US 130/US 206
Road Safety Audit

Bordentown City and Bordentown Township, Burlington County, NJ

September 2012

dvrpc REGIONAL SAFETY PROGRAMS

US 130/US 206
Road Safety Audit

Bordentown City and Bordentown Township, Burlington County, NJ

September 2012

dvrpc REGIONAL SAFETY PROGRAMS

The Delaware Valley Regional Planning Commission is dedicated to uniting the region's elected officials, planning professionals, and the public with a common vision of making a great region even greater. Shaping the way we live, work, and play, DVRPC builds consensus on improving transportation, promoting smart growth, protecting the environment, and enhancing the economy. We serve a diverse region of nine counties: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey. DVRPC is the federally designated Metropolitan Planning Organization for the Greater Philadelphia Region — leading the way to a better future.

The symbol in 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.

DVRPC is funded by a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. The authors, however, are solely responsible for the findings and conclusions herein, which may not represent the official views or policies of the funding agencies.

DVRPC fully complies with Title VI of the Civil Rights Act of 1964 and related statutes and regulations in all programs and activities. DVRPC's website (www.dvrpc.org) may be translated into multiple languages. Publications and other public documents can be made available in alternative languages and formats, if requested. For more information, please call (215) 238-2871.

Table of Contents

Figures and Tables

Appendices

Executive Summary

Those familiar with the confluence of routes US 130 and US 206 in Bordentown City, New Jersey, know this is a high traffic, and oftentimes high-speed thoroughfare designed to facilitate the movement of vehicles, but not the movements of pedestrians and bicyclists. Yet both pedestrian and bicyclist activity is common there, mixing with both local and through traffic. Elected officials from the local, county, and state levels have expressed great concern for the traffic and transportation issues of this corridor, especially those relating to walkers and bikers. To address these concerns, they requested a multifaceted effort that included a Road Safety Audit (RSA) of this location.

This document is the final report for the US 130/US 206 RSA. An RSA is an effective way of identifying crash-causing trends and appropriate countermeasures using a nontraditional approach that promotes transportation safety while maintaining mobility. This project represents a step toward implementation of the Delaware Valley Regional Planning Commission's (DVRPC's) *Safety Action Plan* and the New Jersey Department of Transportation's (NJDOT's) *Strategic Highway Safety Plan (SHSP).* The RSA event was conducted during Fiscal Year 2011 as part of DVRPC's Office of Transportation Safety and Congestion Management's annual work program.

NJDOT is required to develop an SHSP in order to draw on federal safety funds, according to the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), the federal transportation legislation. This requirement applies to all state departments of transportation.

The study section of US 130/US 206 was previously identified as an NJDOT priority location for bicycle and pedestrian improvements. This led to a bicycle and pedestrian access and safety study conducted by Michael Baker Jr., Inc. in the fall of 2011, under contract with NJDOT. In May of 2011, NJDOT published the final product of this effort titled *Route 130/206 Bicycle and Pedestrian Plan*. It was during this effort that study limits were established and various data items collected that were made available for the RSA. DVRPC also conducted a corridor study of this location focusing more closely on circulation issues. The forthcoming publication from this effort will be titled *Traffic-Calming Alternatives for Routes 130 and 206 in Bordentown, NJ*.

The US 130/US 206 RSA was conducted on Tuesday, October 26, 2010. The preaudit and postaudit meetings were held at the Carslake Community Center in Bordentown Township, New Jersey. The audit team of 15 participants included representation from the New Jersey State Assembly, Bordentown Township Police Department, Burlington County Planning and Engineering, Bordentown City, Bordentown Township, FHWA New Jersey Division Office, NJDOT's Bureau of Commuter and Mobility Strategies, New Jersey Division of Highway Traffic Safety, Bicycle Coalition of Greater Philadelphia, Michael Baker Jr., Inc., and DVRPC. See Appendix A for the full list of audit participants.

Site-specific issues, organized by subareas, are discussed in the Findings and Recommendations chapter. Each of the subareas is represented graphically on an aerial view map, with a corresponding table on the opposite page, to assist the reader in locating identified safety issues.

Pedestrian and bicyclist issues were considered high priorities by the audit team. Because this corridor study area has developed to give priority to vehicular movements, access and amenities for other modes have suffered, though not intentionally. Despite this, pedestrians and bicyclists frequently travel the study area, and several bikers and walkers were sighted during the field visit portion of the audit event. Since there are few sanctioned crossing locations, and many destinations, access to businesses and other trip generators can be very difficult without a car.

The recommendations herein were developed collaboratively with roadway owners and local stakeholders from the study task force; DVRPC served as facilitator. The study partners expressed an interest in implementing many of the recommendations, as time and funds allow. Several of the maintenance items, some of which are low cost, can be addressed without additional engineering.

CHAPTER 1

Introduction

As the final report for the US 130/US 206 RSA, this document represents a step toward implementation of DVRPC's *Safety Action Plan*. The RSA process identifies safety issues through an intensive and collaborative forum, and uses brainstorming and local knowledge to enhance analysis findings and develop a range of improvement ideas. The US 130/US 206 RSA was one of two RSAs conducted in the region as part of DVRPC's Fiscal Year 2011 transportation safety program. The NJDOT Bureau of Safety Programs assisted by providing crash rate information and summaries, in addition to staff support at the audit event. DVRPC conducted additional analysis using GIS and Plan4Safety.

What is a Road Safety Audit?

An RSA is a formal safety performance examination of an existing or future road or intersection by a multidisciplinary audit team. Road safety audits can be used on any size project, from minor maintenance to megaprojects, and can be conducted on facilities with a history of crashes, or during the design phase of a new roadway or planned upgrade. DVRPC has mostly used the tool on roadways of five miles in length or less, where there is a demonstrated history of crashes.

A road safety audit is conducted to identify issues that compromise safety and to generate improvement recommendations. Emphasis is placed on identifying low-cost, quick-turnaround safety improvements, though not excluding strategies that are more complex. Implementation of improvement strategies identified through this process in New Jersey may be eligible for Local Federal Aid Safety Funds. Because the RSA process is adaptable to local needs and conditions, recommendations can be implemented as time and resources permit.

The audit event has three basic components:

- Preaudit – the audit team reviews location characteristics and crash analysis;
- Field visit – the audit team examines conditions along the corridor, preferably on foot; and
- Postaudit – the audit team shares findings and develops a list of problems and potential strategies.

Prior to the audit, DVRPC collects and analyzes relevant data, including crash concentration and corridor-wide crash summaries, daytime and nighttime roadway video, traffic volume data, and aerial photographs. DVRPC staff also conducts a preaudit field visit to examine existing conditions. The identified crash concentrations became focus areas during the audit of the US

130/US 206 study area. All maps used during the audit event are in included in Appendix B. Additional analysis is included in the audit-day presentation found in Appendix C.

Following the event, DVRPC staff compiles the identified problems and potential strategies into a matrix. This document is sent back to the audit team for verification. Upon approval from the team, the matrix is incorporated into a technical report. This is then distributed to all audit participants and coordinating agencies for advancement to the implementation stage.

The US 130/US 206 Audit Event

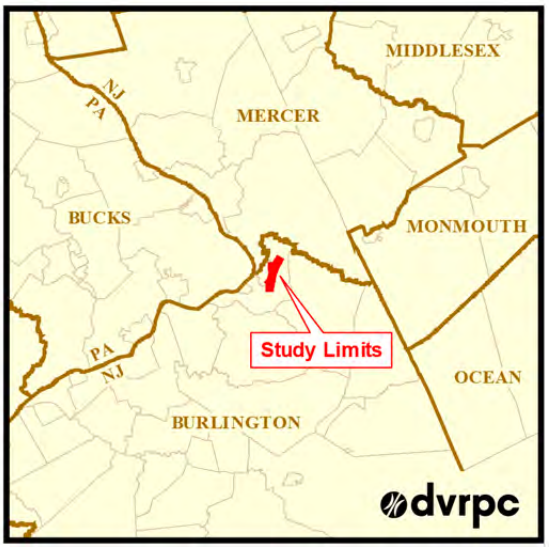
The one-day road safety audit was conducted on Tuesday, October 26, 2010. The preaudit and postaudit meetings were held at the Carslake Community Center, 209 Crosswicks Street, Bordentown Township, New Jersey. The audit team of 15 participants included representation from local, county, regional, state, and federal levels. See Appendix A for the list of audit team members.

The preaudit meeting—an overview of the study area and an examination of crash history—began at 8:00 AM. Next was the field visit, when the audit team drove and walked through the corridor to examine conditions and identify safety issues. After lunch, the team returned to the meeting room for the postaudit session, where problems were defined and countermeasures discussed.

CHAPTER 2

Corridor Description and Analysis

Study Location



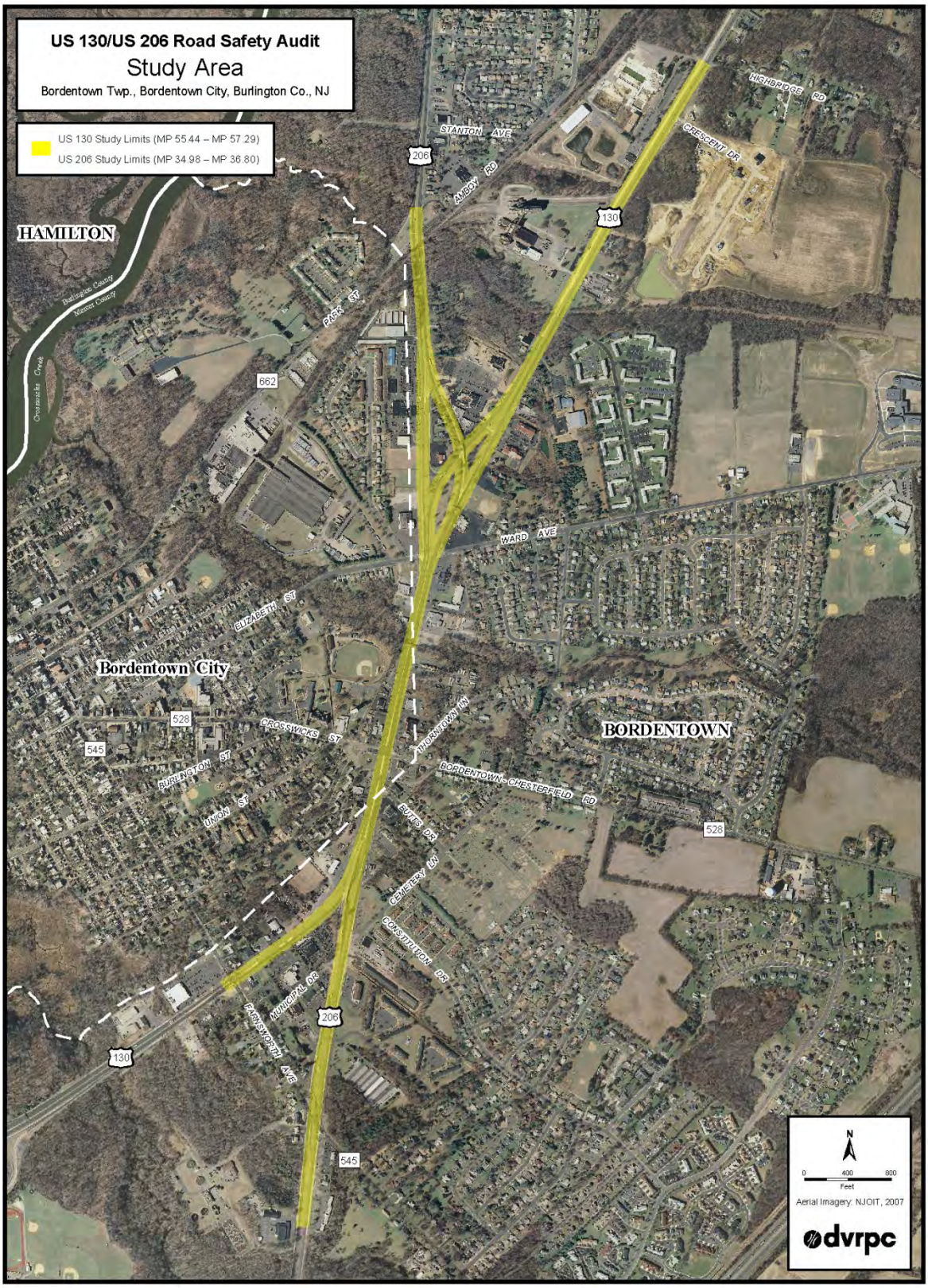
The study area consists of approximately 1.83 miles of US 130, from the intersection of Farnsworth Avenue northeast to the intersection of Highbridge Road, and 1.16 miles of US 206, from the intersection of Farnsworth Avenue northwest to East Park Street (see Figure 1 on page 6). The two roadways overlap in the center of the study area for approximately three-tenths of a mile. This section is designated as US 130 for crash coding purposes. Both routes pass through Bordentown City and Bordentown Township. The frontage along each corridor is primarily commercial, with residential uses beyond. Downtown Bordentown City lies west of the study area and Bordentown Township is to the east, both located in northern Burlington County, New Jersey (please see Appendix B for all maps used during the audit process).

Roadway Characteristics

US 130 and US 206 are classified as urban principal arterials. The study corridors were divided into five analysis sections corresponding to the five cross-section types (see Figure 1). The study area also has five signalized intersections: (1) Farnsworth (CR 545) at US 130, (2) Farnsworth (CR 545) at US 206, (3) Butts Drive at US 130, (4) Crosswicks Street/Bordentown-Chesterfield Road (CR 528) at US 130, and (5) Park Street (CR 662) at US 206. Access to businesses in the study area is predominantly by right-in and right-out access because both roadways are divided highways. There are also seven unsignalized intersections and approximately 93 driveways. Sidewalks are inconsistently available throughout the corridor. There are no bike lanes, and shoulders that could serve as de facto bike lanes are inconsistently available.

The central section, where US 130 and US 206 become a single roadway (considered US 130 for crash coding), has an eight-lane cross-section with a barrier median and no shoulder. This is the

Figure 1: US 130/US 206 Road Safety Audit Study Area



widest roadway section of the entire study area and is considered to have excess capacity that is left over from the pre-I-295 era. At the Crosswicks Street/Bordentown-Chesterfield Road (CR 528) signalized intersection, all turn movements to these streets are made via reverse jug-handles—designed to maximize throughput on US 130. In the south, US 130 (southwestern) has four lanes, with a barrier median and a shoulder; US 206 (southeastern) has four lanes, with a grass median and a shoulder. In the north, US 130 (northeastern) has four lanes, with a grass median and a shoulder; and US 206 (northwestern) has four lanes, with a grass median and a shoulder. The posted speed limit is between 40 and 55 mph, depending on the section.

Traffic Volumes

Traffic volume data for years 2006 through 2010 was provided by NJDOT's consultant Michael Baker Jr., Inc., and by DVRPC, and extracted from the NJDOT straight-line diagrams. The data shows traffic volumes on the north and south sections of the corridor to be in the range of 11,000 to 12,000 vehicles per direction per day on average. In the central section where US 130 and US 206 merge, the data shows an average of 25,000 vehicles per direction per day.

Transit Service

There is one NJ Transit bus line that runs in close proximity to the study area and enters the corridor at East Park Street, though it provides no service along US 130/US 206 within the study limits. The NJ Transit 409 Bus (Trenton, Willingboro, and Philadelphia) has seven bus stops in Bordentown City along county routes 545 and 662, which are also outside of the study corridors located to the west. Peak-hour headways are every hour in the AM and every 30 minutes in the PM. Off-peak headways are every hour.

