

ROAD SAFETY AUDIT

Derby Street at Route 3 Ramps

Town of Hingham

December 2013

Prepared For:
MassDOT



On Behalf Of:
Town of Hingham



Prepared By:
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101 Accord Park Drive
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Background

The intersections of Derby Street at the Route 3 Northbound and Southbound Ramps in Hingham, Massachusetts are listed as High Crash Locations within the Metropolitan Area Planning Council (MAPC) region. As such, the Massachusetts Department of Transportation (MassDOT) has determined that Highway Safety Improvement Program (HSIP) funding would be allowed for reconstruction of these intersections if a Road Safety Audit (RSA) is conducted and the proposed design included safety improvements identified in the RSA. The intersections are currently under design (MassDOT Project #607309) as part of the Reconstruction and Related work on Derby Street from Pond Park Road to Cushing Street project for which the Town of Hingham is the proponent. The project is not currently placed in a funding year on the Transportation Improvement Program (TIP) list.

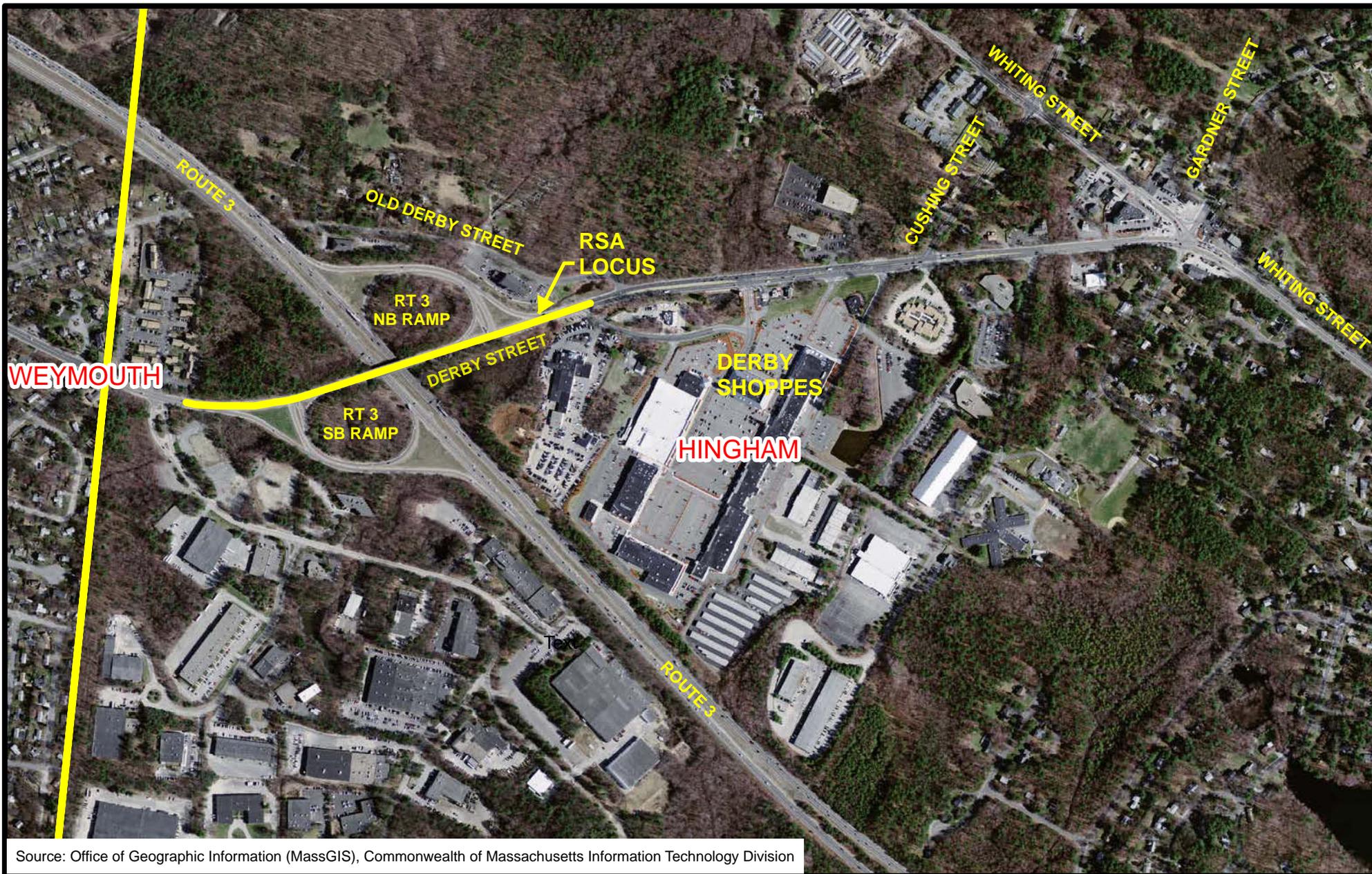
The purpose for this RSA is to identify existing safety deficiencies and potential safety improvements that could be implemented as part of the Reconstruction and Related Work on Derby Street project. Additionally, potential short term low cost improvements are identified for consideration by MassDOT for implementation prior to the reconstruction of the intersections. The location of the two intersections included in the RSA is depicted in Figure 1.

Project Data

The audit team conducted a RSA for the intersections of Derby Street at the Route 3 Northbound and Southbound Ramps on Wednesday November 6, 2013. The RSA Agenda is included in Appendix A. Table 1 lists the audit team members and their affiliations. Appendix B includes contact information for all team members.

Table 1. Participating Audit Team Members

Audit Team Member	Agency/Affiliation
Roger Fernandes	Town of Hingham Projects Engineer
Ted C. Alexiades	Town Administrator
Mary Savage-Dunham	Town of Hingham Director of Community Planning
Emily Wentworth	Town of Hingham
Sgt. Steven Dearth	Town of Hingham Police
Barbara Lachance	MassDOT District 5 Traffic
Corey O'Connor	MassDOT Traffic Safety
Lisa Schletzbaum	MassDOT Traffic Safety
Jason Walters	MassDOT District 5 Projects
Promise Otaluka	FHWA
John Morgan	CHA Consulting
Robert Cahoon	CHA Consulting
Andrew Valcovic	CHA Consulting



TOWN OF HINGHAM, MA

**DERBY STREET AT ROUTE 3
ROAD SAFETY AUDIT**



Figure 1. Locus Map

Traffic data was provided to the audit team prior the RSA, including crash data and collision diagrams based on crash records from the Town of Hingham Police Department and State Police for the three year period of September 2010 to August 2013. It should be noted that twelve additional crash reports were received after the audit was conducted. The additional reports have been reviewed and tabulated and are included in the data contained in this report. Crash records were provided for a total of 18 accidents at the Route 3 Northbound Ramps and 23 accidents at the Southbound Ramps. Of the 18 crashes reported at the Northbound Ramps, eleven (61%) were angle crashes, three (17%) were rear end crashes, two (11%) were sideswipe crashes, one (6%) was a head on crash and one (6%) was a single vehicle crash with a fixed object. Of the 23 crashes reported at the Southbound Ramps, 12 (52%) were rear end crashes, five (22%) were angle crashes, two (9%) were sideswipe crashes, two (9%) were head on crashes, and two (9%) were single vehicle crash with a fixed object. Appendix C provides the detailed crash data for the two intersections.

Project Location and Description

The RSA focused on the two intersection of Derby Street at the Route 3 Ramps in Hingham. Figure 2 depicts the existing intersections.

Exit 15 of Route 3 is a partial cloverleaf interchange with the southbound exit located west of Route 3 intersecting Derby Street from the south and the northbound exit located east of Route 3 intersecting Derby Street from the north. Each exit arrangement allows “YIELD” controlled movements for right turn exits and entrances to Route 3. At Derby Street, left turns from the Route 3 off-ramps operate under “STOP” control. Currently there are no left turn lanes on Derby Street at either on-ramp to Route 3 to provide queue storage. Between Old Derby Street and the southbound ramps, the paved roadway surface is approximately 44 feet wide. Derby Street is functionally classified as an urban minor arterial and has a posted speed limit of 40 miles per hour (mph). Both Derby Street and the ramps to Route 3 are State Highways under the jurisdiction of MassDOT.

