# Table of Contents

Project Data ............................................................................................................................................. 1

Background .............................................................................................................................................. 2

Project Description .................................................................................................................................. 2

Audit Observations ................................................................................................................................... 5

Potential Safety Enhancements ............................................................................................................. 8

Summary of Road Safety Audit ............................................................................................................... 11

List of Appendices

Appendix A. RSA Meeting Agenda
Appendix B. RSA Audit Team Contact List
Appendix C. Detailed Crash Data
Appendix D. Speed Regulations

List of Figures

Figure 1. Location Map ........................................................................................................................... 3

List of Tables

Table 1. Participating Audit Team Members ............................................................................................ 1
Table 2. Estimated Time Frame and Costs Breakdown ........................................................................... 8
Table 3. Potential Safety Enhancement Summary ................................................................................ 12
Project Data

A Road Safety Audit for the intersection of Dascomb Road, East Street and Shawsheen Street in the Towns of Andover and Tewksbury was held on January 26, 2011 at the Tewksbury Police Department in Tewksbury, MA. As indicated in Table 1, the audit team consisted of representatives from State, Regional and Local agencies and included a cross-section of engineering, planning and emergency response expertise.

Table 1. Participating Audit Team Members

<table>
<thead>
<tr>
<th>Audit Team Member</th>
<th>Agency/Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonnie Polin</td>
<td>MassDOT Highway Division – Safety Section</td>
</tr>
<tr>
<td>Lisa Schletzbaum</td>
<td>MassDOT Highway Division – Safety Section</td>
</tr>
<tr>
<td>Matt Small</td>
<td>Tewksbury Police Department</td>
</tr>
<tr>
<td>Patrick Harrington</td>
<td>Tewksbury Police Department</td>
</tr>
<tr>
<td>Jennie Welch</td>
<td>Tewksbury Police Department</td>
</tr>
<tr>
<td>Charles Edgerly</td>
<td>Andover Police Department</td>
</tr>
<tr>
<td>Justin Howard</td>
<td>Northern Middlesex Council of Governments (NMCOG)</td>
</tr>
<tr>
<td>David Tilton</td>
<td>Northern Middlesex Council of Governments (NMCOG)</td>
</tr>
<tr>
<td>Sarah Bradbury</td>
<td>Northern Middlesex Council of Governments (NMCOG)</td>
</tr>
<tr>
<td>Sara Timoner</td>
<td>MassDOT Highway Division – District 4</td>
</tr>
<tr>
<td>Tony Komornick</td>
<td>Merrimack Valley Planning Commission (MVPC)</td>
</tr>
<tr>
<td>Jim Terlizzi</td>
<td>Merrimack Valley Planning Commission (MVPC)</td>
</tr>
<tr>
<td>Steve Sadwick</td>
<td>Town of Tewksbury Community Development Director</td>
</tr>
<tr>
<td>Paul Materazzo</td>
<td>Town of Andover Planning Department</td>
</tr>
<tr>
<td>Brian Moore</td>
<td>Town of Andover DPW/Engineering</td>
</tr>
<tr>
<td>Brian Gilbert</td>
<td>Town of Tewksbury DPW</td>
</tr>
<tr>
<td>Michele Stein</td>
<td>Town of Tewksbury DPW</td>
</tr>
<tr>
<td>Greg Lucas</td>
<td>BETA Group, Inc.</td>
</tr>
<tr>
<td>Christine Keches</td>
<td>BETA Group, Inc.</td>
</tr>
</tbody>
</table>
Background

The Federal Highway Administration defines a Road Safety Audit (RSA) as the formal safety examination of an existing or future road or intersection by an independent, multidisciplinary team. The purpose of an RSA is to identify potential safety issues and possible opportunities for safety improvements considering all roadway users. A Road Safety Audit was scheduled for the intersection of Dascomb Road, East Street and Shawsheen Street because it was identified as a potential location for safety improvements using available Federal and/or State funding opportunities. The intersection is ranked within the top 5% of the regions’ high crash location list. Regardless of the funding source, the RSA is intended to identify both short and long term safety improvements that can be made at the subject intersection.

Project Description

The T-type intersection of Dascomb Road, East Street and Shawsheen Street, shown in Figure 1, straddles the town line between Tewksbury and Andover. The continuous east-west roadway through the intersection is called East Street in Tewksbury, west of the intersection, and is called Dascomb Road in Andover, east of the intersection. Shawsheen Street forms the southern leg of the intersection and is in Tewksbury. All three streets are Town-owned roadways functionally classified as Urban Minor Arterials.

The East Street/Dascomb Road corridor is an important regional roadway, connecting the town centers of Tewksbury to the west and Andover to the east with I-93, which has an interchange at Dascomb Road approximately 2,000 feet east of the study intersection. Shawsheen Street travels southwest from the intersection and provides access to industrial and residential areas of Tewksbury, ultimately crossing Route 38 and continuing into Billerica.

East Street, Dascomb Road and Shawsheen Street form a T-type intersection with Shawsheen Street under STOP control. Shawsheen Street meets East Street and Dascomb Road at a skewed angle, with the southwest corner forming an acute angle. All three streets provide a single lane approach in advance of the intersection. Shawsheen Street widens at the intersection, and existing faded pavement markings delineate an exclusive left turn lane. Dascomb Road also widens along the westbound approach at the intersection to provide room for a westbound through vehicle to pass a stopped vehicle waiting to turn left onto Shawsheen Street. It was suggested that the widened lane along Dascomb Road was an improvement that dates back to the construction of Keri Plaza over 20 years ago. No lane markings are provided to
reinforce this intended two lane operation, and plowed snow on the day of the audit restricted available pavement width, rendering two lane operation impossible on this approach.