The NJ Transit River Line is located outside the study area to the west and has one stop in Bordentown City. Despite the fact that these transit services are not located immediately on one of the study corridors, there is still pedestrian activity to and from the nearest stops, for example, by people who reside to the east in Bordentown Township.

Corridor-Wide Crash Findings

US 130

According to the NJDOT crash database, there were 227 reportable crashes during years 2007 through 2009 along the study area section of US 130; this also includes the overlapping section in the center of the study area where US 130 and US 206 run together (all crashes on the joint section are coded to US 130). Reportable crashes are crashes that result in a fatality, injury, and/or property damage of $500 or more. Corridor-wide crash data maps can be found in Appendix B. Of the three-year total, 91 crashes occurred in 2007 (40 percent), 68 in 2008 (30 percent), and 68 in 2009 (30 percent). Regarding severity, there were no fatal crashes, 61 injury crashes, and 166 property-damage-only (PDO) crashes. Thirty-three percent of the crashes occurred at an intersection, higher than the statewide average of 29 percent.

When analyzing crash frequency by month, on average, the fewest crashes occurred in January and July, when 14 crashes were recorded each month. June and October had the highest numbers, with 28 and 27, respectively. The remainder of the year was consistent, ranging between 15 and 21 crashes per month. Crash concentrations by weekday revealed Sunday (42) and Friday (43) as having the highest per-day crash totals. The fewest crashes occurred on Mondays (20). Friday and Sunday peak volumes are often the result of seasonal traffic traveling to and from vacation destinations. When considering crashes by time of day, the distribution favors the eight-hour period from 11:00 AM to 7:00 PM, when 57 percent of the crashes occurred. Crashes peaked at 12:00 noon, with 19. This is likely related to the midday trips generated by the businesses in the study corridor. There is also a noteworthy spike in crashes during the morning commute from 7:00 AM to 8:00 AM, when 12 crashes were recorded.

Crash distribution by road surface showed no anomalies, as 78 percent of the crashes occurred on dry road conditions, a rate higher than the 2009 statewide average of 71 percent. Seventy-four percent of the crashes occurred under daylight conditions, and 24 percent occurred at night.

The three highest collision type concentrations were rear-end (35 percent), same-direction sideswipe (34 percent), and right-angle crashes (nine percent). When combined, these three account for approximately 78 percent of the crash total. Rear-end crashes tend to be common along signalized roadways, especially those with recurring congestion. Seventy-seven same-direction sideswipes were recorded; this percentage far exceeds the state average (34 percent vs. 16 percent). This overrepresentation may be related to the multiple through-lane configurations that allow frequent passing and weaving, increasing the likelihood of a sideswipe collision. Angle crashes involve drivers traveling in angular directions to one another, e.g., northbound collides with westbound. This collision type often occurs when a driver leaves a business driveway and collides with a driver traveling in the through lane. The US 130 corridor has a fair number of driveways, some of which may be duplicative. Another cause of angle crashes is red-light running. The most common pre-crash action was "going straight ahead," which contributed to 180 crashes. Changing lanes caused a notable 60 crashes, the same number that slowing or stopping caused.

One pedestrian and three bicyclist crashes were recorded during the study period. Throughout the corridor study area, there are missing sidewalks, missing curb ramps, missing crosswalks, missing pedestrian signal heads and countdown timers, poorly lit crosswalks, no pedestrian-scale lighting, no bicycle accommodations, and missing or inadequate shoulders for biking. Although this lack of accommodations is only a contributing factor for the pedestrian and bicyclist crashes, better pedestrian amenities will raise the pedestrian profile, making them more noticeable to drivers and establishing a context where walking and biking are expected and respected.

US 206

Along the study section of US 206 (north and south sections combined; middle section crashes are coded to US 130), there were 82 reportable crashes from 2007 through 2009. Corridor-wide crash data maps can be found in Appendix B. Of the three-year total, 28 crashes occurred in 2007 (34 percent), 20 in 2008 (24 percent), and 34 in 2009 (42 percent). Regarding severity, there were no fatal crashes, 28 injury crashes, and 54 PDO crashes.

When analyzing crash frequency by month, the highest number of crashes occurred on average in May and November, when 13 and 10 crashes were recorded, respectively. August (3) and September (2) had the fewest crashes. The monthly mean was seven crashes. Regarding crash data by day of the week, the two days with the highest crash totals are the same as identified on US 130: Sunday had 16 crashes and Friday had 15. Saturday had the fewest crashes, with seven. By time of day, the majority of crashes occurred during the eight-hour period from 11:00 AM to 7:00 PM—same as US 130—with 60 percent of the total. Within that period, a spike of 10 crashes occurred during the 4:00 PM hour, which, compared to the rest of the day, is 50 percent higher than any other single-hour period. This midday trend is likely related to trips generated by the retail area of the northwestern part of the study corridor.

Crash distributions by road surface condition showed no anomalies, as 79 percent of the crashes occurred on a dry road surface. Sixty-eight percent of the crashes occurred under daylight conditions, while 30 percent occurred at night, a rate slightly higher than the statewide average of 26 percent nighttime crashes.

The three highest collision type concentrations were rear-end (44 percent), hit-fixed-object (HFO) (15 percent), and same-direction sideswipe crashes (13 percent), which, when combined, account for approximately 72 percent of the crash total. Causes of rear-end and same-direction sideswipe crashes are likely similar to those that occurred on US 130: frequent lane changing that is common in two-lane per direction roadway configurations. HFO crashes often occur when drivers leave the road and hit a roadside object, or even the median barrier. There were also five animal crashes recorded, representing six percent of the crash total on US 206, compared to the statewide average of four percent. Both sections of US 206 serve less densely developed areas that are somewhat forested. The most common pre-crash action, "going straight ahead," contributed to 52 crashes. The second highest, "stopped in traffic," led to 25 crashes. Neither sheds much light onto the crash circumstances other than the fact that they typically coincide with rear-end collisions.

One pedestrian crash and one bicyclist crash were recorded during the study period. As with US 130, the US 206 corridor study area has intermittent or missing sidewalks, curb ramps, crosswalks, and associated pedestrian crossing amenities. Also found were poorly lit crosswalks, no pedestrian-scale lighting, no bicycle accommodations, and missing or inadequate shoulders for biking. Despite this lack of pedestrian and bicyclists amenities, these activities are reportedly common in the study area and were also observed during the audit field visit.

Analysis by Cross-Section Geometry

The crash analysis was conducted according to cross-section by route, which yielded five analysis sections between the two routes: 1) US 130 South Section, 2) US 130 Central Section, 3) US 130 North Section, 4) US 206 South Section, and 5) US 206 North Section. NJDOT provided crash rates and crash summaries for each of the five sections and statewide average crash rates per cross-section geometry for comparison (see Figure 2 on page 11). Further details, plus graphics, are available in the PowerPoint presentation included in Appendix C.

US 130 South Section, Milepost 55.44-55.77 (length – 0.33 miles): 54 crashes

Cross-Section Type: Four Lanes, Barrier Median with Shoulders

Actual Crash Rate: 4.43, Statewide Crash Rate: 1.83

This corridor section of US 130 is the southwest leg of the study area, between Farnsworth Avenue and the central section, where it merges with US 206. Fifty-four crashes were recorded here from 2007 to 2009. Northbound crashes were predominant, at 63 percent, compared to southbound crashes, at 30 percent. Although rear-end crashes were predominant, at 35 percent, sideswipe, left-turn, and bicyclist crashes all exceeded statewide averages.

More than half of the crashes (57 percent) occurred in the immediate vicinity of the Farnsworth Avenue (CR 545) signalized intersection—a 0.04-mile-long section. Seven of the 13 injury crashes occurred at this intersection; two were bicyclist crashes. Northbound crashes were greater than southbound crashes in this concentration area, at 17 and 10, respectively.

US 130 Central Section (Merge with US 206), Milepost 55.77-56.44 (length – 0.67 miles): 128 crashes

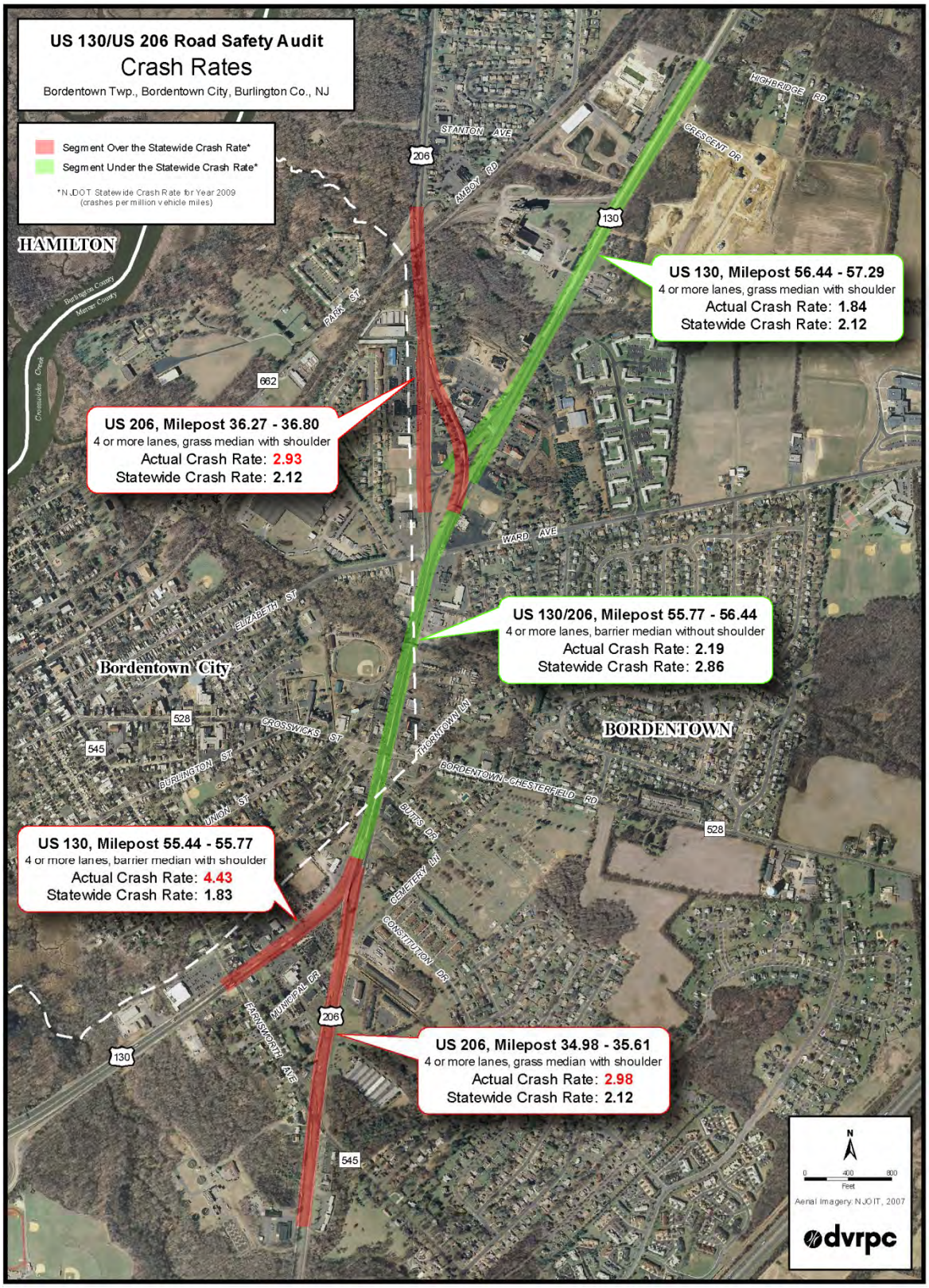
Cross-section Type: Four Lanes, Barrier Median without Shoulders

Actual Crash Rate: 2.25, Statewide Crash Rate: 2.86

This corridor section is the central segment of the study area, starting at the US 130 and US 206 merge, and ending within their subsequent split to the north. One hundred twenty-eight crashes were recorded here between 2007 and 2009. Crashes were evenly distributed in both directions, with 57 northbound crashes and 58 southbound crashes. Sideswipe crashes were the predominant collision type, accounting for 38 percent of the total, which is more than twice the statewide average of 15.7 percent. Rear-end crashes were a close second, at 37 percent, though not above the statewide average. Bicyclist crashes also were above the statewide average.

Of the total crashes, none were fatal, 36 resulted in injury, and 92 were PDO. A majority of the crashes occurred during the daytime and on dry surface conditions. Thirty-nine crashes were reported at intersections, while 89 occurred between intersections. New Jersey uses a narrow definition for “at intersection” crashes: those that occur within the stop bars of the intersection. Crashes near the intersection, but outside the box are considered intersection-related.

Figure 2: US 130/US 206 Road Safety Audit Crash Rates



Within the US 130 Central Section, two segments were studied more in depth. Concentration Area A comprises the Butts and Crosswicks intersections with US 130. These two intersections are closely spaced, and their signals are coordinated. At a length of only 0.10 miles, this concentration area had half of all crashes in the Central Section. Regarding collision types, 25 were rear-end, 21 were sideswipe, one was fixed-object, and two were left turn or U-turn. One bicyclist and one pedestrian crash were recorded; both occurred at the Crosswicks Street intersection. Collisions were roughly evenly distributed between north and south directions, with 24 northbound and 27 southbound.

Concentration Area B is also 0.10 miles long, but is located south of Ward Avenue. Only fixed-object crashes occurred in this area (11), four northbound and seven southbound; 10 were injury crashes. This section is divided by a concrete median barrier, and access to the side streets is right-in and right-out guided by pork-chop style islands. Although these features may have been what were struck, they were not identified by the team during the analysis as the cause.

US 130 North Section, Milepost 56.44-57.29 (length – 0.85 miles): 45 crashes

Cross-Section Type: Four Lanes, Grass Median with Shoulders

Actual Crash Rate: 1.73, Statewide Crash Rate: 2.12

This corridor section of US 130 is the north segment of the study area, stretching from the US 130/US 206 split to the vicinity of Highbridge Road. Forty-five crashes were reported here between 2007 and 2009. The crash distribution was skewed to the southbound direction, which had 29 crashes, compared to only 15 northbound. The segment's predominant collision types included sideswipe, left turn, backing, hit-fixed-object, hit animal, and non-fixed-object, all of which exceeded the statewide crash rate. Rear-end crashes were again the most frequent collision type, at 31 percent of the total, though not exceeding the statewide average.

There were no fatal crashes in this section, though 12 resulted in injury: the remaining 33 were property damage only. A majority of crashes occurred during the daytime and on dry surface conditions. Crashes were concentrated in the vicinity of the Mastoris Diner access and in the vicinity of Highbridge Road. Nine crashes occurred at unsignalized intersections (no signals are within this section) and 36 occurred between intersections. There were no crashes involving a pedestrian or bicyclist.

Two areas within the segment were studied more in depth. Concentration Area A, a 0.03-mile stretch, includes the Mastoris Restaurant driveways from US 130. Twenty-six percent (12 crashes) of the section's crashes occurred here, with three injury crashes. Regarding collision type, there were five sideswipes, four rear-ends, and three left turn or U-turn crashes. There were eight crashes in the southbound direction and four northbound.

Concentration Area B encompasses the vicinity of the Highbridge Road intersection. This corridor segment is 0.01 miles long and was the site of nine crashes: two rear-ends, two left-turns or U-turns, one sideswipe, one right-angle, one fixed-object, one backing, and one involving an animal. There were four crashes in each the northbound and southbound directions, and one injury crash in each direction.

