EVALUATION OF HIGH CRASH LOCATIONS (DARK CRITERIA) STUDY

LOCATION #4:
US ROUTE 9
MILEPOST 8.90 to 10.39
November 2012

Prepared for:
Delaware Department of Transportation

By:
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EXECUTIVE SUMMARY

The Hazard Elimination Program (HEP) site selection process was used to determine ten (10) roadway segments within the state of Delaware that meet the following crash history criteria:

- Dark crash Critical Ratio greater than one (1); and
- Ten (10) or more accidents occurring in the three (3) year study period within a one (1) mile roadway segment.

The evaluation and recommendations for US 9 (County Seat Highway, Sussex Road 28), beginning at Milepost 8.90, approximately 0.85 miles south of Old Furnace Road (Sussex Road 46) / Whaleys Corner Road (Sussex Road 329) at the Sussex County Technical School, and ending at Milepost 10.39, approximately 0.64 miles north of Old Furnace Road / Whaleys Corner Road in Sussex County, Delaware, are included in this report. This report includes the following tasks:

- Reviewed crash history;
- Reviewed existing conditions;
- Identified specific sites where crashes are occurring; and
- Provided recommendations to improve conditions.

Police crash reports were analyzed to identify high crash sites along US Route 9 from Milepost 8.90 to 10.39. The crash patterns at one (1) site, US Route 9 and Old Furnace Road (Sussex Road 46) / Whaleys Corner Road (Sussex Road 329) intersection, garnered evaluation for potential nighttime safety improvements.

The study concluded that roadway lighting was not recommended for the US Route 9 and Old Furnace Road / Whaleys Corner Road intersection. However, other non-lighting improvements were recommended including trimming tree branches for a guide sign, restriping a stop bar and lane markings, and patching a pavement breach at the intersection.

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1. INTRODUCTION

The purpose of this study was to evaluate locations with the highest ratios of crashes occurring during dark conditions throughout the state of Delaware. The study included reviewing crash history and existing conditions of the locations, identifying specific sites where crashes are occurring and providing recommendations to improve conditions.

The study included three parts:

Part 1: Location Selection – The Hazard Elimination Program (HEP) site selection process was used to determine ten (10) locations statewide with a dark crashes Critical Ratio greater than one and ten (10) or more crashes occurring in the three year study period within a one-mile roadway segment. Results from the location selection process were reviewed in coordination with DelDOT. Corridors that were already part of an ongoing HSIP or HEP project were not included in this study. The Critical Ratio methodology was used in the location selection process. The list of statewide 1.0 mile corridors ranked by Critical Ratio is included in **Appendix D**.

Part 2: Evaluation – After the list of the top ten locations was approved by DelDOT, initial review was performed for each selected location. The evaluation included field visits to the sites; collecting information on existing roadway and traffic conditions; crash analysis; preliminary lighting evaluation; and this report. The report includes existing lighting analysis; concept lighting improvement alternatives; other signing, striping and signal recommendations in accordance with the Delaware Strategic Highway Safety Plan (SHSP), particularly related to dark crashes; potential design/implementation issues, and identification of the need for more detailed studies (Phase II studies).

Part 3: Coordination – When possible, DelDOT-approved recommendations will be coordinated for inclusion into the construction of ongoing projects. (HEP, Pavement & Rehabilitation, PD, etc.)

The location selection process resulted in a list of ten locations, including US 9 (County Seat Highway, Sussex Road 28) from milepost 8.90 to 10.39.

Study Area Characteristics

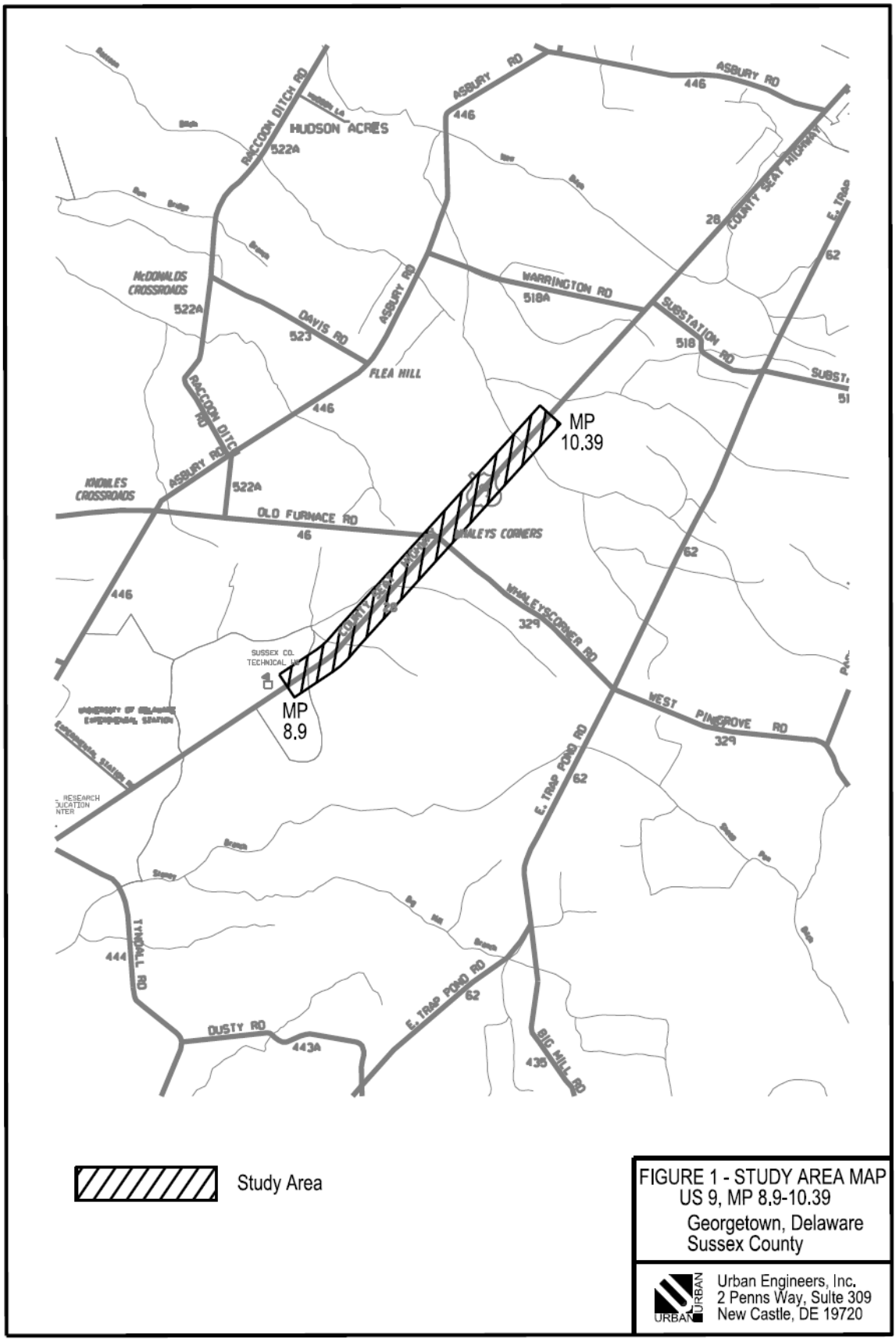
The study area includes US 9 (County Seat Highway, Sussex Road 28), beginning at Milepost 8.90, approximately 0.85 miles south of Old Furnace Road (Sussex Road 46) / Whaleys Corner Road (Sussex Road 329) at the Sussex County Technical School, and ending at Milepost 10.39, approximately 0.64 miles north of Old Furnace Road / Whaleys Corner Road in Sussex County, Delaware, are included in this report.

In the vicinity of the site, US Route 9 is an undivided, two-lane roadway. The posted speed limit is 50 miles-per-hour. The road is classified as a minor arterial roadway throughout the project area. The road experienced ADTs of 6,170 vehicles west of Old Furnace Road / Whaleys Corner Road and 10,250 vehicles east of Old Furnace Road / Whaleys Corner Road in 2011.

There is a shoulder along US Route 9 throughout the project area except near the US Route 9 and Old Furnace Road / Whaleys Corner Road signalized intersection.

Raised pavement markers are present on US Route 9 throughout the project area.

A study area map is provided in **Figure 1**.


HUDSON ACRES
522A
RACCOON DITCH RD
ASBURY RD
446
ASBURY RD
COUNTY SEAT HIGHWAY
28
McDONALDS CROSSROADS
522A
DAVIS RD
523
ASBURY RD
WARRINGTON RD
518A
SUBSTATION RD
518
FLEA HILL
RACCOON DITCH RD
446
MP 10.39
KNOBLES CROSSROADS
ASBURY RD
522A
OLD FURNACE RD
46
WHALEYS CORNER
446
WHALEYSCORNER RD
329
SUSSEX CO. TECHNICAL HS
MP 8.9
WEST PINEGROVE RD
329
E. TRAP POND RD
62
RESEARCH EDUCATION CENTER
TYNDALL RD
444
DUSTY RD
443A
E. TRAP POND RD
62
BIG MILL RD
439
Study Area
FIGURE 1 - STUDY AREA MAP
US 9, MP 8.9-10.39
Georgetown, Delaware
Sussex County
URBAN
Urban Engineers, Inc.
2 Penns Way, Sulte 309
New Castle, DE 19720

2. CRASH DATA SUMMARY AND ANALYSIS

Police crash reports were analyzed to identify high crash sites along US Route 9 from Milepost 8.90 to 10.39. This evaluation was based on crash data during the three year period from May 16, 2008 to May 16, 2011.

A total of forty-five (45) crashes occurred along US Route 9 from Milepost 8.90 to 10.39 during the evaluation period. Eleven (11) of the crashes resulted in personal injuries (24%). Rear-end collisions made up 19 of the 45 crashes (42%). Run-off-the-road collisions with fixed objects made up 12 of the 45 crashes (27%).

Of the 45 crashes, 12 (27%) occurred during dark conditions.

Appendix A shows the crash data summary.

The crash patterns at the following site garnered evaluation for potential nighttime safety improvements

- US Route 9 between Milepost 9.55 and 9.88, which includes the US Route 9 and Old Furnace Road / Whaleys Corner Road intersection.

Appendix B shows the crash diagram for this roadway segment.

There were no other crash patterns identified within this roadway segment.

Site #1: US Route 9 (MP 9.55 to 9.88)

There were thirty-one (31) total crashes along US Route 9 between Milepost 9.55 and 9.88. Eight (8) of these thirty-one (31) crashes (26%) occurred during dark conditions.

Of the thirty-one (31) crashes along this roadway segment, eighteen (18) occurred at the US Route 9 and Old Furnace Road / Whaleys Corner Road intersection. Therefore, the intersection was selected for further evaluation due to the high frequency of crashes.

3. SITE CHARACTERISTICS

An initial field visit was conducted to collect information on existing conditions including: roadway geometry, signage, striping, signal poles locations, and utility pole locations.