Pavement markings are faded and barely identifiable at the intersection. A sidewalk is provided along the Citgo gas station property at the southwest corner of the intersection and provides connection to a continuous sidewalk along Shawsheen Street south of the intersection. A sidewalk is also provided along the north side of East Street to the west of the intersection along the frontage of a recently constructed residential development. There is no connection or crosswalk from this sidewalk to the sidewalk on the southwest corner of the intersection. No other continuous sidewalks or crosswalks exist at the intersection. It was suggested that there is noticeable pedestrian activity during the warmer weather, typically during lunch hours for the adjacent businesses.

Land use of the surrounding area is a mix between industrial, commercial and residential. Keri Plaza on the southeast corner of the intersection has a variety of businesses, including a restaurant, a Dunkin’ Donuts, and a 7-11 convenience store. A Citgo gas station on the southwest corner of the intersection has a Dunkin’ Donuts, convenience store and deli. The Citgo station has driveway access to both Shawsheen Street and East Street, and left turns into the property from East Street are restricted by signage. Keri Plaza has a single driveway accessing Shawsheen Street. There are several large industrial facilities in the area; HP and Brockway Smith are located on Dascomb Road east of the intersection, DeMoula’s/Market Basket warehouse is located on East Street west of the intersection, and Northeast Refrigerated is located on Shawsheen Road south of the intersection. These industrial developments generate a significant amount of truck traffic through the intersection. There are residential areas both west and south of the intersection.

Crash data were provided by the Tewksbury Police Department and the Andover Police Department for the period from May 2006 to September 2010. Police personnel from both towns at the audit suggested that jurisdiction is always a question when a crash occurs at the intersection since the intersection spans both towns. A crash may occur in Tewksbury, while both vehicles stop in Andover following the incident. The data show a total of 33 reported crashes in the area of the intersection. There were 16 rear-end crashes and 16 angle-type crashes. Nine of the 16 rear-end crashes occurred on the Shawsheen Street approach, with the remaining seven occurring on the Dascomb Road westbound approach. It was speculated during the audit meeting that these rear-end crashes on Shawsheen Street occur when two drivers are both looking to the left for an available gap, and the following driver assumes the lead driver will go and accelerates before the lead driver has accelerated. Seven of the angle-type crashes occurred between a through vehicle on East Street eastbound and a vehicle turning left from Dascomb Road to Shawsheen Street. These crashes may be a result of drivers taking a chance on insufficient gaps, or of sight distance restrictions created by the vertical curve on East Street immediately west of the intersection. There was one crash involving a pedestrian at the intersection; a pedestrian crossing Shawsheen Street was struck by a vehicle turning left from Dascomb Road. Crash data summaries and a collision diagram are included in the Appendix.

Speed regulations maintained by MassDOT Highway Division establish a 35 MPH speed limit for East Street and for Shawsheen Street, with a reduction to 25 MPH on Shawsheen Street 400 feet in advance of the intersection. Dascomb Road has an established speed regulation of 40 MPH. Complete speed regulations are included in the Appendix.
Audit Observations

Following a brief introduction to the RSA process and a summary of crash and speed regulation information, the audit participants were asked to discuss safety issues at the intersection of Dascomb Road, East Street and Shawsheen Street. Audit participants then conducted a site visit as a group, at which time they offered observations on safety concerns and deficiencies. A summary of those major safety considerations is as follows:

- **Sight Distance** – Sight distance is restricted by the crest vertical curve on East Street immediately west of the intersection. This requires vehicles turning right from Shawsheen Street to pull out beyond the stop line in an attempt to see oncoming traffic, and is likely a contributing factor of angle crashes involving left turning vehicles from Dascomb Road. Sight distance was further restricted by plowed snow on the day of the audit, as can be seen in the photo.

- **Horizontal Alignment** – The horizontal alignment of the intersection also presents a safety concern. The angle of Shawsheen Street requires right turning drivers to look far to the left, possibly over the shoulder, when judging acceptable gaps. A driver in queue may accelerate in anticipation of the movement of the driver in front of them before that driver has accelerated, which may be a contributing factor in the number of rear-end crashes on this approach. The angle of the intersection, the width of the Shawsheen Street approach and the lack of pavement markings may also cause left turning vehicles to turn from different points and at different angles, which could be a contributing factor in the number of angle-type crashes between Dascomb Road left turning vehicles, East Street through vehicles and Shawsheen Street approach vehicles.

- **Pavement Markings** – Pavement markings are severely faded at the intersection, which decreases visibility of defined lane use. Drivers unaware of the location of the stop line may encroach beyond the stop line, contributing to the occurrence of crashes between turning vehicles and vehicles on the Shawsheen Street approach.

- **Signage** – There were a number of concerns related to signage at the intersection.
  - There is a faded “Stop Ahead” sign on the Shawsheen Street approach, which is both too close to the intersection and too faded to serve as an effective advance warning of the intersection.
There are no advance intersection warning signs on the East Street or Dascomb Road approaches.

There are misaligned stop signs at the driveway exits from the Citgo gas station onto both Shawsheen Street and East Street. This may cause confusion for approaching vehicles on Shawsheen Street and East Street, and may reduce awareness of the study intersection for approaching vehicles.

Advance Signage – Although not specifically related to the intersection, there were concerns regarding advanced signage on I-93 and on the I-93 off-ramps.

- Overhead guide signs on I-93 in both directions at Exit 42 read “Dascomb Rd/Tewksbury”. This may confuse drivers, as there is no Dascomb Road in Tewksbury, and there is no mention of East Street or Andover on the sign.

- The I-93 Southbound off-ramp exits onto Frontage Road, not Dascomb Road. This may cause confusion for drivers, although adequate directional signage exists at the off-ramp to direct drivers to Dascomb Road. There may still be confusion for drivers looking for East Street.

- Directional signage at the end of the I-93 Northbound off ramp shows “Dascomb Road Tewksbury” with a left arrow and “Andover” with a right arrow. This may confuse drivers destined for points on Dascomb Road in Andover to the east of I-93.