US 206 South Section, Milepost 34.98-35.61 (length – 0.63 miles): 42 crashes

Cross-Section Type: Four Lanes, Grass Median with Shoulders

Actual Crash Rate: 2.98, Statewide Crash Rate: 2.12

The US 206 South Section is a 0.63-mile stretch between the Farnsworth Avenue (CR 545) intersection and the US 130/US 206 merge. Forty-two crashes occurred in this section between 2007 and 2009, and it had a crash rate of 2.98, which is above the statewide rate of 2.12. There were more crashes heading northbound than southbound, with 24 and 16, respectively. The predominant collision types included rear-end, hit parked vehicle, hit animal, pedestrian, and bicyclist. All of these collision types exceeded the statewide crash rate. Rear-end crashes were the most predominant type, at 55 percent of the total. The majority of crashes occurred during the daytime and on dry surface conditions.

There were no fatal crashes within the section, 13 injury crashes, and 29 PDO crashes. Ten crashes were coded as “at intersection,” and 32 occurred between intersections.

Sixty-two percent of the section’s crashes were concentrated in the vicinity of the Farnsworth Avenue intersection, a 0.04-mile-long stretch. Twenty-six crashes occurred in this area, including 18 rear-end, two sideswipe, two hit-fixed-object, one left turn or U-turn, one bicyclist, and one pedestrian. Ten of the section’s 13 injury crashes occurred in this concentration area.

US 206 North Section, Milepost 36.27-36.80 (length – 0.53 miles): 40 crashes

Cross-section Type: Four or More Lanes, Grass Median with Shoulders

Actual Crash Rate: 2.93, Statewide Crash Rate: 2.12

The US 206 North Section is the northwest branch of the study area between the US 206/US 130 split to just north of the East Park Street/Amboy Road (CR 662) signalized intersection. Forty crashes were recorded here between 2007 and 2009. Its crash rate is 2.93, above the statewide crash rate of 2.12. There were slightly more crashes in the southbound direction than in the northbound direction, with 19 and 15, respectively. The predominant collision types included right-angle, left turn, overturned, hit-fixed-object, and hit animal, all of which exceed the 2009 statewide crash rate. Again, as in each of the sections, rear-end crashes were the most predominant, at 33 percent, though not exceeding the statewide number. There were no crashes involving bicyclists or pedestrians. Nearly half (45 percent) of the crashes occurred at nighttime, and 78 percent occurred on dry surface conditions. Of the total crashes, none were fatal, 15 resulted in injury, and 25 were PDO.

Within the US 206 North Section, a concentration area in the vicinity of the East Park Street/Amboy Road intersection was studied in more depth. This is a 0.03-mile-long segment, where 22 crashes occurred (55 percent of the section total), including 10 rear-end, four right-angle, three hit-fixed-object, two sideswipe, two left turn/U-turn, one animal, and one overturned. Eight of the entire North Section’s 15 injury crashes occurred in this concentration area, seven in the southbound direction.

Five of the remaining injury crashes occurred in the vicinity of the US 206 Mastoris Diner entrance. This southbound access from US 206 requires a left turn over two lanes of oncoming traffic, and at a point of limited sight distance. Although this area did not experience a significant concentration of crashes, it was examined in detail during the field visit to document its potentially dangerous alignment.

CHAPTER 3

Findings and Recommendations

The following section summarizes the findings, potential strategies, and priorities of the US 130/ US 206 RSA study area in Burlington County, New Jersey. The table for each section shows site-specific safety issues and corresponding potential strategies, general ratings for difficulty to implement, proposed safety benefits, and responsible agency. Also included is the notation ***NJDOT*** to indicate consistency with NJDOT's preceding study, where appropriate. A corresponding aerial map indicating the relative location of each identified issue (where possible) accompanies each table.

DVRPC uses the following general descriptions to characterize each of the three ratings associated with the "difficulty to implement" category:

- Low—can be accomplished through maintenance;
- Medium—requires use of existing or new contract, and some engineering, funding may be readily available; and
- High—longer-term project, may need full engineering, and may require right-of-way acquisition and new funding.

Yellow highlighting identifies those issues that have a low rating for difficulty to implement. These improvements can typically be addressed through maintenance, or without beginning a new planning or engineering effort. Other priorities expressed by the group include those that improve pedestrian and bicyclist access and safety, and those that address circulation issues.

It is expected that implementing these recommendations will improve the safety and operations along the study corridors. Note that potential strategies that call for further study do have a safety benefit in that they are the next step toward a more detailed and appropriate safety improvement. Given fiscal constraints, recommendations may be considered one at a time or in small groups.

Being the roadway owner, NJDOT should use the findings of the RSA as a guide for designing improvements to address these issues. Whereas the RSA findings are numerous, NJDOT should use its experience in safety engineering to determine which issues from the table will yield the highest safety benefit given limited funds.

No safety issues were identified on the corridor segments represented in aerial panels 2, 4, 8, and 9 during the audit event; thus, no figure or table is provided for those segments of the study corridor in the final report.

Figure 3: Panel 1 – Vicinity of Farnsworth Avenue Intersection with US 130

Table 1: Panel 1 – Vicinity of Farnsworth Avenue Intersection with US 130

Site-Specific Issue	Potential Strategy (*NJDOT* - indicates consistency with Baker study)	Difficulty to Implement	Estimated Safety Benefit	Responsible Agency
1. Missing pedestrian crossings and curb ramps on select approaches at the Farnsworth Avenue and US 130 intersection;	1. Install/upgrade all crossings with striping, ADA-compliant curb ramps, and signal heads, and extend medians into crosswalks; ***NJDOT***	1. Medium	1. High	1. NJDOT
2. Right-turn-on-red allowance onto US 130 from Farnsworth Avenue compromises safety for pedestrians crossing Farnsworth Avenue;	2. Add "no turn on red when pedestrians are present" sign to give pedestrians priority, and consider traffic calming to slow right-turning vehicles, which were observed taking these turns without slowing appropriately;	2. Low	2. High	2. NJDOT
3. Median opening located north of the intersection has an antiquated design and presents a safety hazard;	3. Close median opening--U-turns can be made at the intersection or further north between existing opening and the Butts Avenue intersection;	3. Low	3. High	3. NJDOT
4. Lack of left turn green time for EB and WB Farnsworth Avenue traffic--only EB has a protected phase;	4. Revisit signal plan and optimize;	4. Low	4. Medium	4. NJDOT
5. Inadequate storage capacity in the dedicated left-turn lane to Farnsworth WB from US 130 NB leads to overflow traffic demand spilling into US 130 NB through lane;	5. Conduct left-turn capacity analysis; extend left-turn queue if appropriate (coordinate with #4);	5. Low	5. Medium	5. NJDOT
6. Inadequate turning radius/intersection geometry for traffic on US 130 NB turning right onto Farnsworth Avenue EB; especially problematic for large trucks. This situation causes congestion on US 130 NB when trucks turning right become stuck due to encroachment by Farnsworth Avenue WB traffic;	6. This location requires a comprehensive effort due to the constraints of existing land use conditions. Short term: Coordinate with gas station owner to narrow the westernmost driveway along Farnsworth Avenue WB to allow the stop bar to be moved east (which can be addressed temporarily with striping). This will provide needed clearance for trucks to complete right turns unimpeded. Long term: close western-most driveway. Also, consider evaluating ROW options to improve turn radius: a) redesign intersection to better accommodate trucks; b) use regional approach to	6. Medium-High	6. High	6. NJDOT

Site-Specific Issue	Potential Strategy (*NJDOT* - indicates consistency with Baker study)	Difficulty to Implement	Estimated Safety Benefit	Responsible Agency
	connect trucks with their US 206 destinations that does not include the US 130 NB right turn onto Farnsworth Avenue EB; consider new ramp from US 130 NB to US 206 SB north of the intersection and south of the merge (above car dealership); *Note:* Gas station owners reportedly have an application before the Township Planning Board to redo the gas station into a food mart, which may present an opportunity to address access.			
7. ROW encroachment (at Haines Trucking);	7. Work with business owner to modify existing use of ROW and bring into compliance;	7. Medium	7. Medium	7. NJDOT/ Local MCDs/ Burlington County
8. No formal pedestrian accommodations along US 130 between Farnsworth Avenue and Crosswicks Avenue (missing sidewalks and curb ramps). Pedestrian travel is common along this stretch of US 130 as observed during field visit;	8. Develop comprehensive pedestrian access plan that addresses ROW encroachment issues and ADA accessibility; install sidewalks where missing;	8. Medium-High	8. Medium	8. NJDOT
9. Poor access for bicyclists between the intersections at Farnsworth Avenue and Crosswicks Avenue (north) along US 130, including: deteriorated pavement, duplicative driveways, and narrow or missing shoulders;	9. Pavement condition will be addressed during next repaving, consider creating shoulder out of median space or narrowing lanes; *Note:* This area is reportedly within the Bordentown Township redevelopment zone, presenting an opportunity to rethink the current layout.	9. Medium-High	9. Medium	9. NJDOT
10. The Farnsworth Avenue approaches to the US 130 intersection lack adequate space for bicyclists;	10. Consider intersection geometry change to narrow or eliminate lanes and provide needed ROW to accommodate bicyclists (coordinate with #6, and #9);	10. Medium	10. High	10. NJDOT
11. Poorly delineated and confusing merge area where I-295 NB off ramp merges with US 130 NB. This may be an area of excess capacity.	11. Investigate feasibility of a capacity reduction on US 130 NB, which will provide space for a better-designed, safer merge;	11. Medium-High	11. Medium	11. NJDOT

Source: DVRPC, 2011

Figure 4: Panel 3 – Vicinity of Crosswicks Street/Butts Avenue Intersections with US 130/US 206

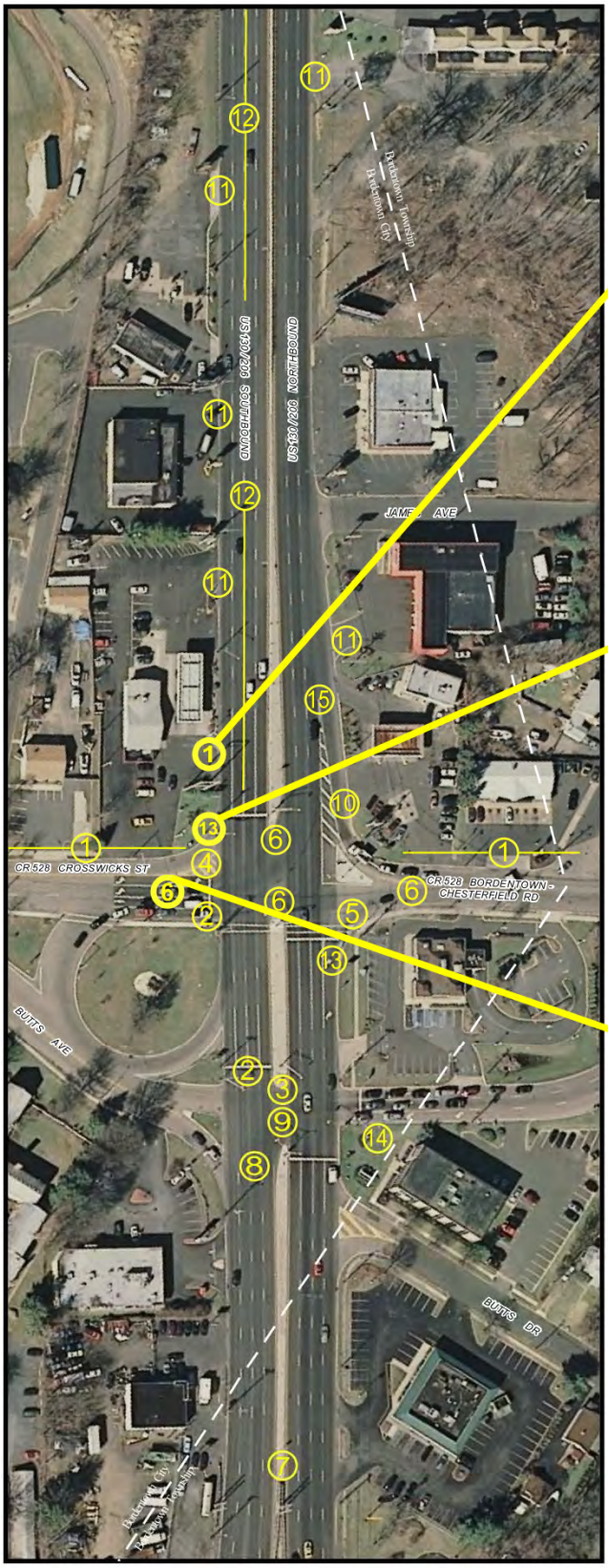


Table 2: Panel 3 – Vicinity of Crosswicks Street / Butts Avenue Intersections with US 130/US 206

Site-Specific Issue	Potential Strategy (*NJDOT* - indicates consistency with Baker study)	Difficulty to Implement	Estimated Safety Benefit	Responsible Agency
1. Missing sidewalk along both US 130 NB and SB directions for most of panel, and along north side of Crosswicks Street;	1. Install sidewalks, where missing, to accommodate pedestrians between and through the intersections; ***NJDOT***	1. Medium	1. High	1. NJDOT
2. Stop bars currently aligned in center of pedestrian crosswalk (crossing US 130 at Butts, and crossing Crosswicks Street along eastbound approach;	2. Move stop bar back (north) at US 130 and Butts intersection, and move stop bar back (west) on Crosswicks Street; ***NJDOT***	2. Low	2. High	2. NJDOT
3. Crossing US 130 at Butts Avenue, the pedestrian refuge island is not properly aligned with the ADA ramps and crosswalk endpoints;	3. Redo pedestrian refuge island to align properly, and add signal and pedestrian heads;	3. Medium	3. High	3. NJDOT
4. Curb ramp on NW corner Crosswicks intersection is not ADA compliant;	4. Redo curb ramp to meet ADA requirements;	4. Medium	4. High	4. NJDOT
5. The receiving lane on the east side of the intersection for Crosswicks EB traffic is mismatched with the west side sending lane;	5. Evaluate need for two through lanes on Crosswicks Street EB, eliminate lane if not necessary, restripe to match west side lane;	5. Medium	5. High	5. NJDOT
6. No space for bicyclist to go through Crosswicks intersection at either approach;	6. Restripe intersection approaches to provide bicyclist-friendly shoulder width; dedicated bike lane;	6. Low	6. Medium	6. NJDOT
7. The section of median pedestrian fence near Denny's Restaurant has been hit repeatedly;	7. Reinstall pedestrian fence on jersey barriers; ***NJDOT***	7. Low	7. Medium	7. NJDOT
8. Left turns from Butts Avenue to US 130/US 206 SB present a potential conflict with Butts Avenue EB slip ramp to SB 206/130, and both have a relatively short roadway length in which to choose between US 130 SB or US 206 SB before the split;	8. Add elephant tracks for left turns from Butts Avenue to 130/206 SB; EB Crosswicks to 130 NB; and consider pavement markings to provide advanced warning of the US 130/US 206 split to provide drivers ample notice; ***NJDOT;***	8. Low	8. Medium	8. NJDOT
9. Signal heads at Butts Avenue are different from those at Crosswicks Street and may present a safety hazard;	9. Evaluate effectiveness of existing signal heads and replace to match each other if safety benefit is identified;	9. Medium	9. Low	9. NJDOT