Derby Street is a three-lane roadway west of the Route 3 southbound ramps that narrows to a two lane, 44-foot wide roadway with 8-foot wide shoulders. A 15-foot wide westbound lane provides limited room for vehicles to maneuver around the left turn queue onto the ramp. Along the north side of the roadway, there is a 5.5 foot wide asphalt sidewalk continuing from Pond Park Road with guardrail behind beginning at the southbound ramp entrance. Derby Street maintains a 44-foot paved width over the Route 3 overpass with 14 foot lanes, 8-foot shoulders, and a 5.5-foot wide concrete sidewalk. At the northbound ramps intersection, Derby Street has the same layout as the southbound ramps with a wider 15’ eastbound lane, which allows vehicles to maneuver around the left turn queue. Guardrail is located on both sides of the roadway extending from the Route 3 overpass through the northbound ramps intersection, ending prior to Old Derby Street. The 5.5-foot wide sidewalk along the north side continues through the ramp intersection ending at Old Derby Street. East of the northbound ramps, Derby Street expands to a 50-foot wide, four lane roadway with 12-foot eastbound lanes, 11-foot westbound lanes, and 2-foot shoulders.

As stated previously, the Derby Street at Route 3 Ramps intersections are currently under design (MassDOT Project #607309) as part of the Reconstruction and Related work on Derby Street from Pond Park Road to Cushing Street project for which the Town of Hingham is the proponent. The timeline for implementation is several years out as the project is not currently placed in a funding year on the Transportation Improvement Program (TIP) list.

WEYMOUTH



Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts Information Technology Division

TOWN OF HINGHAM, MA

DERBY STREET AT ROUTE 3 ROAD SAFETY AUDIT

0 60 120 240 360 480



Figure 2. Derby Street at Route 3 Intersections

Audit Observations and Potential Safety Enhancements

During the RSA performed on November 6, 2013 the following safety issues were identified for the intersections of Derby Street at Route 3 Northbound and Southbound Ramps:

1. Sight Distance/Geometry for Off-Ramp Right Turns
2. Lack of Traffic Control for Derby Street Westbound lane Reduction
3. Guide Sign Placement
4. Pedestrian Accommodations
5. Capacity deficiencies for left turns

Safety Issue #1: Sight Distance/Geometry for Off-Ramp Right Turns

Observations:

A review of crash data indicated a high number of rear-end collisions on the Route 3 Southbound Off-Ramp for right turns. Vehicles exiting the ramp are required to yield to vehicles on Derby Street. Field observations found that there is limited sight distance for vehicles approaching Derby Street due to trees and vegetation along the inside curve radius. Also observed was the angle at which vehicles are positioned while yielding to Derby Street traffic. The sharp angle at which drivers must look back over their shoulder may lead to vehicles that are second in the queue not seeing the movements of the first vehicle in the queue in front of them, thus resulting in rear end collisions between the first two vehicles in the queue.



Enhancements:

1. A potential short-term enhancement would be to perform selective trimming and clearing along the inside radius of the right turn off-ramps. This would improve visibility of approaching vehicles of queues that are waiting to enter Derby Street.

2. A potential long-term solution to help alleviate the rear-end collisions between vehicles at the front of the queue would be to include the right turn movement as part of a future traffic signal. With the right turns signalized, drivers would not need to look back over their shoulder to view oncoming vehicles or find gaps in traffic in order to enter Derby Street. Drivers would then be able to focus on the activity directly in front of them when turning onto Derby Street.

Safety Issue #2: Lack of Traffic Control for Derby Street Westbound Lane Reduction

Observations:

During field observations it was observed that the transition from two lanes to one lane on the Derby Street westbound approach to the Route 3 Northbound Ramps is not well defined. Pavement striping for the two lanes ends abruptly at the existing crosswalk near Old Derby Street. There is no signage to alert drivers of the impending lane reduction. Additionally, the entrance to the Route 3 Northbound Ramps is a couple hundred feet beyond the lane reduction. The lack of signage and pavement markings make it unclear as to whether vehicles should merge into one lane before approaching the ramp or continue to form two lanes with the right lane exiting. Drivers were observed continuing in the right lane, appearing to be headed to the on-ramp, and then merging left at the location of ramp to continue on Derby Street. While there were no reported crashes specifically attributed to this issue, this unexpected maneuver has the potential to cause a collision.



Enhancements:

1. A potential short-term enhancement would be to add signage indicating the end of the two-lane section of Derby Street and the need for vehicles to merge into one lane prior to the entrance to Route 3.
2. An alternative short-term solution would be to extend the two lanes on Derby Street to the Route 3 Northbound on-ramp and add signage and pavement markings indicating that the right lane must turn right. This solution is not ideal, as it would result in drivers that are traveling in a through lane on Derby Street, suddenly finding they are in a right turn only lane. Vehicles that were not intending to turn right would then need to merge left prior to reaching the Route 3 ramp.

3. A potential long term solution would be to extend the two through lanes on Derby Street beyond the entrance to the Route 3 Ramp, thus allowing vehicles to stay in the right lane if headed westbound on Derby Street or to the Northbound Ramp.

Safety Issue #3: Guide Sign Placement

Observations:

During the audit it was recognized that Guide signage placement on Derby Street and the Route 3 off ramps appeared deficient and was not properly alerting motorists of the impending actions that are required. A guide sign on Derby Street near the Derby Shoppes that faces westbound traffic was partially obstructed by vegetation. Traveling westbound on Derby Street there is a guide sign located approximately 250 feet prior to the on-ramp. However, there are no existing guide signs present at the on-ramp to guide vehicles onto Route 3.



Guide signs for vehicles exiting the Route 3 off-ramps are located within the traffic islands where drivers must decide to either turn left or right onto Derby Street and may not provide advance warning, because of the limited visibility from brush and the tight ramp radius.

Enhancements:

1. A potential short-term enhancement would be to clear existing tree limbs and vegetation blocking the guide sign on Derby Street westbound. This will help visibility of existing signs.
2. Installing additional guide signs on Derby Street and the Route 3 off-ramps would be another short-term or medium-term enhancement. Guide signs placed on Derby Street near the ramp entrances for right turns would help guide drivers that may not be sure which ramp they need to take. Also, installing advance guide signs on the ramps may help alert drivers in advance as to which direction on Derby Street they will need to turn at the end of the ramp depending on their destination.

Safety Issue #4: Pedestrian Accommodations

Observations:

RSA team members noted several concerns with regards to pedestrian accommodation and safety. It was noted that at the Route 3 Northbound ramps sidewalks are provided, but there are no delineated crosswalks or accessible wheelchair ramps for pedestrian use to cross the ramp entrances or exits. Also noted was the concern for visibility of pedestrians crossing the on and off ramps due to vegetation along the right side of the off-ramp. Although there were no reported collisions involving pedestrians during the three-year period reviewed, high traffic volumes and the complexity of traffic maneuvers (turns and merges) at this location are concerns for the pedestrian crossings.



Safety concerns were also noted for the existing crosswalk located west of the Route 3 ramps near Old Derby Street. This midblock crossing consists of a long crosswalk across four travel lanes in a relatively high speed location where vehicles are accelerating and decelerating for the Route 3 Ramps. It is also the location of a lane drop in the westbound direction from two through lanes to a single wide lane as described in Safety Issue #2 above. The lane drop could potentially divert drivers' attention from pedestrians in the crosswalk. The existing signage at the crosswalk does not meet current MUTCD

standards and there is no advance warning signage approaching the crossing. It was noted during the audit that there was a past collision involving a pedestrian at this location that resulted in a fatality.

Enhancements:

1. A potential short-term enhancement would be to improve signage at the crosswalk on Derby Street. MUTCD compliant signage advance warning signs could be installed to alert drivers of the crossing.

2. A potential mid-term enhancement would be to install ADA compliant wheelchair ramps at the Route 3 Northbound ramps and to designate crosswalks with MUTCD compliant signage.
3. A potential long-term enhancement would be to provide signalized pedestrian crossings at the Northbound Ramp intersection as part of a new traffic signal. Signalized crossings could be provided for the crossing of the off-ramps as well as the on-ramp for left turning vehicles from Derby Street.
4. Another potential long-term enhancement would be to relocate the mid-block crossing of Derby Street. Consider continuing the sidewalk on the north side of Derby Street eastward to Cushing Street. The crosswalk at Old Derby Street could be eliminated and a new crosswalk constructed at the Derby Shoppes traffic signal.

