

Intersection Road Safety Audit

Maple Avenue & Main Street



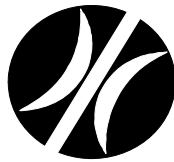
Evesham Township,
Burlington County



DELAWARE VALLEY REGIONAL
PLANNING COMMISSION

April 2008

Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency that provides continuing, comprehensive and coordinated planning to shape a vision for the future growth of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties, as well as the City of Philadelphia, in Pennsylvania; and Burlington, Camden, Gloucester and Mercer counties in New Jersey. DVRPC provides technical assistance and services; conducts high priority studies that respond to the requests and demands of member state and local governments; fosters cooperation among various constituents to forge a consensus on diverse regional issues; determines and meets the needs of the private sector; and practices public outreach efforts to promote two-way communication and public awareness of regional issues and the Commission.



Our logo is adapted from the official DVRPC seal, and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole, while the diagonal bar signifies the Delaware River. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey.

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MAPLE AVENUE AND MAIN STREET INTERSECTION ROAD SAFETY AUDIT

1.0 BACKGROUND

This document represents the final report for the Maple Avenue/Main Street Intersection Road Safety Audit. This project represents a step towards the implementation of the Delaware Valley Regional Planning Commission (DVRPC) Regional Safety Action Plan. Improving the design and operation of intersections is a priority area for both engineering and enforcement disciplines as documented in the Plan. DVRPC has been coordinating with Pennsylvania Department of Transportation to address corridors on the District 6 Safety Plan since fiscal year 2007. In fiscal year 2008, intersection road safety audits are being conducted in New Jersey under Transportation Safety Planning in DVRPC's planning work program. The New Jersey road safety audits concentrate on intersections located on county and/or local roads. Implementation of improvement strategies identified through this process may be eligible for Local Federal Safety funds.

Whereas, the goal of this project is to improve and promote transportation safety on the region's roadways while maintaining mobility, the main objective is to address the safe operation of the roadway and ensure a high level of safety for all road users. The road safety audit program is conducted to generate improvement recommendations and countermeasures for roadway segments demonstrating a history of, or potential for a high incidence of motor vehicle crashes. The emphasis is placed on identifying low cost, quick turnaround safety projects to address the issues where possible but will not exclude the more complex projects.

1.1 The Audit

A road safety audit (RSA) is a formal safety performance examination of an existing or future road or intersection by an audit team. Road safety audits can be used on any size project, from minor maintenance to mega-projects. There are eight major steps involved in conducting a road safety audit but these can be simplified in a three step process – identify the corridor/intersection and audit team; conduct the RSA and report on the findings; and follow-up on RSA findings where feasible. Major benefits of road safety audits include – it is a proactive tool, not solely dependent on crash data; a planning tool to identify safety issues to be considered in improvement projects; can determine if the needs of all road users are adequately met; adaptable to local needs and conditions; and recommendations can be implemented in small stages as time and resources permit.

Prior to the road safety audit activities on site, DVRPC collected, reviewed, and analyzed relevant data (video of roadway under different conditions, traffic volume data, turning movement counts, maps, aerial photographs, and crash data). Using the crash data, collision diagrams were produced which showed the crashes and types for locations where they occurred.

The Road Safety Audit was conducted on March 12, 2008. The day began with a Pre-Audit meeting that involved the definition of road safety audit and how it differs from the corridor study process; the required steps of an audit; presentation of the site issues

and an exchange of ideas and knowledge of the roadway. A video showing the site under night time conditions was also shown. The field view followed where the audit team made up of state and local officials and other stakeholders walked the site and identified transportation safety issues. See **Appendix A** for the list of audit team members. The post-audit meeting followed and was spent discussing the findings from the field view, identifying strategies to address issues and determining priorities.

1.2 Overview of the Study Area

The study area consists of the signalized intersection of East Main Street (CR 620) and Maple Avenue (CR 607) and vicinity; see **Appendix B** the study area map.

CR 620, which is functionally classified as an urban minor arterial, runs in an east-west direction at the study area. It provides direct access to NJ 73 to the west of the study area. East of the study area CR 620 connects with several major roads, including CR 619 (Willow Bend Road), CR 623 (Taunton Boulevard), CR 541 (Stokes Road), CR 534 (Oakshade Road), and CR 648 (Willow Grove Road).

CR 607, which is functionally classified as an urban minor arterial, runs in a north-south direction at the study area. It provides direct access to NJ 73 south of the study area. North of the study area CR 607 connects with several major roads, including NJ 70, CR 674 (Greentree Road), CR 616 (Church Street), and CR 612 (Elbo Lane).

In the study area both roadways are two lanes, with one lane in each direction. Maple Avenue between the E. Main Street intersection and NJ 70 has three lanes, one lane in each direction and a two way left-turn lane. At the intersection the E. Main Street eastbound approach has two lanes, a dedicated left-turn lane and a shared right-turn and through lane. The westbound approach has three lanes with dedicated right and left-turn lanes and a through lane. Maple Avenue northbound and southbound approaches has two lanes each, a dedicated left-turn lane and a shared right-turn and through lane.

The signal is timed for protected/permissive left-turns from E. Main Street. The speed limit at the intersection is 30 MPH but changes to 35 MPH on Maple Avenue away from the intersection. Each roadway has narrow shoulders beyond the intersection.

The land use immediately surrounding the study intersection is commercial. There are commercial uses situated on each corner of the intersection. The commercial buildings on three of the four corners are located along the road with no setbacks. These buildings provide driveway access and parking in the rear of the structure leading up to the intersection. A 7-11 Convenience Store is located on the northeast corner of the intersection and provides parking in the front of the building along with two entrance/exits within the intersection approach. The area surrounding the study location has a mix of commercial, residential, and community land uses.

The NJ Transit Bus Route 406 which travels from Philadelphia to Marlton/Berlin serves the study area. The Route 406 bus travels on NJ 70 to Maple Avenue and turns left onto

E. Main Street at the study intersection. The route 406 bus provides access to Berlin Circle Plaza, Virtua Hospital, The Garden State Park in Cherry Hill, the Walter Rand Transportation Station, and Center City Philadelphia. The bus route makes 39 eastbound and 19 westbound trips per weekday.

Congestion

This area is extremely congested during peak periods but especially so for the afternoon peak. During field observations traffic was backed up on northbound Maple Avenue for over a quarter mile from the study intersection and from NJ 70 almost to the study intersection as well. Transportation Improvement Program project DB # 567 **Route 73/70, Marlton Circle Elimination** is scheduled for construction in FY 2008 and 2009. As described in DVRPC 2008 TIP – “*The Marlton Circle, at the intersection of Route 70 and Route 73, will be eliminated; a grade-separated interchange (Route 73 over Route 70) will be constructed. The primary objective is to improve traffic flow and thereby reduce congestion on Route 73 and Route 70 through the intersection.*” Due to the location of the study intersection in relation to the NJ 70/NJ 73 intersection many motorists will chose to use Maple Avenue to access NJ 70 and other roadways during construction. This will exacerbate not only congestion in this area but also identified safety issues.