Lane Definition – The Dascomb Road approach to the intersection is slightly widened to allow a westbound through vehicle to pass a queued left turning vehicle. The Shawsheen Street approach is wide enough to accommodate two vehicles side by side, and faded pavement markings indicate that this approach was intended to have separate left and right turning lanes. Faded pavement markings and the informal nature of the widened lane reduce lane definition at the intersection, and may cause confusion and potential conflicts for drivers unfamiliar with the area. The lack of a defined through lane may be a contributing factor in the high number of rear-end crashes on the Dascomb Road westbound approach.

Bypass Lane Conflict – In addition to concerns over lane definition, the widened Dascomb Road approach may create conflicts between vehicles turning left from Shawsheen Street and through vehicles on Dascomb Road westbound. A vehicle on...
Shawsheen Street waiting to make a left turn may go in advance of a stopped vehicle waiting to make a left turn from Dascomb Road, unaware that another vehicle is making an unimpeded movement on the right side of that stopped vehicle.

- Pedestrian Accommodations – There are no existing pedestrian accommodations at the intersection. It was noted that there is noticeable pedestrian activity in the area in the warmer months, and that there are existing sidewalks on East Street west of the intersection which do not connect to the intersection.

- Intersection Capacity – Audit participants familiar with the intersection stated that lack of capacity is a concern, especially during peak commuter periods. The high number of angle crashes between Dascomb Road westbound left turning vehicles and East Street through vehicles may be a result of drivers accepting a gap that is too short to safely complete a turn due to high volumes and long wait times. It should be noted that no current traffic volumes or recent capacity studies were available for review.

- Turning Radii – The angle of Shawsheen Street creates a tight turning radius for trucks turning right from East Street onto Shawsheen Street. Traffic volumes were not available to review the number of vehicles making this turn, although one was observed on the day of the audit. It should also be noted that no obvious alternate route exists for vehicles needing to make this turning movement.

- Stones along Shawsheen Street – There are large boulders along Shawsheen Street immediately adjacent to the edge of pavement along the edge of the Keri Plaza property. It was suggested that these stones were placed there to discourage on-street truck parking, which is a known issue with truck drivers that wish to patronize Keri Plaza but do not want to navigate the plaza parking lot. These stones create a potential safety concern, as they limit the clear zone beyond the roadway edge.

- Lighting – The placement and intensity of lighting was noted as a safety concern, although this was not borne out by the crash data reported. Overhead highway lights are located on utility poles east of the intersection, but are not present on the poles at the intersection. It was also suggested that lighting at the Citgo gas station draws the driver’s focus away from the roadway which reduces awareness and visibility of the intersection.

- Pavement Condition – It was noted that the pavement is in poor condition at the intersection. There is significant truck traffic due to the number of nearby warehouse and industrial businesses, which causes increased wear on existing pavement.
Potential Safety Enhancements

After the site visit, audit participants returned to the meeting location to discuss the safety issues and consider improvements. Audit participants were encouraged to consider both short and long term improvements for each issue. Each improvement considered has been categorized as short-term, mid-term, or long-term based on the definitions shown in Table 2. Additionally, a cost category has been assigned to each improvement based on the parameters set forth in Table 2.

<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term</td>
<td>&lt;1 year</td>
</tr>
<tr>
<td>Mid-term</td>
<td>1–3 years</td>
</tr>
<tr>
<td>Long-term</td>
<td>&gt;3 years</td>
</tr>
</tbody>
</table>

The following improvements were suggested by audit participants to improve safety issues associated with the intersection of Dascomb Road, East Street and Shawsheen Street.

- Realign the Shawsheen Street approach to intersect Dascomb Road and East Street at a 90° angle. This safety enhancement would improve the viewing angle for approaching traffic on Shawsheen Street, while also increasing the turning radius for vehicles turning right from East Street onto Shawsheen Road. The grass and landscaped area on the corner of the Citgo gas station property could accommodate a realigned Shawsheen Street approach with minimal impact to existing driveways and parking areas. This is a long-term, high cost improvement. It should be noted that realignment would push the Shawsheen Street approach closer to the crest of the vertical curve on East Street, which could exacerbate existing sight distance concerns.

- Formalize lane use on the Dascomb Road approach. The existing Dascomb Road approach is wider at Shawsheen Street to accommodate a through vehicle wishing to pass a vehicle stopped to make a left turn onto Shawsheen Street. This lane use should be maintained and formalized by widening to accommodate 11-foot lanes and a minimum 4-foot shoulder with proper tapers, lane markings and exclusive arrow markings added to reinforce lane control. This is a mid-term, high cost improvement.

- Flatten the vertical curve on East Street. The crest vertical curve on East Street just to the west of the intersection creates sight distance concerns for vehicles exiting Shawsheen Street and for vehicles turning left from Dascomb Road onto Shawsheen Street. Cutting the crest vertical curve to flatten the roadway profile would provide greater visibility and would require grading modifications of driveways and roadway edge slopes, and may impact utilities under the roadway. This is a long-term, high cost improvement.

- Provide pedestrian accommodations. There are currently no accommodations for pedestrians to cross any of the roadways at the intersection, and limited sidewalk exists in the vicinity of the intersection. This improvement would provide a continuous sidewalk along Dascomb Road and East Street, and would provide handicap access ramps and crosswalks allowing pedestrians to cross Dascomb
Road/East Street and Shawsheen Street. A sidewalk should also be considered on the east side of Shawsheen Street, which would provide pedestrian access to Keri Plaza from the intersection. This is a mid-term, high cost improvement that should be considered in conjunction with installation of a traffic signal to provide a protected crossing for pedestrians.

- Consider a fully actuated traffic signal. A traffic signal would provide control for safer vehicle movements by providing protected movements for vehicles exiting Shawsheen Street and for vehicles turning left from Dascomb Road. A two lane Shawsheen Street approach would allow the Shawsheen Street right turn to operate as an overlap phase with the Dascomb Road left turn. A capacity study and a traffic signal warrant analysis should be performed to determine if a traffic signal is warranted at the intersection. Installation of a traffic signal is a long-term, high cost improvement could be constructed independent of other improvements, but would be most beneficial in conjunction with realignment of Shawsheen Street and with provision of pedestrian accommodations.