Site #1: US Route 9 (County Seat Highway) @ Old Furnace Road (Sussex Road 46) / Whaleys Corner Road (Sussex Road 329) Intersection (M.P. 9.75)

US Route 9 and Old Furnace Road / Whaleys Corner Road intersection is located at Milepost 9.75 of US Route 9. The intersection is signalized and there is no existing street lighting. There is a span wire pole on both the southeast corner and the north-west corner. The eastbound approach along US Route 9 has one (1) shared through-left-right lane with a shoulder. The westbound approach has one (1) shared through-left lane and one (1) right-turn lane without a shoulder. The northbound approach along Whaleys Corner Road has one (1) shared through-left-right lane without a shoulder. The southbound approach along Old Furnace Road has one (1) shared through/left-right lane without a shoulder. There are no raised curbs at the intersection. There is no existing sidewalk or crosswalk at the intersection.

There is a parking area located on the northwest corner; access is not limited. There are three (3) residential driveways near the intersection:

- One (1) approximately one-hundred (100) feet south of the intersection along northbound Whaleys Corner Road;
- Two (2) approximately one-hundred (100) feet east of the intersection along eastbound US Route 9; and
- One (1) approximately one-hundred (100) feet west of the intersection along eastbound US Route 9.

Photo 1: Facing East on US Route 9 approaching Old Furnace Road / Whaleys Corner Road

Photo 2: Facing West on US Route 9 approaching Old Furnace Road / Whaleys Corner Road

Photo 1 and **Photo 2** show the eastbound and westbound approaches along US Route 9.

Photo 3: US Route 9 (County Seat Highway) @ Old Furnace Road / Whaleys Corner Road Intersection

Photo 3 shows the parking area and driveways near the intersection mentioned above.

4. LIGHTING WARRANT EVALUATION

The DelDOT Lighting Guidelines contain the conditions for determining if lighting is warranted at a given site. A warrant analysis for the US Route 9 and Old Furnace Road / Whaleys Corner Road intersection is included below.

Site #1: US Route 9 at Old Furnace Road / Whaleys Corner Road (MP 9.75)

Section 2.3, *Lighting Warrants*, of the DelDOT Lighting Guidelines states that lighting may be installed at "locations where crash patterns indicate that lighting may reduce crashes and where the percentage of nighttime accidents is 35 percent or greater."

Crash Patterns

The Crash Data Summary and Evaluation showed that there were eighteen (18) total crashes at the Old Furnace Road / Whaleys Corner Road intersection during the three (3) year evaluation period. Three (3) of these crashes (17%) occurred during dark conditions.

The following list shows the circumstances surrounding each dark crash at the intersection:

- Vehicle traveling west along US Route 9 sideswiped vehicle traveling in the same direction on westbound US Route 9
- Vehicle traveling eastbound along US Route 9 turning left collides with vehicle traveling through the intersection westbound along US Route 9
- Vehicle weaving through traffic sideswiped vehicle traveling in the same direction before hitting another vehicle on eastbound US Route 9

Percentage of Nighttime Accidents

Seventeen (17) percent of the crashes at the site occurred during dark conditions. The crash history at this intersection does not meet the conditions for a location where lighting "may be installed," as per Section 2.3 of the DelDOT Lighting Guidelines.

Lighting Warrant Results

Intersection lighting is not warranted based on the vehicle crash history.

5. PREVIOUS STUDIES RECOMMENDATIONS

Previous roadway studies have been completed by DelDOT for the US Route 9 and Old Furnace Road/Whaleys Corner Road intersection. The following list shows the site name and date of the previous studies:

- Site K Dated 2000 (No recommendations were presented in this study)
- Site H Task I and Task II Dated 2007

Site H Task I and Task II Dated 2007 Intersection Recommendations

IMPLEMENTED	Replace damaged Street Name Sign for Old Furnace Road posted on the north-east corner of the intersection.
IMPLEMENTED	Extend the stop line through the right-turn lane located on the westbound US Route 9 approach.
IMPLEMENTED	Eliminate the passing zones (install double yellow centerline) along US Route 9 within 200-feet of the intersection.
IMPLEMENTED	Install supplemental name plates with the Signal Ahead signs on the eastbound and westbound US Route 9 approaches.

6. RECOMMENDED IMPROVEMENTS AND PROJECT COORDINATION

Recommendations are included below, and recommended improvements are summarized in the following table.

Based on the crash history and existing conditions it is recommended not to implement lighting at the US Route 9 and Old Furnace Road / Whaleys Corner Road signalized intersection.

Site #1: US Route 9 @ Old Furnace Road / Whaleys Corner Road Intersection (M.P. 9.75)

Roadway Lighting

Since lighting is not warranted based on crash history, and there are no plans for any new residential or commercial developments in close proximity to the intersection, roadway lighting is not recommended.

Other Improvements

During the field visit it was realized that there are some existing conditions that could be improved near the intersection with low costs. The possible improvements are recommended as follows.

Trim tree branches covering the guide sign on the southbound Old Furnace Road approach at the intersection. **Photo 4** shows the existing condition of the sign view from driver eyes' height.

Restripe a stop bar and lane markings on the southbound approach at the intersection. Photo 5 shows the existing stop bar and lane striping conditions on the southbound Furnace Road approach to the intersection.

Patch the pavement breach on the edge of the eastbound US Route 9 approach to the intersection. **Photo 6a** and **Photo 6b** show the existing condition of the pavement breach.

Recommended Improvements

Site	Recommended Improvement
#1. US 9 @ Old Furnace Rd / Whaley's Corner Rd Intersection (MP 9.75)	Trim tree branches covering the guide sign on the southbound Old Furnace Road approach at the intersection.
	Restripe a stop bar and lane markings on the southbound Furnace Road approach at the intersection.
	Patch the pavement breach on the edge of the eastbound US Route 9 approach to the intersection.

Photo 4: The Guide Sign Covered by Tree Branches on the Southbound Old Furnace Road Approach at US Route 9

Photo 5: Existing Stop Bar and Lane Striping on Southbound Old Furnace Road Approach at US Route 9

Photo 6a: A Pavement Breach on the Eastbound US Route 9 Approach at Old Furnace Road / Whaleys Corner Road (Looking North)

Photo 6b: A Pavement Breach on the Eastbound US Route 9 Approach at Old Furnace Road / Whaleys Corner Road (Looking East)

APPENDIX A: Crash Data Summary

Delaware Crash Analysis Reporting System (CARS)

Crash Study Time Period: *Study Period from 05-16-2008 to 05-16-2011*
Query Type: *roadBuffer*
Description: *S28 US 9 County Seat Highway*
MP 8.90-10.39

Study Requested By: LD
Study Generated By: tdtsswn
Number of Crashes: 45
Includes Non-Reportable Crashes: N
Study Code:

State of Delaware Crash Study Summary

Study Period from 05-16-2008 to 05-16-2011

Summary	
	# of Crashes
Total Crashes	45
Fatal Crashes	0
Total Alcohol-Related Crashes	3
Total Non Alcohol-Related Crashes	42
Total Fatalities	0
Total Pedestrian Fatalities	0
Total Pedestrian Injuries	0
Total Pedestrian Crashes	0
Total Motorcycle Crashes	0
Total Pedalcyclist Crashes	0

Classification		
	# of Crashes	**% of Total Crashes**
Non-Reportable	0	0.00%
Reportable	34	75.56%
Personal Injury	11	24.44%
Fatality	0	0.00%
Total	45	

Manner Of Impact		
	# of Crashes	**% of Total Crashes**
Front to rear	19	42.22%
Front to front	2	4.44%
Angle	8	17.78%
Sideswipe, same direction	2	4.44%
Sideswipe, opposite direction	0	0.00%
Rear to side	0	0.00%
Rear to rear	0	0.00%
Other	2	4.44%
Unknown	0	0.00%
Not a collision between two vehicles	12	26.67%
Total	45	

Alcohol Related Crashes by Classification					
	Non-reportable	Reportable	Personal Injury	Fatality	**Total**
Alcohol Related	0	1	2	0	3
Non-Alcohol Related	0	33	9	0	42
Total	0	34	11	0	45

Manner of Impact By Classification					
	Non-Reportable	Reportable	Personal Injury	Fatality	**Total**
Front to rear	0	15	4	0	19
Front to front	0	1	1	0	2
Angle	0	6	2	0	8
Sideswipe, same direction	0	1	1	0	2
Sideswipe, opposite direction	0	0	0	0	0
Rear to side	0	0	0	0	0
Rear to rear	0	0	0	0	0
Other	0	2	0	0	2
Unknown	0	0	0	0	0
Not a collision between two vehicles	0	9	3	0	12
Total	0	34	11	0	45

Day Of Week		
	# of Crashes	% of Total Crashes
Sunday	5	11.11%
Monday	7	15.56%
Tuesday	6	13.33%
Wednesday	6	13.33%
Thursday	8	17.78%
Friday	11	24.44%
Saturday	2	4.44%
Total	45	

Time Of Day (AM)		
	# of Crashes	% of Total Crashes
00:00 - 00:59	0	0.00%
01:00 - 01:59	0	0.00%
02:00 - 02:59	2	4.44%
03:00 - 03:59	0	0.00%
04:00 - 04:59	0	0.00%
05:00 - 05:59	1	2.22%
06:00 - 06:59	0	0.00%
07:00 - 07:59	5	11.11%
08:00 - 08:59	7	15.56%
09:00 - 09:59	1	2.22%
10:00 - 10:59	0	0.00%
11:00 - 11:59	2	4.44%
Total	18	

Time Of Day (PM)		
	# of Crashes	% of Total Crashes
12:00 - 12:59	3	6.67%
13:00 - 13:59	1	2.22%
14:00 - 14:59	1	2.22%
15:00 - 15:59	11	24.44%
16:00 - 16:59	2	4.44%
17:00 - 17:59	1	2.22%
18:00 - 18:59	0	0.00%
19:00 - 19:59	3	6.67%
20:00 - 20:59	1	2.22%
21:00 - 21:59	2	4.44%
22:00 - 22:59	0	0.00%
23:00 - 23:59	2	4.44%
Total	27	
Unknown Time	0	

Surface Conditions		
	# of Crashes	% of Total Crashes
Dry	19	42.22%
Wet	22	48.89%
Snow	1	2.22%
Ice/Frost	3	6.67%
Sand	0	0.00%
Water (standing,mo	0	0.00%
Slush	0	0.00%
Oil	0	0.00%
Mud, Dirt, Gravel	0	0.00%
Other	0	0.00%
Unknown	0	0.00%
Total	45	

Lighting Conditions		
	# of Crashes	% of Total Crashes
Daylight	31	68.89%
Dawn	0	0.00%
Dusk	1	2.22%
Dark-Lighted	1	2.22%
Dark-Not Lighted	12	26.67%
Dark-Unknown Lighting	0	0.00%
Other	0	0.00%
Unknown	0	0.00%
Total	45	

Weather Conditions		
	# of Crashes	% of Total Crashes
Clear	21	46.67%
Cloudy	1	2.22%
Fog, Smog, Smoke	0	0.00%
Rain	21	46.67%
Sleet, Hail (freezing rain or drizzle)	0	0.00%
Snow	2	4.44%
Blowing Snow	0	0.00%
Severe Crosswinds	0	0.00%
Blowing Sand, Soil, Dirt	0	0.00%
Other	0	0.00%
Unknown	0	0.00%
Total	45	