No average annual daily traffic (AADT) volumes were available for Maple Avenue or Main Street in the study area, but NJ 73 showed AADT of 38, 977 vehicles south of NJ 70 and 58,565 vehicles north of NJ 70 in 2006. In the same year, volumes of 28,287 west of NJ 73 and 37,747 east of NJ 73 were recorded for NJ 70; see **Appendix B** for *Traffic Volume Map*. Turning movement counts were taken in January 2008 for the study intersection. These showed that the morning peak hour is between 8:00 AM and 9:00AM and afternoon peak hour is between 4:15 PM and 5:15 PM; see **Appendix C**. The through movement on northbound Maple Avenue and westbound Main Street are the dominant movements in the morning and in the afternoon peak hour the dominant movements are eastbound Main Street and southbound Maple Street. The left-turn movements are high during the afternoon peak from all approaches except northbound Maple Avenue. Westbound Main Street also has heavy turn movements.

1.3 Crash Data

According to New Jersey Department of Transportation (NJDOT) crash database there were 34 reportable crashes between 2004 and 2006 in the study area. Reportable crashes are crashes which may result in a fatality, injury, and/or property damage of five hundred dollars or more. A comprehensive analysis of the crash data is shown in **Appendix C**. Also available in this appendix is a Crash Summary developed by NJDOT Bureau of Safety Programs highlighting crashes which occurred in the intersection box. Of the reportable crashes, there were 14 crashes in 2004 (40%); 10 crashes in 2005 (30%); and 10 crashes in 2006 (30%). When analyzing crash frequency by month, June had the highest number of crashes with 7 (21%), August and November were next with 5 crashes each. Crashes occurred in every month of the year except February and July.

Rear-end (14), and angle (12) crashes represented 76% of the 34 reportable crashes. Rear-end (41%) and angle (35%) were higher than 2006 New Jersey Statewide County Road Averages of 30.32% and 18.09%, respectively. There were no fatal crashes during the study period. There were 27 (79%) property damage only crashes and 7 injury crashes of varying levels of severity. Nineteen of the thirty-four crashes occurred between 3:00 PM and 7:00 PM. In an analysis of roadway surface conditions during the occurrence of crashes, 71% occurred on dry road surface. Seventy-three percent of the crashes occurred during daylight hours.

2.0 FINDINGS AND RECOMMENDATIONS

The following represents the findings and recommendations of the Maple Avenue/Main Street Intersection Road Safety Audit. Shaded areas represent recommended strategies requiring low level of effort for implementation with high potential safety benefits.

Signs



Issue

- “Evesham Fire Rescue” sign mounted on lane designation sign support on the westbound approach of Main Street is too low.

Possible Improvement Strategies

Relocate sign and mount according to the MUTCD standards (bottom of the sign at least 7 feet from the ground).

Level of Effort

Low

Potential Safety Benefit

High

Issue

- “No Parking” sign on eastbound side of Main Street west of the intersection is faded and mounted too low.

Possible Improvement Strategies

- Replace existing sign and mount according to MUTCD standards.

Level of Effort

Low

Potential Safety Benefit

Medium

Issue

- “No Parking to Corner” sign located on the southbound side of Maple Avenue is faded.

Possible Improvement Strategies

- Replace existing sign and add additional “No Parking” signs as appropriate on both roadways in the vicinity of the intersection.

County in coordination with the township will examine existing parking ordinances and address as appropriate.

Level of Effort Low	Potential Safety Benefit Medium
<p><u>Issue</u></p> <ul style="list-style-type: none"> • “One-way” and “Do Not Block Driveway” signs located in driveways west of the intersection on the westbound side of Maple Avenue are too low and placed in the county right of way by others. <p>Possible Improvement Strategies</p> <ul style="list-style-type: none"> • Remove signs. The “One-way” should be reinstalled for the driveways outside the county right-of-way. 	
Level of Effort Low	Potential Safety Benefit High
<p><u>Issue</u></p> <ul style="list-style-type: none"> • Street name signs for side streets are small and in some cases are faded. <p>Possible Improvement Strategies</p> <ul style="list-style-type: none"> • Place street name signs with size and font type in accordance with the MUTCD. 	
Level of Effort Low	Potential Safety Benefit High
<p><u>Issue</u></p> <ul style="list-style-type: none"> • Street name sign post at the corner of Oak Avenue is leaning. <p>Possible Improvement Strategies</p> <ul style="list-style-type: none"> • Re-install sign post and orient street name plates that they are visible to motorists. 	
Level of Effort Low	Potential Safety Benefit High
<p><u>Issue</u></p> <ul style="list-style-type: none"> • “No Parking” signs are mounted on posts that are not breakaway. <p>Possible Improvement Strategies</p> <ul style="list-style-type: none"> • Re-install signs using breakaway post. 	
Level of Effort Low	Potential Safety Benefit High

Curb Ramp



Issue

- Pedestrian ramp on the northeast corner doesn't connect with the crosswalk.

Possible Improvement Strategies

Relocate pedestrian ramp to allow roadway crossing in the crosswalk.

Level of Effort

Low

Potential Safety Benefit

High

Issue

- Traffic signal pole is in the pedestrian ramp on the southwest corner.

Possible Improvement Strategies

- Relocate the traffic signal pole. It also blocks pedestrian movement on the sidewalk.

Level of Effort

Medium

Potential Safety Benefit

High

Issue

- Bollard is located in the pedestrian ramp on the northeast corner.

Possible Improvement Strategies

- The municipality should remove the bollard from the curb ramp.

Level of Effort

Low

Potential Safety Benefit

High

County will inventory ADA ramps throughout the county and address as appropriate.

Sidewalk



Issue

- Concrete planters are located in the sidewalk west of the intersection on the westbound side of Main Street.

Possible Improvement Strategies

- Remove the planters from the sidewalk.

Level of Effort

Low

Potential Safety Benefit

High

Issue

Cable and other wires are tripping hazard on the sidewalk on the northbound side of Maple Avenue.

Possible Improvement Strategies

- Bury the wires underground.

Level of Effort

Low

Potential Safety Benefit

High

Issue

- Traffic signal pole on the southwest corner of the intersection blocks the sidewalk.

Possible Improvement Strategies

- Relocate the traffic signal pole.

