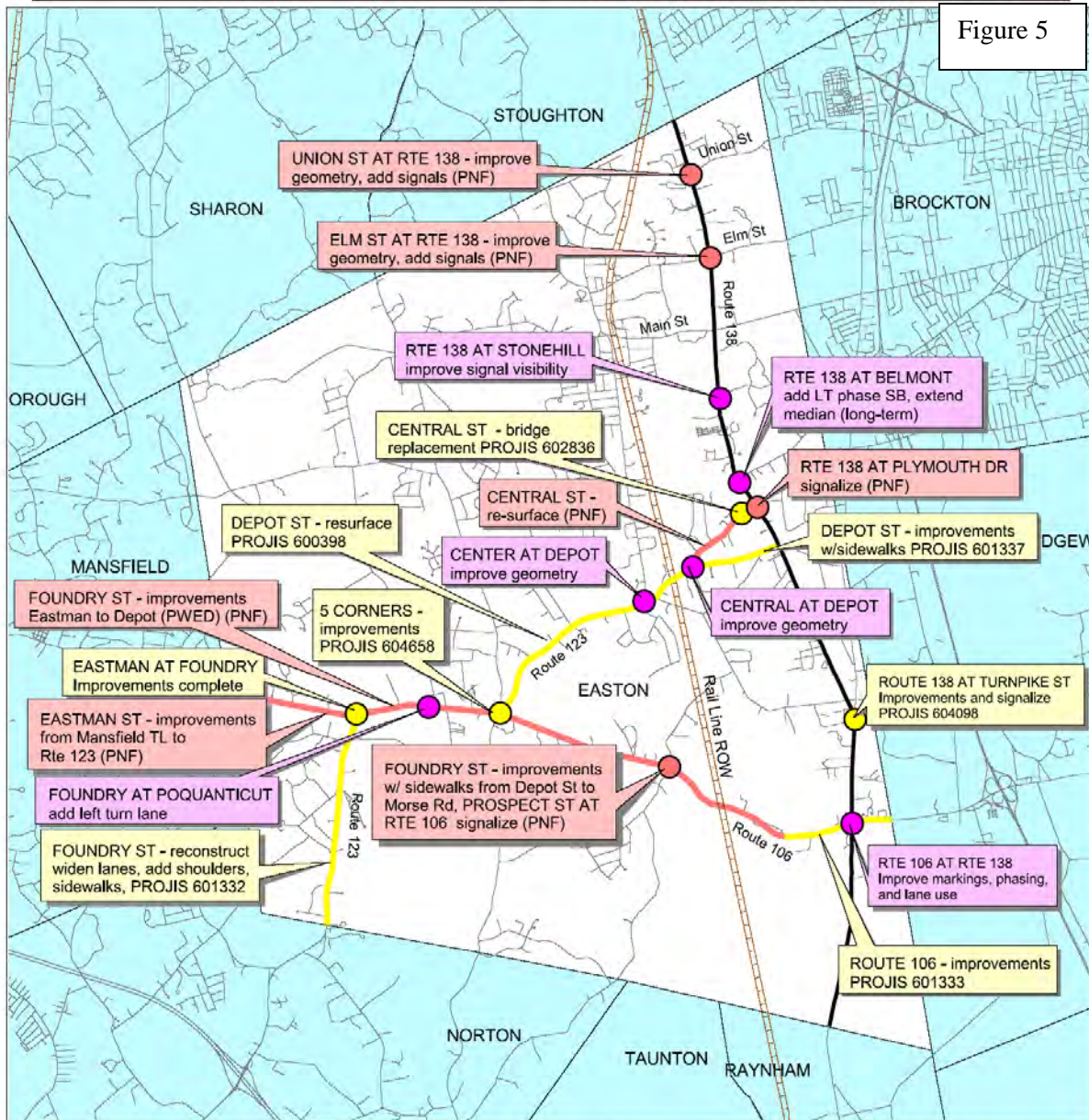
The steering committee for the Easton State Numbered Routes Corridor Study met continuously throughout the study process. Traffic operations analyses, for existing and future conditions, signal warrant analyses, safety analyses, pavement conditions, and proposed alternative improvements have been presented to the committee by OCPC staff for review and discussion. The minutes to the steering committee meeting are included in the appendix to this report. Based on the analyses and the steering committee review, a number of alternative improvements for study area locations have been developed. These recommended improvements incorporate the findings and recommendations for improvements at specific locations from previous studies as identified in Table 6. The steering committee recommendations for improvements include projects that are both approved and not yet approved by the PRC. Figure 5 summarizes all recommended projects, along with planned ongoing approved projects. Table 7 compares existing and future levels-of-service without improvements to the future levels-of-service with improvements to discern the operational improvements from the recommended projects.