First Harmful Event		
	# of Crashes	% of Total Crashes
Overturn/Rollover, Non-Collision	1	2.22%
Fire/Explosion, Non-Collision	0	0.00%
Immersion, Non-Collision	0	0.00%
Jackknife, Non-Collision	0	0.00%
Cargo/Equipment Loss or Shift, Non-Collision	0	0.00%
Fell/Jumped From Motor Vehicle, Non-Collision	0	0.00%
Thrown or Falling Object, Non-Collision	0	0.00%
Other Non-Collision, Non-Collision	0	0.00%
Pedestrian, Collision With Person, Motor Vehicle, or Non-Fixed Object	0	0.00%
Pedalcycle, Collision With Person, Motor Vehicle, or Non-Fixed Object	0	0.00%
Railway Vehicle (train, engine), Collision With Person, Motor Vehicle, or Non-Fixed Object	0	0.00%
Animal, Collision With Person, Motor Vehicle, or Non-Fixed Object	0	0.00%
Motor Vehicle in Transport, Collision With Person, Motor Vehicle, or Non-Fixed Object	29	64.44%
Legally Parked Motor Vehicle, Collision With Person, Motor Vehicle, or Non-Fixed Object	1	2.22%
Struck by Falling, Shifting Cargo or Anything Set in Motion by Motor Vehicle, Collision With Person, Motor Vehicle, or Non-Fixed Object	0	0.00%
Work Zone / Maintenance Equipment, Collision With Person, Motor Vehicle, or Non-Fixed Object	0	0.00%
Other Non-Fixed Object, Collision With Person, Motor Vehicle, or Non-Fixed Object	1	2.22%
Impact Attenuator/Crash Cushion, Collision With Fixed Object	0	0.00%
Bridge Overhead Structure, Collision With Fixed Object	0	0.00%
Bridge Pier or Support, Collision With Fixed Object	0	0.00%
Bridge Rail, Collision With Fixed Object	0	0.00%
Cable Barrier, Collision With Fixed Object	0	0.00%
Culvert, Collision With Fixed Object	0	0.00%
Curb, Collision With Fixed Object	0	0.00%
Ditch, Collision With Fixed Object	4	8.89%
Embankment, Collision With Fixed Object	5	11.11%

Guardrail Face, Collision With Fixed Object	0	0.00%
Guardrail End, Collision With Fixed Object	0	0.00%
Concrete Traffic Barrier, Collision With Fixed Object	0	0.00%
Other Traffic Barrier, Collision With Fixed Object	0	0.00%
Tree (standing), Collision With Fixed Object	0	0.00%
Utility Pole, Collision With Fixed Object	2	4.44%
Light Support, Collision With Fixed Object	0	0.00%
Traffic Sign Support, Collision With Fixed Object	0	0.00%
Overhead Sign Support, Collision With Fixed Object	0	0.00%
Traffic Signal Support, Collision With Fixed Object	0	0.00%
Fence, Collision With Fixed Object	0	0.00%
Mailbox, Collision With Fixed Object	0	0.00%
Other Post, Pole or Support, Collision With Fixed Object	0	0.00%
Other Fixed Object (wall, building, tunnel, etc.), Collision With Fixed Object	1	2.22%
Illegally Parked Motor Vehicle, Collision with person, vehicle, or object not fixed	0	0.00%
Stopped Motor Vehicle, Collision with person, vehicle, or object not fixed	0	0.00%
Unknown, Collision With Fixed Object	1	2.22%
Total	45	

Primary Contributing Circumstance		
	# of Crashes	**% of Total Crashes**
Speeding	0	0.00%
Failed to yield right of way	0	0.00%
Passed Stop Sign	0	0.00%
Disregard Traffic Signal	0	0.00%
Wrong side or wrong way	0	0.00%
Improper passing	0	0.00%
Improper lane change	0	0.00%
Following too close	2	4.44%
Made improper turn	2	4.44%
Driving under the influence	1	2.22%
Driver inattention, distraction, or fatigue	0	0.00%
Driving in a careless or reckless manner	3	6.67%
Driving in an aggressive manner	0	0.00%
Improper backing	0	0.00%
Other improper driving	0	0.00%
Mechanical defects	0	0.00%
Animal in Roadway - Deer	0	0.00%
Animal in Roadway - Other Animal	0	0.00%
Other environmental circumstances - weather, glare	1	2.22%
Roadway circumstances - debris, holes, work zone	0	0.00%
Other	0	0.00%
Unknown	1	2.22%
Total	10	

Driver Contributing Circumstance		
	# of Drivers	**% of Total Drivers**
No Contributing Action		0.00%
Failed to yield right of way		0.00%
Ran Red Light		0.00%
Ran Stop Sign		0.00%
Disregard other traffic sign		0.00%
Disregard other road markings		0.00%
Exceeded authorized speed limit		0.00%
Driving too fast for conditions		20.00%
Made an improper turn		20.00%
Improper backing		10.00%
Wrong side or wrong way		0.00%
Followed too closely		30.00%
Failure to keep in proper lane		0.00%
Ran off roadway		0.00%
Operating vehicle in erratic, reckless, careless, negligent or aggressive manner		0.00%
Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway, etc.		0.00%
Over-correcting/over-steering		0.00%
Improper Passing		0.00%
Other Contributing Action		10.00%
Unknown		10.00%
Total		

CTY	RD	MP	C-MP	DIR	COMP/HQ#	Date	Time	Day	Fat	Inj	AL	LC	WC	SC	FHE	PC	Class	MOI
2008																		
S	329	0	0	5	0408051721	10/22/08	0805	4	0	0	N	01	01	01	13		02	03
S	329	0	0	5	0408059399	12/8/08	1925	2	0	0	N	05	01	01	13		03	04
S	28	8.97	8.97	5	0408042197	8/28/08	1407	5	0	0	N	01	04	02	13		02	01
S	28	9.41	9.41	5	0408048650	10/3/08	2150	6	0	0	N	05	01	01	13		02	01
S	28	9.55	9.55	5	0408062504	12/28/08	1100	1	0	0	Y	01	01	01	26		03	00
S	28	9.86	9.86	5	0408059993	12/12/08	0727	6	0	0	N	01	04	02	13		02	03
S	329	0	0	5	0408058238	12/1/08	1525	2	0	0	N	01	01	01	13		03	01
S	28	9.75	9.75	5	0408046021	9/18/08	1520	5	0	0	N	01	01	01	13		02	01
S	28	9.86	9.86	5	0408055629	11/14/08	2345	6	0	0	Y	05	04	02	26		03	00
S	28	10	10	5	0408055367	11/13/08	1520	5	0	0	N	01	04	02	26		02	00
S	28	10.0	10.01	5	0408052339	10/25/08	1920	7	0	0	N	05	04	02	13		02	01
S	28	9.62	9.62	5	0408049755	10/10/08	1606	6	0	0	N	01	01	01	13		02	03
S	28	9.11	9.11	5	0408048648	10/3/08	2141	6	0	0	N	05	01	01	13		02	01
S	28	9.93	9.93	5	0408055370	11/13/08	1517	5	0	0	N	01	04	02	13		02	04
S	28	9.75	9.75	5	0408059646	12/10/08	0758	4	0	0	N	01	04	02	13		03	02
2009																		
S	28	9.72	9.72	5	0409044015	9/1/09	1520	3	0	0	N	01	01	01	13		03	01
S	28	9.68	9.68	5	0409044016	9/1/09	1520	3	0	0	N	01	01	01	14		02	01
S	28	9.72	9.72	5	0409016297	4/12/09	0232	1	0	2	N	05	01	01	13		03	01
S	28	9.67	9.67	5	0409008468	2/24/09	0838	3	0	1	N	01	01	01	13		03	01
S	329	0	0	5	0409001032	1/7/09	0802	4	0	0	N	01	04	02	13		02	01
S	28	10.2	10.2	5	0409006222	2/9/09	1242	2	0	0	N	01	01	01	13		02	01
S	329	0	0	5	0409014103	3/29/09	2048	1	0	0	N	05	01	01	13		02	03
S	28	9.18	9.18	5	0409063840	12/22/09	1918	3	0	0	N	05	01	01	32		02	00
S	28	9.83	9.83	5	0409052122	10/16/09	1519	6	0	0	N	01	04	02	26		02	00
S	28	9.6	9.6	5	0409026194	6/5/09	1149	6	0	0	N	01	04	02	26		03	00
S	28	9.69	9.69	5	0409018056	4/22/09	1510	4	0	0	N	01	04	02	13		02	01
S	28	9.85	9.85	5	0409013816	3/28/09	0230	7	0	0	N	05	04	02	99		02	00
S	28	9.8	9.8	5	0409013485	3/26/09	0820	5	0	0	N	01	04	02	13		02	01
S	28	9.67	9.67	5	0409057427	11/15/09	2330	1	0	0	N	05	04	02	01		02	00
S	28	9.77	9.77	5	0409046906	9/16/09	0710	4	0	0	N	01	04	02	40		02	00
S	28	9.98	9.98	5	0409045442	9/8/09	0815	3	0	0	N	01	04	02	13		02	01
S	28	9.68	9.68	5	0409059968	11/30/09	1516	2	0	0	N	01	01	02	13		02	00
S	28	9.88	9.88	5	0409058819	11/23/09	1712	2	0	0	N	05	04	02	32		02	00
S	28	9.15	9.15	5	0409048452	9/25/09	0812	6	0	0	N	01	04	02	13		02	03
S	329	0	0	5	0409061655	12/10/09	1519	5	0	0	N	01	01	01	17		02	00
2010																		
S	00028	9.84			0410001139	1/8/10	0530	6	0	0	N	05	06 -	03	25	12	02	88
S	00028	9.79	9.79	3	0410053924	10/14/10	1215	5	0	0	N	01	04 -	02	13	12	02	01
S	00028	9.55			0410001162	1/8/10	0748	6	0	0	N	04	06 -	04	25	99	02	02
S	00028	9.79	9.79	3	0410054517	10/17/10	1619	1	0	0	Y	01	01 -	01	13	10	02	01

CTY	RD	MP	C-MP	DIR	COMP/HQ#	Date	Time	Day	Fat	Inj	AL	LC	WC	SC	FHE	PC	Class	MOI
2010																		
S	00028	9.17	9.17	3	0410054805	10/19/10	1300	3	0	1	N	01	02 -	01	13	09	03	03

CTY	RD	MP	C-MP	DIR	COMP/HQ#	Date	Time	Day	Fat	Inj	AL	LC	WC	SC	FHE	PC	Class	MOI
2010																		
S	00028	9.74			0410004405	1/28/10	1202	5	0	0	N	01	01 -	01	13	09	02	03
2011																		
S	00046	10.6	10.60	3	0411014149	4/1/11	0904	6	0	0	N	01	04 -	02	13	08	02	01
S	00028	9.53	9.53	3	0411001449	1/10/11	0745	2	0	0	N	01	01 -	04	25	12	02	88
S	00028	9.53	9.53	3	0411001456	1/10/11	0827	2	0	1	N	01	01 -	04	25	19	03	03
S	On COU	9.73	9.73	3	0411003948	1/26/11	1527	4	0	0	N	03	04 -	02	13	08	02	01