Level of Effort

Medium

Potential Safety Benefit

High

Pavement Markings



Issue

Crosswalks are faded in areas and should be made more visible.

Possible Improvement Strategies

Repaint crosswalks and upgrade to continental style.

Level of Effort

Low

Potential Safety Benefit

High

Bicyclists



Issue

- There are no bicycle amenities at the intersection or in the vicinity.

Possible Improvement Strategies

- Install “Share the Road” signs on the roadways leading to the intersection.

Level of Effort

Low

Potential Safety Benefit

High

Intersection Design



Issue

- Intersection is skewed and buildings intrude on the sight distances for turning traffic – compromise crosswalk.
- Intersection is currently congested and is expected to become more congested during the construction phase of the scheduled elimination of the Marlton Circle.

Possible Improvement Strategies

- Signal timing changes:
 - Add protected/permissive left-turn phase for all approaches and retime the signal to accommodate volumes. Possible strategy – Add northbound and eastbound left-turn phases (for northbound Maple Avenue a 3 to 5 seconds left turn phase; for eastbound Main Street a 3 to 12 seconds left-turn phase); following the termination of the northbound lead left allow the southbound thru to be initiated while the southbound left-turn continues; establish a “No Turn on Red”; install a NTOR blank out sign or create an overlap for the westbound right-turn to run simultaneously with the southbound protected left-turn phase.
 - Install pedestrian countdown signals on all of the approaches.
 - Install a pedestrian lead prior to the initiation of the Maple Avenue Right-of-Way.
 - Install backplates on the Main Street traffic heads.

Level of Effort

Low

Potential Safety Benefit

High

And

- Consider an additional approach lane for northbound Maple at NJ 70 to improve operation of both intersections.

Level of Effort

Medium/High

(Depends if ROW acquisition is required)

Potential Safety Benefit

High

Issue

- Driveways are too close to the intersection. Left-turns from these driveways are potentially unsafe considering they are crossing multiple lanes of traffic. From the collision diagram there are a number of crashes associated with the 7-11 convenience store driveways.

Possible Improvement Strategies

- Prohibit left-turns from the 7-11 driveways on Maple Avenue and Main Street.
NJDOT approval of a local ordinance and county resolution will be required prior to the implementation of the prohibitions.
- In the longer term, modify the driveway for right-turns only.

Level of Effort

Low

Potential Safety Benefit

High

Transit



Issue

- NJ Transit bus serves this intersection, stops are not indicated.

Possible Improvement Strategies

Sign existing bus stops for the information of the motorists and the safety of the passengers getting on or off the buses.

Level of Effort

Low

Potential Safety Benefit

High

3.0 CONCLUSION

As discussed earlier, the road safety audit program is conducted to generate improvement recommendations and countermeasures for roadway segments demonstrating a history of, or potential for a high incidence of motor vehicle crashes. The safety issues identified during the audit and documented in this report along with recommended strategies should improve the overall safety of the study area. Existing congestion issues identified along with the potential congestion associated with the construction phase of the Marlton Circle elimination project needs to be addressed in the short term. Many of the strategies identified can be implemented through routine maintenance. The full impact of the improvement strategies will be realized when they are combined but time and budget constraints may dictate when remedial strategies are implemented.

Engineering strategies alone will not eliminate the traffic safety issues identified along the corridor. Therefore, enforcement and education are necessary components to address the human behavioral aspects to effectively reduce the number of crashes occurring. Policy or legislative issues may be involved in addressing safety concerns, engaging the appropriate stakeholders are important. Coordination and collaboration is the key to making the roadway safer for all users.

APPENDIX A
Audit Team

Maple Avenue/Main Street, Evesham Township - Road Safety Audit

Audit Team

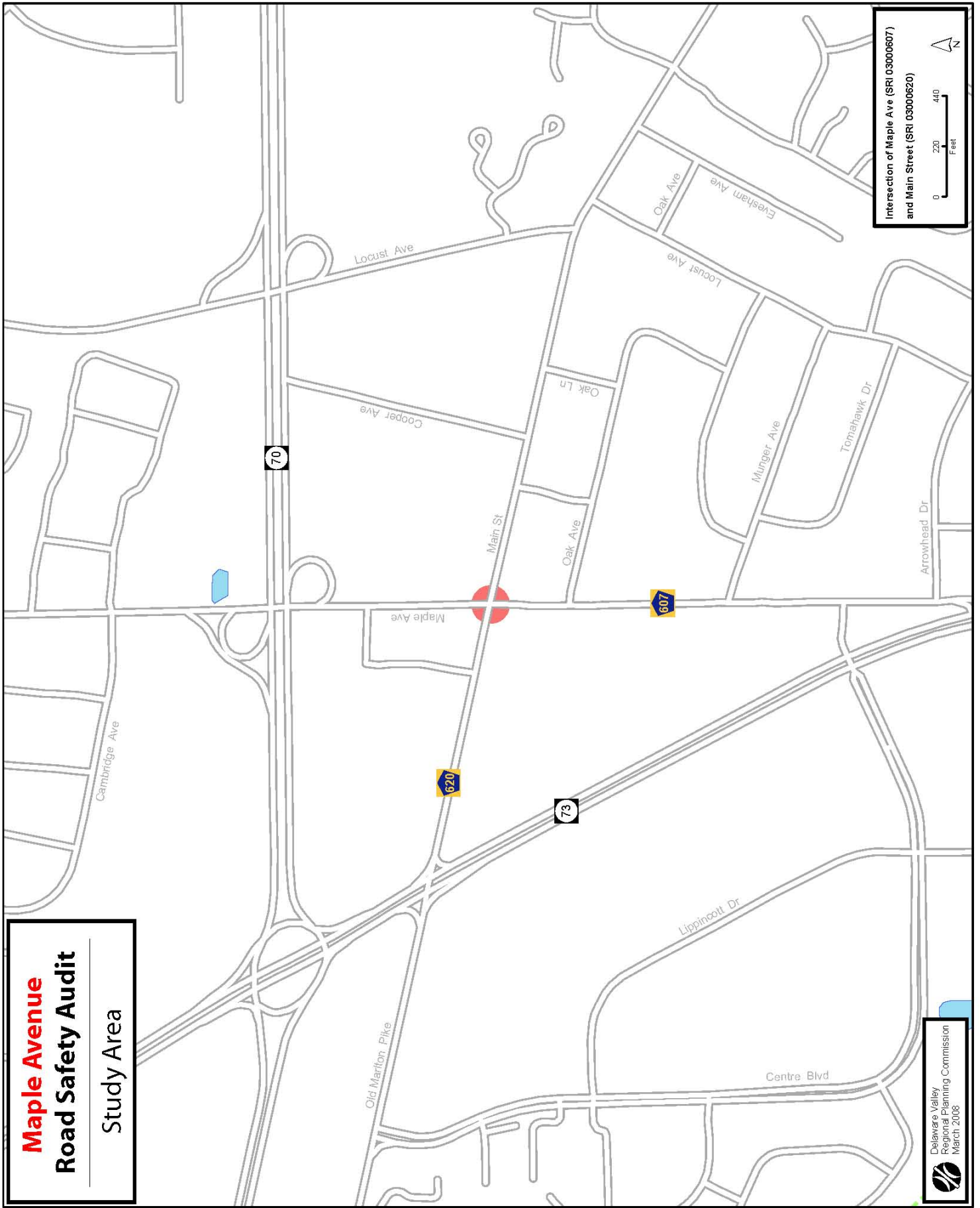
Name	Organization
Rosemarie Anderson	Delaware Valley Regional Planning Commission
William Hoffman	Federal Highway Administration
Harry Klatt	Burlington County Engineering Department
Officer Bruce LaCarte	Evesham Township Police Department
Martin Livingston	Burlington County Engineering Department
Regina Moore	Delaware Valley Regional Planning Commission
Kevin Murphy	Delaware Valley Regional Planning Commission
Marhaba Omer	New Jersey Department of Transportation
William Ragazine	Cross County Connection Transportation Management Association
Ray Reeve	New Jersey Division of Highway Traffic Safety
Chris VanBrunt	Burlington County Engineering Department