Safety Issue #5: Capacity deficiencies for left turns

Observations:

There have been a relatively high number of angle collisions involving vehicles turning left from the northbound ramps (8) and southbound ramps (4) over the three-year period reviewed. RSA team members noted that left turns movements from the Route 3 off-ramps are difficult due to the high traffic volumes on Derby Street. In addition to the high volumes, left turning drivers from the northbound ramps must also discern the intent of westbound approaching vehicles that are merging from two lanes to one lane as they approach the ramps. Audit members noticed that in many cases it was difficult to determine if vehicles



intended to turn right onto the Route 3 ramps or if they intended to proceed straight on Derby Street. As a result of the lack of adequate gaps in traffic and the difficulty in discerning the intent of approaching drivers, exiting vehicles experience lengthy delays while waiting to turn left onto Derby Street. The calculated level of service (LOS) is “F” during each of the weekday morning, weekday evening and weekend mid-day peak hour periods for left turns from both the Northbound and Southbound Ramps. Although the Audit was performed at an off-peak time of day, vehicle queues of more than five cars were noticed on multiple occasions. Often, drivers had to wait for Derby Street traffic to stop and let the vehicles turn left from the ramp before they could find an adequate gap in traffic to proceed. Team members have also observed U-turn type maneuvers involving vehicles exiting the northbound ramps turning right onto Derby Street westbound and then making a left turn into the Hingham Industrial Park and turning around in order to then head eastbound on Derby Street. This U-turn maneuver is done to avoid making a left turn from the off-ramp onto Derby Street.

Enhancements:

1. A potential long-term enhancement would be to signalize the Northbound and Southbound Ramp intersections. New fully actuated signals should be considered, which could be coordinated with the existing signals on Derby Street to provide for optimal corridor progression. Widening for turn lanes should also be considered for additional capacity.
2. A potential long-term improvement would be to construct a full four-quadrant clover interchange at Exit 15. This would allow for all right turns onto and off of the ramps, thus reducing delays and vehicle queues. In order to meet the capacity demands, this option would also likely include widening of Derby Street to four lanes between the Northbound and southbound ramps. This would require reconstruction of the bridge over Route 3, would have significant environmental impacts, and would be a considered a major infrastructure project.

Summary of Road Safety Audit

Table 2 summarizes the safety issues, possible enhancements, estimated safety payoff, time frame, estimated cost, and the responsible party. Safety payoff estimates are subjective and are based on engineering judgment. Safety payoffs are classified as low medium, and high. The time frame is categorized as short-term (<1 year), mid-term (1 to 3 years), or long-term (>3 years). The costs are categorized as low (<\$10,000), medium (\$10,001 to \$50,000), or high (>\$50,001).

Table 2. Potential Safety Enhancement Summary

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Agency
Sight Distance/Geometry for Off-Ramp right Turns	Perform selective trimming and clearing along the inside radius of the right turn off-ramps to improve visibility for approaching drivers of vehicle queues that are waiting to enter Derby Street	Low	Short-term	Low	MassDOT
	Include the right turn movement from the off-ramps as part of future traffic signals. With the right turns signalized drivers would not need to look back over their shoulder to view oncoming vehicles.	High	Long-term	High	MassDOT
Lack of Traffic Control for Derby Street Westbound Lane Reduction	Add signage indicating the need for vehicles to merge into one lane after the two lanes end prior to the Route 3 Northbound Ramps.	Low	Short-term	Low	MassDOT
	Extend the two lanes on Derby Street to the Route 3 Northbound on-ramp and add signage indicating that the right lane must turn right. This solution is not ideal as it would result in vehicles that are traveling in a through lane on Derby Street, suddenly finding themselves in a right turn only lane. Additional advance signing and pavement markings would be required.	Low	Mid-term	Medium	MassDOT
	Extend the two through lanes on Derby Street beyond the entrance to the Route 3 Ramp, thus allowing vehicles to stay in the right lane if headed westbound on Derby Street or to the Northbound Ramp. Requires widening of Derby Street and could be implemented in conjunction with traffic signal installation.	Medium	Long-term	High	MassDOT

Table 2. Potential Safety Enhancement Summary

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Agency
Guide Sign Placement	Clear existing tree limbs and vegetation blocking the guide sign on Derby Street westbound. This will help visibility of existing signs.	Low	Short-term	Low	MassDOT
	Install additional guide signs on the off-ramps to help alert drivers in advance as to which direction on Derby Street they will need to turn at the end of the ramp	Low	Short-term	Low	MassDOT
	Install additional guide signs on Derby Street for Route 3 prior to and at the on-ramps to better guide vehicles to the appropriate on-ramp.	Low	Short-term	Low	MassDOT
Pedestrian Accommodations	Improve signage at the crosswalk on Derby Street. MUTCD compliant signage and advance warning signs could be installed to better alert drivers of the crossing	Low	Short-term	Low	MassDOT
	Install ADA compliant wheelchair ramps at the Route 3 Northbound ramps and designate crosswalks with MUTCD compliant signage.	Low	Mid-term	Medium	MassDOT
	As part of a signal system at the Northbound ramps, consider providing signalized crossings for the pedestrian crossing of the off-ramps as well as the on-ramp for left turning vehicles from Derby Street.	High	Long-term	High	MassDOT

Table 2. Potential Safety Enhancement Summary

Safety Issue	Potential Safety Enhancement	Safety Payoff	Time Frame	Cost	Responsible Agency
	Relocate the mid-block crossing of Derby Street currently located east of the Route 3 Ramps. The mid-block crosswalk would be eliminated and a new crosswalk constructed at the Derby Shoppes traffic signal providing a signalized crossing for pedestrians. This would require the continuation of the sidewalk on the north side of Derby Street eastward to Derby Shoppes.	High	Long-term	High	MassDOT
Capacity Deficiencies for Left Turns	Signalize the Northbound and Southbound Ramp intersections. New fully actuated signals may require coordination with the existing signals on Derby Street to provide for optimal corridor progression. Intersection improvements would also require widening for turn lanes additional turn lanes to meet capacity demands.	High	Long-term	High	MassDOT
	Construct a full four quadrant clover interchange at Exit 15. This would allow for all right turns onto and off of the ramps. In order to meet the capacity demands, this option would also likely include widening of Derby Street to four lanes between the Northbound and Southbound ramps. This would require reconstruction of the bridge over Route 3 and would be a considered a major infrastructure project.	High	Long-term	High	MassDOT

Appendix A. RSA Meeting Agenda

Agenda

Road Safety Audit

Hingham, MA

Derby Street at Route 3 Ramps

Meeting Location: Hingham DPW

25 Bare Cove Park Drive, Town Engineer's Office

November 6th, 2013

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 <ul style="list-style-type: none">• Crash, Speed & Volume Summaries– provided in advance• Existing Geometries and Conditions
11:00 AM	Visit the Site <ul style="list-style-type: none">• Drive to intersections of Derby Street at Route 3 NB and SB Ramps• As a group, identify areas for improvement
11:30 AM	Post Visit Discussion / Completion of RSA <ul style="list-style-type: none">• 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 November 6th, 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