- Improve signage. Intersection warning signs should be installed on the Dascomb Road and East Street approaches. A W1-2R warning sign as shown at right should be installed on the East Street approach; a W1-2L with the mirror image should be installed on the Dascomb Road approach. A W3-1a “Stop Ahead” graphic sign should be installed on the Shawsheen Street approach approximately 300 feet in advance of the intersection, and the existing faded Stop Ahead sign should be removed. This is a short-term, low cost improvement.

- Reapply pavement markings. New pavement markings should be integrated into any potential realignment or widening option, but markings can also be reapplied within the existing configuration as a short-term, low cost option. The two-lane operation of the Dascomb Road approach should not be marked unless a minimum of 22 feet of available pavement exists between the center line and edge of pavement.

- Relocate the stop line on Shawsheen Street. This potential improvement was suggested because of encroachment of turning trucks, which was observed on the day of the audit from a truck turning right from East Street to Shawsheen Street. The plowed snow contributed to this specific instance of encroachment; however, the crash history at the intersection shows crashes that may be the result of encroachment, only one of which occurred during the winter months. This improvement would require study of truck turns within the existing geometry and placing the stop line for Shawsheen Street at a location that allows trucks to turn without encroachment. This concept should also be applied to any potential geometric improvement at the intersection. This is a short-term, low cost improvement.

- Install a median island on Shawsheen Street. This was suggested as a potential improvement to define the Shawsheen Street departure lane and reduce the potential for crashes between turning vehicles and stopped vehicles. This improvement would require additional widening to accommodate the median island, and would also require an initial study to determine if truck turns can still be accommodated.
for the large trucks which serve the industrial uses in the area. This is a mid-term, medium cost improvement.

- Relocate street name signs. The existing street name signs are located on the southeast corner of the intersection, adjacent to the stop sign for Shawsheen Street. The signs identify East Street and Shawsheen Street, but there is no sign for Dascomb Road. It is recommended that these signs be relocated to the southwest corner of the intersection, which is at a higher elevation than the southeast corner and would be more visible for approaching traffic. This is a short-term, low cost improvement.

- Incorporate signage changes at the I-93/Dascomb Road interchanges. There were several concerns related to signage on I-93 and at the off-ramps from I-93 Northbound and Southbound. Subsequent to the RSA meeting, MassDOT has identified updated signage that will be erected as part of an ongoing I-93 signage update project. The overhead guide signs on I-93 in both directions for Exit 42 which currently say Dascomb Road Tewksbury” will now say “Dascomb Road Tewksbury Andover”, properly identifying both communities. The addition of East Street as a destination was also suggested by audit participants. A new sign cannot be added due to sign spacing constraints, but this suggestion can be accommodated by modifying a sign intended to replace the existing sign for the Park & Ride facility at the interchange. The updated sign (shown at right) will identify the Park & Ride facility and “East Street Tewksbury” at Exit 42. The sign update project also includes Dascomb Road on both directional signs at the end of the I-93 Northbound off-ramp, modifying the existing sign from “Andover” to “Dascomb Rd Andover” with a right arrow. MassDOT also indicated that signage can be added to the I-93 Southbound off-ramp onto Frontage Road identifying East Street and Tewksbury (shown at right). These signage changes are a short-term, low cost improvement.

- Relocate existing overhead light and evaluate lighting. The existing lighting should be relocated to a pole closer to the intersection, and overall light intensity should be evaluated to determine if additional improvements are appropriate. This is a short-term, medium cost improvement.

- Realign stop signs at the Citgo driveways. The existing stop signs at the driveway exits onto East Street and Shawsheen Road are both misaligned and are currently angled slightly towards the main road. These signs should be realigned so that the sign face is perpendicular to the driveway and will not lead to confusion for drivers approaching on East Street or Shawsheen Road. This is a short-term, low cost improvement. Removal of the stop signs may also be considered, since stop signs are not required and are typically not erected at driveway exits. Further evaluation regarding need would be required prior to any removal action.
Rehabilitate pavement. Pavement rehabilitation should be integrated with any potential realignment or widening option, but can also be undertaken within the existing geometry. The proper method of pavement rehabilitation should be determined based on pavement cores and on current traffic counts, including heavy vehicle percentages. This is a mid-term, high cost improvement.

Remove boulders along Shawsheen Street and erect No Parking signs. The boulders along the edge of Shawsheen Street bordering the Keri Plaza property are intended to prevent trucks from parking on-street, but also create an obstruction within the clear zone. These boulders should be removed and replaced with No Parking signs. This is a short-term, low cost improvement. If there is no existing ordinance to restrict parking, the Town of Tewksbury will need to pursue that in conjunction with this improvement. This improvement could also be incorporated in conjunction with previously discussed sidewalk improvements.