ONGOING AND PLANNED IMPROVEMENTS

Easton State Numbered Routes Corridor Study

Figure 5



- State Numbered Route
- PRC Approved Projects (TIP)
- Pre-PRC Projects (require PNF)
- Other recommended improvements
- Railroad Right of Way
- Roads
- Easton Town Bounds
- Other Massachusetts Municipalities



2 0 2 4 Miles

Old Colony Planning Council
70 School Street
Brockton, MA 02301

GIS Data Sources:
MassGIS, MHD, OCPC Field Data



Table 7 Level-of-Service Summary 2011 Future Conditions with Mitigation

ID	Intersection	Existing Conditions		Future Conditions		Future Conditions with Improvements	
		AM LOS	PM LOS	AM LOS	PM LOS	AM LOS	PM LOS
1	Washington St (Rte 138)/Roche Brothers/ Stonehedge Apts	B	B	B	B	NA	NA
2	Washington St (Rte 138) at Union Street	F	F	F	F	B	B
3	Washington St (Rte 138) at Elm Street	F	F	F	F	B	B
4	Washington St (Rte 138) at Main Street	C	C	C	D	NA	NA
5	Washington St (Rte 138) at Stonehill College	B	B	C	C	NA	NA
6	Washington St (Rte 138) at Belmont St (Rte 123)	B	D	C	E	B	B
7	Washington St (Rte 138) at Central St	B	C	B	D	NA	NA
8	Washington St (Rte 138) at Plymouth Dr Easton Industrial Park	E	F	E	F	B	B
9	Washington St (Rte 138) at Depot St (Rte 123)	B	B	C	C	NA	NA
10	Washington St (Rte 138) at Purchase St/West St	C	F	D	F	NA	NA
11	Washington St (Rte 138) at Turnpike St	E	F	F	F	C	C
12	Turnpike St at West St/Purchase St	D	F	E	F	NA	NA
13	Turnpike St (Rte 138) at Foundry St/West Center St (Rte 106)	B	C	C	E	C	D
14	FIVE CORNERS Foundry St (Rte 106) at Depot (Rte 123)	E	E	F	F	C	D
15	Foundry St (Rte 106) at Poquanticut Ave	E	F	F	F	D	F
16	Eastman St (Rte 106) at Foundry St (Rte 123)	C	C	C	C	NA	NA
17	Foundry St (Rte 106) at Prospect St	C	F	C	F	B	B
18	Depot St (Rte 123) at Bay Rd (north of 5 Corners)	C	E	D	F	C	F
19	Foundry St (Rte 123) at Highland St	E	D	F	E	E	E
20	Depot St (Rte 123) at Cross Street	D	F	E	F	NA	NA
21	EASTON CENTER Depot St (Rte 123) at Center St	F	F	F	F	F	F
22	Depot St (Rte 123) at Purchase St	F	F	F	F	NA	NA
23	Depot St (Rte 123) at Central Street	F	NA	F	NA	F	NA
24	Depot St (Rte 123) at Church Street	B	B	B	B	NA	NA
25	Rte 123 Belmont St at Bristol (Industrial Prk)	D	F	E	F	NA	NA
26	Rte 123 Belmont St at Stonehill College	B	B	B	C	NA	NA
27	Foundry St (Rte 123) at Norton Ave	B	C	B	C	B	C
28	Foundry St (Rte 123) at Old Foundry St	D	D	D	E	C	D

N/A = Not Applicable, no improvements recommended

6.1 Recommended Intersection Improvements

Table 8 summarizes intersection improvements and the prioritization given by the study steering committee. Table 8 summarizes the intersection traffic control, jurisdiction, LOS, crash rate, the crash rate percentage difference from the district average, number of fatal crashes, previous planned improvements (if any), implementation, and the priority status given by the study steering committee.



Table 8 Intersection Recommendations

Inter- section	Existing Traffic Control	Jurisdiction	AM, PM LOS	Crash Rate	% vary from district average	Fatals (past 15 years)	Mass Highway Top 200?	Improvement Status	Recommended Improvements	Comments	Priority	Long term-Short-term
Washington St (Rte 138) at Union Street	stop sign	state	F, F	0.867	47%	1	no	Roche Bros development mitigation required functional design plans, MBTA commuter rail mitigation proposes to construct Roche Bros design	Install traffic signals, improve geometry, add SB and NB storage lanes	Pre-PRC, requires a PNF - Combine as a single project with signals at Route 138 and Elm Street	High	long-term
Washington St (Rte 138) at Elm Street	stop sign	state	F, F	0.928	57%	1	no	Roche Bros development mitigation required functional design plans, MBTA commuter rail mitigation proposes to construct Roche Bros design	Install signals, realign intersection, improve geometry and sight distances	Pre-PRC, requires a PNF - Combine as a single project with signals at Route 138 and Union Street	High	long-term
Rte 123 Belmont St at Stonehill College	signal	state	B, B	0.359	-34%	0	no		Add crosswalks and pedestrian phasing to signals	Low cost short term improvements	High	short-term
Washington St (Rte 138) at Stonehill College	signal	state	B, B	0.926	10%	0	no		Improve signal visibility, increase speed enforcement, Add advanced warning signs Rte 138 signal ahead	Easton and OCPC to coordinate improvements with MassHighway	High	short-term
Washington St (Rte 138) at Belmont St (Rte 123)	signal	state	B, D	1.847	119%	1	no	A proposed 40R development Queset Commons off of Rte 138 to impact this intersection	Add pedestrian phasing, crosswalks, and amenities for safety. Separate phasing for EB and WB - Lead/Lag phasing NB SB, or Lead/Lag NB SB with designated SB left turn - LONG TERM Alternative -widen EB approach, extend the EB island back from the intersection, add SB left turn storage.	Improvements should come from mitigation of Queset Commons impacts - Easton and OCPC to coordinate improvements with MassHighway -	High	short term and long-term



Table 8 (continued)