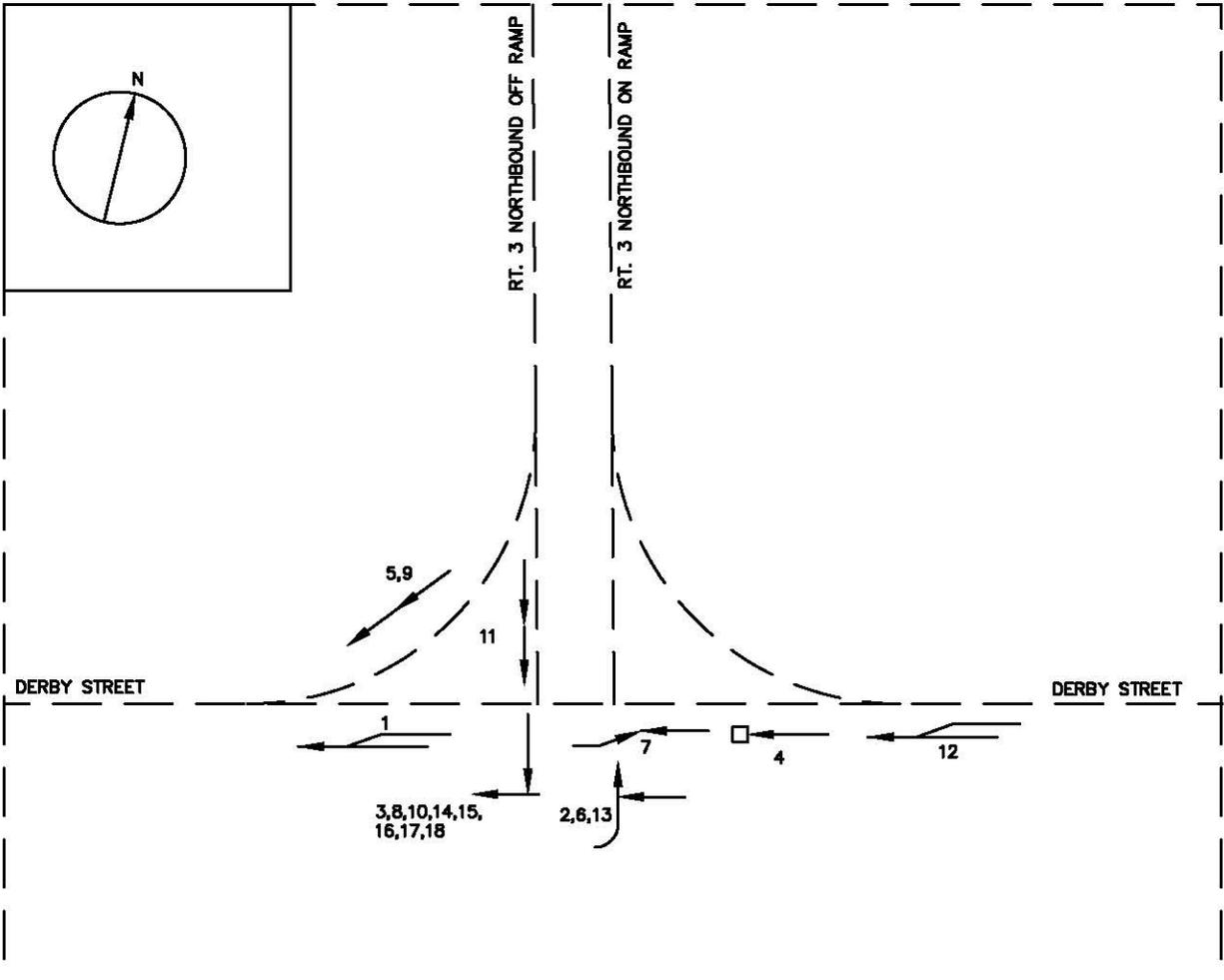
Participating Audit Team Members

Date: November 6, 2013

Location: Derby Street at Route 3 Ramps, Hingham, MA

Audit Team Members	Agency/Affiliation	Email Address	Phone Number
Roger Fernandes	Town of Hingham Projects Engineer	fernandesr@hingham-ma.gov	781-804-2305
Ted C. Alexiades	Town Administrator	alexiadest@hingham-ma.gov	781-741-1400
Mary Savage-Dunham	Town of Hingham Director of Community Planning	dunhamm@hingham-ma.gov	781-741-1419
Emily Wentworth	Town of Hingham	wentworthe@hingham-ma.us	781-741-1494
Sgt. Steven Dearth	Town of Hingham Police	dearths@hingham-ma.com	781-804-2205
Barbara Lachance	MassDOT District 5 Traffic	barbara.lachance@dot.state.ma.us	508-884-4260
Corey O'Connor	MassDOT Traffic Safety	corey.oconnor@state.ma.us	857-368-9638
Lisa Schletzbaum	MassDOT Traffic Safety	lisa.schletzbaum@state.ma.us	857-368-9634
Jason Walters	MassDOT District 5 Projects	jason.walters@state.ma.us	508-884-4370
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John Morgan	CHA Consulting	jmorganjr@chacompanies.com	781-982-5437
Robert Cahoon	CHA Consulting	rcahoon@chacompanies.com	781-982-5469
Andrew Valcovic	CHA Consulting	avalcovic@chacompanies.com	781-792-2283

Appendix C. Detailed Crash Data



TYPE OF ACCIDENT	
1 REAR-END	
2 HEAD-ON	
3 SIDESWIPE	
4 OVERTURNED	
5 FIXED-OBJECT	
6 ANGLE	
7 PARKED CAR	
8 OUT OF CONTROL	
9 PEDESTRIAN	

RT. 3 NORTHBOUND RAMP @
DERBY STREET

TOWN OF HINGHAM

FROM 9-2010 TO 8-2013

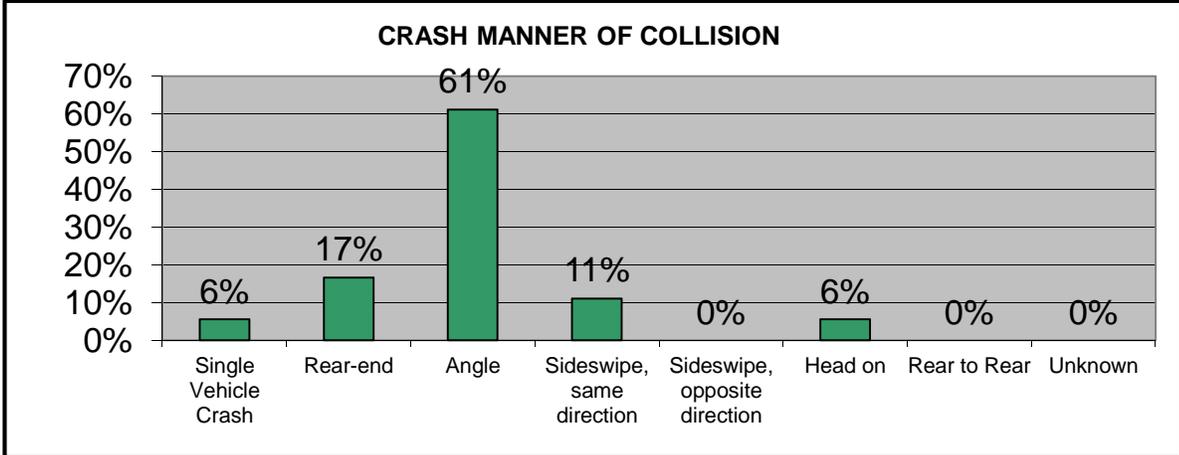
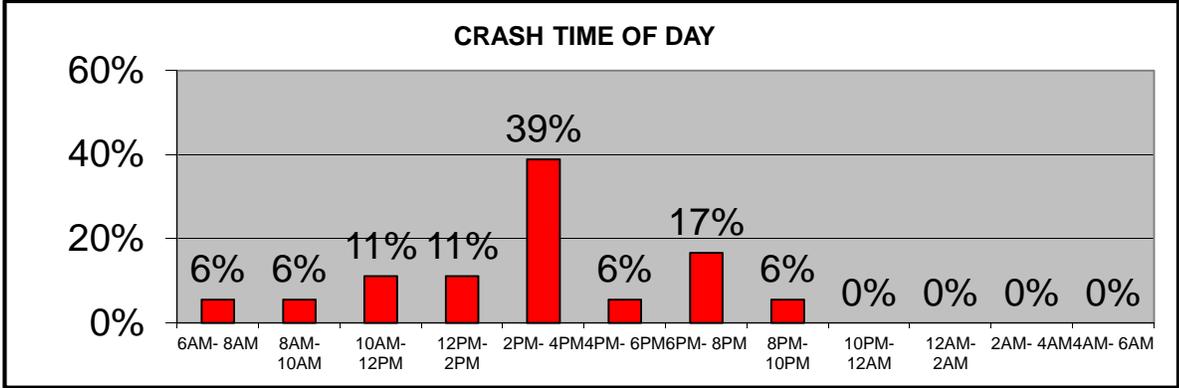
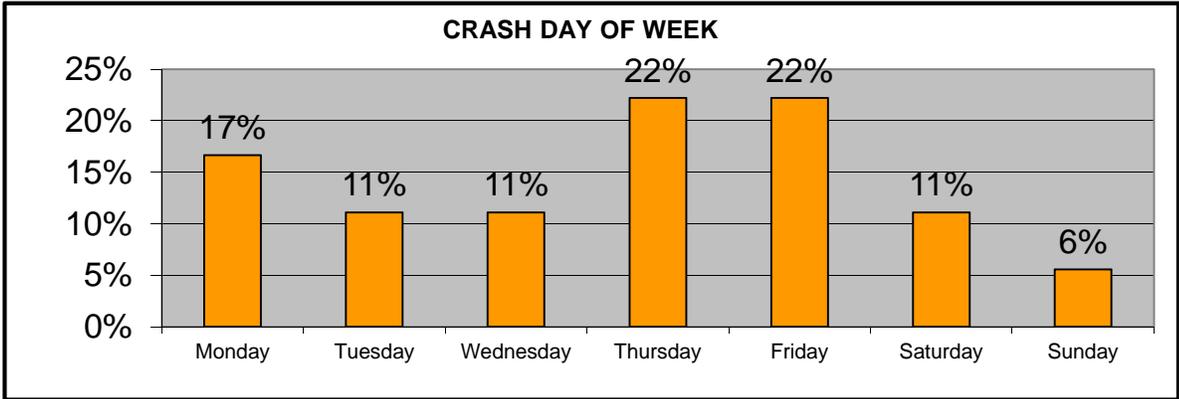
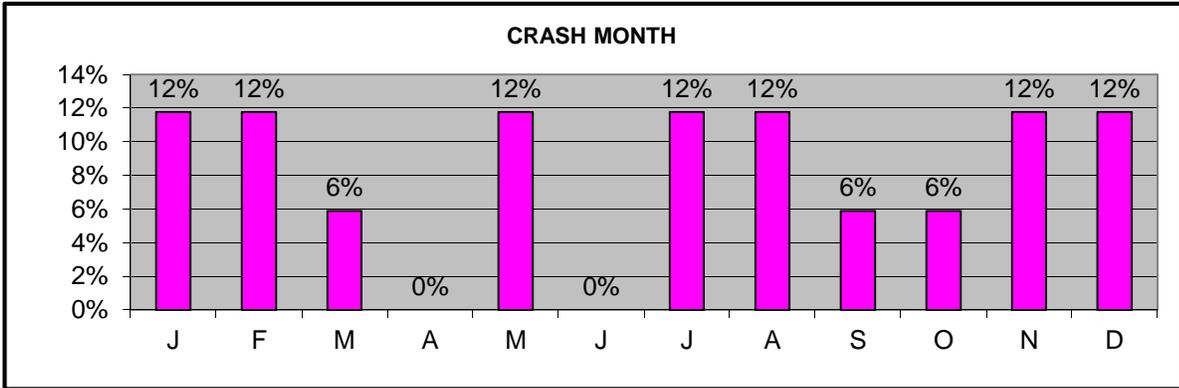
TOTAL ACCIDENT REPORTS - 18