Summary of Road Safety Audit

Table 3 summarizes potential recommendations discussed by the audit team. The recommendations are categorized based on the potential safety payoff, as well as by time frame and cost. The safety payoff is a qualitative judgment of the effectiveness of the potential safety improvements. The cost is a preliminary order of magnitude estimate based on prior experience with roadway and safety improvements. Cost does not include inflation or construction administration.
### Table 3. Potential Safety Enhancement Summary

<table>
<thead>
<tr>
<th>Safety Issue</th>
<th>Safety Enhancement</th>
<th>Responsibility</th>
<th>Safety Payoff</th>
<th>Time Frame</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Horizontal Alignment, Lane Definition, Turning Radii, Pavement Condition, Pavement Markings</strong></td>
<td>Realign the Shawsheen Street approach to intersect Dascomb Road at a 90° angle.</td>
<td>Town</td>
<td>High</td>
<td>Long-term</td>
<td>$300,000</td>
</tr>
<tr>
<td>Sight Distance, Pavement Condition</td>
<td>Flatten the vertical curve on East Street.</td>
<td>Town</td>
<td>High</td>
<td>Long-term</td>
<td>$300,000</td>
</tr>
<tr>
<td>Sight Distance, Bypass Lane Conflict, Intersection Capacity</td>
<td>Consider installation of a fully actuated traffic signal. (Installation must be preceded by an intersection study and traffic signal warrant analysis.)</td>
<td>Town</td>
<td>High</td>
<td>Long-term</td>
<td>$800,000</td>
</tr>
<tr>
<td>Lane Definition, Pavement Markings</td>
<td>Formalize lane control on the Dascomb Road approach by widening Dascomb Road to provide two 11-foot lanes and a 4-foot shoulder, with lane and arrow markings. (It should be noted that this does not directly address the potential bypass lane conflict, but may shape driver expectation if the outside lane is formalized.)</td>
<td>Town</td>
<td>Medium</td>
<td>Mid-term</td>
<td>$150,000</td>
</tr>
<tr>
<td>Pedestrian Accommodations</td>
<td>Install sidewalks and crosswalks at the intersection.</td>
<td>Town</td>
<td>Medium</td>
<td>Mid-term</td>
<td>$250,000</td>
</tr>
<tr>
<td>Signage</td>
<td>Improve signage by installing W1-2 intersection warning signs and replacing existing W3-1a Stop Ahead sign.</td>
<td>Town</td>
<td>Medium</td>
<td>Short-term</td>
<td>$1,000</td>
</tr>
<tr>
<td>Pavement Markings</td>
<td>Reapply pavement markings. (This improvement is intended as a short-term improvement within existing geometry. Pavement markings should also be integrated into any geometric improvements.)</td>
<td>Town</td>
<td>Medium</td>
<td>Short-term</td>
<td>$5,000</td>
</tr>
<tr>
<td>Pavement Condition</td>
<td>Rehabilitate pavement. (This improvement is intended as a mid-term improvement independent of other geometric improvements.)</td>
<td>Town</td>
<td>Medium</td>
<td>Mid-term</td>
<td>$250,000</td>
</tr>
</tbody>
</table>
### Table 3. Potential Safety Enhancement Summary

<table>
<thead>
<tr>
<th>Safety Issue</th>
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<th>Responsibility</th>
<th>Safety Payoff</th>
<th>Time Frame</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavement Markings, Turning Radii</td>
<td>Relocate stop line on Shawsheen Street to avoid encroachment from turning trucks.</td>
<td>Town</td>
<td>Medium</td>
<td>Short-term</td>
<td>$1,000</td>
</tr>
<tr>
<td>Lighting</td>
<td>Relocate existing overhead light to a pole closer to the intersection and evaluate overall lighting intensity.</td>
<td>Town</td>
<td>Medium</td>
<td>Short-term</td>
<td>$10,000</td>
</tr>
<tr>
<td>Lane Definition</td>
<td>Install a median island on the Shawsheen Street approach. (This improvement would require additional study to ensure that truck turns can still be accommodated.)</td>
<td>Town</td>
<td>Medium</td>
<td>Mid-term</td>
<td>$40,000</td>
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<tr>
<td>Advance Signage</td>
<td>Incorporate signage changes at the I-93/Dascomb Road interchanges.</td>
<td>MassDOT</td>
<td>Low</td>
<td>Short-term</td>
<td>$10,000</td>
</tr>
<tr>
<td>Signage</td>
<td>Realign stop signs at the Citgo driveways.</td>
<td>Town</td>
<td>Low</td>
<td>Short-term</td>
<td>$500</td>
</tr>
<tr>
<td>Stones along Shawsheen Street</td>
<td>Remove stones along Shawsheen Street and erect No Parking signs.</td>
<td>Town</td>
<td>Low</td>
<td>Short-term</td>
<td>$5,000</td>
</tr>
<tr>
<td>Signage</td>
<td>Relocate street name signs from the southeast corner to the southwest corner.</td>
<td>Town</td>
<td>Low</td>
<td>Short-term</td>
<td>$500</td>
</tr>
</tbody>
</table>
Appendix A. RSA Meeting Agenda
Road Safety Audit
Andover / Tewksbury
Dascomb Road / Shawsheen Street / East Street
Meeting Location: Tewksbury Police Department
918 Main Street, Tewksbury, MA
Wednesday, January 26th, 2011
10:00 AM – 12:00 noon

Type of meeting: High Crash Location – Road Safety Audit
Attendees: Invited Participants to Comprise a Multidisciplinary Team
Please bring: Thoughts and Enthusiasm!!

10:00 AM
Welcome and Introductions

10:15 AM
Review of Site Specific Material
- Crash, Speed & Volume Summaries – provided in advance
- Existing Geometries and Conditions

11:00 AM
Visit the Site
- Drive to the intersection of Dascomb Road/Shawsheen Street/East Street
- As a group, identify areas for improvement

11:30 AM
Post Visit Discussion / Completion of RSA
- Discuss observations and finalize findings
- Discuss potential improvements and finalize recommendations

12:00 noon
Adjourn for the Day – but the RSA has not ended

Instructions for Participants:
- Before attending the RSA on January 26th, participants are encouraged to drive through the intersection and complete/consider elements on the RSA Prompt List with a focus on safety.
- All participants will be actively involved in the process throughout. Participants are encouraged to come with thoughts and ideas, but are reminded that the synergy that develops and respect for others’ opinions are key elements to the success of the overall RSA process.
- After the RSA meeting, participants will be asked to comment and respond to the document materials to assure it is reflective of the RSA completed by the multidisciplinary team.
Appendix B. RSA Audit Team Contact List
## Participating Audit Team Members