Report generated by tdtsswn at 2011-05-23 06:40:12.185

Report Legend

- **Cty - County**
- **Rd - Maintenance Road**
- **MP - Milepoint**
- **C-MP - Continuous Milepoint**
- **DIr - Direction of Highway**
- **COMP/HQ# - Complaint Number/Headquarters Number**
- **DAY - Day Of Week Code**
- **Fat - Fatality**
- **Inj - Injury**
- **AL - Alcohol Involved**
- **LC - Lighting Condition**
- **WC - Weather Condition**
- **SC - Surface Condition**
- **MHE - Most Harmful Event**
- **PC - Primary Contributing Circumstance**
- **Class - Report Classification**
- **MOI - Manner of Impact**

APPENDIX B: Crash Diagrams

Site #1: US Route 9 @ Old Furnace Road / Whaleys Corner Road Intersection

Total Number of Crashes = 17

Driveway

Old Furnace Road

PARKING AREA: NO RAISED CURBS, ACCESS IS NOT LIMITED

N

Not To Scale

U.S. Route 9

Driveway

Whaleys Corner Road

Driveway

LEGEND:

- Number of Daylight Conditions Crashes
- Number of Dark Conditions Crashes
- Hit Fixed Object
- Angle
- Rear End

Crash Diagram

Site #1: U.S. Route 9 at
Old Furnace Road / Whaleys Corner Road
May 2008 to May 2011
Location #4: U.S. 9, MP 8.90 - 10.39
Evaluation of High Crash Locations
(Dark Criteria) Study

Urban Engineers, Inc.
2 Penns Way, Suite 309
New Castle, DE 19720

APPENDIX C: Previous Studies

2000 HSIP – Site K Report
2007 HSIP – Site H Report

INTRODUCTION

Site K is a 0.89-mile corridor located southwest of Georgetown along U.S. 9/County Seat Highway (S28) from 1.23 miles east of Road 446B to 0.82 miles west of Road 518A. U.S. 9 is a two-lane, undivided, open-section roadway with shoulders. The posted speed limit on U.S. 9 is 50 miles per hour. Within the limits of the site there is one unsignalized intersection at S46/S329.

ACCIDENT DATA SUMMARIES

A total of twenty-five accidents were reported during the three-year study period between January 1996 and December 1998. Twelve accidents occurred at the U.S. 9/S46 intersection including eight angle accidents, two northbound rear end accidents and one northbound left-turn accident. Of the eight angle accidents, five involved eastbound S46 vehicles and three involved westbound S46 vehicles. Seven of the eleven accidents resulted in injuries.

The following is a categorical summary of the accidents:

TABLE 1
Accident Data Summary

Accident Severity		**Year**		**Collision Type**		**Surface**		**Lighting**	
Injury	10 (40%)	1996	6 (24%)	Rear End	3 (12%)	Dry	20 (80%)	Daylight	16 (64%)
PDO	15 (60%)	1997	8 (32%)	Angle	13 (52%)	Wet	2 (8%)	Dark/Unlit	6 (24%)
		1998	11 (44%)	Other	9 (36%)	Snowy	2 (8%)	Dawn/Dusk	3 (12%)
						Unknown	1(4%)		
Total	25		25		25		25		25

Primary Cause				
Speed too fast – 2 (8%)	Fail to yield R-O-W – 1 (4%)	Pass Stop sign – 8 (32%)	Improper passing – 2 (8%)	Following too closely – 1 (4%)
Made improper turn – 1 (4%)	Driving under influence – 1 (4%)	Inattentive – 2 (8%)	Careless driving – 3 (12%)	Unknown – 2 (8%)
Other – 2 (8%)				

FIELD OBSERVATIONS

U.S. 9/S46/S329 Intersection

- No significant queuing or delay was observed during the morning or evening peak periods. Northbound and southbound through and right-turning vehicles were observed using the shoulder to bypass stopped left-turning vehicles.

- Stop signs on the eastbound S46 approach are located on both sides of the roadway. The stop sign on the right side of the road is set back from the intersection in advance of the Banks Sporting Goods parking lot.

- No stop bars are provided on the eastbound or westbound approaches to U.S. 9.

- "Stop Ahead" signs exists on both the eastbound and westbound S46/S329 approaches to U.S. 9. The Stop Ahead sign on the eastbound approach is faded and in poor condition and is posted in a ditch, partially blocked by tree branches.

- A wooden fence has recently been installed in the Banks Sporting Goods parking lot on the southwest corner of the intersection, likely to prohibit eastbound right-turning motorists from cutting through the parking lot to head southbound on U.S. 9

- Passing is permitted on U.S. 9 throughout the corridor.

- Motorists on the eastbound and westbound S46/S329 approaches have adequate corner sight distance looking northbound and southbound on U.S. 9.

ADDITIONAL STUDIES

Based on conversations with DelDOT Traffic, a signal is planned at the U.S. 9 @ S46/S329 intersection; therefore, the HSIP committee recommended no further studies.

Photo 1: Eastbound S46/S329 approach to Route 9

Photo 2: Westbound S329/S46 approach to Route 9

Photo 3: Southbound Route 9 approach to S46

Photo 4: Northbound Route 9 approach to S46

Photo 5: Eastbound S46 approaching U.S. 9

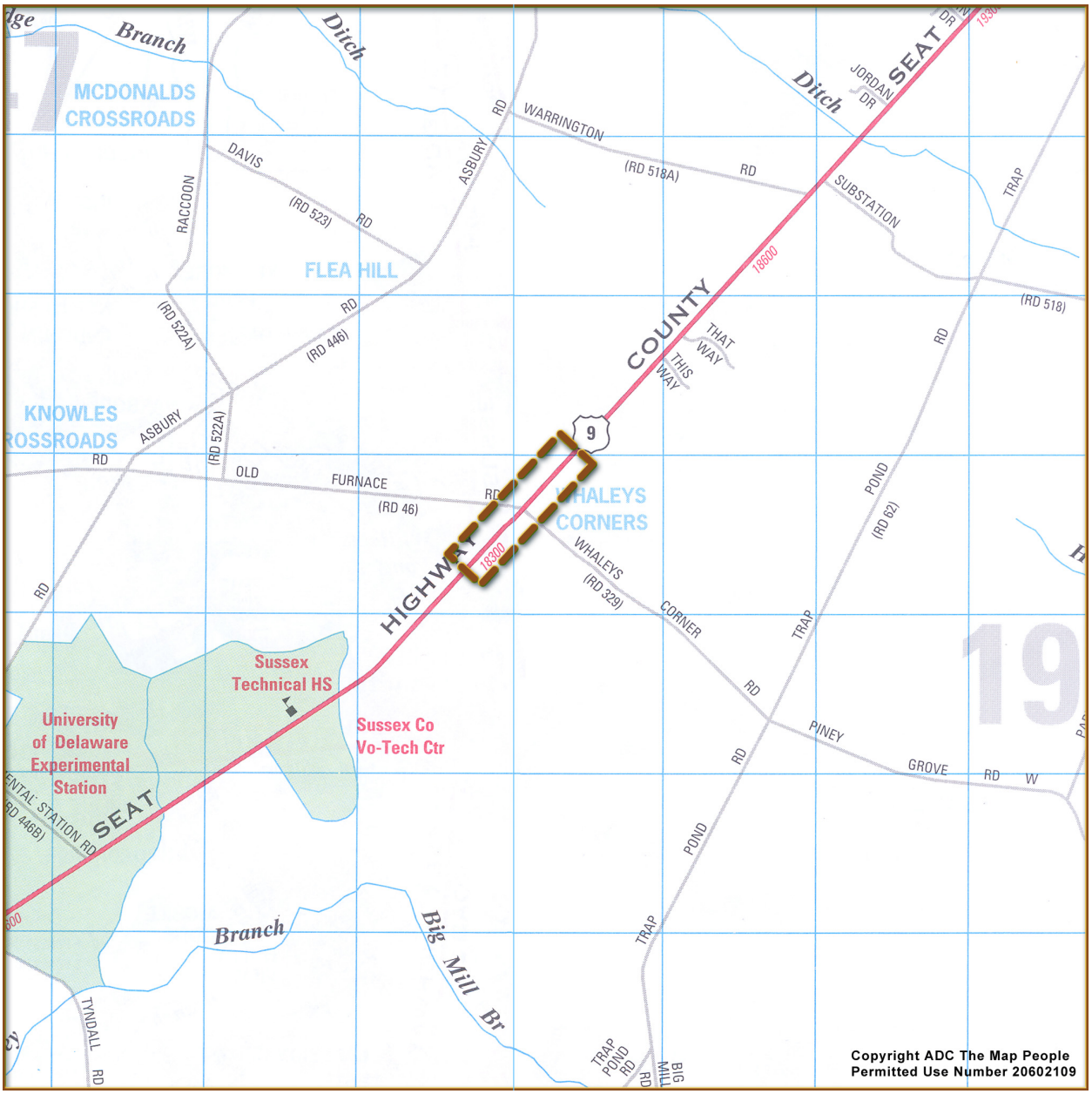
Photo 6: Westbound S329 approaching U.S. 9

DelDOT
Delaware Department of Transportation

2007 Highway Safety Improvement Program – Site H (Rank 38)

S28 (U.S. 9) – MP 9.60-10.09

From 0.25-mile west of Whaleys Corner Road to 0.24-mile east of Old Furnace Road



INTRODUCTION

Site H is a 0.49-mile corridor located west of Georgetown along U.S. 9 from 0.25-mile west of Whaleys Corner Road to 0.24-mile east of Old Furnace Road. U.S. 9 is a two-lane, undivided, open-section roadway with shoulders. The posted speed limit along U.S. 9 is 50 miles per hour. The ADT is approximately 9,400. Within the limits of the site, there is one signalized intersection at Old Furnace Road/Whaleys Corner Road.

Other Relevant Projects*:* U.S. 9 from 1.23 miles east of Road 466B to 0.82-mile west of Warrington Road was identified as part of 2000 Highway Safety Improvement Program – Site K. At that time, a signal was planned for the intersection of U.S. 9 at Old Furnace Road/Whaleys Corner Road; therefore, no additional improvements were recommended. The signal was installed on August 11, 2005.

Additionally, DelDOT Traffic studied the intersection of U.S. 9 at Old Furnace Road/Whaleys Corner Road in March 2006 and concluded that split phasing was needed on the northbound and southbound side street approaches. Split phasing was installed on April 11, 2006.

Resurfacing of U.S. 9 is proposed as part of the FY 2008 Paving Program.