APPENDIX B

Maps

Maple Avenue Road Safety Audit

Study Area



Intersection of Maple Ave (SRI 03000607)
and Main Street (SRI 03000620)



Delaware Valley
Regional Planning Commission
March 2008

Maple Avenue Road Safety Audit

Traffic Volume

DVRPC Traffic Count

● AADT (Year)

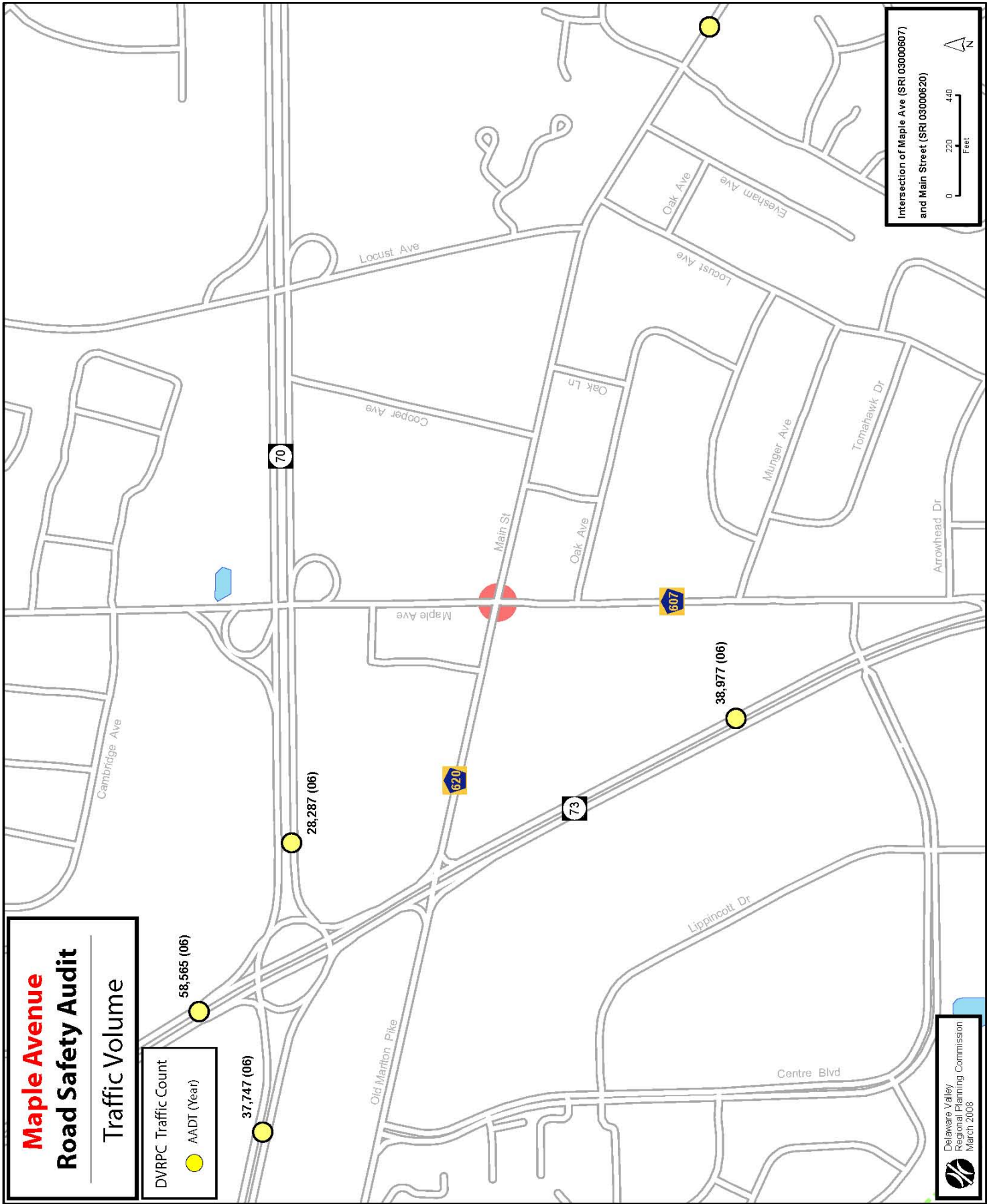
58,565 (06)

37,747 (06)

28,287 (06)

38,977 (06)

Intersection of Maple Ave (SRI 03000607)
and Main Street (SRI 03000620)