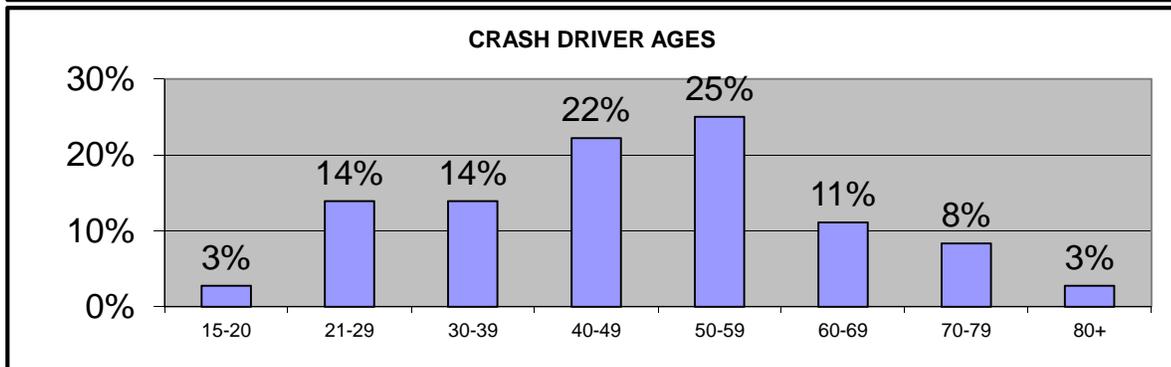
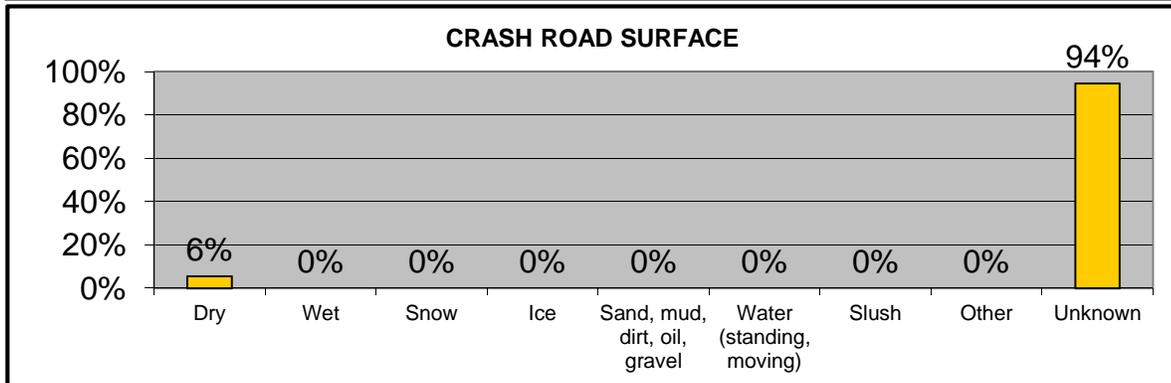
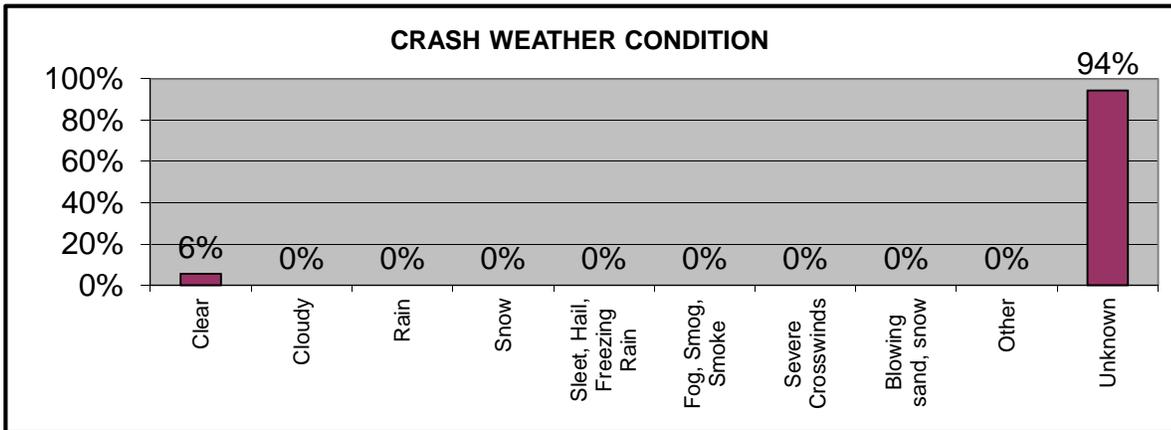
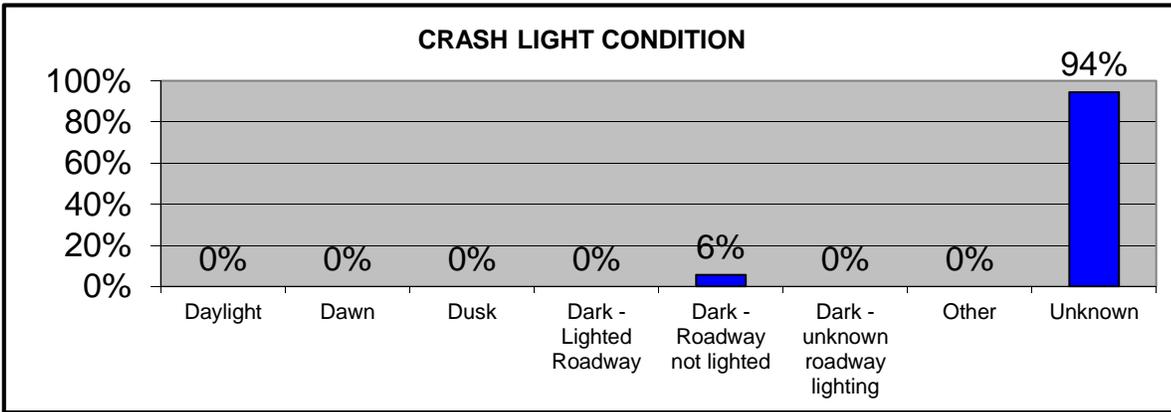
TITLE:
COLLISION DIAGRAM
RTE. 3 NORTHBOUND
RAMP @
DERBY STREET

DATE: NOVEMBER 2013

Crash Data Summary Tables and Charts
 Derby Street @ Rte. 3 Northbound ramp, Hingham, MA



Crash Data Summary Tables and Charts
 Derby Street @ Rte. 3 Northbound ramp, Hingham, MA