CRASH DATA SUMMARIES

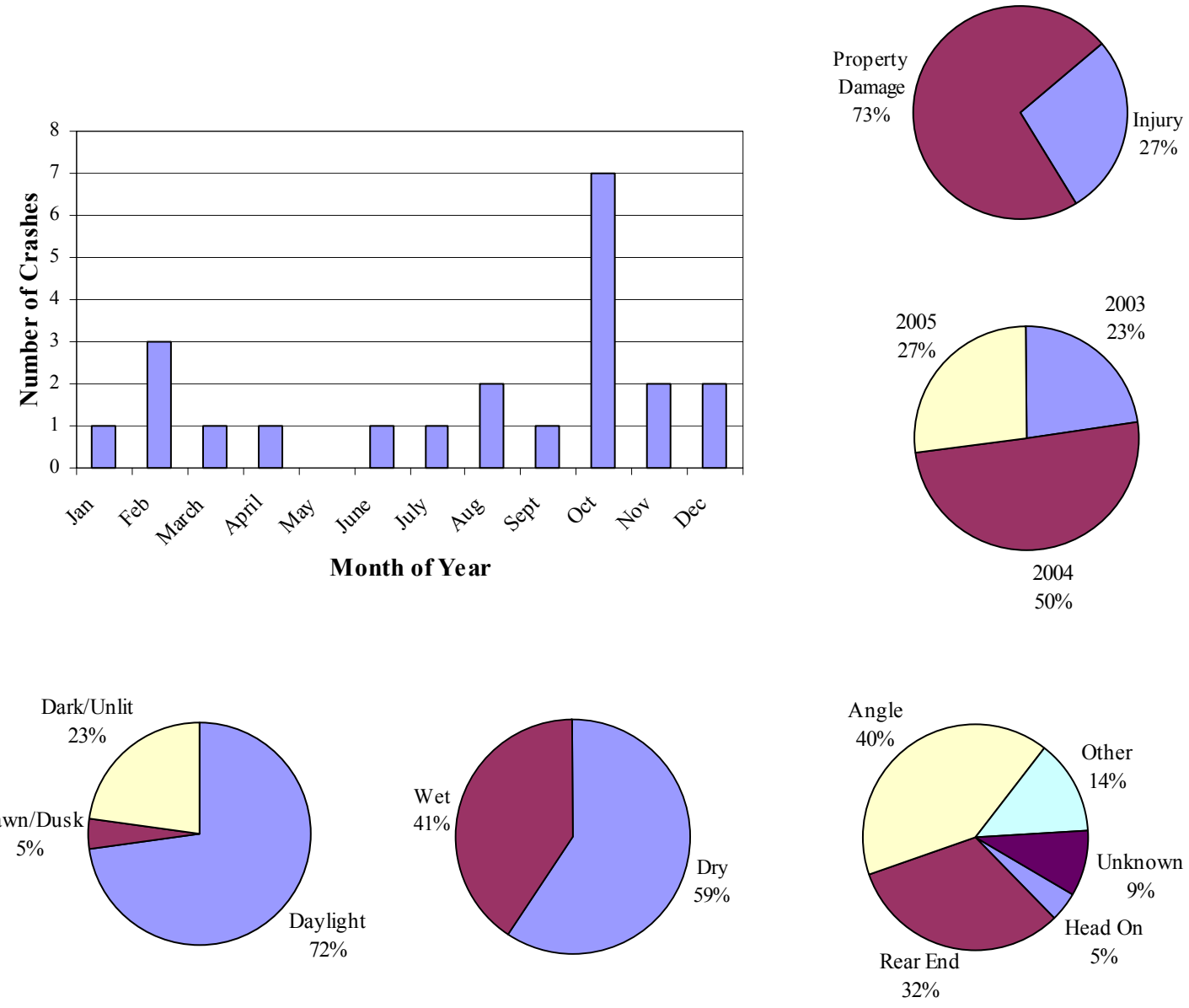
A total of 29 crashes were reported during the four-year study period between January 2003 and December 2006 including 11 (38 percent) rear end crashes and 9 (31 percent) angle crashes. Eight (28 percent) crashes of the 29 total crashes resulted in personal injuries. Additionally, 16 (55 percent) crashes occurred on wet pavement. Fourteen (48 percent) crashes occurred during the evening peak hours (3 PM – 6 PM). The following is a summary of the crashes by location and type:

- U.S. 9 at Old Furnace Road/Whaleys Corner Road – 23 crashes
  - "Stop" control (January 1, 2003 through August 11, 2005) – 12 crashes (4.6 crashes per year)
    - 4 eastbound rear end crashes (3 crashes involving left-turning vehicles, 1 crash involving vehicles stopped for a school bus)
    - 3 eastbound/southbound angle crashes
    - 2 eastbound/northbound angle crashes
    - 2 westbound/southbound angle crashes
    - 1 southbound right-turn crash
  - Traffic signal control – NB/SB concurrent phasing (August 11, 2005 through April 11, 2006) – 6 crashes (8.6 crashes per year)
    - 2 westbound rear end crashes
    - 1 southbound left-turn crash
    - 1 westbound crash involving a vehicle that swerved to avoid a stopped westbound vehicle, ran off the road, and struck a tree
    - 1 crash involving a southbound left-turning vehicle that lost control and struck a westbound right-turning vehicle
    - 1 eastbound rear end crash

- Traffic signal control –split phasing on side streets (April 11, 2006– December 31, 2006) – 5 crashes (7.1 crasher per year)
  - 3 eastbound rear end crashes (1 crash involving left-turning vehicles)
  - 1 eastbound run off the road crash involving a vehicle that lost control while attempting to stop for a red light
  - 1 southbound run off the road/fixed-object crash

A categorical summary of the crashes by type, severity, surface condition, lighting condition, year, and month is shown in Figure 1.

FIGURE 1
Crash Data Summary



FIELD OBSERVATIONS

U.S. 9 at Old Furnace Road/Whaleys Corner Road

- This intersection operates with no left-turn phasing on the eastbound and westbound U.S. 9 approaches and split phasing on the northbound and southbound Old Furnace Road/Whaleys Corner Road approaches to the intersection. The eastbound, northbound and southbound approaches each include a shared left/through/right-turn lane. The westbound approach includes a shared through/left-turn lane and a right-turn lane.

- Signal Ahead warning signs (36" x 36") are posted on all approaches to the intersection. A supplemental name plaque is provided with the Signal Ahead sign posted on the northbound approach.

- No lighting is provided at the intersection.

- Utility poles are located along both sides of U.S. 9 in close proximity to the roadway.

- The Street Name sign posted on the northeast corner of the intersection is bent and needs to be replaced.

- Southbound right-turning vehicles drive through part of the parking lot located on the northwest corner of the intersection to complete their turn.

- The stop line located on the westbound U.S. 9 approach does not extend through the right-turn lane.

- Westbound right-turning vehicles drive on the shoulder prior to entering the right-turn lane.

- Southbound vehicles typically pull approximately a full car length beyond the stop line before stopping.

- During field visits, a near miss side swipe crash was observed involving two westbound right-turning vehicles. One vehicle waited until the turn lane begun before moving to the right while the other vehicle was traveling in the shoulder.

- Eastbound and westbound through vehicles bypass left-turning vehicles in the shoulder and right-turn lane, respectively.

- During the AM and PM peaks, southbound queues reach 12 vehicles, northbound queues reach 10 vehicles, westbound queues reach 8 vehicles, and eastbound queues reach 6 vehicles. All queues clear every cycle.
- Passing zones are provided on eastbound U.S. 9, east of Old Furnace Road, and on westbound U.S. 9, west of Old Furnace Road.

REMEDIAL IMPROVEMENTS

- Resurface U.S. 9 within site limits as part of FY 2008 Paving Program. The proposed pavement marking improvements should be installed following pavement resurfacing.

- Replace the damaged Street Name sign for Old Furnace Road posted on the northeast corner of the U.S. 9 at Old Furnace Road/Whaleys Corner Road intersection.

- Extend the stop line located on the westbound U.S. 9 approach to Old Furnace Road through the right-turn lane.

- Eliminate the passing zones (install double yellow centerline) on U.S. 9 within 200 feet of the U.S. 9 at Old Furnace Road.

- Install supplemental name plates with the Signal Ahead signs on the eastbound and westbound U.S. 9 approaches to Old Furnace Road/Whaleys Corner Road.

TOTAL COST OF REMEDIAL IMPROVEMENTS - $300

ADDITIONAL STUDIES

The HSIP committee recommends performing additional studies to determine whether eastbound and westbound left-turn lanes are warranted at the U.S. 9 at Old Furnace Road/Whaleys Corner Road intersection.

Photo 1: Eastbound U.S. 9 at Old Furnace Road/Whaleys Corner Road

Photo 2: Westbound U.S. 9 at Old Furnace Road/Whaleys Corner Road

Photo 3: Northbound Whaleys Corner Road at U.S. 9

Photo 4: Southbound Old Furnace Road at U.S. 9

INTRODUCTION

Site H is a 0.49-mile corridor located west of Georgetown along U.S. 9 from 0.25-mile west of Whaleys Corner Road to 0.24-mile east of Old Furnace Road. The posted speed limit along U.S. 9 is 50 miles per hour. The ADT is approximately 9,200. Within the limits of the site, there is one signalized intersection at Old Furnace Road/Whaleys Corner Road.

At the Task I meeting, the HSIP committee recommended performing additional studies to determine whether eastbound and westbound left-turn lanes are warranted at the U.S. 9 at Old Furnace Road/Whaleys Corner Road intersection.

Other Relevant Projects*:* U.S. 9 from 1.23 miles east of Road 466B to 0.82-mile west of Warrington Road was identified as part of 2000 Highway Safety Improvement Program – Site K. At that time, a signal was planned for the intersection of U.S. 9 at Old Furnace Road/Whaleys Corner Road; therefore, no additional improvements were recommended. The signal was installed on August 11, 2005.

Additionally, DelDOT Traffic studied the intersection of U.S. 9 at Old Furnace Road/Whaleys Corner Road in March 2006 and concluded that split phasing was needed on the northbound and southbound side street approaches. Split phasing was installed on April 11, 2006.

U.S. 9 AT OLD FURNACE ROAD/WHALEYS CORNER ROAD

EXISTING CONDITIONS

Site Description: U.S. 9 is a two-lane, undivided, open-section roadway with shoulders. This intersection operates with no left-turn phasing on the eastbound and westbound U.S. 9 approaches and split phasing on the northbound and southbound Old Furnace Road/Whaleys Corner Road approaches to the intersection. The eastbound, northbound and southbound approaches each include a shared left/through/right-turn lane. The westbound approach includes a shared through/left-turn lane and a right-turn lane.