APPENDIX C

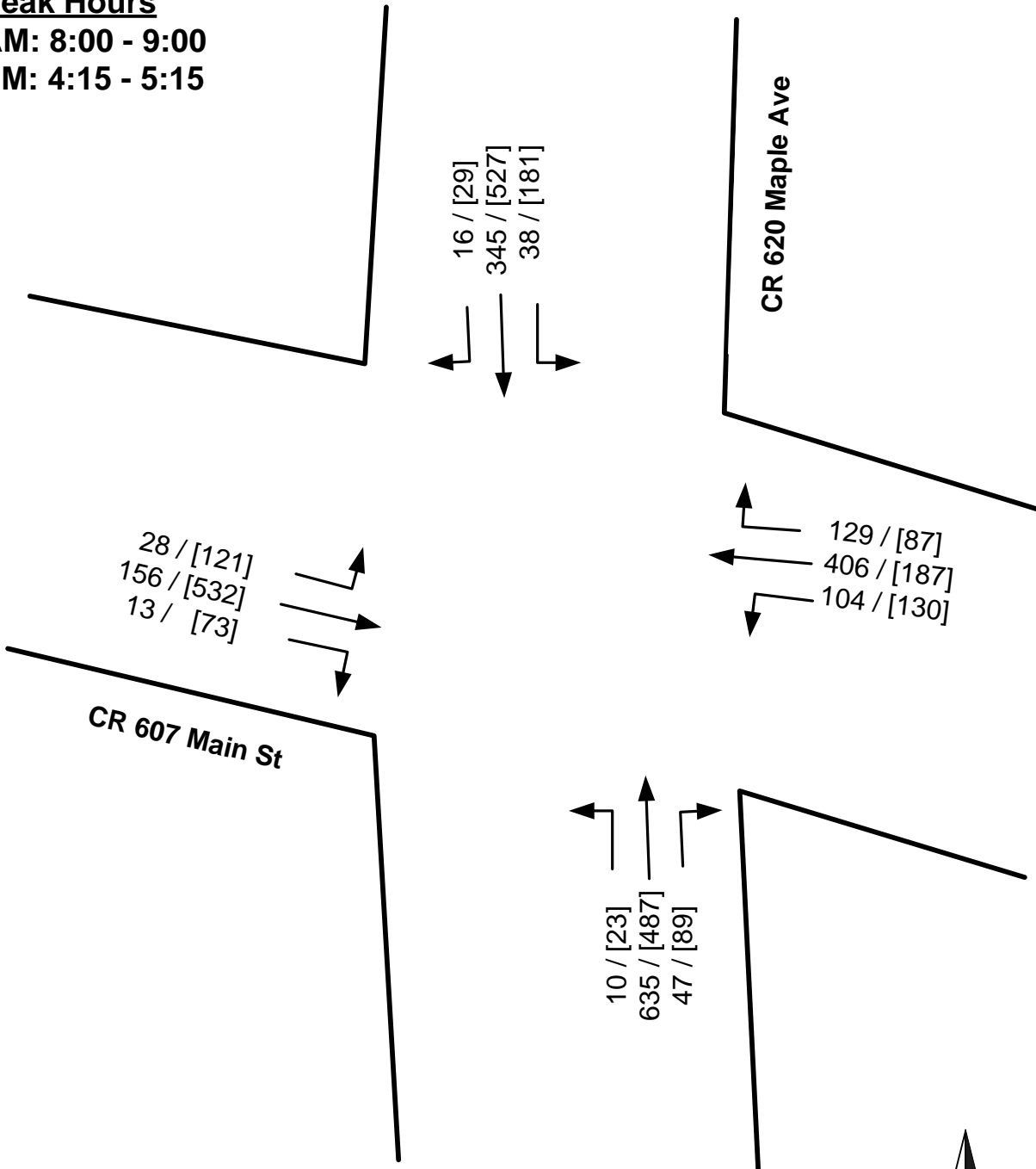
Traffic Data

Evesham Township

CR 607 Maple Ave and CR 620 Main St Intersection.

Peak Hour Turning Movement Counts AM & [PM]

Peak Hours
 AM: 8:00 - 9:00
 PM: 4:15 - 5:15



SCHEMATIC NOT TO SCALE



Delaware Valley Regional Planning Commission
 February 2008

Intersection of Main Street and Maple Avenue
 Evesham Township, New Jersey



Intersection Crash Summary
 NJDOT Crash Database
 2004 - 2006

COLLISION TYPE	
Rear End	14
Right Angle	12
Same Direction Side Swipe	3
Left/U Turn	3
Opposite Dir / Head-On	1
Fixed Object	1
Total	34
LIGHT CONDITION	
Day	25
Night	8
Dusk	1
Total	34
SURFACE CONDITION	
Dry	24
Wet	9
Snowy	1
Total	34
SEVERITY	
Fatal	0
Major Injury	1
Moderate Injury	0
Minor Injury	6
Property Damage Only	27
Total	34



● Crash Location



Delaware Valley
 Regional Planning Commission
 March 2008

ROAD SAFETY AUDIT

Intersection Crash Summary, 2004 - 2006

CR 620 Main St (MP 0.45 - MP 0.52), and CR 607 Maple Ave (MP 0.2 - MP 0.24)