Intersection	Existing Traffic Control	Jurisdiction	AM, PM LOS	Crash Rate	% vary from district average	Fatals (past 15 years)	Mass Highway Top 200?	Improvement Status	Recommended Improvements	Comments	Priority	Long term-Short-term
Washington St (Rte 138) at Central St	signal	state	B, C	1.125	34%	0	no		Coordinate phasing and signals with those proposed for Rte 138 and Plymouth Dr intersection		High	long-term
Washington St (Rte 138) at Plymouth Dr Easton Indust. Park	stop sign	state	E, F	1.110	88%	0	no		Add traffic signals and coordinate with signals at Central St at Route 138, SB LT storage lane	Pre-PRC, requires a PNF	High	long-term
Washington St (Rte 138) at Turnpike St	stop sign	state	E, F	0.325	-45%	1	no	MassHighway to signalize Projis 604098 construction 2011 - currently in preliminary design stage	Re-align, add NB RT storage, signalize intersection	Easton and OCPC should work closely with MassHighway toward consensus on improvements and design	High	long-term
Turnpike St (Rte 138) at Foundry St/West Center St (Rte 106)	signal	state	B, C	1.675	99%	0	no	Resurface Projis 601333	Add pavement markings to delineate movement through the intersection, review lane use, timing and phasing for safety.	Easton and OCPC should work closely with MassHighway toward consensus on improvements and design	High	short-term
FIVE CORNERS Foundry St (Rte 106) at Depot (Rte 123)	signal	Easton	E, E	1.452	73%	0	YES #103	Intersection re-alignment 2008/2009 Projis 604658 Project approaching 25% design - LT exclusive EB and SB Intersection widening "Box widening"	Easton and OCPC should work with MassHighway to review design	Project approaching 25% design.	High	long-term
Foundry St (Rte 106) at Poquanticut Ave	stop sign	Easton	E, F	0.559	-6%	0	no		Add left turn lane on Route 106 as part of Foundry Street improvements Eastman St to Depot St	PNF from Easton required, these improvements will be part of PWED application for Route 106 improvements	Medium	short-term
Eastman St (Rte 106) at Foundry St (Rte 123)	signal	Easton	C, C	2.029	142%	1	no	Improvements complete	Widen intersection, add turn lanes, and add signals		High	long-term
Foundry St (Rte 106) at Prospect St	stop sign	Easton	C, F	1.498	154%	0	no	Pre-PRC, these improvements to be part of Route 106 re-surface and improvements from Depot Street to Morse Rd	Add traffic signals	PNF from Easton required, these improvements will be part of PWED application for Route 106 improvements	High	long-term



Table 8 (continued)

Intersection	Existing Traffic Control	Jurisdiction	AM, PM LOS	Crash Rate	% vary from district average	Fatalities	Mass Highway Top 200?	Improvement Status	Recommended Improvements	Comments	Priority	Long term-Short-term
Depot St (Rte 123) at Bay Rd (north of 5 Corners)	stop sign	Easton	C, E	0.222	-63%	0	no	Intersection re-alignment 2008/2009 Projis 604658	Project approaching 25% design.	Easton and OCPC should work with MassHighway to review design	High	long-term
EASTON CENTER Depot St (Rte 123) at Center St	stop sign	Easton	F, F	1.615	173%	0	no	Resurface Projis 601337	Review design without disturbing monument, investigate roundabout feasibility and school access issues	Easton and OCPC should work with MassHighway to review design	Medium	long-term
Depot St (Rte 123) at Central Street	stop sign	Easton	F	1.362	131%	0	no	Resurface Projis 601337		Easton and OCPC should work with MassHighway to review design	Medium	long-term

6.1.1 Intersection of Washington Street Route 138 at Union Street

Although Union Street is a narrow two-lane road in Easton, with no shoulders in some sections, it provides an important link to Pleasant Street (Route 27) and Route 24 in Brockton. The LOS analysis shows that this intersection is currently operating under failed conditions at LOS “F” in both the morning and afternoon peak hours. Further analysis shows that this intersection will continue to operate under failed conditions under future operating conditions. Peak hour operating conditions are such that there are very few sufficient gaps in the Route 138 major street traffic to allow left turn movements from Route 138 southbound to Union Street or left turns from Union Street westbound to Route 138 southbound. This situation causes long delays, long queues, and increases crashes due to motorists making critical turning movements utilizing gaps in the major traffic stream that are too short and hazardous. This intersection has a higher than average crash rate, and a fatal crash occurred at this location in 1995 (based on MassHighway’s database). Route 138 provides an alternative north to south route to Route 24. When major incidents occur shutting down the Route 24 corridor, Union Street is used as a major connection allowing traffic to access Route 138 from the Brockton and the Route 24 corridor. It is expected that traffic will increase at this intersection in the near future due to proposed residential and retail developments in close proximity along Route 138.

This intersection has been the subject of analysis in Environmental Impact Reports for the Roche Brothers Supermarket and the MBTA expansion of the commuter rail line to a station to be located in the vicinity of the Roche Brothers Supermarket. Both impact reports concluded that improvements are needed to mitigate increased traffic at this intersection due to these developments. Mitigation requirements for the Roche Brothers development, stated in the EIR, include the development of functional designs for improvements and signalization of this intersection as well as the signalization of the Route 138/Elm Street intersection. The EIR offered two conceptual improvement plans; the first concept included improvements to mitigate the Roche Brothers Supermarket traffic and the second included improvements to mitigate traffic due to both the Roche Brothers traffic and traffic due to an MBTA commuter rail station off of Route 138 near the Roche Brothers parcel.



It is recommended that a traffic signal be installed at this intersection to improve traffic operations and safety. Analyses of future peak hour operating conditions show a substantial improvement in the LOS under signal operation. The LOS at this intersection will be at LOS “B” if a signal is installed, compared to LOS “F” conditions under future stop control operations. Warrant analyses were performed for this intersection based on the standards published in the MUTCD, and the results show that this intersection satisfies these traffic signal warrants. The signal warrant analyses are included in the appendix to this report.