**Date:** 11/26/11  
**Location:** Dascumb Rd / East St / Shawmut St

<table>
<thead>
<tr>
<th>Audit Team Members</th>
<th>Agency/Affiliation</th>
<th>Email Address</th>
<th>Phone Number</th>
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<tbody>
<tr>
<td>Gary Lucas</td>
<td>BETA Group</td>
<td><a href="mailto:gluco@beta-inc.com">gluco@beta-inc.com</a></td>
<td>781-255-1982</td>
</tr>
<tr>
<td>Lisa Schleifstein</td>
<td>MASSDOT</td>
<td><a href="mailto:lisa.schleifstein@state.ma.us">lisa.schleifstein@state.ma.us</a></td>
<td>617-977-7685</td>
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<tr>
<td>Christine Kennes</td>
<td>BETA Group</td>
<td><a href="mailto:ckeches@beta-inc.com">ckeches@beta-inc.com</a></td>
<td>RI-255-1982</td>
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<tr>
<td>Matt Small</td>
<td>Tewksbury PD</td>
<td><a href="mailto:msml@tewksbury-ma.gov">msml@tewksbury-ma.gov</a></td>
<td>978-857-7373 x 211</td>
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<tr>
<td>Sara Timoner</td>
<td>MASSDOT D4</td>
<td><a href="mailto:sam.timoner@state.ma.us">sam.timoner@state.ma.us</a></td>
<td>781-764-6455</td>
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<tr>
<td>Justin Howard</td>
<td>NACOG</td>
<td><a href="mailto:jhoward@nacog.org">jhoward@nacog.org</a></td>
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<tr>
<td>David Tilley</td>
<td>NACOG</td>
<td><a href="mailto:jtilley@nacog.org">jtilley@nacog.org</a></td>
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<tr>
<td>Bonnie Polin</td>
<td>MASSDOT</td>
<td><a href="mailto:bpolin@state.ma.us">bpolin@state.ma.us</a></td>
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<td>Tony Komorick</td>
<td>MVPC</td>
<td><a href="mailto:akomorick@mvpc.org">akomorick@mvpc.org</a></td>
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<td>Jim Tiberi</td>
<td>MVPC</td>
<td><a href="mailto:jtiberi@mvpc.org">jtiberi@mvpc.org</a></td>
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<td>Patrick Harrington</td>
<td>Tewksbury Police</td>
<td><a href="mailto:pharrington@tewksbury-ma.gov">pharrington@tewksbury-ma.gov</a></td>
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<td>Jennie Welch</td>
<td>Tewksbury PD</td>
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<td>Steve Sadowick</td>
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<td>Andover PD</td>
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<td>Brian Moise</td>
<td>Andover DPW/Engineer</td>
<td><a href="mailto:bmoise@andover-ma.gov">bmoise@andover-ma.gov</a></td>
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<td>Brian Gilbert</td>
<td>Tewksbury DPD</td>
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<td>Michele Stein</td>
<td>Tewksbury DPD</td>
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<td>Sarah Bradbury</td>
<td>Tewksbury DPD</td>
<td><a href="mailto:sbradbury@tewksbury-ma.gov">sbradbury@tewksbury-ma.gov</a></td>
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</table>
Appendix C. Detailed Crash Data
## Collision Diagram

**Indicate North**

by Arrow

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### Symbols
- Moving Vehicle
- Backing Vehicle
- Non-Involved Vehicle
- Pedestrian
- Parked Vehicle
- Fixed Object
- Fatal Accident
- Injury Accident

### Types of Collisions
- Rear-End
- Head On
- Side Swipe
- Out of Control
- Left Turn
- Right Angle

### Show for Each Accident
1. Approximate location of accident
2. Type of collision and vehicles involved.
3. Time, Day, Date
4. Any other pertinent factors mentioned on the report (i.e., presence of oil on road, rains, etc.)

---

### Intersection

**Dascomb Rd** and **Shawshen St**

**Period From:** 5/2006 **to** 9/2010

Andover and Tewksbury police departments.
## Crash Data Summary Table

**Intersection of Shawsheen Street, East Street, and Doscomb Road; Tewksbury & Andover, MA**

**May 2006 - September 2010**

<table>
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<tr>
<th>#</th>
<th>Crash Date</th>
<th>Crash Day</th>
<th>Time of Day</th>
<th>Manner of Collision Type</th>
<th>Light Condition Type</th>
<th>Weather Condition Type</th>
<th>Road Surface Type</th>
<th>Driver Contributing Cause</th>
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<th>Comments</th>
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<td>6:14 AM</td>
<td>Rear-end</td>
<td>Daylight</td>
<td>Clear</td>
<td>Dry</td>
<td>Other improper action</td>
<td>33</td>
<td>20</td>
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<tr>
<td>2</td>
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<td>Sunday</td>
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<td>Clear</td>
<td>Dry</td>
<td>Other improper action</td>
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<td>Daylight</td>
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<td>Dry</td>
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<td>84</td>
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<td>Daylight</td>
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<td>Dry</td>
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<td>32</td>
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<td>Sideswipe, opposite direction</td>
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<td>Clear</td>
<td>Slush</td>
<td>Failed to yield to right of way</td>
<td>46</td>
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</table>

1. 3 crashes were excluded from the above listed summary because they were not related to the intersection.
2. 5 of these 13 crashes were in the parking lots of either Kari Plaza or Cigar Fresh Express.