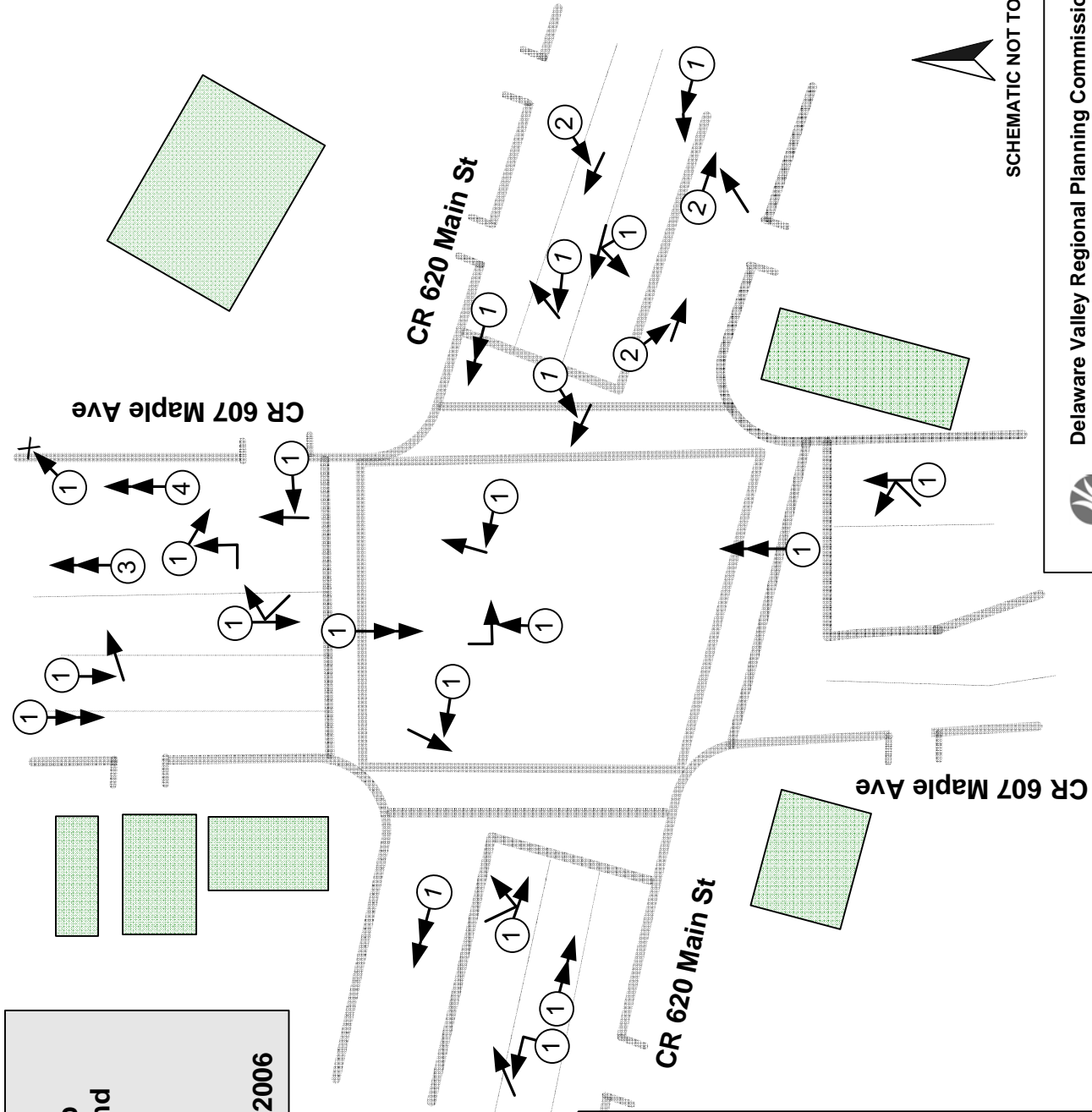
Evesham Township, New Jersey

YEAR	COLLISION TYPE	PREDOMINANT DRIVER ACTIONS
2004	Rear End	Driver Inattention
2005	Right Angle	Failure to Yield Right-Of-Way
2006	Same Direction Side Swipe	None
Total	Left/U Turn	Failed To Obey Traffic Control Device
	Opposite Dir / Head-On	Improper Turning
	Fixed Object	Physical Obstructions (viewing, etc)
	Total	Unknown
		Total
MONTH	SEVERITY	SURFACE CONDITION
Jan	Fatal	Dry
Feb	Major Injury	Wet
March	Moderate Injury	Snowy
April	Minor Injury	Total
May	Property Damage Only	
June	Total	
July		
August		
Sept		
Oct		
Nov		
Dec		
Total		
DAY OF WEEK	LIGHT CONDITION	TIME OF DAY (SUMMARY)
Friday	Day	Midnight to 5:59 AM
Monday	Night	AM Peak Period (6 - 8:59 AM)
Saturday	Dusk	Midday (9AM - 3:59 PM)
Sunday	Total	PM Peak Period (4 - 6:59 AM)
Tuesday		7PM - Midnight
Thursday		
Wednesday		
Total		

Road Safety Audit
Evesham Township
CR 607 Maple Ave and
CR 620 Main St
Intersection

Collision Diagram
Crash Data Years 2004-2006

Total Crashes = 34
 Pedestrian Crashes = 0



SCHEMATIC NOT TO SCALE

Crash Type Legend

① = # crashes

- ↑ Rear End
- ↘ Angle
- ↙ Opposite Direction Sideswipe
- ↗ Same Direction Sideswipe
- ↖ Left Turn
- ↘ Left Turn
- × Hit Fixed Object

CRASH SUMMARY

County Road 607 MP 0.45 at County Road 620 (East Main ST)
Evesham Township, Burlington County
01/01/2004 THRU 12/31/2006

TOTAL CRASHES: 6

SEVERITY	COUNT	% OF TOTAL	2006 Average
Fatal	0	0.00%	
Injury	2	33.33%	29.16%
Property Damage	4	66.67%	
Total	6		

INTERSECTION	COUNT	% OF TOTAL	2006 Average
At Signalized Intersection	6	100.00%	100.00%
At Unsignalized Intersection	0	0.00%	
Between Intersections	0	0.00%	
Railroad Crossing	0	0.00%	
Total	6		

COLLISION TYPE	COUNT	% OF TOTAL	2006 Average	**
Same Dir.-Rear End	2	33.33%	30.32%	
Same Dir.-Sideswipe	0	0.00%		
Angle	2	33.33%	18.09%	
Head On	0	0.00%		
Parked Vehicle	0	0.00%		
Left Turn / U Turn	1	16.67%	7.89%	
Backing	0	0.00%		
Encroachment	1	16.67%	0.46%	
Overturned	0	0.00%		
Fixed Object	0	0.00%		
Animal	0	0.00%		
Pedestrian	0	0.00%		
Pedalcycle	0	0.00%		
Non - Fixed Object	0	0.00%		
Railcar - Vehicle	0	0.00%		
Unknown	0	0.00%		
Other	0	0.00%		
Total	6			

SURFACE CONDITION	COUNT	% OF TOTAL	2006 Average
Dry	6	100.00%	77.54%
Wet Surface	0	0.00%	
Snow	0	0.00%	
Ice	0	0.00%	
Unknown	0	0.00%	
Other	0	0.00%	
Total	6		

LIGHT	COUNT	% OF TOTAL	2006 Average
Day	4	66.67%	
Dusk	0	0.00%	
Night	2	33.33%	25.49%
Dawn	0	0.00%	
Unknown	0	0.00%	
Total	6		

Note:

** These columns indicate the number of fatal crashes in each accident category.

Source: Bureau of Safety Programs, New Jersey Department of Transportation

APPENDIX D

Checklist

CHECKLIST

Audit Team Member _____

GENERAL ISSUES

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Drainage	Do drainage items seem to be adequate?		
	Are drainage items clear of debris?		
2 Landscaping	Is landscaping in accordance with guidelines (sight distance, clearances etc.)		
3 Public Utilities	Are boxes, poles, and/or posts located in a safe position?		
	Do the above items interfere with sight distance?		
4 Access Management	Are there locations at and near the intersection where access management is problematic?		
5 Lighting	Is lighting needed in the vicinity of the intersection?		

ALIGNMENT AND CROSS SECTION

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Visibility	Are sight distances adequate for the speed of traffic approaching the intersection?		
	Is adequate sight distance provided at intersection?		
2 Driver expectation	Are there any sections of the intersection which may cause driver confusion such as:		
	a. Is alignment of roadway clearly defined?		
	b. Are crossroads or hidden driveways properly signed along corridor?		
	c. Are bicycle lanes clearly defined?		
	d. Do streetlight and tree lines conform with the road alignment?		