Site-Specific Issue	Potential Strategy (*NJDOT* - indicates consistency with Baker study)	Difficulty to Implement	Estimated Safety Benefit	Responsible Agency
10. Crosswicks Street WB slip ramp to US 130/206 NB has compromised sight distance and is generally problematic due to driveway frequency, length of acceleration lane, and excessive speed of through traffic;	10. Redo the slip ramp and median island to meet FHWA standard for pedestrian access; this will force vehicles to enter roadway closer to the intersection and improve sight distance; ***NJDOT***	10. Medium	10. High	10. NJDOT
11. Duplicative access points both for US 130 NB and SB between Crosswicks Street and Elizabeth/Ward streets to the north;	11. Implement access management at specific driveways by narrowing openings and eliminating duplicates–this fix is supported by the analysis;	11. High	11. High	11. NJDOT/ Local MCDs
12. US 130/US 206 SB may have excess capacity left over from the pre-interstate I-295 era;	12. Consider road dieting US 130/US 206 SB from four lanes to three and adding a shoulder;	12. Medium	12. High	12. NJDOT
13. The dedicated right-turn lane to Crosswicks Street from both US 130/US 206 NB and SB hampers safe bike and pedestrian movements at the intersection;	13. Consider squaring off the SE and the NW corners of US 130 and Crosswicks intersection to slow right-turning drivers to accommodate pedestrians;	13. Medium	13. High	13. NJDOT
14. Signs to indicate turns made from jug handle only for motorists on US 130/US 206 are ineffective, and as a result, drivers sometimes make illegal left turns at the intersection rather than use the far-side jug handle;	14. Evaluate sign placement, adequacy of advance warning, and messaging to improve the information flow to motorists; reinstall overhead US 130/US 206 signs; add lane marking in left through lane to indicate through movements only;	14. Low	14. High	14. NJDOT
15. Drivers entering the merge onto US 130 NB from Crosswicks are often speeding, making merge movements difficult and even dangerous.	15. Consider a gateway treatment to emphasize the posted 40 mph speed limit.	15. Medium	15. High	15. NJDOT

Source: DVRPC, 2011

Figure 5: Panel 5 – Median Crossover on US 206 at Mastoris Diner

Table 3: Panel 5 – Median Cross-Over on US 206 at Mastoris Diner

Site-Specific Issue	Potential Strategy (*NJDOT* - indicates consistency with Baker study)	Level of Effort	Estimated Safety Benefit	Responsible Agency
1. The major issue at this location is the crossover access to US 206 NB from the access road that serves the businesses located between the US 206 NB and SB lanes (see graphic). The crossover also serves the entrance to Mastoris Diner. A combination of limited sight distance of the oncoming traffic from the US 206 NB two-lane slip ramp, and reportedly higher-than-posted travel speeds, create a safety hazard at this location. This is further complicated by the horizontal and vertical curvature of US 206 NB approaching the crossover. Though the total number of crashes at this location is comparatively lower than others in the study area, the potential for higher severity crashes is cause for alarm. Also, vegetation overgrowth compromises sight distance;	1. This location can be improved by providing advance warning to drivers and slowing the through traffic to increase reaction time. Specifically, provide driveway ahead (or other appropriate) warning signs and pavement markings along US 206 NB slip ramp at appropriate intervals in advance of the cross-over. These should be used to supplement a flashing beacon. Note: *There is a feeling that the flashing beacon will be ineffective over time due to over-exposure*. Additionally, efforts should be made to clear the sight triangle obstructing this location. The long-term improvement is to relocate the cross-over to a spot with better sight distance, and possibly narrowing the passage to one lane to calm traffic;	1. Low-Medium	1. High	1. NJDOT/ Local MCDs/ Burlington County
2. On the south end of Panel 5 is the US 130 SB ramp crossover, which provides access to the businesses in the area between US 206 NB and SB, as well as stop-controlled access to US 206 SB before it merges with US 130 SB further south. This access point allows US 130 SB drivers to access the right-in right-out at Elizabeth Street from US 206 SB. Also, this early access to US 206 SB prior to the merge is used by informed drivers to access the businesses located along the highway frontage further south, and is somewhat safer because otherwise it requires a hard right weave from US 130 SB ramp crossing over two lanes while descending the roadway's downgrade. One issue here is the location of	2. Like Issue #1, this location can be improved by providing advance warning to drivers and slowing the through traffic to increase reaction time. Specifically, provide driveway ahead (or other appropriate) warning signs and pavement markings along US 130 SB ramp at appropriate intervals in advance of the cross-over; consider flashing beacon. Also, guide signing should be installed for the right turn to direct traffic to Elizabeth Street instead as an alternative to diving across the merge area. Motorist information signs could also be installed for the shopping area and Sunoco Gas Station;	2. Low-Medium	2. High	2. NJDOT

Site-Specific Issue	Potential Strategy (*NJDOT* - indicates consistency with Baker study)	Level of Effort	Estimated Safety Benefit	Responsible Agency
the crossover on the US 130 SB ramp. Located just beyond the crest of a vertical curve after an overpass, similar to the cross-over described in Issue #1, the limited sight distance presents a potential safety hazard;				
3. No sidewalks or other pedestrian accommodations between E. Park Street and Crosswicks Street for the entire length of the stretch.	3. Improve pedestrian access between E. Park Street and Crosswicks Street. The addition of sidewalks to Park Street along US 206 would accommodate pedestrians commuting to jobs along the corridor. Pedestrians were observed along this part of the study area during the field visit; ***NJDOT***.	3. High	3. High	3. NJDOT/ Local MCDs/ Burlington County

Source: DVRPC, 2011

Figure 6: Panel 6 – US 206 Intersection of US 206 and E. Park Street/Amboy Road

Table 4: Panel 6 – US 206 Intersection of US 206 and E. Park Street / Amboy Road

Site-Specific Issue	Potential Strategy (*NJDOT* - indicates consistency with Baker study)	Level of Effort	Estimated Safety Benefit	Responsible Agency
1. Pedestrian accommodations are missing at the intersection; e.g., no sidewalks or crosswalks, no curb ramps. There are push buttons, but missing signal heads render them useless. Pedestrians were observed crossing this location during the field visit;	1. Add sidewalks, crosswalk, curb ramps, and pedestrian signal heads to accommodate pedestrians. A long-term improvement to complement ground-level access involves utilizing the adjacent freight rail line ROW to provide east-west pedestrian access; ***NJDOT***	1. High	1. High	1. NJDOT
2. Bicyclists are not accommodated along the east-west intersection approaches due to missing shoulders;	2. Restripe the approaches for narrower lanes to create a small shoulder for bicyclists. A long-term improvement to complement ground-level access involves utilizing the adjacent freight rail line ROW to provide east-west bike access (coordinate with imp. Strategy #1);	2. Low	2. Medium	2. NJDOT
3. Compromised sight distance due to vertical curve and overgrown vegetation of Amboy Road WB traffic for jug handle traffic entering Amboy Road WB;	3. Cut back vegetation and install warning signs and pavement markings in advance of jug handle to warn of entering traffic;	3. Low	3. Medium	3. Burlington County
4. The right-turn movement from US 206 NB to Amboy Road EB lacks proper clearance, as drivers frequently cross into the WB stop bar on Amboy Road while turning right;	4. Move stop bar back (east) to provide needed clearance for right turns from US 206 NB; ***NJDOT***	4. Low	4. Medium	4. Burlington County
5. Hit-fixed-object crashes were noted as common by the study team, and this is consistent with the data analysis;	5. Upgrade crash attenuators under bridge, provide extra warning if necessary, and add elephant tracks for left turns from Amboy Road WB to US 206 SB;	5. Low	5. Medium	5. NJDOT
6. It was noted by the study team that it is common for US 206 NB drivers to make an illegal left turn at the intersection rather than use the far-side jug handle.	6. Add signs to better communicate that left turns must be made via far-side jug handle; add lane marking in left- through lane to indicate through movements only. ***NJDOT***	6. Low	6. Medium	6. NJDOT

Source: DVRPC, 2011

Figure 7: Panel 7 – Median Crossover at US 130 at Mastoris Diner

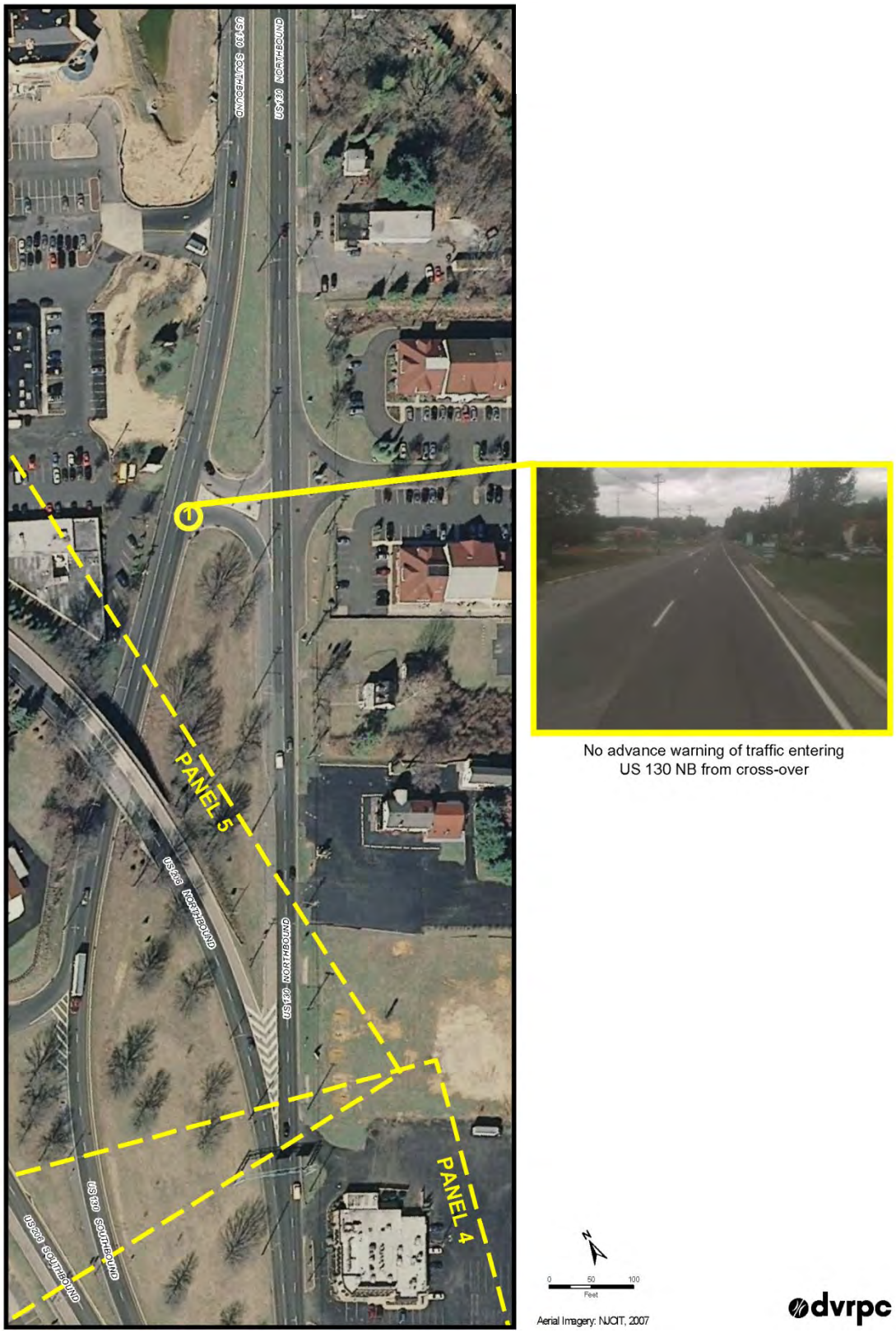


Table 5: Panel 7 – Median Cross-Over at US 130 at Mastoris Diner

Site-Specific Issue	Potential Strategy (*NJDOT* - indicates consistency with Baker study)	Level of Effort	Estimated Safety Benefit	Responsible Agency
1. Just as US 130 SB splits near Mastoris Diner, there is median opening crossover that facilitates U-turns between US 130 NB and SB. During the field visit, it was observed that no advance warning is given to motorists on US 130 NB of traffic entering the roadway from the crossover.	1. This location can be improved by providing advance warning to drivers and slowing the through traffic to increase reaction time. Specifically, provide driveway ahead (or other appropriate) warning signs and pavement markings along US 130 SB and NB at appropriate intervals in advance of the cross-over; consider flashing beacon. The long-term improvement for this location is to relocate this access to a better/safer location with better sight distance.	1. Low/High	1. High/High	1. NJDOT

Source: DVRPC, 2011

Figure 8: Panel 10 – Intersection of US 130 and Highbridge Road

Note:
#2 not shown on map

Illegal u-turns made at the median break for Highbridge Road

0 50 100
Feet

Aerial Imagery: NJOIT, 2007

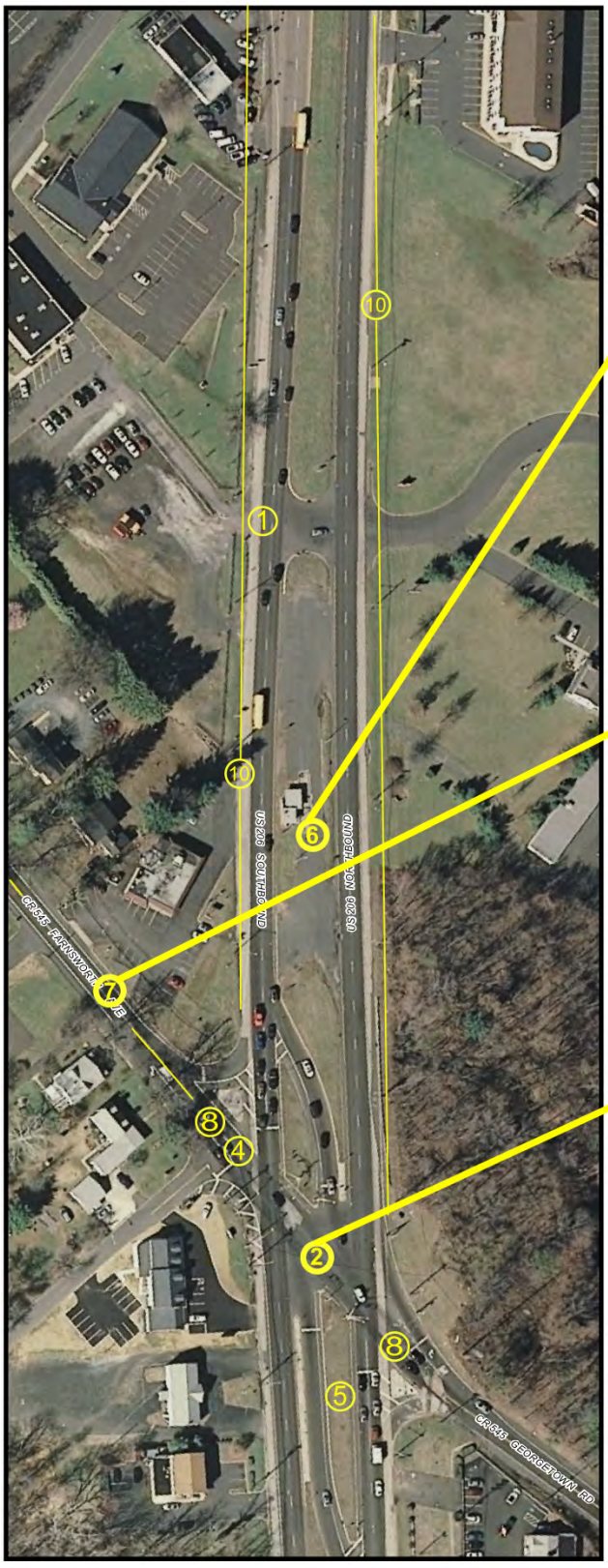
dvrpc

Table 6: Panel 10 – Intersection of US 130 and Highbridge Road

Site-Specific Issue	Potential Strategy (*NJDOT* - indicates consistency with Baker study)	Level of Effort	Estimated Safety Benefit	Responsible Agency
1. Illegal U-turns made at the median break for Highbridge Road from 130 SB; this move is prohibited because of the limited sight distance resulting from the vertical curve a short distance south of the intersection;	1. In the short term, add supplementary signs to reinforce that U-turns are illegal. The study team explained that many of the illegal U-turns are made by drivers en-route to commercial establishments located along US 130 NB. Installing a new median break at the Villa Mannino driveway to accommodate only left-turns from SB 130, and not cross-over access to US 130 SB, will provide the needed access that is currently utilized via illegal, and unsafe, U-turns at Highbridge Road;	1. Medium	1. High	1. NJDOT
2. Highbridge Road is difficult to see from US 130 due to the surrounding wooded area and poor lighting conditions.	2. Install an intersection ahead warning sign or flashing beacon for Highbridge Road; consider additional street lighting; reinforce the no U-turn signage at and in advance of Highbridge Road for US 130 SB traffic.	2. Low	2. Medium	2. NJDOT/ Bordentown Twp.