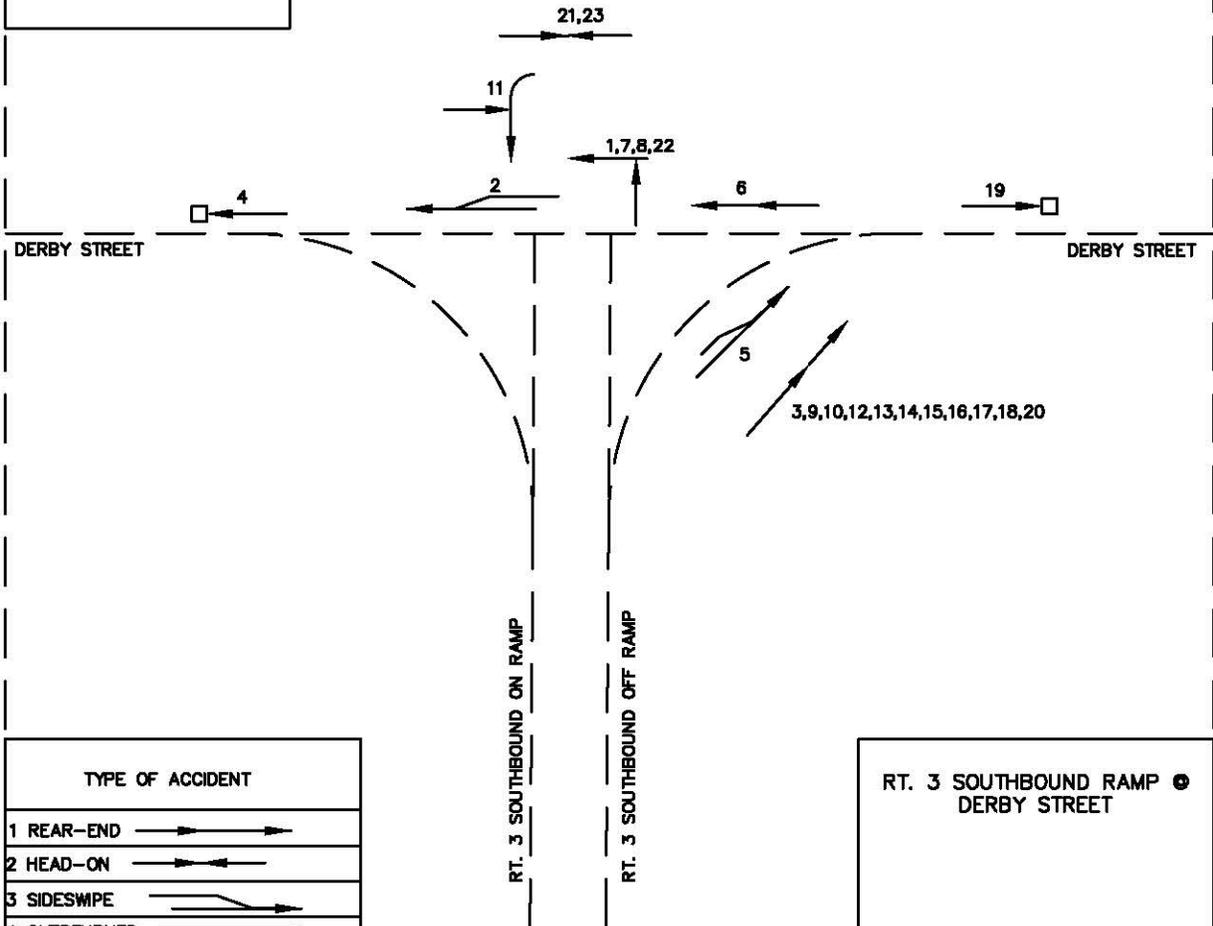
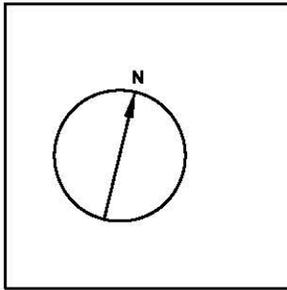


Crash Data Summary Table
 Derby Street @ Rte. 3 Southbound ramp, Hingham, MA
 9/2010 to 8/2013

Crash Diagram Ref #	Month #	Crash Date m/d/y	Day #	Crash Day	Time #	Time of Day	Manner of Collision		Light Condition		Weather Condition		Road Surface		Driver Contributing Code		Ages				Comments					
							#	Type	#	Type	#	Type	#	Type	#	Type	DOB	DOB	DOB	DOB		D1	D2	D3	D4	
1	10	10/29/10	5	Friday	15	3:38 PM	3	Angle	99	Unknown	99	Unknown	99	Unknown	4	Failed to yield right of way	6/12/1986	1/20/1961			24	49			V1 failed to yield to oncoming westbound traffic	
2	12	12/2/10	4	Thursday	15	3:19 PM	4	Sideswipe, same direction	99	Unknown	99	Unknown	99	Unknown	4	Failed to yield right of way	10/15/1972	12/3/1969			38	40			V1 thought V2 was going to make a turn and attempted to pass	
3	6	6/9/11	4	Thursday	13	1:11 PM	2	Rear-end	99	Unknown	99	Unknown	99	Unknown	5	Followed too closely	10/8/1945	2/14/1989			65	22			V1 rear ended V2 which was waiting to merge onto Derby St	
4	7	7/21/11	4	Thursday	14	2:12 PM	1	Single Vehicle Crash	99	Unknown	99	Unknown	99	Unknown	9	running off road	11/1/1952				18				V1 fell asleep and crossed over the centerline into the opposing lane	
5	10	10/20/11	4	Thursday	15	3:09 PM	4	Sideswipe, same direction	99	Unknown	99	Unknown	99	Unknown	4	Failed to yield right of way	4/4/1968	9/14/1927			43	84			V2 failed to yield right of way to Derby St traffic and clipped V1	
6	1	1/19/12	4	Thursday	17	5:11 PM	2	Rear-end	99	Unknown	99	Unknown	99	Unknown	5	Followed too closely	12/21/1956	4/20/1994			55	17				
7	4	4/3/12	2	Tuesday	11	11:47 AM	3	Angle	99	Unknown	99	Unknown	99	Unknown	4	Failed to yield right of way	11/12/1973	4/27/1969			38	42			V2 traveling west on Derby St struck by V1 exiting Rte 3 S ramp	
8	5	5/10/12	4	Thursday	7	7:01 AM	3	Angle	99	Unknown	3	Rain	2	Wet	19	Inattention	8/1/1972	4/7/1995			39	17			V1 was cut off by V2 exiting Rte 3 S ramp	
9	5	5/17/12	4	Thursday	16	4:48 PM	2	Rear-end	99	Unknown	99	Unknown	99	Unknown	5	Followed too closely	3/3/1964	2/12/1985			48	27			V2 was stopped at yield sign and was rear ended by V1	
10	5	5/27/12	7	Sunday	12	12:24 PM	2	Rear-end	99	Unknown	99	Unknown	99	Unknown	5	Followed too closely	9/7/1992	8/23/1963			19	48			V3 rear ended V1 who rear ended V2. V3 fled scene	
11	3	3/3/13	7	Sunday	18	6:17 PM	3	Angle	99	Unknown	99	Unknown	99	Unknown	4	Failed to yield right of way	5/19/1988	1/24/1934			24	79			V1 cut off V2 while attempting to turn onto Rte 3 S ramp	
12	6	6/18/12	1	Monday	14	2:40 PM	2	Rear-end	1	Daylight	2	Cloudy	1	Dry	1	No Improper Driving	1/1/1961	1/1/1977			51	35				
13	4	4/25/12	3	Wednesday	15	3:15 PM	2	Rear-end	1	Daylight	2	Cloudy	1	Dry	99	Unknown										
14	3	3/5/13	2	Tuesday	15	3:45 PM	2	Rear-end	1	Daylight	1	Clear	1	Dry	19	Inattention	1/1/1967	1/1/1967	1/1/1954		46	46	59			
15	5	5/25/13	6	Saturday	9	9:15 AM	2	Rear-end	1	Daylight	1	Clear	1	Dry	1	No Improper Driving	1/1/1975	1/1/1961			38	52				
16	7	7/17/13	3	Wednesday	15	3:08 PM	2	Rear-end	1	Daylight	1	Clear	1	Dry	97	Other improper action	1/1/1989	1/1/1952			24	61				
17	8	8/1/13	4	Thursday	7	7:05 AM	2	Rear-end	1	Daylight	1	Clear	1	Dry	99	Unknown	1/1/1991				22					
18	10	10/12/12	5	Friday	6	6:15 AM	2	Rear-end	1	Daylight	1	Clear	1	Dry	5	Followed too closely	1/1/1977	1/1/1992			35	20				
19	10	10/28/2011	5	Friday	6	6:53 AM	1	Single Vehicle Crash	99	Unknown	99	Unknown	4	Ice	1	No Improper Driving	11/13/1970				40					
20	20	12/19/2011	1	Monday	14	2:59 PM	2	Rear-end	99	Unknown	99	Unknown	99	Unknown	5	Followed too closely	6/2/1993	5/8/1976			51	35				
21	10	10/13/2012	6	Saturday	20	8:56 PM	6	Head on	99	Unknown	99	Unknown	99	Unknown	9	Failure to keep in proper lane or running off road	6/3/1971	10/14/1951	6/19/1984		70	60	28			
22	12	12/8/11	4	Thursday	16	4:10 PM	3	Angle	99	Unknown	99	Unknown	99	Unknown	4	Failed to yield right of way	10/27/1971	8/9/1958			40	53				
23	12	12/10/12	1	Monday	19	7:09 PM	6	Head on	99	Unknown	99	Unknown	99	Unknown	19	Inattention	4/7/1965	6/8/1991			47	21				

Summary based on Crash Reports obtained from the Hingham Police Dept. and MassDOT

*Courtesy Crash - A term used to describe a crash that occurs subsequent to a non-involved mainline driver who gives the right of way, contrary to the rules of the road, to another driver.