3 Widths	Are all the traffic lanes and roadway widths adequate?		
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INTERSECTIONS

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Location	Are there any roadside objects nearby which would intrude on driver's line of sight?		
	Are the intersections adequate for all vehicular movements?		
2 Controls	Are pavement markings and intersection control signing satisfactory?		
	Are there any pedestrian signals?		
3 Signage	Is the intersection appropriately signed?		
	Are there advance warning signs indicating the intersection?		
	Are signs appropriately located and of the appropriate size?		
4 Layout	Is the intersection layout obvious to all users?		
	Is the alignment of curbs satisfactory?		
	Are turning radii and tapers appropriate?		
	Are there driveways located at or near the intersections?		
5 Visibility, and Sight Distance	Is sight distance adequate for all movements and all users?		
6 Transit	Are there bus stops located near the intersections?		
	a. If so are the bus stops near side or far side?		
7 Turn Lanes	Do the turning lanes have sufficient storage?		
	Are there locations where a left-turn lane		

	is needed?		
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TRAFFIC SIGNALS

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Signal Operation	Are traffic signals operating correctly? (Example clearance time)		
	Should there be left-turn signal protection for the approaches?		
2 Signal heads and Visibility	Are traffic signals clearly visible to approaching motorists?		
	Are signal heads adequately placed not to cause driver confusion?		
	Are the signals post mounted, wire mounted, or mast arm mounted?		
	Are "signal ahead warning" signs needed?		
	Is the number of signal heads adequate?		
	Are the signal heads too small for motorists to notice?		
	Are the signals hard to see due to sun glare?		

PEDESTRIANS

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Land Use Factors	Are there schools or other pedestrian generators nearby?		
2 Sidewalks	Are sidewalks continuous throughout the corridor?		
	Are the sidewalks in good conditions (uneven, cracked, etc.)?		
	Are the sidewalks wide enough to accommodate persons using mobility aides?		
3 Facilities at CR 607 and CR 620 intersection	Are crosswalks provided at the intersection?		
	Are the pedestrian ramps adequate?		

	Are there pedestrian signals located at intersection?		
	Is the intersection clearly delineated for the visually impaired?		
	Is there adequate drainage at the intersection?		
	Are crosswalks clearly marked?		
4 Area near the CR 607 and CR 620 intersection	Is the speed limit appropriate for all road users?		
	Is there on street parking that would impede pedestrian visibility?		
	Are there safety concerns for pedestrian crossings midblock?		
	Are the pedestrian ramps adequate for midblock crosswalk?		
	Is the midblock crosswalk along CR 616 visible to motorists?		
5 Lighting	Is the sidewalk adequately lit for pedestrians to see and feel safe?		
	Are there dark places or hiding places which represent a personal security issue?		
	Are the pedestrian crosswalks adequately lit for pedestrians and motorists?		
6 Visibility and Sight Distance	Are pedestrians waiting to cross visible to motorists?		
	Can pedestrians see approaching vehicles?		
	Are there temporary or permanent obstructions near crosswalks (parked vehicles, vegetation, fences, etc.)		

BICYCLISTS

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
	Are there share the road signs posted?		
	Is the road surface of suitable quality for bicyclists?		
	Are parked vehicles an obstruction to bicyclists?		

TRANSIT

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Buses	Are bus stops located at or near the intersection of CR 620 and CR 607? Or along Maple Avenue and Main Street?		

ON STREET PARKING

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Parking	Are there time parking restriction signs posted?		
	Does parking obstruct through lane traffic?		
	Is parking located at the edge of intersections which could cause conflict for right-turning traffic?		
	Does parking obstruct vehicular or pedestrian movement?		

SIGNAGE, PAVEMENT MARKINGS, DELINEATION AND LIGHTING

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Signage	Are there signs missing from key locations?		
	Are signs easy to understand?		
	Are the correct signs used for each situation, and is each sign necessary?		
	Are signs effective for all likely conditions (i.e. day, night, oncoming headlights, etc.)?		
	Is there sign clutter at the intersection?		

	Are all necessary regulatory, warning, and direction signs in place? Are they conspicuous?		
	Are they redundant?		
	Are traffic signs in their correct locations, and properly positioned with respect to lateral clearance and height?		
	Are signs placed so as to restrict sight distance, particularly for vehicles?		
	Do signs supports conform to guidelines?		
2 Pavement Markings and Delineation	Does existing pavement markings need to be re-painted?		
	Do raised pavement markers need to be installed at the approach of the intersection?		
	Are pavement markings easily visible and effective for all likely conditions (i.e. at night, day, inclement weather etc.)?		

PAVEMENT

<u>Item #</u>	<u>Description</u>	<u>Check</u>	<u>Comments</u>
1 Pavement defects	Is the pavement free of defects (i.e. excessive roughness, potholes) which could result in safety problems?		
2 Ponding	Is the pavement free of areas where ponding may occur resulting in a safety problem?		

APPENDIX E
Response Sheet

CR 607 and CR 620 Intersection Road Safety Audit Response Sheet

<u>INTERSECTION ISSUES</u>	<u>Solution</u>	<u>Decision</u> Agree/Reject	<u>Planned</u> Completion Date	<u>Comments</u>
Signs				
<ul style="list-style-type: none"> “Evesham Fire Rescue” sign mounted on lane designation sign support on the westbound approach of Main Street is too low. 	<ul style="list-style-type: none"> Relocate sign and mount according to the MUTCD standards (bottom of the sign at least 7 feet from the ground). 			
<ul style="list-style-type: none"> “No Parking” sign on eastbound side of Main Street west of the intersection is faded and mounted too low. 	<ul style="list-style-type: none"> Replace existing sign and mount according to MUTCD standards. 			
<ul style="list-style-type: none"> “No Parking to Corner” sign located on the southbound side of Maple Avenue is faded. 	<ul style="list-style-type: none"> Replace existing sign and add additional “No Parking” signs as appropriate on both roadways in the vicinity of the intersection. <u>County in coordination with the township will examine existing parking ordinances and address as appropriate.</u> 			
<ul style="list-style-type: none"> “One-Way” and “Do Not Block Driveway” signs located in driveways west of the intersection on the westbound side of Maple Avenue are too low and placed in the county right of way by others. 	<ul style="list-style-type: none"> Remove signs. The “One way” signs should be reinstalled for the driveways outside the county right-of-way. 			