Source: DVRPC, 2011

Figure 9: Panel 11 – Intersection of US 206 and Farnsworth Avenue

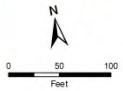


Note:
#3 Not shown on map
#9 Not shown on map

Defunct weigh station approximately 100 feet north of intersection

Traffic on Farnsworth Avenue backs up between US 130 and US 206

Missing pedestrian crossing accomodations on every leg of intersection



Aerial Imagery: NJOIT, 2007

dvrpc

Table 7: Panel 11 – Intersection of US 206 and Farnsworth Avenue

Site-Specific Issue	Potential Strategy (*NJDOT* - indicates consistency with Baker study)	Level of Effort	Estimated Safety Benefit	Responsible Agency
1. US 206 SB peak-period traffic queue blocks police access to cross-over median opening;	1. Stripe roadway section as "Do Not Block the Box" and add appropriate signs;	1. Low	1. Medium	1. NJDOT
2. Missing crosswalks, curb ramps, sidewalks, push buttons, and pedestrian signal heads;	2. Install pedestrian amenities, starting with crosswalks, push buttons, and pedestrian signal heads; curb ramps will follow with sidewalks;	2. Medium	2. High	2. NJDOT
3. Coordination between Farnsworth Avenue signal and the Crosswicks and Butts intersection seems lacking based on the recurring traffic queue; reportedly inadequate intersection clearance interval;	3. Evaluate signal coordination and optimization in the sub-network;	3. Medium	3. Medium	3. NJDOT/ Burlington County
4. The location of the Farnsworth Avenue EB approach stop bar currently allows queuing drivers to block access to the side road where the water authority is located;	4. Retain existing stop bar and install a second stop bar west of side road approach to create a gap that allows drivers from the side road access to Farnsworth Avenue;	4. Low	4. Medium	4. Burlington County
5. Inadequate signage prohibiting U-turns for trucks along 206 NB at the intersection;	5. Reinforce existing no U-turn warning signs;	5. Low	5. Medium	5. NJDOT
6. Defunct weigh station, located in the median approximately 100 feet north of the intersection, inhibits safety and operational improvements opportunities;	6. Investigate future of the building and associated ROW issues.	6. Low	6. Low-Medium	6. NJDOT
7. Traffic on Farnsworth Avenue WB backs up to US 206 from US 130;	7. Addressing this problem involves improvement strategy discussed in Panel 1, #5;	7. Medium	7. Medium	7. NJDOT/ Burlington County
8. Left turns from Farnsworth/Georgetown Avenues are not delineated, creating some confusion;	8. Add elephant tracks for left turns and add arrow markings to center-of-left lane to instruct drivers;	8. Low	8. Medium	8. Burlington County

Site-Specific Issue	Potential Strategy (*NJDOT* - indicates consistency with Baker study)	Level of Effort	Estimated Safety Benefit	Responsible Agency
9. Peak-period congestion and noted operational issues create safety concerns;	9. The team suggested that a roundabout be considered as a replacement for the existing signalized intersection to maintain traffic flow and provide an opportunity for pedestrian improvements;	9. High	9. High	9. NJDOT/ Burlington County
10. No sidewalks or other pedestrian accommodations are in place between the Farnsworth Avenue intersection and the Crosswicks Street intersection along US 206.	10. Consider a median diet to reduce footprint of entire intersection and reduce the dilemma zone of the intersection that would provide needed space for a sidewalk.	10. High	10. High	10. NJDOT/ Burlington County

Source: DVRPC, 2011

CHAPTER 4

Conclusion

The RSA is conducted to generate improvement recommendations and countermeasures for roadway segments or intersections demonstrating a history of, or potential for, motor vehicle crashes. The safety recommendations, identified during the audit and documented in this report, should improve the safety of the study area when implemented. Some 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 will dictate the implementation schedule.

This RSA benefited by being one of three transportation studies focused on the US 130/US 206 confluence through Bordentown City and Bordentown Township. A common theme highlighted in each effort is the need for better pedestrian facilities and for new pedestrian connections. Also important is the lack of connectivity that is typically inherent with a divided roadway. Although this configuration benefits throughput, it comes at the expense of access and circulation that can cause increased traffic on side streets.

The NJDOT study, *Rt. 130/Rt. 206 Bicycle and Pedestrian Corridor Plan,* includes improvement recommendations also found in this RSA document, though that report is primarily focused on pedestrian facilities and related issues. DVRPC's corridor study of this area from the same time period also considers safety issues echoing those identified in this report, but takes a closer look at vehicular movements and circulation. The forthcoming report is titled *Traffic-Calming Alternatives for Routes 130 and 206 in Bordentown, NJ*.

When it comes to improving safety, engineering strategies alone only go so far, especially when trying to address bicyclist and pedestrian safety. Education, with support from a targeted enforcement campaign, is an effective approach for addressing the driver behaviors that lead to crashes. Policy or legislative actions can provide the legal weight needed to motivate people to be safer and more conscientious drivers. Employing a multipronged approach and engaging the appropriate stakeholders is an effective course of actions to advance the goal of improved safety on US 130/US 206 corridors in Bordentown City and Bordentown Township in Burlington County.

It is recommended that the issues highlighted in yellow (from the preceding section) be implemented first because they typically require a lower level of effort to implement; some of these improvements are projected to have a medium or high safety benefit. Many of these items are low-cost safety improvements, like signs and pavement markings, and can be implemented through the existing maintenance schedule.