Action for Implementation of Improvements

It is recommended that a Project Notification Form (PNF) be completed to begin the process of implementing improvements at this intersection. The signalization improvements at this intersection and the signalization of the Route 138/Elm Street intersection can be combined as one project with one PNF submittal. This intersection (and the Route 138 at Elm Street intersection) is under the jurisdiction of MassHighway. The submittal of a PNF should be coordinated with MassHighway District 5.

6.1.2 Intersection of Washington Street Route 138 at Elm Street

This intersection operates under failed conditions, LOS “F” during the morning and afternoon peak hours. Although this is a four-way intersection, and the Union Street/Route 138 intersection is a T-type intersection, traffic operations at the Elm Street/Route 138 intersection are similar to the Union Street/Route 138 intersection. The critical turning movements from the side street (Elm Street) are not provided with adequate gaps in the major street (Route 138) traffic stream to allow for safe efficient movement. This situation creates congestion and hazardous conditions. Furthermore, the westbound Elm Street approach to Route 138 is not directly opposite the eastbound Elm Street approach to Route 138. The eastbound approach is offset to the north, which creates a “dog-leg” movement for Elm Street through movements adding to the hazards for turning movements at this intersection. This intersection has a higher than average crash rate and a fatal crash occurred at this location in 1994 (based on MassHighway’s database).

This intersection was also the subject of analyses, along with the Washington Street/Union Street intersection, in the environmental impact reports for both the Roche Brothers Supermarket and the MBTA Commuter Rail Station. These EIR’s concluded that improvements to this intersection are necessary to mitigate future traffic due to both projects. This mitigation consisted of improving turning radii at the Elm Street westbound approach, adding additional turning lanes on the northbound and southbound Route 138 approaches, and installing traffic signals.

It is recommended that traffic signals be installed at this intersection to improve both peak hour traffic operations and safety at this intersection. It is further recommended that this intersection be re-aligned, in the long-term, to create a conventional four-way intersection. The re-alignment of the intersection is considered long-term due to the potential cost that may be incurred by this improvement because of potential right-of-way needs.

Action for Implementation of Improvements

It is recommended that a Project Notification Form (PNF) be completed to begin the process of implementing improvements at this intersection, and that these improvements be combined with the improvements at Route 138 and Union Street under one project. This intersection is under the jurisdiction of MassHighway. Completion of the PNF should be coordinated with the MassHighway District 5.

6.1.3 Washington Street Route 138 at Stonehill College

This intersection operates under acceptable levels-of-service (LOS “B”) under existing and projected future peak hour operations. This intersection does have a higher than average crash rate, and Stonehill



officials have cited visibility problems at the intersection along with overall speeding problems along Route 138 north and south of the intersection. Sight distance problems exist for vehicles approaching from the south. It is recommended that signal visibility be improved through the review of existing signs approaching the intersection, and proper advanced warning signs be installed (based on the MUTCD) on the northbound and southbound Route 138 approaches. It is further recommended that the signal timing and phasing be reviewed, and that an increase in the “all red” timing be investigated and increased, if necessary, to allow for the proper clearance of vehicle turning movements. In addition, it is recommended that the Easton Police Department enhance enforcement of speeding within this section of Route 138.

Action for Implementation of Improvements

It is recommended that the Town of Easton and Stonehill College coordinate improvements at this intersection with both the OCPC and MassHighway District 5. The improvements are anticipated to be low cost and implemented in the short-term with minor effort.

6.1.4 Belmont Street Route 123 at Stonehill College

Although this intersection operates under acceptable levels-of-service under existing and future peak hour operations, the signals do not provide pedestrian actuation for crossing Belmont Street. This intersection does not have any crosswalks or other pedestrian amenities for pedestrians to safely cross Route 123. Pedestrian activity, mainly from Stonehill College is significant due to students crossing at this intersection to access public transportation on Belmont Street.

Action for Implementation of Improvements

It is recommended that the Town of Easton and Stonehill College coordinate improvements at this intersection with both the OCPC and MassHighway District 5. The improvements are anticipated to be low cost and implemented in the short-term with minor effort.

6.1.5 Washington Street Route 138 at Belmont Street Route 123

The Washington Street (Route 138)/Belmont Street (Route 123) intersection is an important junction in the route between Route 138 and Route 24 via Belmont Street Route 123. This intersection operates under LOS “C” conditions during the morning peak hour and LOS “D” conditions during the afternoon peak hour under existing operations. The LOS analysis results indicate that this intersection will be at LOS “E” under future afternoon peak hour operating conditions. The steering committee concluded that there has been increased pedestrian traffic at this intersection due to pedestrian activity from Stonehill College and from residential growth in the vicinity of this intersection. This intersection currently lacks crosswalks and pedestrian signals. Furthermore, the number of crashes, along with a high crash rate, at this intersection is due to a commercial drive off of the Belmont Street westbound approach that requires left turn entering vehicles, or vehicles exiting left, to cross two lanes of westbound traffic. This drive is approximately 150 feet east of the intersection and it provides access to a small shopping plaza on the northeast quadrant of the intersection. This plaza is also served by an additional drive off of Route 138 that allows left turns in and out of the property. An extension of the traffic island on the westbound approach that would allow only right turns in and out of this drive will serve to reduce angle collisions at this intersection. This will not substantially reduce access to the site because the plaza is currently served by a full access off of Route 138 and the Belmont Street drive is redundant.