Summary based on Crash Reports obtained from the Andover & Tewksbury Police Departments.
## Crash Data Summary Tables and Charts

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<td>3%</td>
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<tr>
<td>2 PM to 6 PM</td>
<td>36%</td>
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<td>12%</td>
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<td>26%</td>
</tr>
<tr>
<td>Sideswipe, same dire</td>
<td>3%</td>
</tr>
<tr>
<td>Sideswipe, opposite</td>
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<tr>
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<td>Sleet, Hail, Freezing</td>
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<tr>
<td>Fog, Smog, Smoke</td>
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<td>Severe Crosswinds</td>
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<td>Blowing sand, snow</td>
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<td>7%</td>
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<tr>
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<td>Sand, mud, dirt, oil, g</td>
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### Driver Ages

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Appendix D. Speed Regulations
TOWN OF TOWNSBURY
SPECIAL SPEED REGULATION NO. 617

Highway Location: TOWNSBURY
Authority In Control: Town of Tewksbury
Name of Highways: Whipple Road, Salem Road, East Street and Lake Street

In accordance with the provisions of Chapter 90, Section 10, of the General Laws (Ter. Ed.) as amended, the following Special Speed Regulation is hereby adopted by the Board of Selectmen of the town of Tewksbury

That the following speed limits are established at which motor vehicles may be operated in the areas described:

WHIPPLE ROAD - EASTBOUND

Beginning at the Lowell - Tewksbury line
Thence easterly on Whipple Road
0.74 miles at 40 miles per hour
1.22 " " 35 " " "
0.11 " " 25 " " "
1.86 " " 35 " " " ending at the Tewksbury - Billerica line; the total distance being 3.73 miles.

WHIPPLE ROAD - WESTBOUND

Beginning at the Billerica - Tewksbury line
Thence westerly on Whipple Road
1.96 miles at 35 miles per hour
0.11 " " 25 " " "
1.22 " " 35 " " "
0.74 " " 40 " " " ending at the Tewksbury - Lowell line; the total distance being 3.93 miles.
SILEM ROAD - EASTBOUND

Beginning at a point 170 feet east of Route 38
Thence easterly on Salem Road

0.13 miles at 25 miles per hour
0.45 " " 35 " " ending at the
Tewksbury - Wilmington line; the total distance being 0.59 miles.

SILEM ROAD - WESTBOUND

Beginning at the Wilmington - Tewksbury line
Thence westerly on Salem Road

0.46 miles at 35 miles per hour
0.16 " " 25 " " ending at Route 38;
the total distance being 0.62 miles.

EAST STREET - EASTBOUND

Beginning at Route 38
Thence easterly on East Street

0.12 miles at 30 miles per hour
2.60 " " 35 " " ending at the
Tewksbury - Andover line; the total distance being 2.72 miles.

EAST STREET - WESTBOUND

Beginning at the Andover - Tewksbury line
Thence westerly on East Street

2.60 miles at 35 miles per hour
0.12 " " 30 " " ending at Route 38;
the total distance being 2.72 miles.

LAKE STREET - EASTBOUND

Beginning at the Wilmington - Tewksbury line
Thence easterly on Lake Street

0.31 miles at 20 miles per hour ending at the
Tewksbury - Wilmington line; the total distance being 0.31 miles.

LAKE STREET - WESTBOUND

Beginning at the Wilmington - Tewksbury line
hence westerly on Lake Street

0.31 miles at 20 miles per hour ending at the
Tewksbury - Wilmington line; the total distance being 0.31 miles.
Operation of a motor vehicle at a rate of speed in excess of these limits shall be prima facie evidence that such speed is greater than is reasonable and proper.

The provisions of this regulation shall not, however, abrogate in any sense Chapter 90, Section 14, of the General Laws (Ter. Ed.).

Date of Passage: March 30, 1971

[Signature]

Board of Selectmen

Attest:

[Signature]

Town Clerk

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
SPECIAL SPEED REGULATION NO. 617

The Department of Public Works and the Registrar of Motor Vehicles, acting jointly, do hereby certify that this regulation is consistent with the public interest.

Standard signs must be erected at the beginning of each zone.

Date: April 27, 1971

By: [Signature]

EDWARD J. RILES
Commissioner

for Highway Engineering

Registrar of Motor Vehicles.
TOWN OF TWEKSURY
SPECIAL SPEED REGULATION No. 379

Highway Location:
Authority in Control:
Name of Highway(s):

TOWN OF TWEKSURY
TOWN OF TWEKSURY
SHAWSHEN STREET

In accordance with the provisions of Chapter 90, Section 18, of the General Laws (Ter. Ed.) as amended, the following Special Speed Regulation is hereby Adopted by the Board of Selectmen of the Town of Tewksbury

That the following speed limits are established at which motor vehicles may be operated in the areas described:

SHAWSHEN STREET NORTHBOUND

Beginning at the Billericia - Tewksbury Town line thence northerly 0.51 miles at 35 miles per hour
thence 0.78 miles at 40 miles per hour
thence 0.20 miles at 30 miles per hour
thence 0.30 miles at 35 miles per hour
thence 1.19 miles at 40 miles per hour
thence 0.21 miles at 30 miles per hour
thence 0.75 miles at 35 miles per hour
thence 0.07 miles at 25 miles per hour

ending at the Tewksbury - Andover Town Line. The total distance being 4.01 miles.
SHAWSBURY STREET SOUTHBOUND

Beginning at the Andover - Tewksbury town line thence southerly in Tewksbury

0.82 miles at 35 miles per hour
thence 0.21 miles at 30 miles per hour
thence 1.19 miles at 40 miles per hour
thence 0.30 miles at 35 miles per hour
thence 0.20 miles at 30 miles per hour
thence 0.78 miles at 40 miles per hour
thence 0.51 miles at 35 miles per hour

ending at the Tewksbury - Billerica Town line. The total distance being 3.61 miles.
Operation of a motor vehicle at a rate of speed in excess of these limits shall be prima facie evidence that such speed is greater than is reasonable and proper.

The provisions of this regulation shall not, however, abrogate in any sense Chapter 90, Section 14, of the General Laws (Ter. Ed.).

Date of Passage 6/6/67

Francis L. Currie
Frank A. Antonelli
David J. Beattle
Joseph J. Whelan
Kevin Sullivan
Board of Selectmen

Attest: John E. Hedstrom

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

SPECIAL SPEED REGULATION NO. 379

The Department of Public Works and the Registrar of Motor Vehicles, acting jointly do hereby certify that this regulation is consistent with the public interests. Standard signs must be erected at the beginning of each zone.