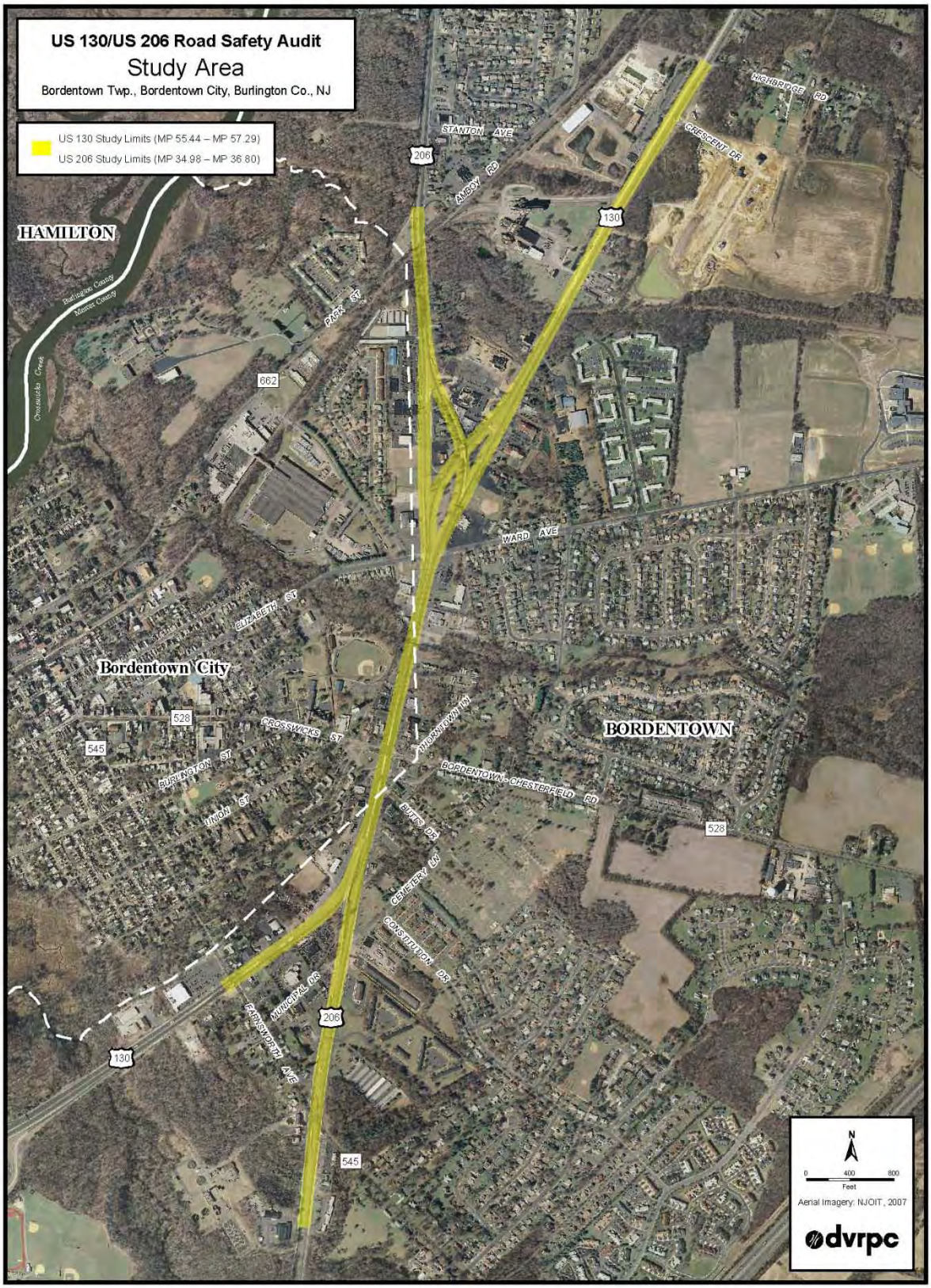
Appendix A

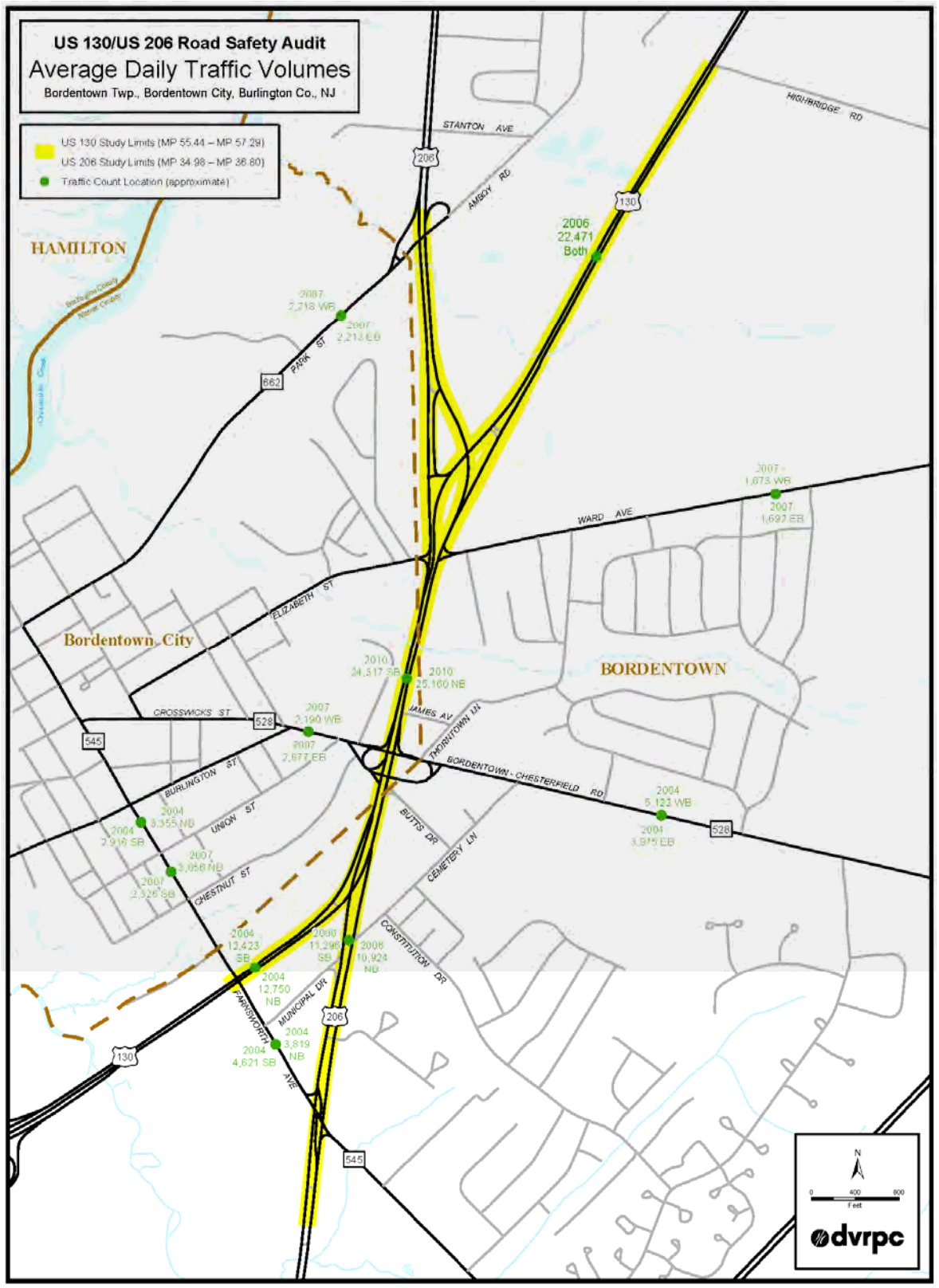
Audit Team

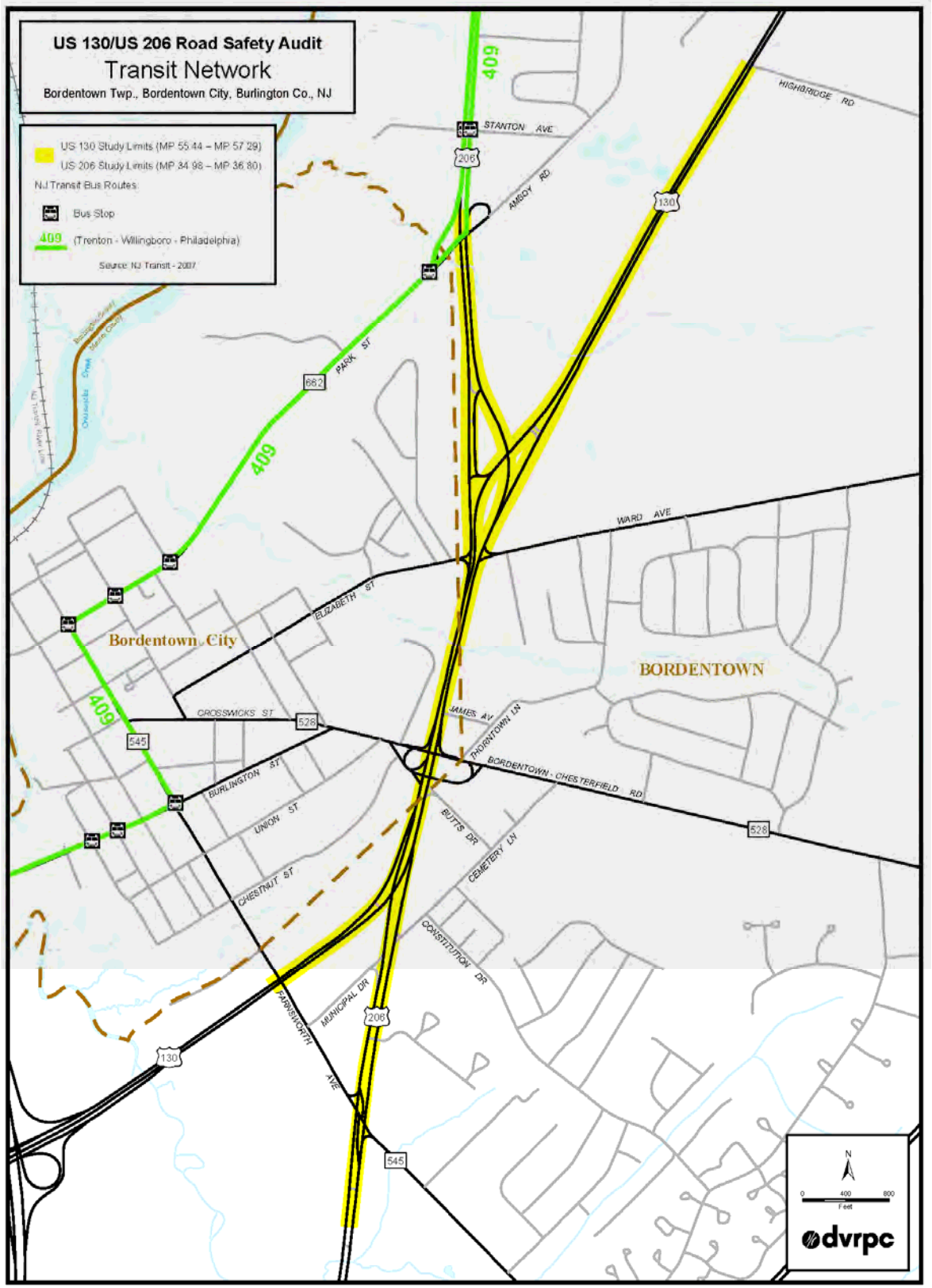
Name	Agency
John Boyle	Bicycle Coalition of Greater Philadelphia
New Jersey State Assemblyman Joseph Malone	Representing Bordentown City
Fred Miller	Bordentown City Police
Vanessa Price	Bordentown City – Resident
Jason Medina	Bordentown Township – Committeeman
Chief Frank Nucera Jr.	Bordentown Township Police
Gary Wheelock	Bordentown Township – Resident
Marty Livingston	Burlington County Engineers Office
Regina Moore	DVRPC
Kevin Murphy	DVRPC
Caroline Trueman	FHWA – NJ
Layla Fryc	Michael Baker Jr., Inc.
Steven Wong	Michael Baker Jr., Inc.
Ray Reeve	NJ Division of Highway Traffic Safety
Elise Bremer-Nei	NJDOT Bike/Pedestrian Programs

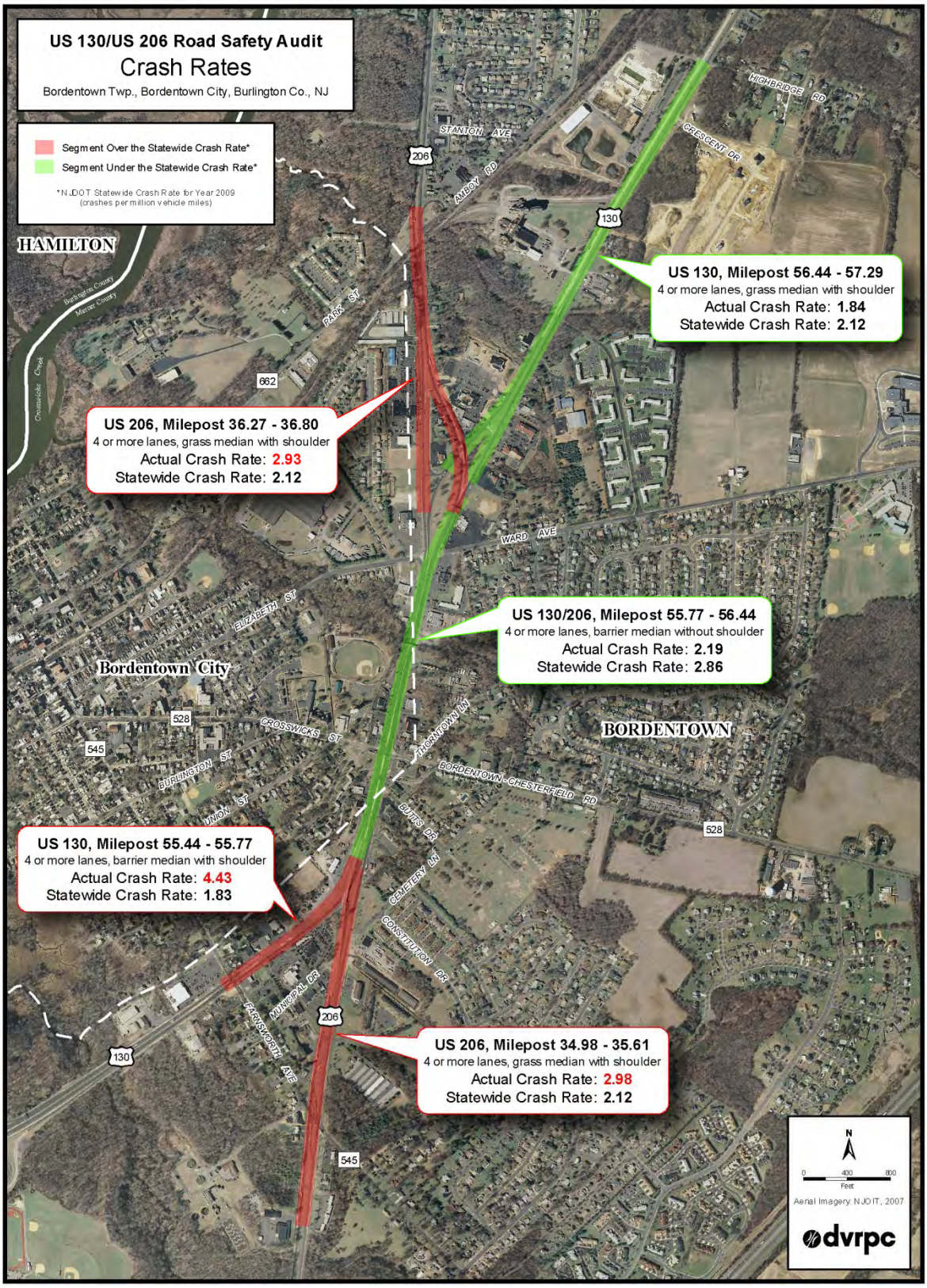
Appendix B

Maps


US 130/US 206 Road Safety Audit
Study Area
Bordentown Twp., Bordentown City, Burlington Co., NJ
US 130 Study Limits (MP 55.44 – MP 57.29)
US 206 Study Limits (MP 34.98 – MP 36.80)
HAMILTON
Bordentown City
BORDENTOWN
STANTON AVE
AMBOY RD
HIGHBRIDGE RD
CRESCENT DR
PARK ST
WARD AVE
ELIZABETH ST
CROSSWICKS ST
BURLINGTON ST
UNION ST
THORNTOWN LN
BORDENTOWN-CHESTERFIELD RD
CEMETERY LN
CONSTITUTION DR
MUNICIPAL DR
FARNSWORTH AVE
Burlington County
Mercer County
Crosswicks Creek
206
130
662
528
545
N
0
400
800
Feet
Aerial Imagery: NJOIT, 2007
dvrpc


US 130/US 206 Road Safety Audit
Average Daily Traffic Volumes
Bordentown Twp., Bordentown City, Burlington Co., NJ
US 130 Study Limits (MP 55.44 – MP 57.29)
US 206 Study Limits (MP 34.98 – MP 36.80)
Traffic Count Location (approximate)
HAMILTON
Bordentown City
BORDENTOWN
STANTON AVE
HIGHBRIDGE RD
AMBOY RD
PARK ST
WARD AVE
ELIZABETH ST
CROSSWICKS ST
JAMES AV
THORNTOWN LN
BORDENTOWN - CHESTERFIELD RD
BURLINGTON ST
UNION ST
CHESTNUT ST
BUTTS DR
CEMETERY LN
CONSTITUTION DR
MUNICIPAL DR
FARNSWORTH AVE
2006 22,471 Both
2007 2,718 WB
2007 2,213 EB
2007 1,673 WB
2007 1,697 EB
2010 24,517 SB
2010 25,160 NB
2007 3,190 WB
2007 2,677 EB
2004 3,355 NB
2004 2,916 SB
2007 3,056 NB
2007 2,326 SB
2004 5,123 WB
2004 3,975 EB
2004 12,423 SB
2008 11,296 SB
2008 10,924 NB
2004 12,750 NB
2004 3,819 NB
2004 4,621 SB
0 400 800
Feet
dvrpc


US 130/US 206 Road Safety Audit
Transit Network
Bordentown Twp., Bordentown City, Burlington Co., NJ
US 130 Study Limits (MP 55.44 – MP 57.29)
US 206 Study Limits (MP 34.98 – MP 36.80)
NJ Transit Bus Routes
Bus Stop
409 (Trenton - Willingboro - Philadelphia)
Source: NJ Transit - 2007
409
STANTON AVE
206
AMBOY RD
HIGHBRIDGE RD
130
PARK ST
682
WARD AVE
ELIZABETH ST
Bordentown City
BORDENTOWN
CROSSWICKS ST
528
545
JAMES AV
THORNTOWN LN
BORDENTOWN - CHESTERFIELD RD
BURLINGTON ST
UNION ST
CHESTNUT ST
BUTTS DR
CEMETERY LN
CONSTITUTION DR
MUNICIPAL DR
FARNSWORTH AVE
N
0 400 800
Feet
dvrpc

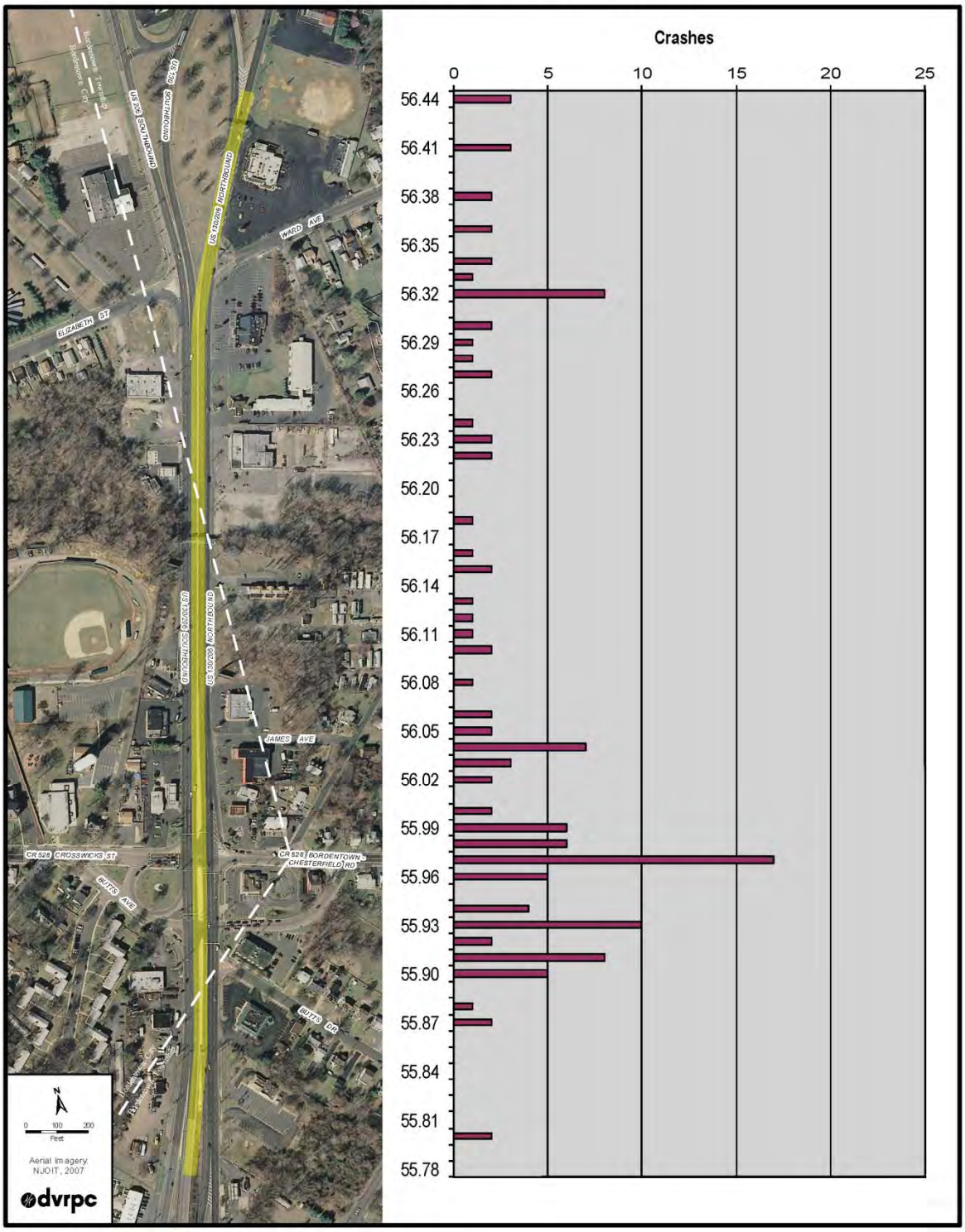

US 130/US 206 Road Safety Audit
Crash Rates
Bordentown Twp., Bordentown City, Burlington Co., NJ
Segment Over the Statewide Crash Rate*
Segment Under the Statewide Crash Rate*
*NJDOT Statewide Crash Rate for Year 2009 (crashes per million vehicle miles)
US 130, Milepost 56.44 - 57.29
4 or more lanes, grass median with shoulder
Actual Crash Rate: 1.84
Statewide Crash Rate: 2.12
US 206, Milepost 36.27 - 36.80
4 or more lanes, grass median with shoulder
Actual Crash Rate: 2.93
Statewide Crash Rate: 2.12
US 130/206, Milepost 55.77 - 56.44
4 or more lanes, barrier median without shoulder
Actual Crash Rate: 2.19
Statewide Crash Rate: 2.86
US 130, Milepost 55.44 - 55.77
4 or more lanes, barrier median with shoulder
Actual Crash Rate: 4.43
Statewide Crash Rate: 1.83
US 206, Milepost 34.98 - 35.61
4 or more lanes, grass median with shoulder
Actual Crash Rate: 2.98
Statewide Crash Rate: 2.12
HAMILTON
Bordentown City
BORDENTOWN
STANTON AVE
HIGHBRIDGE RD
CRESCENT DR
AMBOY RD
PARK ST
WARD AVE
ELIZABETH ST
CROSSWICKS ST
BURLINGTON ST
UNION ST
HIGHTOWN LN
BORDENTOWN-CHESTERFIELD RD
BUTTS DR
CEMETERY LN
CONSTITUTION DR
MUNICIPAL DR
FARNSWORTH AVE
Crosswicks Creek
Burlington County
Mercer County
206
130
662
528
545
N
0 400 800
Feet
Aerial Imagery: NJOIT, 2007
dvrpc

US 130/US 206 Road Safety Audit

Crash Frequency by Mile Post: US 130 - Farnsworth Ave. to US 206 Merge
0.33 Miles, 54 Crashes (2007-2009)