TYPE OF ACCIDENT	
1 REAR-END	
2 HEAD-ON	
3 SIDESWIPE	
4 OVERTURNED	
5 FIXED-OBJECT	
6 ANGLE	
7 PARKED CAR	
8 OUT OF CONTROL	
9 PEDESTRIAN	

RT. 3 SOUTHBOUND RAMP @
DERBY STREET

TOWN OF HINGHAM

FROM 9-2010 TO 8-2013

TOTAL ACCIDENT REPORTS - 23

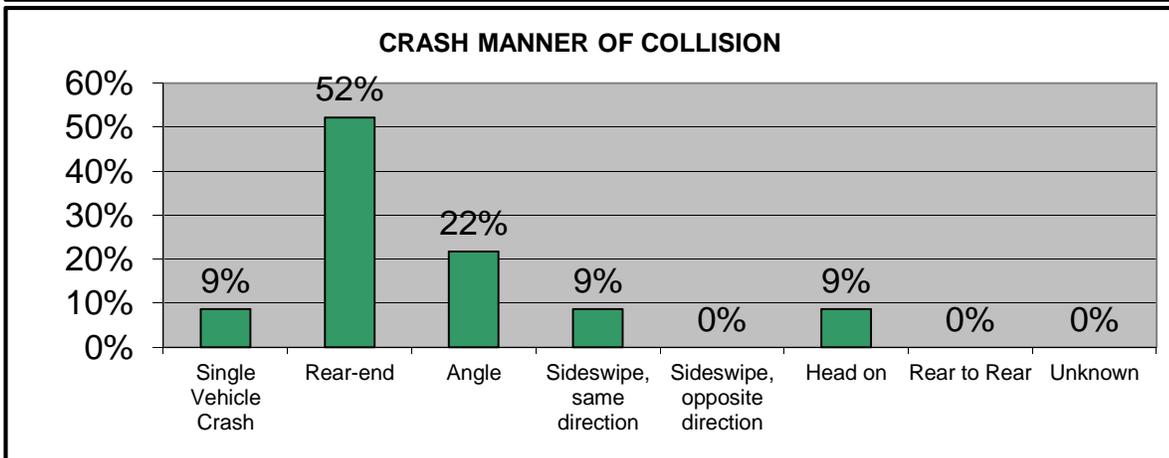
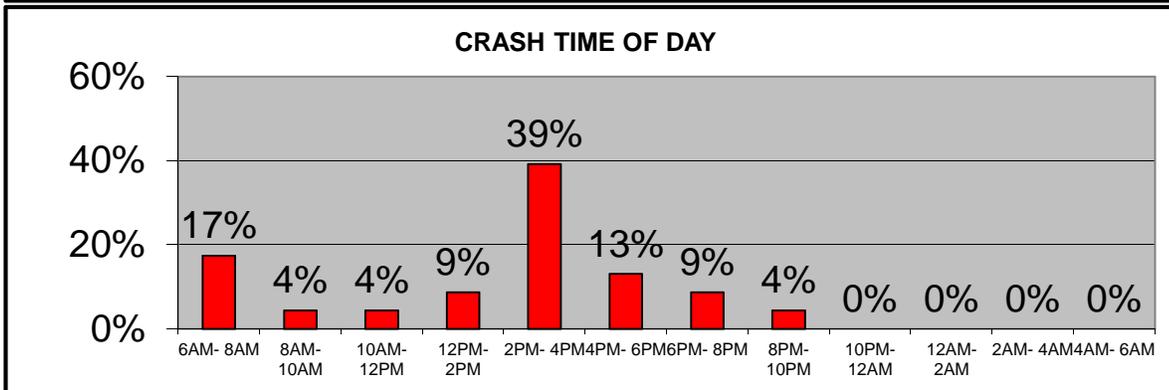
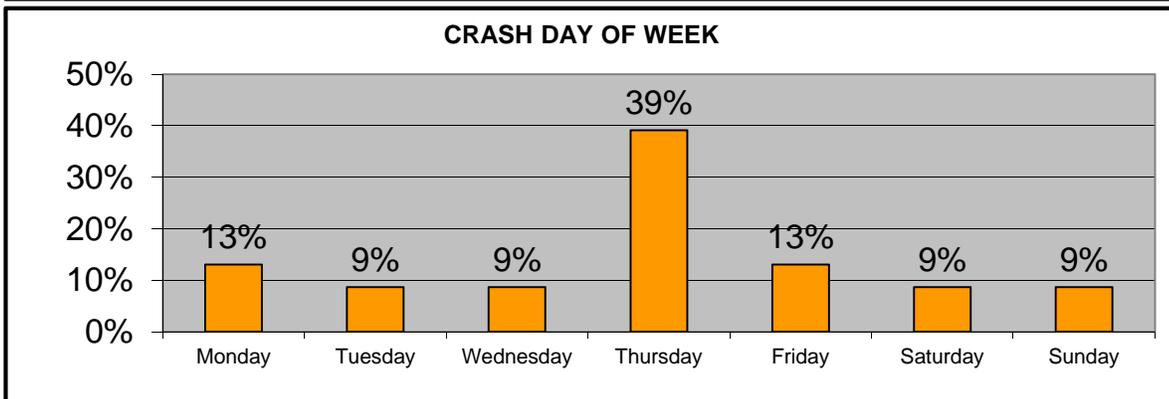
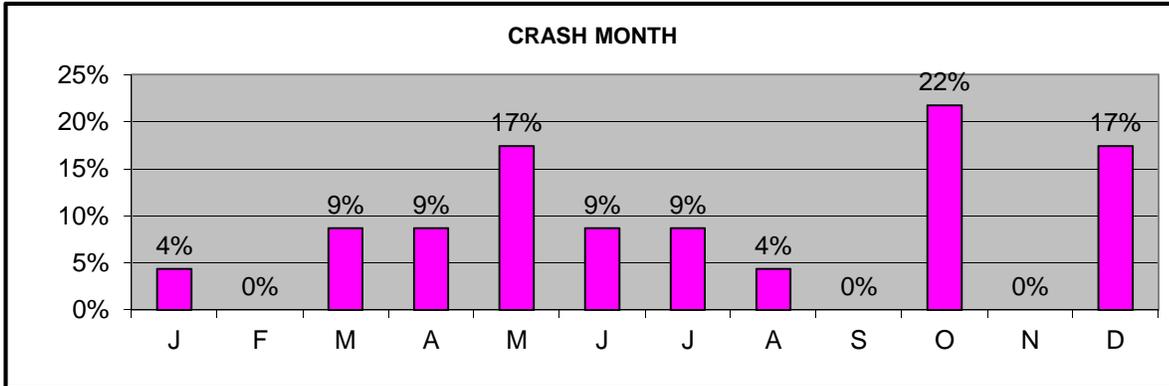