DATE July 3, 1967

BY Edward J. Ribbs, KK
Commissioner
For Highway Engineering

Richard E. McLaughlin
Registrar of Motor Vehicles
TOWN OF TOWNSURY
SPECIAL SPEED REGULATION NO. 379-A.

Highway Location: TOWNSURY
Authority In Control: TOWN OF TOWNSURY
Name of Highway: SHAWSEE STREET

In accordance with the provisions of Chapter 90, Section 18, of the General Laws (Ter. Ed.) as amended, the following Special Speed Regulation is hereby adopted by the Board of Selectmen of the Town of Towsbury.

Special Speed Regulation Number 379 dated July 3, 1967 is hereby amended as follows.

That the following speed limits are established at which motor vehicles may be operated in the areas described:

**SHAWSEE STREET-NORTHBOUND**

By striking out the clause reading 0.51 miles at 35 miles per hour

And inserting in place thereof:
0.25 miles at 35 miles per hour
0.26 " " 30 " "

**SHAWSEE STREET-SOUTHBOUND**

By striking out the clause reading 0.51 miles at 35 miles per hour

And inserting in place thereof:
0.26 miles at 30 miles per hour
0.25 " " 35 " "

Operation of a motor vehicle at a rate of speed in excess of these limits shall be prima facie evidence that such speed is greater than is reasonable and proper.

The provisions of this regulation shall not, however, abrogate in any sense Chapter 90, Section 14, of the General Laws (Ter. Ed).

Date of Passage

Attest

Town Clerk

Board of Selectmen
COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

SPECIAL SPEED REGULATION NO. 379-A

The Department of Public Works and the Registrar of Motor Vehicles, acting jointly, do hereby certify that this regulation is consistent with the public interests.

Standard signs must be erected at the beginning of each zone.

DATE: April 30, 1975

FOR THE DEPARTMENT OF PUBLIC WORKS

BY: [Signature]
Traffic Engineer

Registrar of Motor Vehicles
TOWN OF ANDOVER
SPECIAL SPEED REGULATION NO. 516

Highway Location:

Authority In Control:

Name of Highway(s):

ANDOVER - RECEIVED
TOWN OF ANDOVER
FEB 11 11 00 AH 70
TOWN CLERK

Lowell Street and Haverhill Street
(Route 133)

North Street
Dascomb Road

In accordance with the provisions of Chapter 90, Section 18, of the General Laws (Ter. Ed.) as amended, the following Special Speed Regulation is

hereby Adopted

by the Board of Selectmen

of the Town of Andover

That the following speed limits are established at which motor vehicles may be operated in the areas described:

Lowell Street and Haverhill Street (Route 133) - EASTBOUND

Beginning at the Tewksbury-Andover Line, thence easterly

\[ \frac{4}{42} \]

1.78 miles at 45 miles per hour

\[ \frac{4}{2.16} \] 0.16 " " 40 " " ending at the beginning of State Highway west of Route I-93

and beginning again at the end of State Highway east of Route I-93, thence easterly

1.21 miles at 40 miles per hour

0.31 " " 30 " "

0.33 0.66 " " 40 " "

1.04 0.73 " " 30 " "

0.66 " " 35 " " ending at the Andover-North Andover Line; the total distance being 5.51 miles.

Haverhill Street and Lowell Street (Route 133) - WESTBOUND

Beginning at the North Andover-Andover Line, thence westerly in Andover
0.64 miles at 35 miles per hour
0.73 " 30 " " 
0.67 " 40 " " 
0.36 " 30 " " 
1.17 " 40 " " ending at the beginning of State Highway east of Route I-93

and beginning again at the end of State Highway west of Route I-93, thence westerly

1.94 miles at 40 miles per hour
1.76 " 45 " " " ending at the Andover-Tewksbury Line; the total distance being 5.51 miles.

North Street - NORTHBOUND

Beginning at a point 200 feet north of Chandler Road, thence northerly on North Street
1.20 miles at 40 miles per hour
0.05 " 25 " " ending at River Road; the total distance being 1.25 miles.

North Street - SOUTHBOUND

Beginning at a point 265 feet south of River Road, thence southerly on North Street
1.20 miles at 40 miles per hour
0.04 " 25 " " ending at Chandler Road; the total distance being 1.24 miles.

Dascomb Road - EASTBOUND

Beginning at the Tewksbury-Andover Line, thence easterly in Andover
0.25 miles at 40 miles per hour ending at the beginning of State Highway west of Route I-93

and beginning again at the end of State Highway east of Route I-93, thence easterly
1.23 miles at 40 miles per hour
0.07 " 25 " " ending at Andover Street; the total distance being 1.55 miles.

Dascomb Road - WESTBOUND

Beginning at a point 480 feet west of Andover Street, thence westerly on Dascomb Road
1.21 miles at 40 miles per hour ending at the beginning of State Highway east of Route I-93
and beginning again at the end of State Highway west of Route I-93, thence westerly
0.25 miles at 40 miles per hour ending at the Andover-
Tewksbury Line; the total distance being 1.66 miles.

Operation of a motor vehicle at a rate of speed in excess of these limits shall be prima facie evidence that such speed is greater than is reasonable and proper.

The provisions of this regulation shall not, however, abro-
gate in any sense Chapter 90, Section 14, of the General Laws
(Ter. Ed.)

Date of Passage: March 16, 1970

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
SPECIAL SPEED REGULATION NO. 516

The Department of Public Works and the Registrar of Motor Vehicles, acting jointly, do hereby certify that this regulation is consistent with public interest.

Standard signs must be erected at the beginning of each zone.

Date: June 3, 1970

By: Edward J. Riddle

Richard O. McLaughlin
Registrar of Motor Vehicles

for Highway Engineering