Crash Data Summary: A total of 35 crashes were reported between January 2003 and December 2006 including 18 (51 percent) rear end crashes and 11 (31 percent) angle crashes. Nine (26 percent) crashes of the 35 total crashes resulted in personal injuries. Additionally, 20 (57 percent) crashes occurred on wet pavement. Of the eighteen rear end crashes, twelve occurred on wet pavement. Nineteen (54 percent) crashes occurred during the evening peak hours (3 PM to 6 PM). The following is a summary of the crashes by location and type:

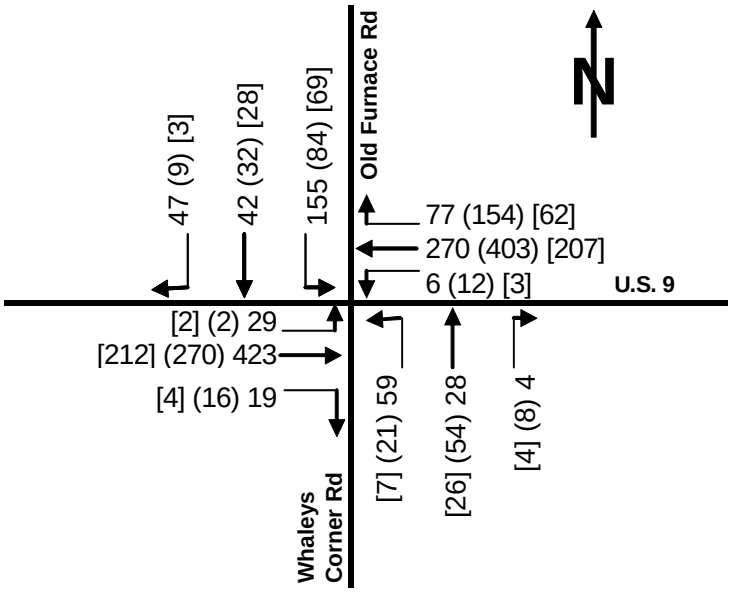
U.S. 9 at Old Furnace Road/Whaleys Corner Road – 35 crashes

- "Stop" control (January 1, 2003 through August 11, 2005) – 16 crashes (5.9 crashes per year)
  - 5 eastbound rear end crashes (4 crashes involving left-turning vehicles, 1 crash involving vehicles stopped for a school bus)
  - 4 eastbound/southbound angle crashes
  - 2 eastbound/northbound angle crashes
  - 2 westbound/southbound angle crashes
  - 1 southbound right-turn crash
  - 1 southbound rear end crash
  - 1 crash involving a westbound right-turning vehicle that struck a stopped southbound vehicle

- Traffic signal control (August 11, 2005 through December 31, 2006) – 19 crashes (14.6 crashes per year)
  - 5 eastbound rear end crashes (1 crash involving left-turning vehicles)
  - 4 southbound rear end crashes
  - 3 westbound rear end crashes (1 crash involving left-turning vehicles)
  - 1 southbound left-turn crash
  - 1 eastbound left-turn crash
  - 1 southbound run off the road/fixed-object crash
  - 1 eastbound run off the road crash involving a vehicle that lost control while attempting to stop for a red light
  - 1 crash involving a westbound right-turning vehicle that struck a stopped southbound vehicle
  - 1 westbound crash involving a vehicle that swerved to avoid a stopped westbound vehicle, ran off the road, and struck a tree
  - 1 crash involving a southbound left-turning vehicle that lost control and struck a westbound right-turning vehicle

Traffic Volumes: Peak hour turning movement counts were conducted at the U.S. 9 at Old Furnace Road/Whaleys Corner Road intersection on Tuesday, May 22, 2007 from 7:00 AM to 9:00 AM, 11:00 AM to 1:00 PM, and 3:00 PM to 6:00 PM and on Saturday, July 21, 2007 from 9:00 AM to 3:00 PM. The count summaries are included in the Appendix. Peak hour turning movements are shown in Figure 1.

FIGURE 1
Peak Hour Volumes



00 - AM Peak 7:30 AM - 8:30 AM
(00) - PM Peak 4:30 PM - 5:30 PM
[00] - SAT Peak 2:00 PM - 3:00 PM

Field Observations: The following observations were noted during field studies.

- Signal Ahead warning signs (36" x 36") are posted on all approaches to the intersection. A supplemental name plaque is provided with the Signal Ahead sign posted on the northbound approach.

- No lighting is provided at the intersection. Utility poles are located along both sides of U.S. 9 in close proximity to the roadway.

- During field visits, a near miss side swipe crash was observed involving two westbound right-turning vehicles. One vehicle waited until the turn lane begun before moving to the right while the other vehicle was traveling in the shoulder.

- Eastbound and westbound through vehicles bypass left-turning vehicles in the shoulder and right-turn lane, respectively.

- During the AM and PM peaks, southbound queues reach 12 vehicles, northbound queues reach 10 vehicles, westbound queues reach 8 vehicles, and eastbound queues reach 6 vehicles. All queues clear every cycle.

- During summer Saturday observations, queues were minimal (averaging 3 vehicles on the northbound, southbound, and westbound approaches). Additionally, the intersection was operating with responsive detection and cycle lengths were generally short.

Speed Study: Vehicle speeds were measured on the U.S. 9 approaches to Old Furnace Road/Whaleys Corner Road between 1:30 PM and 2:30 PM on Monday, July 16, 2007. Radar speed distributions are included in the Appendix and results are summarized in Table 1. As shown, the 85th percentile speeds along U.S. 9 are 6 and 7 miles per hour above the 50 mph speed limit on the westbound and eastbound approaches, respectively. Vehicle speeds ranged from 36 to 65 mph.

TABLE 1
Speed Data Summary

Criteria	U.S. 9	
	Eastbound	**Westbound**
Posted Speed Limit	50 mph	50 mph
85th Percentile Speed	57 mph	56 mph
% more than 5 mph over Speed Limit	19%	14%
Mean Speed	53 mph	50 mph

TRAFFIC ANALYSES

Left-Turn Bay Warrant: Currently, westbound left-turns on U.S. 9 are completed from a shared left-turn/through lane and eastbound left-turns on U.S. 9 are completed from a shared left-turn/through/right-turn lane, and through motorists generally shift into the right-turn lane or shoulder to bypass left-turning vehicles. The need for separate left-turn lanes was evaluated based on the NCHRP Report 279 guidelines. These guidelines indicate that left-turn lanes should be considered at all new and existing signalized intersections because of their proven safety effectiveness, their improvement to capacity, the flexibility in

possible signal phasing schemes and their acceptability by the driving public. NCHRP Report 279 provides the following guidance for installing left-turn lanes at existing signalized intersections:

- *Left-turn design volume exceeds 20-percent of total approach volume.* This guideline is **NOT SATISFIED.**
- *Left-turn design volume exceeds 100 vehicles per hour in peak periods.* This guideline is **NOT SATISFIED.**
- *Minimum stopping sight distance is not available to the intersection.* This guideline is **NOT SATISFIED**.
- *High-speed rural intersections.* This guideline is **SATISFIED**.

Warrants for Left-Turn Phasing: DelDOT's Signal Design Manual considers the following criteria when considering protected-permissive left-turn phasing. The warrant analysis was performed on the eastbound and westbound U.S. 9 approaches to Old Furnace Road/Whaleys Corner Road. Table 2 summarizes the results.

1. *Volumes*
    a. *Left-turning vehicles exceed 90 vehicles per hour on the approach for more than two hours of an average day.* This warrant is **NOT SATISFIED** on either approach.
    b. *The product of left turning vehicles per hour on the approach and conflicting through vehicles per hour on the opposite approach exceeds 125,000 on a six-lane roadway, 100,000 on a four-lane roadway, or 50,000 on a two-lane roadway for more than two hours of an average day.* This warrant is **NOT SATISFIED** on either approach.
    c. *The left-turn volume on the approach exceeds two (2) vehicles per cycle still waiting at the end of the green phase during the peak hour.* This warrant is **NOT SATISFIED** on either approach.
2. *Right-Turns*
    a. *Right-turn volume on the conflicting approach exceeds 350 vehicles per hour in the peak hour.* This warrant is **NOT SATISFIED** for either approach.
    b. *Left-turn volume on the approach exceeds 90 vehicles per hour in the peak hour.* This warrant is **NOT SATISFIED** on either approach
3. *U-Turns*
    a. *U-turn volume on the approach exceeds 50 vehicles per hour in the peak hour.* This warrant is **NOT SATISFIED** on either approach.
    b. *U-turn volume on the approach is greater than 30 percent of the traffic movement from that lane.* This warrant is **NOT SATISFIED** on either approach.
4. *Delay*
    a. *Left-turn delay of 2.0 vehicle-hours or more occurs on the approach in a peak hour on a critical approach.* This warrant is **NOT SATISFIED** on either approach.

b. *Average left turning vehicle delay on the approach exceeds 35 seconds in the peak hours.* This warrant is **NOT SATISFIED** on either approach.

c. *Left-turn volume on the approach exceeds two vehicles per cycle during the peak hour.* This warrant is **NOT SATISFIED** on either approach.

5. *Crashes*

a. *There were four or more left-turn accidents involving left-turning vehicles from the approach in a one-year period.* This warrant is **NOT SATISFIED** on either approach.

b. *There were six or more left-turn accidents involving left-turning vehicles from the approach in a two-year period.* This warrant is **NOT SATISFIED** on either approach.

6. Speed

a. *The 85th percentile speed of opposing vehicles to the approach exceeds 45 mph on a four-lane roadway or 40 mph on a six-lane roadway.* This warrant is **NOT APPLICABLE.**

TABLE 2
Permissive-Protected Left-Turn Phasing Warrants Summary

Warrant	U.S. 9 EBL	U.S. 9 WBL
Volumes		
Exceed 90 vph for more than 2 hours	No	No
Cross-product greater than 50,000	No	No
2 vehicles per cycle still waiting after phase	No	No
Right-Turns		
Exceeds 350 vph in peak hour	No	No
Left-turn volume exceeds 90 vph in peak hour	No	No
U-Turns		
Exceeds 50 vph in peak hour	No	No
Greater than 30% of traffic movement	No	No
Delay		
2.0 veh-hr or more during peak hour	No	No
Average left-turn delay exceeds 35 seconds in peak hours	No	No
Left-turn volume exceeds 2 vehicles per cycle during peak hour	No	No
Crashes		
Four or more left-turn crashes in a 1-year period	No	No
Six or more left-turn crashes in a 2-year period	No	No
Speed		
85th percentile speed greater than 45 mph	N/A	N/A
Warrants Met:	**0**	**0**

Capacity Analyses: Capacity analyses were conducted using Highway Capacity Manual (SYNCHRO Software) methodology to determine the impacts of restriping the eastbound and westbound U.S. 9 approaches to include a left-turn lane and a shared through/right-turn lane. Analyses were performed for both permissive left-turn phasing and permissive-protected left-turn phasing during the highest peak hours (the AM and PM peaks). As shown in Table 3, the intersection currently operates at level of service (LOS) 'C' during both the morning and evening peak hours. LOS and delay improve minimally with the installation of left-turn lanes on eastbound and westbound U.S. 9 during the morning peak;

however, delay will increase slightly with the installation of left-turn lanes on the eastbound and westbound (and elimination of the westbound right-turn lane) approaches during the evening peak. Delay will increase slightly with the installation of protected-permissive left-turn phasing.

Reconfiguring the eastbound and westbound U.S. 9 approaches to the intersection can be accommodated within the existing pavement section; however, this would require reducing the width of the shoulders on U.S. 9 and eliminating the westbound right-turn lane. Due to the high number of westbound right-turning movements, analyses were performed for the widening to provide separate left, through and right-turn lanes on the eastbound and westbound approaches to the intersection. As shown, average delay at the intersection will increase slightly compared to existing conditions due to the permissive-protected left-turn phasing, but by less than four seconds per vehicle.