This intersection has been the subject of operational analysis in the EIR completed for the Roche Brothers Supermarket. The EIR concluded that future improvements to this intersection should include widening at all four of the intersection approaches. The conceptual plans from the EIR shows three lanes on the southbound approach; an exclusive left turn lane, and exclusive through lane, and a shared through right turn lane. The conceptual plans recommend three lanes on the Belmont Street westbound approach; two



exclusive left turn lanes and a shared through right turn lane. The plans recommend three lanes northbound; an exclusive left turn lane to CVS, an exclusive through lane and a northbound right turn only lane, as well as two lanes eastbound from CVS, with an exclusive eastbound left turn lane and a shared eastbound through and right turn lane. Future peak LOS analyses, shown previously in Table 7, show that these improvements, along with the appropriate changes in phasing and timing, will result in improvements in LOS from “C” and “E”, for the future morning and afternoon peak respectively, to LOS “B” and “B” for the future with recommended improvements in place.

Action for Implementation of Improvements

It is anticipated that a proposed mixed-use development to be located in close proximity of this intersection will have significant impacts on the operations and safety at this intersection. The Town of Easton, MassHighway, and OCPC, through the site plan review process and the MEPA process, should review plans and proposals, and require mitigation of impacts for this intersection.

6.1.6 Washington Street Route 138 at Plymouth Drive

Plymouth Drive provides access to the Easton Industrial Park to and from Route 138. This intersection is un-signalized and during the morning and afternoon peak hours, access to and from the industrial park is congested. Left turn movements from Route 138 into Plymouth Drive must cross two lanes of traffic as well as left turns from Plymouth Drive to Route 138 southbound. These movements are further inhibited by the lack of sufficient gaps in the mainstream northbound and southbound traffic on Route 138. Analyses conducted for this intersection indicate that a traffic signal is warranted at this location. Future peak hour LOS completed for this intersection shows that the LOS is improved from LOS “E” and “F”, respectively in the AM and PM future peak hour to LOS “B” and “B,” respectively, under future signalized peak hour operating conditions. A traffic signal installed at this location should be coordinated with the existing signal at the Central Street/Washington Street Route 138 intersection, due to its close proximity.

Action for Implementation of Improvements

It is recommended that a Project Notification Form (PNF) be completed to begin the process of implementing improvements at this intersection. The intersection is under MassHighway’s jurisdiction. The completion of the PNF should be coordinated with the Town of Easton, OCPC, and MassHighway District 5.

6.1.7 Turnpike Street Route 138 at Foundry Street Route 106

Foundry Street Route 106, like Union Street and Belmont Street, provides access to Route 24. In addition, Foundry Street is an important east west arterial in the region. The LOS at this intersection is currently LOS “B” during the morning peak hour and LOS “D” during the afternoon peak hour. The LOS is expected to be at LOS “C” and LOS “E” during the future morning and afternoon peak hours respectively. The traffic signal at this intersection currently operates in two phases with the northbound and southbound moving with a green while the eastbound and westbound are stopped, and then the eastbound and westbound moving with a green signal while the northbound and southbound are stopped. The intersection is expected to operate under LOS “E” conditions during the future afternoon peak under these operating conditions. If the phasing is changed to allow for a “lead” and “lag” between the northbound and southbound movements and also during the eastbound and westbound phasing, then the LOS will improve to LOS “D” during the future afternoon peak. The installation of pavement markings at this intersection is also recommended to safely channel vehicles through the intersection. The crash rate at this intersection is 1.675 crashes per million entering vehicles, which is 92 percent higher than the 0.87 state average for crash rates for signalized intersections.



Action for Implementation of Improvements

It is anticipated that the recommended improvements for this intersection can be implemented as part of the approved planned improvements for Foundry Street Route 106 (MassHighway Project Information Number 601333). These recommended improvements involve short-term inexpensive fixes to the timing and phasing of the traffic signal and the installation of pavement markings to designate lane use.

6.1.8 Foundry Street Route 106 at Prospect Street

This intersection is currently under stop sign control and operates at LOS “C” and “F” under existing and future peak hour operating conditions. Safety is a major concern at this intersection, which has limited sight distance along Foundry Street due to the curvature of the road. The crash rate is high at 1.498 crashes per MEV. Past efforts to improve the sight distance by the Easton DPW by removing vegetation from the Foundry Street approaches have resulted in limited success due to the alignment of the road. Analyses conducted for this intersection show that it satisfies the MUTCD warrants for installing a traffic signal. In addition, the LOS is improved from LOS “C” and “F,” during the AM and PM existing and future peak hours, respectively, to LOS “B” and “B” under signalized future AM and PM peak hour conditions. It is recommended that traffic signals be installed at this intersection to improve safety and traffic operations.

Action for Implementation of Improvements

It is recommended that a Project Notification Form (PNF) be completed to begin the process of implementing improvements at this intersection. The intersection is under Easton’s jurisdiction. The completion of the PNF should be coordinated with the Town of Easton, OCPC, and MassHighway District 5. It is anticipated that implementation of recommended improvements at this intersection be combined in a single project with recommended improvements to reconstruct the Foundry Street Route 106 corridor from the Five Corners intersection to Morse Road.

6.1.9 Foundry Street Routes 106/123 at Poquanticut Street

The critical movements at this intersection currently operate at LOS “E” and “F” conditions during the AM and PM peak hours and will continue to operate at this level in the future. This is due mainly to the lack of sufficient gaps in the mainstream of the Foundry Street traffic. Widening the Foundry street approach to allow Foundry Street eastbound through traffic to pass vehicles waiting to turn left onto Poquanticut Street will improve the LOS under future conditions to LOS “D” during the future AM peak hour.