<u>INTERSECTION ISSUES</u>	<u>Solution</u>	<u>Decision Agree/Reject</u>	<u>Planned Completion Date</u>	<u>Comments</u>
Signs (continued)				
<ul style="list-style-type: none"> Street name signs for side streets are small and in some cases are faded. 	<ul style="list-style-type: none"> Place street name signs with size and font type in accordance with the MUTCD. 			
<ul style="list-style-type: none"> Street name sign post at the corner of Oak Avenue is leaning. 	<ul style="list-style-type: none"> Re-install sign post and orient street name plates that they are visible to motorists. 			
<ul style="list-style-type: none"> “No Parking” signs are mounted on posts that are not breakaway. 	<ul style="list-style-type: none"> Re-install signs using breakaway post. 			
Curb ramp				
<ul style="list-style-type: none"> Pedestrian ramp on the northeast corner does not connect with the crosswalk. 	<ul style="list-style-type: none"> Relocate pedestrian ramp to allow roadway crossing in the crosswalk. 			
<ul style="list-style-type: none"> Traffic signal pole is in the pedestrian ramp on the southwest corner. 	<ul style="list-style-type: none"> Relocate the traffic signal pole. 			
<ul style="list-style-type: none"> Bollard is located in the pedestrian ramp on the northeast corner. 	<ul style="list-style-type: none"> The municipality should remove the bollard from the curb ramp. <u>County will inventory ADA ramps throughout the county and address as appropriate.</u> 			

<u>INTERSECTION ISSUES</u>	<u>Solution</u>	<u>Decision Agree/Reject</u>	<u>Planned Completion Date</u>	<u>Comments</u>
Sidewalk				
<ul style="list-style-type: none"> Concrete planters are located in the sidewalk west of the intersection on the westbound side of Main Street. 	<ul style="list-style-type: none"> Remove the planters from the sidewalk. 			
<ul style="list-style-type: none"> Cable and other wires are tripping hazard on the sidewalk on the northbound side of Maple Avenue. 	<ul style="list-style-type: none"> Bury the wires underground. 			
<ul style="list-style-type: none"> Traffic signal pole on the southwest corner of the intersection blocks the sidewalk. 	<ul style="list-style-type: none"> Relocate the traffic signal pole. 			
Pavement Markings				
<ul style="list-style-type: none"> Crosswalks are faded in areas and should be made more visible. 	<ul style="list-style-type: none"> Repaint crosswalks and upgrade to continental style. 			

<u>INTERSECTION ISSUES</u>	<u>Solution</u>	<u>Decision Agree/Reject</u>	<u>Planned Completion Date</u>	<u>Comments</u>
<p>Intersection Design</p> <ul style="list-style-type: none"> • Intersection is skewed and buildings intrude on the sight distances for turning traffic – compromise crosswalk. • Intersection is currently congested and expected to become more congested with the pending elimination of the Marlton Circle. 	<ul style="list-style-type: none"> • Signal timing changes: <ul style="list-style-type: none"> • Add protected/permissive left-turn phase for all approaches and retime the signal to accommodate volumes. Possible strategy – Add northbound and eastbound left-turn phases (for northbound Maple Avenue a 3 to 5 seconds left turn phase; for eastbound Main Street a 3 to 12 seconds left-turn phase); following the termination of the northbound lead left allow the southbound thru to be initiated while the southbound left-turn continues; Establish a “No turn on Red”; install a NTOR blank out sign or create an overlap for the westbound right-turn to run simultaneously with the southbound protected left-turn phase. 			

<u>INTERSECTION ISSUES</u>	<u>Solution</u>	<u>Decision Agree/Reject</u>	<u>Planned Completion Date</u>	<u>Comments</u>
Intersection Design (continued)				
<ul style="list-style-type: none"> • Driveways are too close to the intersection. Left-turns from these driveways are potentially unsafe considering they are crossing multiple lanes of traffic. From the collision diagram there are a number of crashes associated with the 7-11 convenience store driveways. 	<ul style="list-style-type: none"> • Install pedestrian countdown signals on all of the approaches. • Install a pedestrian lead prior to the initiation of the Maple Avenue Right of Way. • Install backplates on the Main Street traffic heads. <p>Consider an additional approach lane for northbound Maple at NJ 70 to improve operation of both intersections.</p>			
<ul style="list-style-type: none"> • Driveways are too close to the intersection. Left-turns from these driveways are potentially unsafe considering they are crossing multiple lanes of traffic. From the collision diagram there are a number of crashes associated with the 7-11 convenience store driveways. 	<ul style="list-style-type: none"> • Prohibit left-turns from the 7-11 driveways on Maple Avenue and Main Street. <p><u>NJDOT approval of a local ordinance and county resolution will be required prior to the implementation of the prohibitions.</u></p> <p>In the longer term, modify the driveway for right-turns only.</p>			
Bicyclists				
<ul style="list-style-type: none"> • There are no bicycle amenities at the intersection or in the vicinity. 	<ul style="list-style-type: none"> • Install “Share the Road” signs on the roadways leading to the intersection. 			

<u>INTERSECTION ISSUES</u>	<u>Solution</u>	<u>Decision</u> Agree/Reject	<u>Planned</u> Completion Date	<u>Comments</u>
<p>Transit</p> <ul style="list-style-type: none"> NJ Transit bus serves this intersection, stops are not indicated. 	<ul style="list-style-type: none"> Sign existing bus stops for the information of the motorists and the safety of the passengers getting on or off the buses. 			

Title of Report: ***INTERSECTION ROAD SAFETY AUDIT – MAPLE AVENUE & MAIN STREET, EVESHAM TOWNSHIP***

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Geographic Area Covered:

The study area consists of the signalized intersection of East Main Street (CR 620) and Maple Avenue (CR 607) and vicinity in Evesham Township, New Jersey.

Key Words:

Road, safety, audit, potential, fatalities, injuries, reportable, crashes, issues, strategies, coordination, engineering, enforcement, education, stakeholders, prioritize, intersection, speed limit, traffic volumes, stakeholders, audit team, breakaway, geometry, pavement markings, signs, traffic signals, crosswalk, sidewalk, curb ramp.

ABSTRACT: This is a documentation of the process and findings of the Maple Avenue (CR 607) and Main Street (CR 620) Intersection Road Safety Audit (RSA) undertaken by Delaware Valley Regional Planning Commission (DVRPC). The goal of the audit is to generate improvement recommendations and countermeasures for intersections demonstrating a history of, or potential for a high incidence of motor vehicle crashes. The emphasis is placed on identifying low cost, quick turnaround safety projects to address the issues where possible. This project represents a step towards implementation of the Delaware Valley Regional Planning Commission (DVRPC) Regional Safety Action Plan. Improving the design and operation of intersections is a priority area for both engineering and enforcement discipline as documented in the Plan. Improvement strategies may be eligible for Local Federal Safety Funds for implementation. The report details safety issues identified by the audit team at the study location and remedial strategies to address them.

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