TABLE 3
Capacity Analyses Summary

Condition	AM Peak Hour		PM Peak Hour	
	Delay[1]	LOS[2]	Delay[1]	LOS[2]
Existing	30.9	C	20.2	C
EB/WB U.S. 9 left-turn lanes (Permissive Phasing)	29.6	C	22.8	C
EB/WB U.S. 9 left-turn lanes (Permissive-Protected Phasing)	36.7	D	26.4	C
EB/WB U.S. 9 left, through and right-turn lanes (Permissive-Protected Phasing)	34.3	C	23.0	C

[1] Delay – Average Delay (seconds) per intersection approach vehicle
[2] LOS – Intersection Level of Service

TASK II RECOMMENDATION

Both the eastbound and westbound U.S. 9 approaches do not meet the crash or volume warrants for left-turn bays or left-turn phasing; however, left-turn bays could reduce the number of rear end crashes occurring on these approaches by reducing the potential for through vehicles to rear end vehicles that are stopped to make left-turns. Although providing eastbound and westbound left-turn lanes can be accommodated within the existing pavement section, it will require eliminating the westbound right-turn lane. Due to the high volume of westbound right-turning movements and minimal benefits gained in terms of capacity and LOS, installing eastbound and westbound left-turn lanes on U.S. 9 is not recommended.

Based on the high percentage (57 percent) of crashes that occurred on wet pavement conditions, the HSIP committee recommends skid testing and pavement resurfacing (if necessary) on the approaches to the U.S. 9 at Whaleys Corner Road/Old Furnace Road intersection to address the wet weather related crashes.

The following signing and pavement marking improvements are recommended as noted in the Task I report:

- Replace the damaged Street Name sign for Old Furnace Road posted on the northeast corner of the U.S. 9 at Old Furnace Road/Whaleys Corner Road intersection.

- Extend the stop line located on the westbound U.S. 9 approach to Old Furnace Road through the right-turn lane.

- Eliminate the passing zones (install double yellow centerline) on U.S. 9 within 200 feet of the U.S. 9 at Old Furnace Road.

- Install supplemental name plates with the Signal Ahead signs on the eastbound and westbound U.S. 9 approaches to Old Furnace Road/Whaleys Corner Road.

TOTAL COST OF IMPROVEMENTS - $300 (signing and striping improvements only)

APPENDIX D: Statewide 1.0 Mile Corridors Ranked by Critical Ratio

Delaware - Statewide

Accident Date Range	**Interval Length**	**Parameters**
01/01/2007 - 12/31/2009	1.0 mile	AMBIENT_LIGHT_PARAMETER-05

Rank	Crit. Ratio	County	Road	Road Name	Beg MP	End MP	# Accs	Notes
1	10.12	1	355D	Harmony Road	0	0.05	1	<10 accidents - Did not meet criteria
2	5.93	1	34H	US 13	0	0.1	1	<10 accidents - Did not meet criteria
3	4.48	1	367	Welsh Tract Road	0	0.99	19	Location #1
4	4.48	1	367	Welsh Tract Road	0.1	1.09	19	Location #1
5	4.01	1	367	Welsh Tract Road	0.2	1.19	17	Location #1
6	4.01	1	367	Welsh Tract Road	0.3	1.29	17	Location #1
7	3.78	1	367	Welsh Tract Road	0.4	1.39	16	Location #1
8	3.76	1	367	Welsh Tract Road	0.5	1.49	16	Location #1
9	3.7	3	199	Fowlers Beach Road	1.2	2.15	4	<10 accidents - Did not meet criteria
10	3.6	1	11A	Delaware Park Road	0	0.15	4	<10 accidents - Did not meet criteria
11	3.56	3	246	Albury Avenue	0.9	1.89	7	<10 accidents - Did not meet criteria
12	3.55	3	199	Fowlers Beach Road	1.1	2.09	4	<10 accidents - Did not meet criteria
13	3.51	3	396		1.8	2.79	6	<10 accidents - Did not meet criteria
14	3.51	3	396		1.9	2.89	6	<10 accidents - Did not meet criteria
15	3.46	2	14	SR 42	3	3.91	5	<10 accidents - Did not meet criteria
16	3.43	1	31A	Old Limestone Road	0	0.31	1	<10 accidents - Did not meet criteria
17	3.43	3	14C		0	0.29	1	<10 accidents - Did not meet criteria
18	3.27	3	60	SR 54	3.1	4.09	7	<10 accidents - Did not meet criteria
19	3.27	3	60	SR 54	3.2	4.19	7	<10 accidents - Did not meet criteria
20	3.27	3	60	SR 54	3.3	4.29	7	<10 accidents - Did not meet criteria
21	3.25	1	38	St. Andrews School Road	0	0.99	7	<10 accidents - Did not meet criteria
22	3.23	2	429	Mechanic Street	3.1	4.09	6	<10 accidents - Did not meet criteria
23	3.23	2	429	Mechanic Street	3.2	4.19	6	<10 accidents - Did not meet criteria
24	3.23	2	429	Mechanic Street	3.3	4.29	6	<10 accidents - Did not meet criteria
25	3.18	1	429	Mechanic Street	3.8	4.79	7	<10 accidents - Did not meet criteria
26	3.14	2	14	SR 42	2.9	3.89	5	<10 accidents - Did not meet criteria
27	3.09	2	14	SR 42	2.8	3.79	5	<10 accidents - Did not meet criteria
28	3.05	2	14	SR 42	2.7	3.69	5	<10 accidents - Did not meet criteria
29	3.05	3	246	Albury Avenue	1	1.99	6	<10 accidents - Did not meet criteria
30	3.04	2	14	SR 42	2.6	3.59	5	<10 accidents - Did not meet criteria
31	3.02	1	367	Welsh Tract Road	0.6	1.59	13	Location #1
32	3.02	3	396		2.2	3.16	5	<10 accidents - Did not meet criteria
33	3	3	542A		0	0.18	1	<10 accidents - Did not meet criteria
34	2.93	3	396		2	2.99	5	<10 accidents - Did not meet criteria
35	2.93	3	396		2.1	3.09	5	<10 accidents - Did not meet criteria
36	2.83	1	355B		0	0.26	1	<10 accidents - Did not meet criteria
37	2.83	3	361	West Avenue	2.3	3.29	8	<10 accidents - Did not meet criteria
38	2.81	1	12A	Farrand Drive Ext.	0	0.1	2	<10 accidents - Did not meet criteria
39	2.8	3	60	SR 54	4.8	5.79	6	<10 accidents - Did not meet criteria
40	2.8	3	60	SR 54	4.9	5.89	6	<10 accidents - Did not meet criteria
41	2.8	3	60	SR 54	5	5.99	6	<10 accidents - Did not meet criteria
42	2.79	3	361	West Avenue	2.2	3.19	8	<10 accidents - Did not meet criteria
43	2.78	3	361	West Avenue	2.1	3.09	8	<10 accidents - Did not meet criteria
44	2.75	3	261		1.1	2.09	8	<10 accidents - Did not meet criteria
45	2.71	1	429	Mechanic Street	3.7	4.69	6	<10 accidents - Did not meet criteria
46	2.71	3	544		0.2	1.19	6	<10 accidents - Did not meet criteria
47	2.69	1	224	Upper Snuffmill Road	0	0.95	6	<10 accidents - Did not meet criteria
48	2.69	1	429	Mechanic Street	3.6	4.59	6	<10 accidents - Did not meet criteria
49	2.69	2	429	Mechanic Street	2.8	3.79	5	<10 accidents - Did not meet criteria
50	2.69	2	429	Mechanic Street	2.9	3.89	5	<10 accidents - Did not meet criteria
51	2.69	2	429	Mechanic Street	3	3.99	5	<10 accidents - Did not meet criteria
52	2.66	3	199	Fowlers Beach Road	0.8	1.79	3	<10 accidents - Did not meet criteria
53	2.66	3	199	Fowlers Beach Road	0.9	1.89	3	<10 accidents - Did not meet criteria
54	2.66	3	199	Fowlers Beach Road	1	1.99	3	<10 accidents - Did not meet criteria
55	2.65	1	315A		0	0.08	1	<10 accidents - Did not meet criteria
56	2.65	3	261		1.2	2.19	7	<10 accidents - Did not meet criteria
57	2.58	1	318A	St. James Church Road	0	0.24	1	<10 accidents - Did not meet criteria
58	2.58	3	246		0.5	1.49	5	<10 accidents - Did not meet criteria
59	2.58	3	544		0.1	1.09	6	<10 accidents - Did not meet criteria
60	2.56	3	246	Albury Avenue	0.6	1.59	5	<10 accidents - Did not meet criteria
61	2.55	2	127		0	0.41	1	<10 accidents - Did not meet criteria
62	2.55	3	246	Albury Avenue	0.7	1.69	5	<10 accidents - Did not meet criteria
63	2.55	3	246	Albury Avenue	0.8	1.79	5	<10 accidents - Did not meet criteria
64	2.55	3	246	Albury Avenue	1.1	2.09	5	<10 accidents - Did not meet criteria

Delaware - Statewide

Accident Date Range	**Interval Length**	**Parameters**
01/01/2007 - 12/31/2009	1.0 mile	AMBIENT_LIGHT_PARAMETER-05