Action for Implementation of Improvements

It is anticipated that implementation of recommended improvements at this intersection be combined in a single project with recommended improvements to reconstruct the Foundry Street Route 106 corridor from the Eastman Street intersection to the Five Corners intersection. It is recommended that improvements at this intersection be included in a Project Notification Form (PNF) for implementing improvements within the section of Foundry Street between Eastman Street and the Five Corners intersection. This intersection is under Easton’s jurisdiction. The completion of the PNF should be coordinated with the Town of Easton, OCPC, and MassHighway District 5.



6.1.10 Center Street at Depot Street

This intersection operates at LOS “F” under existing and future AM and PM peak hour operations. This is due mainly to the heavy volumes of traffic on Depot Street that do not provide adequate gaps within the stream to allow for safe turning movements from the side street (Center Street). In addition, the intersection contains an historic Civil War monument. The monument is located at the center of the intersection, which creates a modified “T” type intersection operation. As Center Street approaches the monument, it is split into two segments, with right turning vehicles passing to the right and left turning vehicles passing to the left. Both of these road segments allow two-way traffic for vehicles turning from Depot Street to enter Center Street. This set up adds potential conflicts for vehicles turning in and out of Center Street to and from Depot Street. A study completed for the Town of Easton in March of 2005 stated that minor geometric modifications might be proposed at this intersection, although the study did not specify specifically what the modifications would entail. This intersection has a high number of crashes (37) and a high crash rate (1.615 MEV), due mainly to motorist confusion.



Center St at Depot St looking east from Depot St



Center St at Depot St looking west from Depot St



Center St at Depot St looking south from Center St



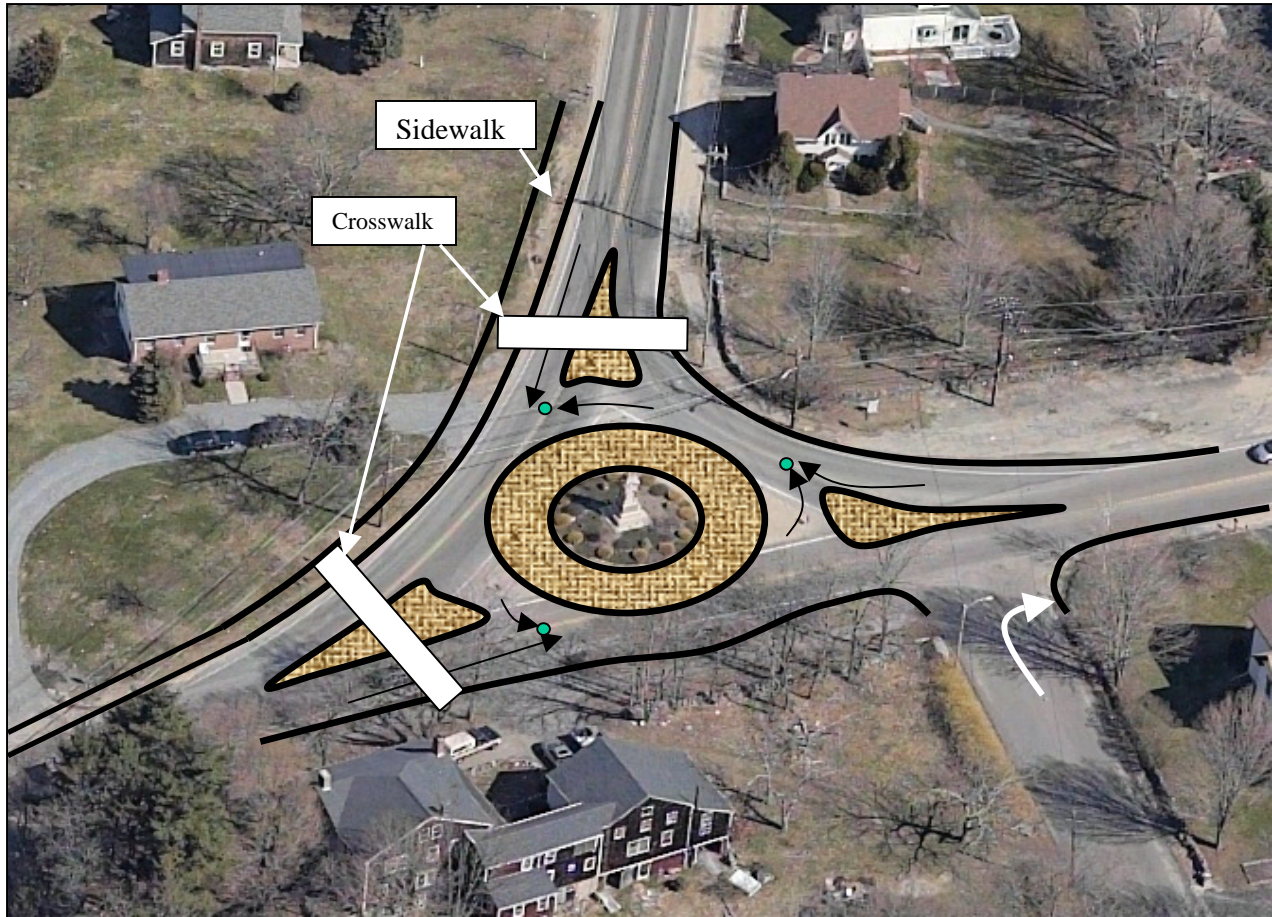
It is recommended that the town investigate the feasibility of designing a modern roundabout around the existing monument. The roundabout would be constructed without moving or disturbing in any way the existing Civil War monument. Preliminary analysis using the FHWA’s An Informational Guide on Roundabouts shows that the intersection would operate under acceptable levels-of-service for future AM and PM peak hour operations if a roundabout were designed around the existing monument. The FHWA’s guide states that the circulating flow should not exceed 1,800 vehicles per hour at a single lane roundabout. An estimate of the maximum future PM peak circulating flow for a roundabout at this intersection is 988 vehicles per hour, which is under the 1,800 threshold. Furthermore, a roundabout would reduce turning movement conflicts as they currently exist and provide splitter islands as refuge for pedestrian crossings at the intersection. The internal diameter of a roundabout designed around the existing monument would most likely be 120 feet to 130 feet in diameter. Figures 6 and 7 compare the current intersection design and conflicts to a roundabout concept. The roundabout is yield sign controlled at the approaches.