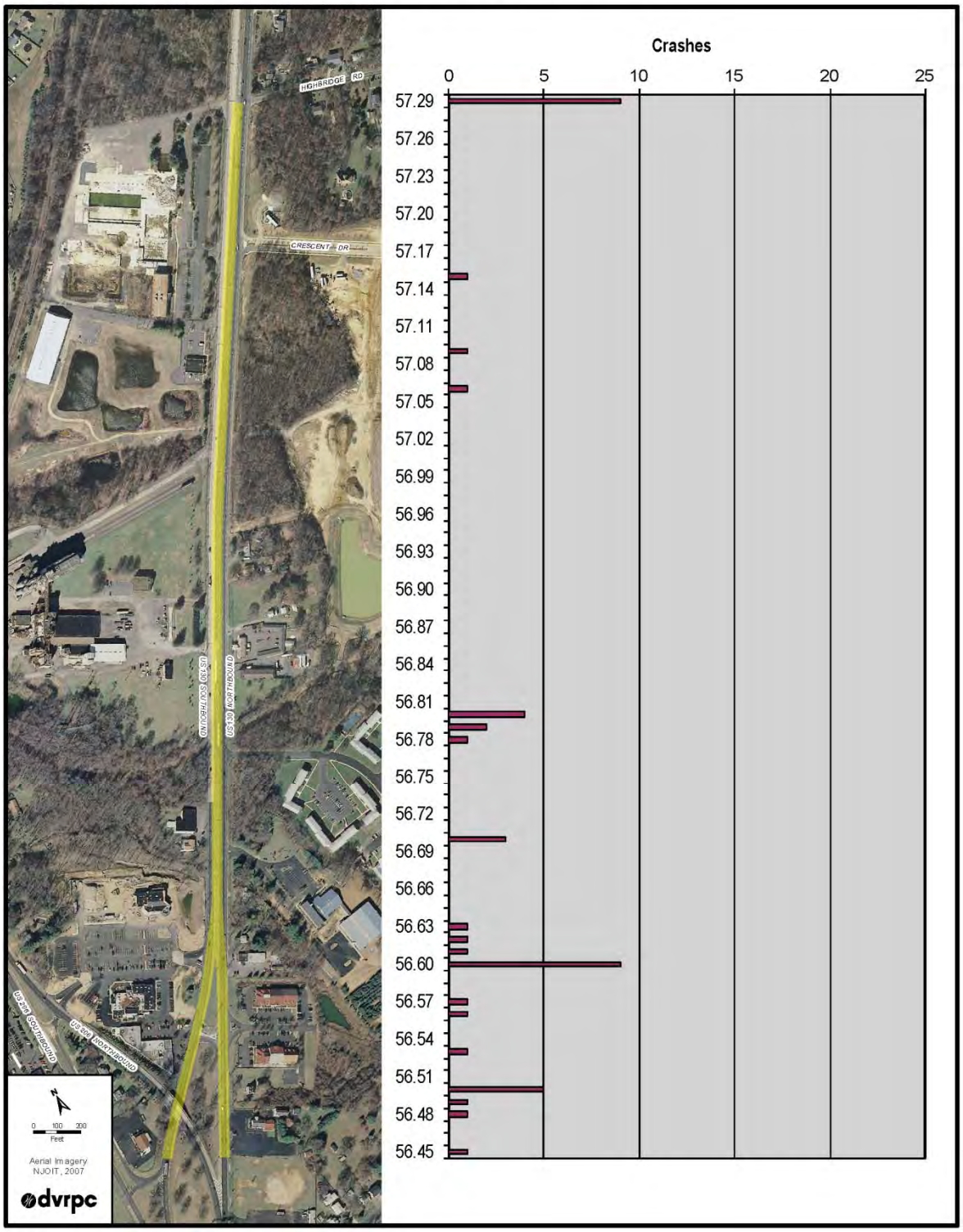
US 130/US 206 Road Safety Audit

Crash Frequency by Mile Post: US 130/206 Joint Section
0.66 Miles, 128 Crashes (2007-2009)



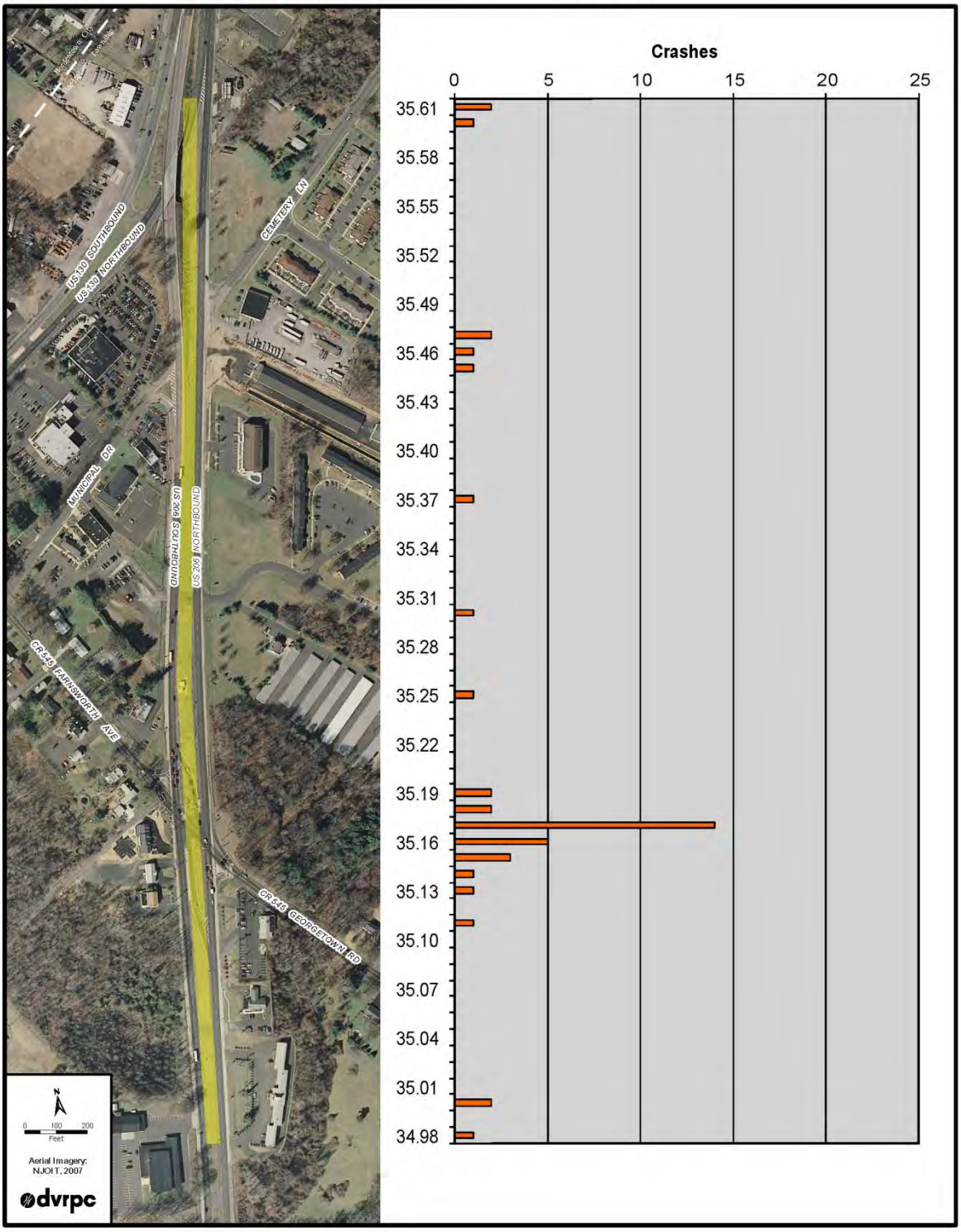
US 130/US 206 Road Safety Audit

Crash Frequency by Mile Post: US 130 - US 206 Split to Highbridge Rd.
0.84 Miles, 45 Crashes (2007-2009)



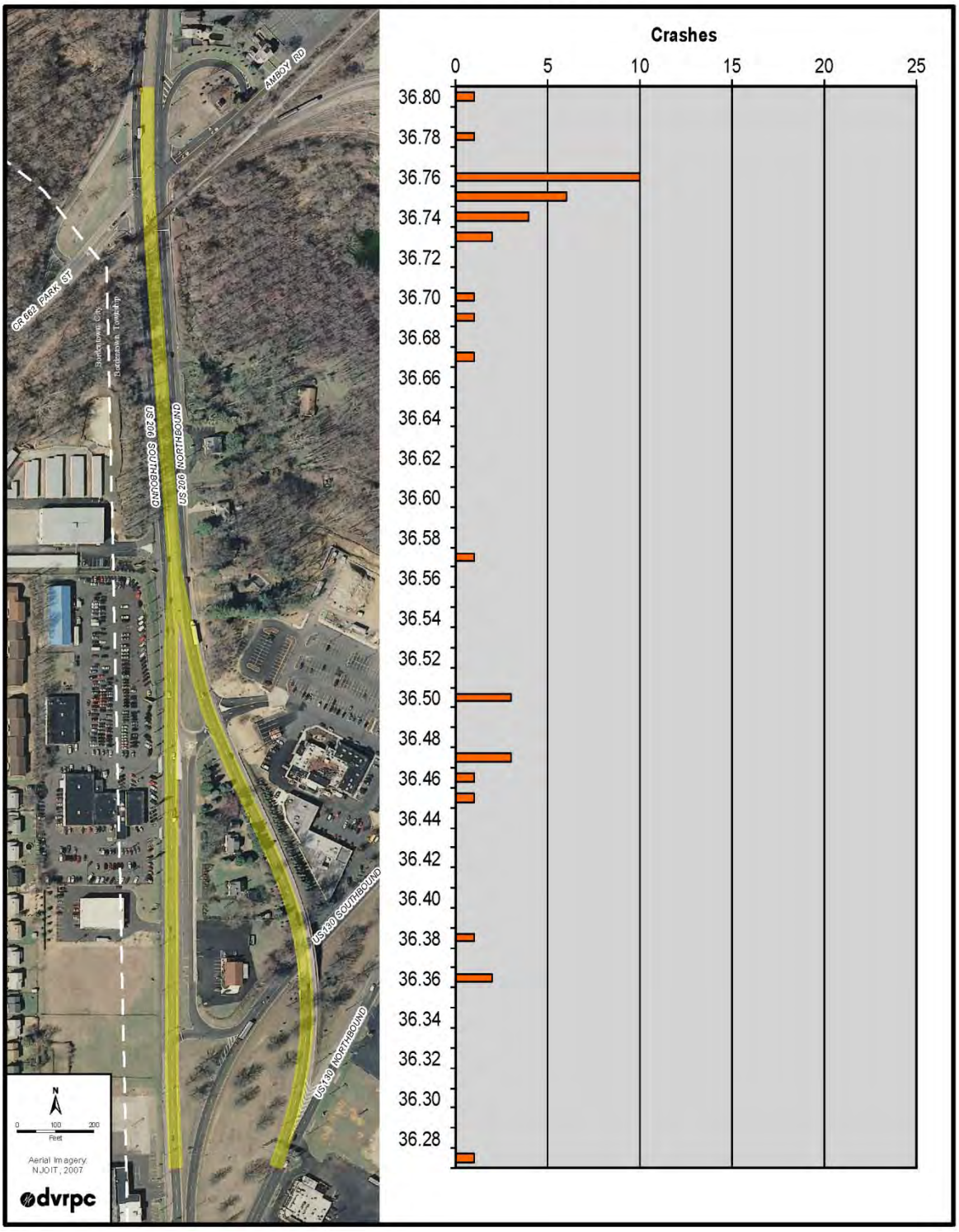
US 130/US 206 Road Safety Audit

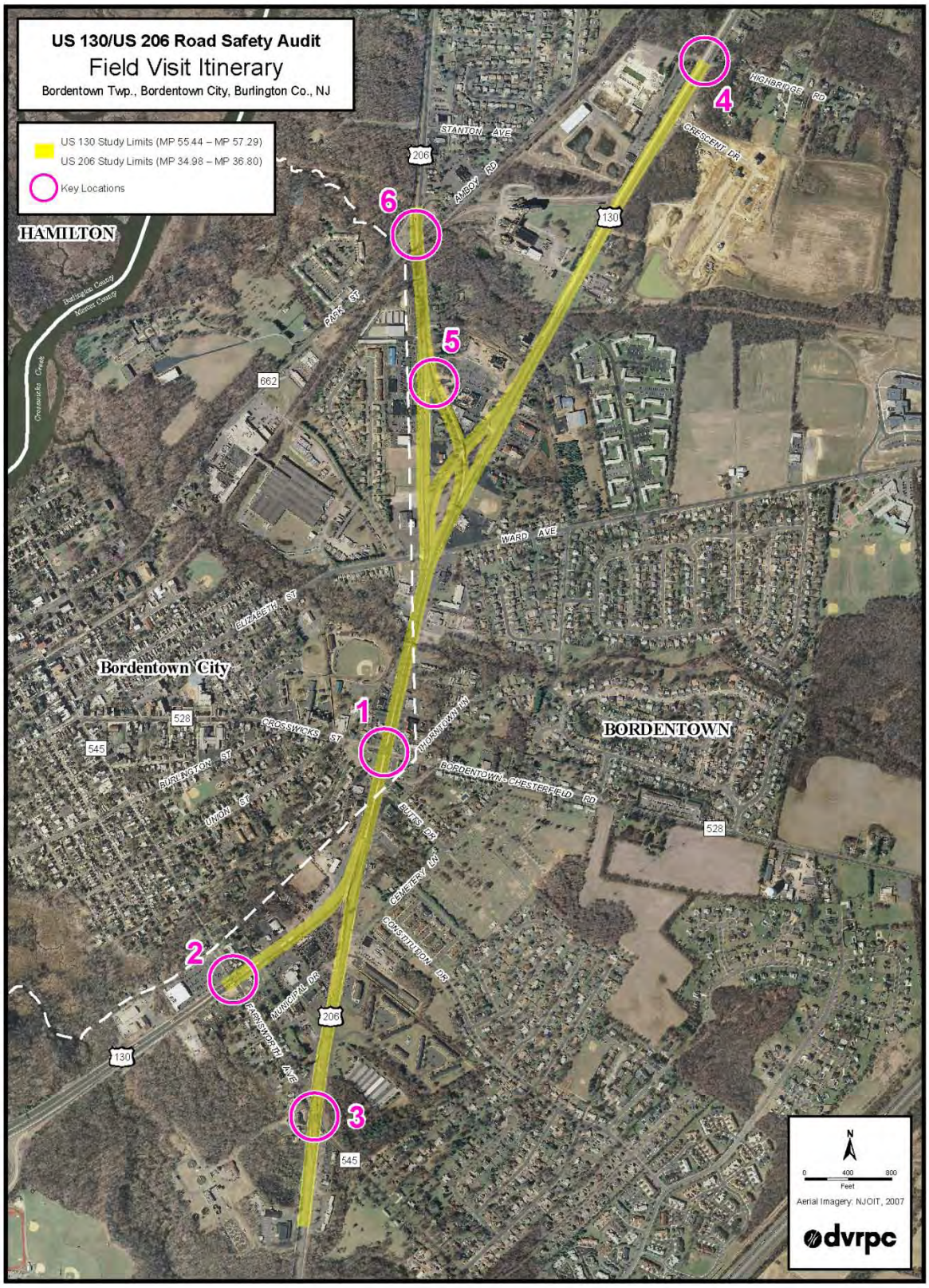
Crash Frequency by Mile Post: US 206 - Farnsworth Ave. to US 130 Merge
0.63 Miles, 42 Crashes (2007-2009)