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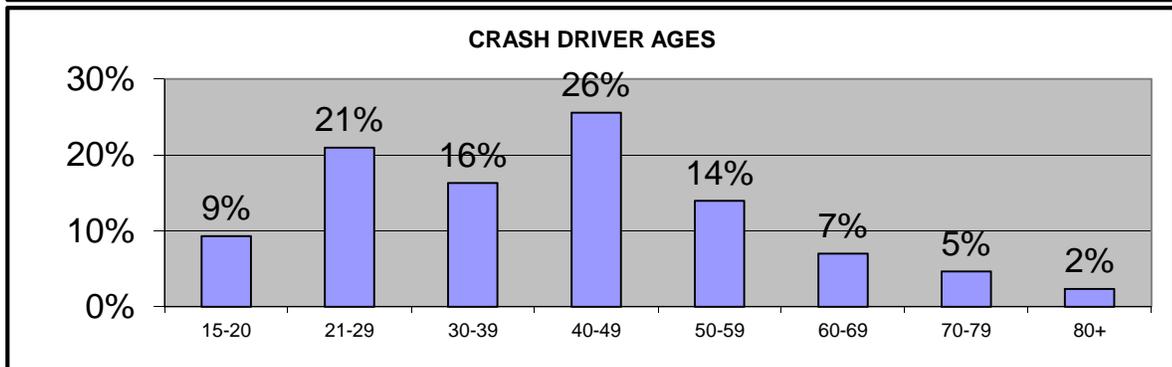
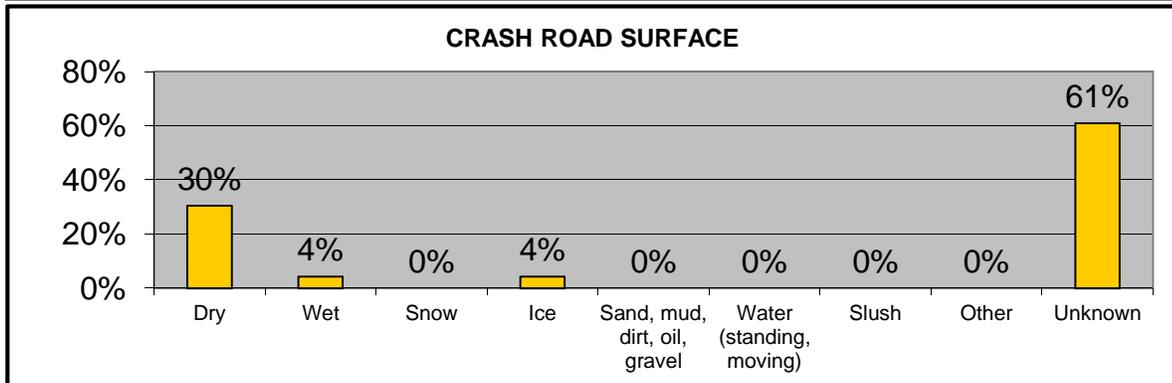
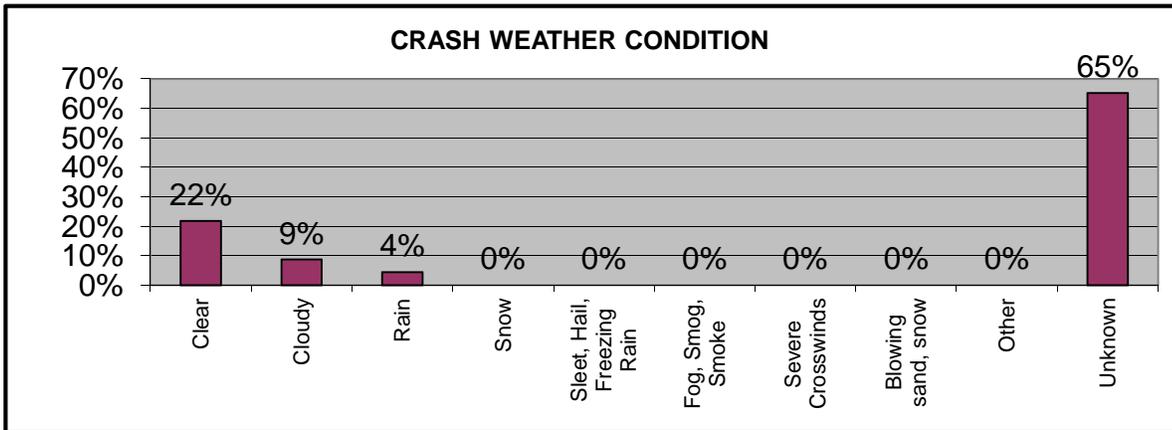
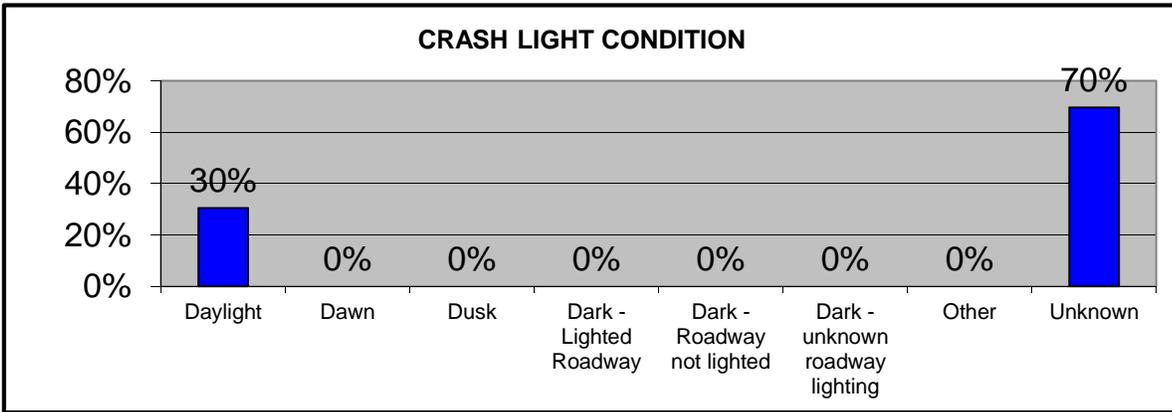
TITLE:
COLLISION DIAGRAM
RTE. 3 SOUTHBOUND
RAMP @
DERBY STREET

DATE: NOVEMBER 2013

Crash Data Summary Tables and Charts
 Derby Street @ Rte. 3 Southbound ramp, Hingham, MA

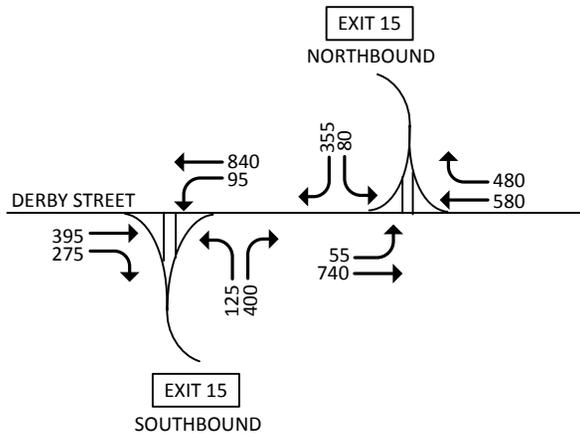


Crash Data Summary Tables and Charts
 Derby Street @ Rte. 3 Southbound ramp, Hingham, MA

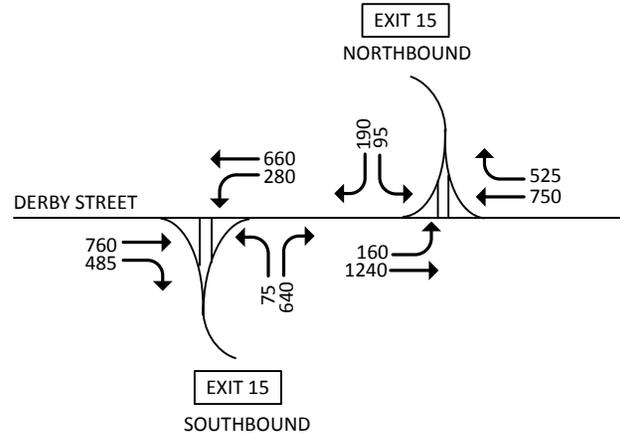


Appendix D. Peak Hour Traffic Volumes

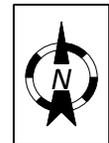
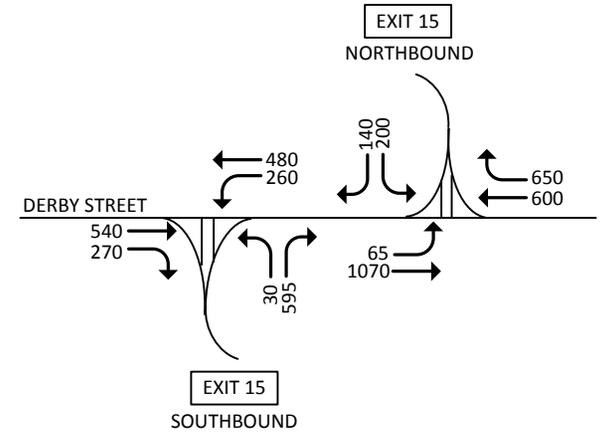
AM Peak Hour
8:00 – 9:00 AM



PM Peak Hour
4:45 – 5:45 PM



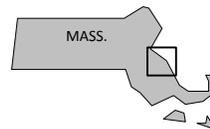
Saturday Peak Hour
12:00 – 1:00 PM



Not to Scale



Road Safety Audit – Derby Street @ Route 3 Ramps
Hingham, Massachusetts



2012 Existing Conditions
Peak Hour Traffic Volumes

Figure 1