Figure 6 Center Street at Depot Street current alignment and conflicts





Figure 7 Center Street at Depot Street future roundabout concept alignment and conflicts



Action for Implementation of Improvements

It is anticipated that the recommended improvements for this intersection can be combined with and implemented as part of the approved planned improvements for Depot Street Route 123 (MassHighway Project Information Number 601337).

6.1.11 Central Street at Depot Street

This intersection is described as the most congested intersection in the Depot Street corridor in a 2005 Request for Project Initiation study completed by VHB for the Town of Easton. The LOS for the AM peak hour under existing and future conditions is LOS “F.” The VHB study recommended a wider pavement cross-section to allow through vehicles to maneuver around stopped vehicles on Depot Street waiting to turn left.

Action for Implementation of Improvements

It is anticipated that the recommended improvements for this intersection can be implemented as part of the approved planned improvements for Depot Street Route 123 (MassHighway Project Information Number 601337).



6.2 Recommended Corridor Improvements

Table 9 summarizes the recommended corridor improvements, their existing improvement status, jurisdiction, and recommended improvements and implementation.

Table 9

LOCATION	Jurisdiction	Fatalities	Improvement Status	Recommended Improvements	Comments	Priority	Long term Short term
Route 123 Foundry Street from Norton Town Line to Route 106 Eastman St	Easton	0	TIP Project PROJIS 601332 - comments on 75% design returned to design engineer - Planned full depth pavement, cold planing overlay, sidewalks, pavement markings, and other incidentals - construction 2008	Pavement condition survey results - surface pavement in poor condition	Easements completed, town to go to conservation commission for wetlands order of conditions	High	short-term
Route 106 Eastman Street from Mansfield TL to Route 123 Foundry Street	Easton	0			Requires PNF from Easton	Medium	long-term
Route 106 Foundry from Eastman Street to 5 Corners	Easton	1	Subject of Easton PWED grant application	Pavement condition survey results - surface pavement in poor condition, add left turn lane on Rte 106 at Poquanticut	Requires PNF from Easton	High	long-term
Route 106 Foundry Street from 5 Corners to Morse Road	Easton	3	Pre-PRC proposal in TIP pavement in good to fair condition		Requires PNF from Easton	Medium	long-term
Route 106 Foundry Street - Morse Road to West Bridgewater line	Easton	0	PROJIS 601333	Safety and congestion improvements needed at the Route 138/Route 106 intersection, improve lane use, phasing and pavement markings	Short-term improvements (MHD)	High	short-term
Rte 123 Depot Street from Foundry to Black Brook Rd	Easton	0	PROJIS 600398	Project nearly complete	Under Construction	High	long-term
Route 123 Depot Street from Black Brook (Foxridge) to Route 138	Easton	1	PROJIS 601337	Depot Street east of Route 138 in poor condition to Turnpike Street	Sidewalks included along Depot Street. 40 to 49 feet of ROW	Medium	long-term
Central Street Bridge replacement	Easton	0	Contract not yet awarded PROJIS 602836		Contract not yet awarded	High	short-term
Central Street resurface from Washington Street to Depot Street	Easton	0	Pre-PRC proposal in TIP		Requires PNF from Easton	High	short-term



6.2.1 Central Street from Washington Street to Depot Street

Central Street will require resurfacing after the bridge is replaced over the Queset Brook. The project to replace the bridge is set to commence once the contract is awarded to a construction firm. Central Street is currently closed to through traffic with most of the traffic being re-routed via Depot Street to Washington Street.

Action for Implementation of Improvements

It is recommended that a Project Notification Form (PNF) be completed for implementing improvements to the surface pavement on Central Street. This project is under Easton's jurisdiction. The completion of the PNF should be coordinated with OCPC, and MassHighway District 5.

6.2.2 Eastman Street Route 106 from Mansfield Town Line to Foundry Street

This section of roadway contains areas of longitudinal cracking. Although the overall condition of the pavement surface is good, a pavement overlay is recommended to extend the life cycle of the surface and to maintain a consistency of the surface for Route 106 in Easton.

Action for Implementation of Improvements

It is recommended that a Project Notification Form (PNF) be completed for implementing improvements to Eastman Street. This project is under Easton's jurisdiction. The completion of the PNF should be coordinated with OCPC, and MassHighway District 5.