Rank	Crit. Ratio	County	Road	Road Name	Beg MP	End MP	# Accs	Notes
65	2.55	3	261		1	1.99	8	<10 accidents - Did not meet criteria
66	2.51	3	28	US 9	6	6.99	14	Location #2
67	2.5	2	295		0	0.99	3	<10 accidents - Did not meet criteria
68	2.5	2	295		0.1	1.09	3	<10 accidents - Did not meet criteria
69	2.46	3	361	West Avenue	1.9	2.89	8	<10 accidents - Did not meet criteria
70	2.44	2	88		0.2	1.19	4	<10 accidents - Did not meet criteria
71	2.43	2	14	SR 42	2.4	3.39	4	<10 accidents - Did not meet criteria
72	2.43	2	14	SR 42	2.5	3.49	4	<10 accidents - Did not meet criteria
73	2.42	2	88		0.3	1.29	4	<10 accidents - Did not meet criteria
74	2.4	2	88		0.4	1.39	4	<10 accidents - Did not meet criteria
75	2.4	3	544		0.3	1.29	5	<10 accidents - Did not meet criteria
76	2.38	2	14	SR 42	2.3	3.29	4	<10 accidents - Did not meet criteria
77	2.37	1	454	Sawmill Branch Road	0.5	1.46	3	<10 accidents - Did not meet criteria
78	2.37	3	28	US 9	5.9	6.89	13	Location #2
79	2.35	1	275	Golden Ring Road	1.4	2.39	8	<10 accidents - Did not meet criteria
80	2.35	1	275	Golden Ring Road	1.5	2.49	8	<10 accidents - Did not meet criteria
81	2.35	3	261		0.9	1.89	8	<10 accidents - Did not meet criteria
82	2.34	2	88		0.5	1.49	4	<10 accidents - Did not meet criteria
83	2.34	3	396		1.7	2.69	4	<10 accidents - Did not meet criteria
84	2.34	3	60	SR 54	3	3.99	5	<10 accidents - Did not meet criteria
85	2.34	3	60	SR 54	3.4	4.39	5	<10 accidents - Did not meet criteria
86	2.34	3	60	SR 54	3.5	4.49	5	<10 accidents - Did not meet criteria
87	2.34	3	60	SR 54	3.6	4.59	5	<10 accidents - Did not meet criteria
88	2.34	3	60	SR 54	3.7	4.69	5	<10 accidents - Did not meet criteria
89	2.34	3	60	SR 54	3.8	4.79	5	<10 accidents - Did not meet criteria
90	2.34	3	60	SR 54	5.1	6.09	5	<10 accidents - Did not meet criteria
91	2.32	3	361		2	2.99	7	<10 accidents - Did not meet criteria
92	2.31	2	271		3.1	4.01	2	<10 accidents - Did not meet criteria
93	2.28	1	260	Brecks Lane Road	0	0.57	2	<10 accidents - Did not meet criteria
94	2.28	2	384		3	3.99	7	<10 accidents - Did not meet criteria
95	2.27	2	88		0.1	1.09	4	<10 accidents - Did not meet criteria
96	2.22	1	429	Mechanic Street	3.5	4.49	5	<10 accidents - Did not meet criteria
97	2.22	2	207		2.9	3.89	4	<10 accidents - Did not meet criteria
98	2.22	2	207		3	3.99	4	<10 accidents - Did not meet criteria
99	2.21	1	429	Mechanic Street	3.3	4.29	5	<10 accidents - Did not meet criteria
100	2.21	1	82	SR 1	5.5	6.49	12	Location #3
101	2.19	3	261		0.8	1.79	8	<10 accidents - Did not meet criteria
102	2.17	1	275	Golden Ring Road	1.6	2.59	7	<10 accidents - Did not meet criteria
103	2.17	1	469	Black Diamond Road	0.4	1.39	3	<10 accidents - Did not meet criteria
104	2.17	1	469	Black Diamond Road	0.5	1.49	3	<10 accidents - Did not meet criteria
105	2.17	1	469	Black Diamond Road	0.6	1.59	3	<10 accidents - Did not meet criteria
106	2.17	1	469	Black Diamond Road	0.7	1.69	3	<10 accidents - Did not meet criteria
107	2.16	3	28	US 9	9.1	10.09	13	Location #4
108	2.15	2	30	Main Street	1.5	2.49	9	<10 accidents - Did not meet criteria
109	2.15	2	429		2.7	3.69	4	<10 accidents - Did not meet criteria
110	2.15	2	429		3.4	4.39	4	<10 accidents - Did not meet criteria
111	2.15	2	429		3.6	4.59	4	<10 accidents - Did not meet criteria
112	2.15	3	353		2.3	3.29	3	<10 accidents - Did not meet criteria
113	2.15	3	525		1.8	2.79	7	<10 accidents - Did not meet criteria
114	2.15	3	525		1.9	2.89	7	<10 accidents - Did not meet criteria
115	2.15	3	525		2	2.99	7	<10 accidents - Did not meet criteria
116	2.15	3	525		2.1	3.09	7	<10 accidents - Did not meet criteria
117	2.15	3	525		2.2	3.19	7	<10 accidents - Did not meet criteria
118	2.14	3	28	US 9	6.1	7.09	12	Location #2
119	2.14	3	361		2.4	3.39	6	<10 accidents - Did not meet criteria
120	2.13	1	452	Fieldsboro Road	0	0.99	3	<10 accidents - Did not meet criteria
121	2.13	1	452	Fieldsboro Road	0.1	1.09	3	<10 accidents - Did not meet criteria
122	2.13	1	452	Fieldsboro Road	0.2	1.19	3	<10 accidents - Did not meet criteria
123	2.13	1	452	Fieldsboro Road	0.3	1.29	3	<10 accidents - Did not meet criteria
124	2.13	1	452	Fieldsboro Road	0.4	1.39	3	<10 accidents - Did not meet criteria
125	2.13	1	452	Fieldsboro Road	0.5	1.49	3	<10 accidents - Did not meet criteria
126	2.13	1	452	Fieldsboro Road	0.6	1.59	3	<10 accidents - Did not meet criteria
127	2.13	2	30	Main Street	1.6	2.59	9	<10 accidents - Did not meet criteria
128	2.13	3	353		2.4	3.39	3	<10 accidents - Did not meet criteria

Delaware - Statewide
Accident Date Range 01/01/2007 - 12/31/2009
Interval Length 1.0 mile
Parameters AMBIENT_LIGHT_PARAMETER-05

Rank	Crit. Ratio	County	Road	Road Name	Beg MP	End MP	# Accs	Notes
129	2.12	2	8	US 113	9.6	10.59	13	Location #5
130	2.12	3	24	SR 24	18.2	19.19	7	<10 accidents - Did not meet criteria
131	2.12	3	24	SR 24	18.4	19.39	7	<10 accidents - Did not meet criteria
132	2.12	3	24	SR 24	18.5	19.49	7	<10 accidents - Did not meet criteria
133	2.11	3	246	Albury Avenue	0.3	1.29	4	<10 accidents - Did not meet criteria
134	2.11	3	261		1.3	2.29	5	<10 accidents - Did not meet criteria
135	2.11	3	353		2.1	3.09	3	<10 accidents - Did not meet criteria
136	2.11	3	477		0	0.99	3	<10 accidents - Did not meet criteria
137	2.1	1	26	Old Baltimore Pike	2.5	3.49	21	Location #6
138	2.1	3	48		7.2	8.19	7	<10 accidents - Did not meet criteria
139	2.1	3	48		7.3	8.29	7	<10 accidents - Did not meet criteria
140	2.1	3	48		7.4	8.39	7	<10 accidents - Did not meet criteria
141	2.1	3	48		7.5	8.49	7	<10 accidents - Did not meet criteria
142	2.1	3	48		7.6	8.59	7	<10 accidents - Did not meet criteria
143	2.1	3	48		7.7	8.69	7	<10 accidents - Did not meet criteria
144	2.1	3	48		7.8	8.79	7	<10 accidents - Did not meet criteria
145	2.1	3	48		7.9	8.89	7	<10 accidents - Did not meet criteria
146	2.1	3	48		8	8.99	7	<10 accidents - Did not meet criteria
147	2.09	2	30	Main Street	0.7	1.69	7	<10 accidents - Did not meet criteria
148	2.09	3	246	Albury Avenue	0.4	1.39	4	<10 accidents - Did not meet criteria
149	2.09	3	28	US 9	8.9	9.89	12	Location #4
150	2.07	3	246	Albury Avenue	1.8	2.7	3	<10 accidents - Did not meet criteria
151	2.07	3	326	State Street	0.8	1.79	8	<10 accidents - Did not meet criteria
152	2.06	2	188		0	0.32	1	<10 accidents - Did not meet criteria
153	2.06	3	353		2	2.99	3	<10 accidents - Did not meet criteria
154	2.06	3	353		2.5	3.49	3	<10 accidents - Did not meet criteria
155	2.05	1	26	Old Baltimore Pike	2.8	3.79	21	Location #6
156	2.05	3	594		0	0.99	6	<10 accidents - Did not meet criteria
157	2.04	2	30	Main Street	0.4	1.39	7	<10 accidents - Did not meet criteria
158	2.04	3	246		1.2	2.19	4	<10 accidents - Did not meet criteria
159	2.04	3	28	US 9	9	9.99	12	Location #4
160	2.04	3	544		0.4	1.39	4	<10 accidents - Did not meet criteria
161	2.03	2	303		1.2	2.19	2	<10 accidents - Did not meet criteria
162	2.02	1	301	Thompson's Station Road	0.3	1.29	9	<10 accidents - Did not meet criteria
163	2.02	1	301	Thompson's Station Road	0.4	1.39	9	<10 accidents - Did not meet criteria
164	2.02	2	54	Main Street	0.1	1.09	6	<10 accidents - Did not meet criteria
165	2.02	2	54	Main Street	0.2	1.19	6	<10 accidents - Did not meet criteria
166	2.02	2	54	Main Street	0.3	1.29	6	<10 accidents - Did not meet criteria
167	2.02	2	54	Main Street	0.4	1.39	6	<10 accidents - Did not meet criteria
168	2.02	2	54	Main Street	0.5	1.49	6	<10 accidents - Did not meet criteria
169	2.01	3	28	US 9	5.8	6.79	11	Location #4
170	2.01	3	488		2.8	3.79	4	<10 accidents - Did not meet criteria
171	2.01	3	488		2.9	3.89	4	<10 accidents - Did not meet criteria
172	2	1	82	SR 1	5.6	6.59	12	Location #3
173	2	1	9	SR 52	3.2	4.19	16	Location #7
174	2	2	8	US 113	9.7	10.69	12	Location #5
175	1.99	3	361		1.8	2.79	7	<10 accidents - Did not meet criteria
176	1.99	3	479A		0	0.6	2	<10 accidents - Did not meet criteria
177	1.98	1	26	Old Baltimore Pike	2.6	3.59	20	Location #6
178	1.98	1	26	Old Baltimore Pike	2.9	3.89	20	Location #6
179	1.98	1	9	SR 52	3.1	4.09	16	Location #7
180	1.98	2	325	Big Oak Road	1.4	2.39	4	<10 accidents - Did not meet criteria
181	1.98	2	73	North Street	4.3	5.29	7	<10 accidents - Did not meet criteria
182	1.98	3	207		1.3	2.29	7	<10 accidents - Did not meet criteria
183	1.98	3	353		1.9	2.89	3	<10 accidents - Did not meet criteria
184	1.98	3	544		1	1.99	2	<10 accidents - Did not meet criteria
185	1.97	1	26	Old Baltimore Pike	2.7	3.69	20	Location #6
186	1.97	2	30	Main Street	1.4	2.39	8	<10 accidents - Did not meet criteria
187	1.97	3	2	US 13	3.6	4.59	18	Location #8
188	1.96	1	383	Church Road	0.4	1.37	8	<10 accidents - Did not meet criteria
189	1.96	2	30	Main Street	0.3	1.29	7	<10 accidents - Did not meet criteria
190	1.96	2	384		3.1	4.09	6	<10 accidents - Did not meet criteria
191	1.96	3	16	SR 16	25.8	26.79	5	<10 accidents - Did not meet criteria
192	1.96	3	16	SR 16	25.9	26.89	5	<10 accidents - Did not meet criteria

Delaware - Statewide

Accident Date Range	**Interval Length**	**Parameters**
01/01/2007 - 12/31/2009	1.0 mile	AMBIENT_LIGHT_PARAMETER-05

Rank	Crit. Ratio	County	Road	Road Name	Beg MP	End MP	# Accs	Notes
193	1.96	3	16	SR 16	26	26.99	5	<10 accidents - Did not meet criteria
194	1.96	3	16	SR 16	26.1	27.09	5	<10 accidents - Did not meet criteria
195	1.96	3	353		2.6	3.59	3	<10 accidents - Did not meet criteria
196	1.95	2	73	North Street	4.2	5.19	7	<10 accidents - Did not meet criteria
197	1.95	3	326	State Street	0.7	1.69	8	<10 accidents - Did not meet criteria
198	1.94	1	32	US 40	4.2	5.19	25	Location #9
199	1.94	2	73	North Street	4.4	5.39	7	<10 accidents - Did not meet criteria
200	1.94	3	213	Walnut Street	8.1	9.09	5	<10 accidents - Did not meet criteria
201	1.94	3	484		2.7	3.69	4	<10 accidents - Did not meet criteria
202	1.92	1	17	SR 92	0	0.99	17	Location #10