6.2.3 Foundry Street from Eastman Street to the Five Corners intersection

This section of Foundry Street is signed as both Route 106 and Route 123. The surface pavement is in poor condition with extensive alligator cracking in certain sections. According to the 2005 VHB study, this section of Foundry Street lacks formal drainage. Evidence of the ponding of water is noticeable, especially after extensive rainstorms. This section of the road carries approximately 20,000 to 22,000 vehicles per day. The Town of Easton recently applied for a Public Works Economic Development (PWED) grant for the reconstruction of this section of Foundry Street. Recommended improvements include resurfacing and drainage updates to include catch basins.

Action for Implementation of Improvements

It is recommended that a Project Notification Form (PNF) be completed for implementing improvements to Foundry Street. This project is under Easton's jurisdiction. The completion of the PNF should be coordinated with OCPC, and MassHighway District 5.

6.2.4 Foundry Street Route 106 from the Five Corners to Morse Road

This section of Route 106 contains areas of longitudinal cracking. Although the overall condition of the pavement surface is good, pavement improvements are recommended to extend the life cycle of the surface and to maintain a consistency of the surface for Route 106 in Easton. The VHB study recommended the widening of shoulders and the installation of a sidewalk along Route 106 as part of this project. The intersection of Foundry Street at Prospect Street is a major intersection along this route. It is recommended that a traffic signal be installed at this intersection in order to improve safety and peak hour traffic operations, which are currently at LOS "F" during the afternoon peak.



Action for Implementation of Improvements

It is recommended that a Project Notification Form (PNF) be completed for implementing improvements to this section of Foundry Street Route 106. This project is under Easton's jurisdiction. This project should include alignment improvements and traffic signal installation at the intersection of Foundry at Prospect Street. The completion of the PNF should be coordinated with OCPC, and MassHighway District 5.

6.3 Access Management

Access Management is defined as the planning of the design, location, and operation of driveways, median openings, interchanges, and street connections. Access management provides two important advantages when applied to a roadway corridor:

- Improved Safety
- Improved Capacity

These advantages are achieved through Access Management techniques that seek to obtain the following results:

- Limit the number of conflict points in turning movements
- Separate conflict areas
- Remove turning vehicles from through traffic lanes
- Reduce conflicting volumes
- Improve roadway operations
- Improve driveway operations

Commercial and retail activities are extremely important within certain segments of corridors on Route 138, Route 106, and Route 123. Although some access management techniques include limiting the number of curb cuts, adding medians, and reducing turning movements, well planned access management design and modifications do not negatively impact businesses. Access Management applications result in reduced blocking of driveways by queues, better access between neighborhoods and businesses, and safer overall driving conditions. All of these attributes are important to both retailers and the customers they serve.

Development along highway corridors sometimes results in the redevelopment of parcels that were abandoned or are in transition in regards to use. The techniques applied to these segments involve retrofitting access management to existing curb cut access. Retrofits sometimes require the consolidation of access points.

The areas within Route 138, Route 106, and Route 123 in which access management techniques should be a prime focus include:

- Route 138 Washington Street from Belmont Street south to Depot Street. Route 138 is mainly a two-lane highway; however, it has four-lane sections within this segment and includes numerous driveways to adjacent retail uses.
- The Five Corners area along Foundry Street Route 106 and Depot Street Route 123. Although Depot Street and Foundry Street carry a heavy amount of through traffic between Route 24 and I-495, the Five Corners area is emerging as an important retail area.



Examples of typical access management applications include:

1. Access Spacing
 - Limit the number of access points to properties
 - Consolidate redundant, low-volume drives
2. Establish a minimum distance between drives
 - Limit the width of access points based on the site use
 - Turning Lanes
3. Establish minimum turning radii to slow traffic in high traffic pedestrian areas
 - Improve corner clearance
4. Establish deceleration/acceleration lanes
 - Add Two-Way Turning Lanes
5. On-Site Remedies
 - Share drives between sites
 - Add longer “throat lengths” to internal driveways in lots
 - Connect adjacent commercial properties
 - Construct service roads with multiple drives but fewer access points on the arterial
6. Median Treatments
 - Add Medians and turning lanes

Implementation of access management can be achieved at the local level through a number of avenues:

- Master Plan - The master plan is the responsibility of the Planning Board and outlines policies for development.
- Zoning Ordinance - The zoning ordinance codifies land-use regulations.
- Subdivision regulations and site plan review – To regulates parcel subdivision and encourage developers to include Access Management

6.3.1 Current Town Requirements

Current town requirements regarding access management are included in Section 8 under “Off Street Parking and Loading Regulations.” The following requirements under are included this section:

- Section 8-9-7. Parking and loading spaces shall be so arranged as not to permit backing of vehicles onto any street, except in residential districts.
- Section 8-9-8. Any portion of any entrance or exit driveway shall not be closer than 50 feet to the curb line of an intersection street.
- Section 8-9-9. Any two driveways leading to or from a street or to or from a single lot shall not be within 30 feet of each other at their intersections with the front line of the interior lot and 40 feet for a corner lot.
- Section 8-9-10. An entrance or exit driveway shall not exceed 36 feet in width at its throat.



6.3.2 Access Management Recommendations

The Town of Easton should enhance existing access management requirements for development along Route 138, Route 123, and Route 106 to include the following:

- Incorporate access management in the site plan review process to encourage developers to take advantage of the benefits resulting from access management techniques.
- Revise Zoning Ordinance Section 8-9-8 to provide that an entrance or driveway should not be closer than 150 feet to the curb line of an intersection street.
- Identify access management policies for specific corridors in any update of the Town's Master Plan.