US 130/US 206 Road Safety Audit

Crash Frequency by Mile Post: US 206 - US 130 Split to E. Park St.
0.53 Miles, 40 Crashes (2007-2009)




US 130/US 206 Road Safety Audit
Field Visit Itinerary
Bordentown Twp., Bordentown City, Burlington Co., NJ
US 130 Study Limits (MP 55.44 – MP 57.29)
US 206 Study Limits (MP 34.98 – MP 36.80)
Key Locations
HAMILTON
Bordentown City
BORDENTOWN
1
2
3
4
5
6
206
130
545
528
662
STANTON AVE
AMBOY RD
HIGHBRIDGE RD
CRESCENT DR
PARK ST
WARD AVE
ELIZABETH ST
CROSSWICKS ST
BURLINGTON ST
UNION ST
THORNTOWN LN
BORDENTOWN-CHESTERFIELD RD
BURTIS DR
CEMETERY LN
CONSTITUTION DR
MUNICIPAL DR
FARNSWORTH AVE
Crosswicks Creek
Burlington County
Mercer County
N
0 400 800
Feet
Aerial Imagery: NJOIT, 2007
dvrpc

Appendix C

Presentation

US 130 / US 206
Road Safety Audit

Bordentown City and Bordentown Township, Burlington County, NJ

REGIONAL SAFETY PROGRAMS

Tuesday, October 26, 2010

DVRPC – Delaware Valley Regional Planning Commission

- Metropolitan Planning Organization of the Delaware Valley serving 9 counties:
  - PA: Bucks, Chester, Delaware, Montgomery, and Philadelphia
  - NJ: Burlington, Camden, Gloucester, and Mercer
- Transportation Improvement Program (TIP)
  - DVRPC facilitates a regional body to oversee allocation of federal transportation funds

US 130 / US 206 RSA

- Why this section of US 130 and US 206?
  - NJDOT priority location for bicycle and pedestrian improvements
  - NJDOT/Michael Baker Jr., Inc safety study on bicycle and pedestrian access
- Collaboration between:
  - NJDOT Office of Bicycle and Pedestrian Programs
  - Burlington County Offices of Planning and Engineering
  - DVRPC's Office of Transportation Safety and Congestion Management

RSA Schedule

1. Pre-Audit Meeting - 8:00 AM
   - What are Road Safety Audits? – FHWA video
   - Analyze and discuss study area crash data and related safety issues
2. Field Visit
   - Foot/windshield survey of the corridor to identify safety issues and examine conditions
   - Lunch
3. Post Audit Meeting
   - Define problems
   - Brainstorm improvement ideas
   - Wrap up by 5:00 PM

What is a Road Safety Audit?

- Federal Highway Administration Road Safety Audit Video

What is a RSA?

- A safety performance examination of an existing or future road or intersection by an independent, multidisciplinary audit team

History of RSAs

- First used in the United Kingdom in 1980s
- Australia and New Zealand have used RSAs since the 1990s
- Formal practice in the United States began in 1997 when the Federal Highway Administration sponsored a pilot program in 13 states

Benefits

- Adaptable to local needs and conditions
- Short term
- Recommendations can be implemented in small stages as time and resources permit
- Can be performed during any stage of a project

Audit Team

- Assemblyman Joseph Malone III
- Bordentown Township Police Department
- Burlington County Planning, Engineering
- Public: Bordentown City, Bordentown Township
- US DOT / FHWA, New Jersey Division
- New Jersey DOT, Office of Bicycle and Pedestrian Programs
- New Jersey Division of Highway Traffic Safety
- Bicycle Coalition of Greater Philadelphia
- Michael Baker Jr., Inc.
- DVRPC

Audit Materials

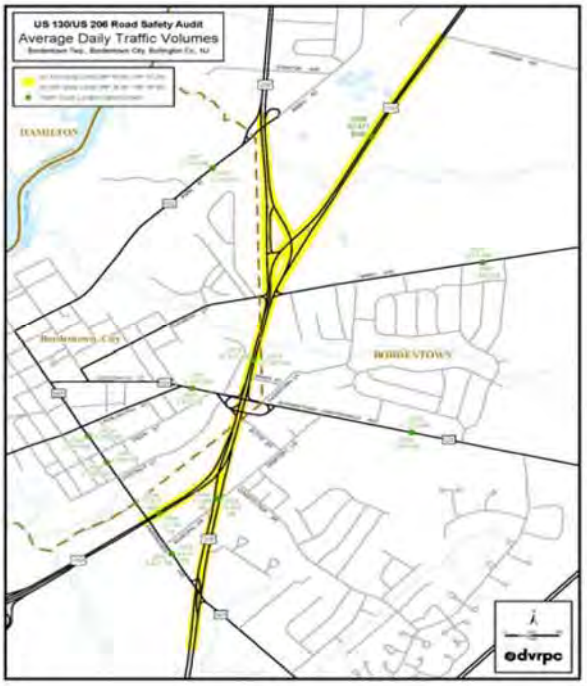
- Location Maps/Aerials
- Crash Data
  - Data Summaries
  - Maps/Analysis
- Traffic Counts
  - AADTs
  - Turning Movement Counts
- Checklist
- Field Note Sheets

Study Area

- US 130
  - 1.83 miles
  - Farnsworth Ave to Highbridge Rd
- US 206
  - 1.16 miles
  - Farnsworth Ave to E Park St
- Land Use
  - Predominantly commercial frontage along each corridor
  - Residential beyond

Traffic Volumes

- Traffic volumes provided by:
  - Michael Baker, Jr. Inc.
  - DVRPC
  - NJDOT SLD
- AADTs
  - South: 11,000 vehicles per direction on US 206; 12,000 vehicles per direction on US 130
  - Central: approx. 25,000 vehicles in each direction
  - North: 11,000 vehicles per direction on US 130



Transit

- NJ Transit Bus 409 (Trenton, Willingboro, and Philadelphia)
  - No service along 130/206 within study limits, enters corridor at E. Park St.
  - 7 bus stops in Bordentown City along Routes 545 and 662
  - Peak hour headways: every hour in AM, and every 30 minutes in PM
  - Off-peak headways: every hour
- NJ Transit River LINE
  - Located west of the study area
  - 1 stop in Bordentown

Operational Characteristics

US 130 / US 206

- Functional classification
  - Urban Principal Arterial
- Speed limit
  - Between 40 and 55 mph
- Intersections
  - 5 signalized, 7 unsignalized
- Access Points
  - Aprx. 93 driveways

Operational Characteristics

CROSS SECTION GEOMETRY

Route	Section	Lanes	Median	Shoulder
130	55.44 – 55.77	4+	Barrier	YES
130	55.77 – 56.44	4+	Barrier	NO
130	56.44 – 57.29	4+	Grass	YES
206	34.98 – 35.61	4+	Grass	YES
206	36.27 – 36.80	4+	Grass	YES

Cross Section Geometry – US 130

Cross Section Geometry – US 206

Land Use – Commercial

Crash Data

- Utilized NJDOT Crash Database
- Data years 2007 – 2009
- NJDOT Bureau of Safety Programs
  - Crash rates by cross section geometry with comparison to statewide average rate
  - Crash detail printouts
- DVRPC GIS Analysis
- US 130 and US 206 data analyzed individually

Crash Data – US 130

- Three Analysis Sections
  1. South – US 130, Farnsworth Ave. to US 206 Merge
     - 0.33 miles
     - 54 crashes (2007 – 2009)
  2. Central – US 130 / US 206 Joint Section
     - 0.66 miles
     - 128 crashes (2007 – 2009)
  3. North – US 130, US 206 Split to Highbridge Road
     - 0.84 miles
     - 45 crashes (2007 – 2009)

Crash Data – US 206

- Two Analysis Sections
  1. South – US 206, Farnsworth Ave. to US 130 Merge
     - 0.63 miles
     - 42 crashes (2007 – 2009)
  2. North – US 206, US 130 Split to E. Park Street
     - 0.53 miles
     - 40 crashes (2007 – 2009)

Corridor-wide Crash Findings

YEAR

US 130

Total of 227 reportable crashes

YEAR	TOTAL	PERCENTAGE
2007	91	40%
2008	68	30%
2009	68	30%

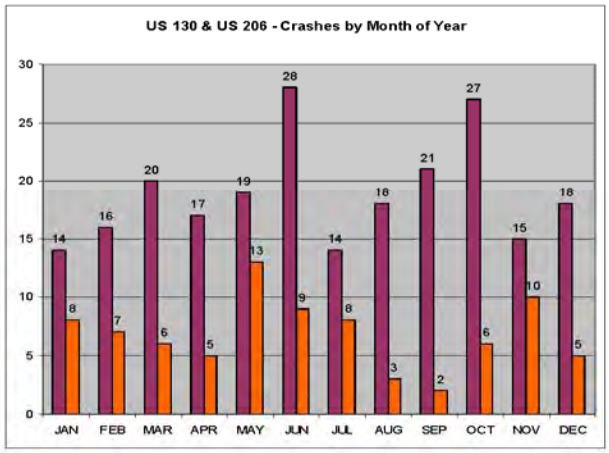
US 206

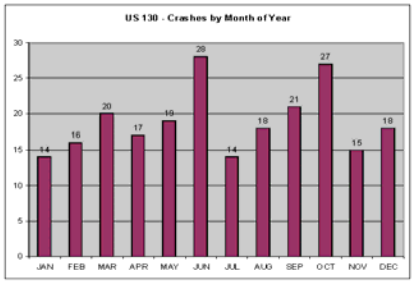
Total of 82 reportable crashes

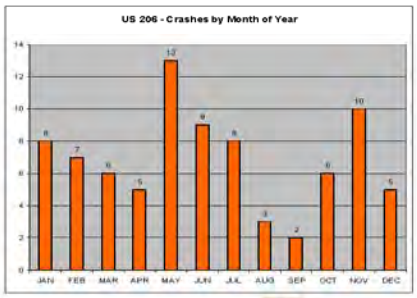
YEAR	TOTAL	PERCENTAGE
2007	28	34%
2008	20	24%
2009	34	42%

Corridor-wide Crash Findings

MONTH OF YEAR

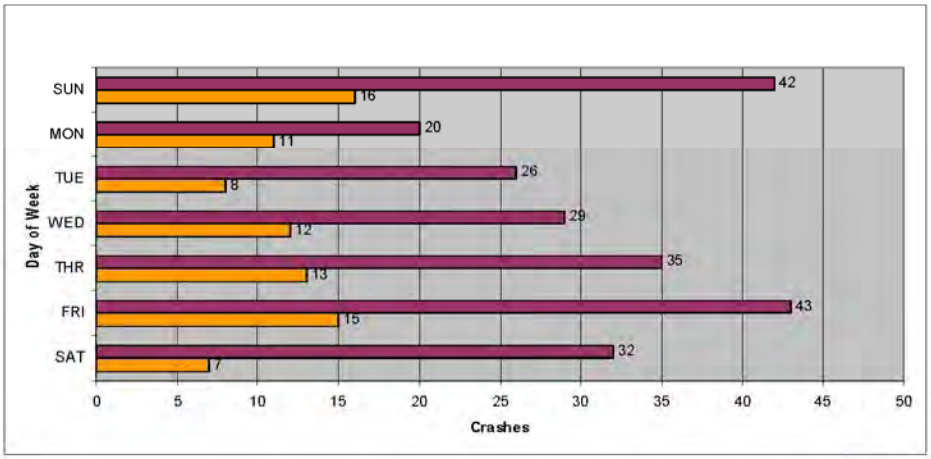




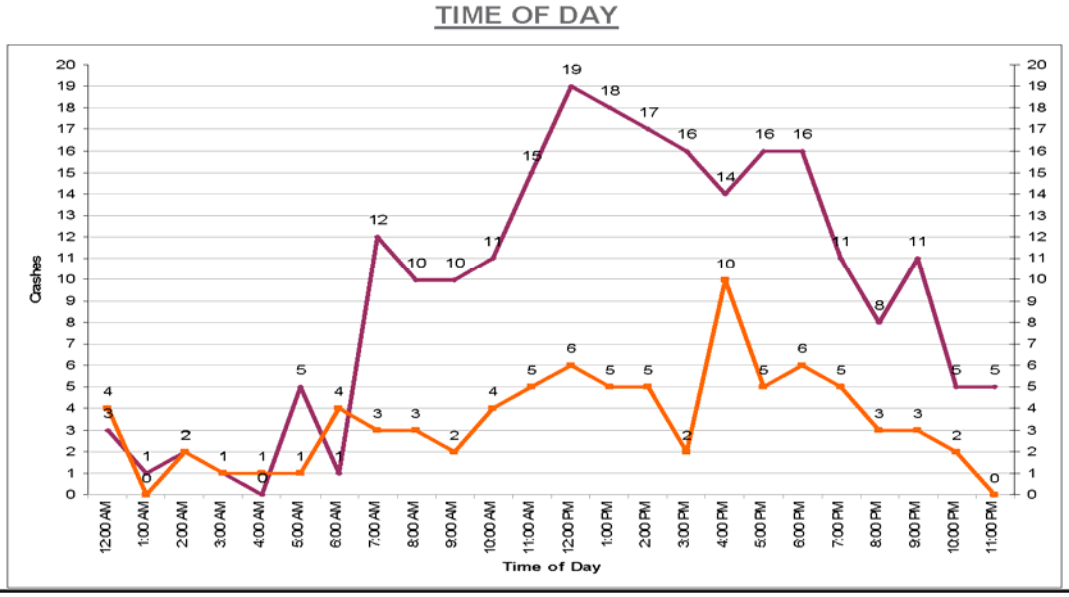


Corridor-wide Crash Findings

DAY OF WEEK



Corridor-wide Crash Findings



Corridor-wide Crash Findings

Comparison of study area corridor segments to statewide averages:

- 2009 Statewide Average of At/between Intersections for the State Road System
- Provides a minimum threshold for analyzing various crash statistics

Corridor-wide Crash Findings

COLLISION TYPE

	US 130 Total Crashes	US 130 Percentage	US 206 Total Crashes	US 206 Percentage	2009 Statewide Average
Same Direction (Rear End)	80	35.24%	36	43.90%	47.12%
Same Direction (Sideswipe)	**77**	**33.92%**	11	13.41%	15.72%
Right Angle	20	8.81%	**9**	**10.98%**	10.71%
Fixed Object	19	8.37%	**12**	**14.63%**	12.01%
Left Turn/U Turn	**14**	**6.17%**	**4**	**4.88%**	2.88%
Non-fixed Object	**4**	**1.76%**	0	N/A	0.80%
Backing	**3**	**1.32%**	0	N/A	0.80%
Pedestrian	1	0.44%	**1**	**1.22%**	0.93%
Pedalcyclist	**3**	**1.32%**	**1**	**1.22%**	0.55%
Animal	3	1.32%	**5**	**6.10%**	3.58%
Other	1	0.44%	**1**	**1.22%**	0.71%
Overturned	1	0.44%	**1**	**1.22%**	0.76%
Encroachment	**1**	**0.44%**	0	N/A	0.23%
Struck Parked Vehicle	0	N/A	1	1.22%	1.30%

Corridor-wide Crash Findings

DIRECTIONAL SPLIT

Direction	US 130	US 130%	US 206	US 206%
NORTH	107	47%	39	48%
EAST	5	2%	6	7%
SOUTH	102	45%	35	43%
WEST	13	6%	2	2%
Total	227	100%	82	100%

Corridor-wide Crash Findings

CRASH SEVERITY AND LOCATION

	US 130	US 206	2009 Statewide Average
CRASH SEVERITY LEVEL			
Fatal	N/A	N/A	0.30%
Injury	61 (26.87%)	**28 (34.15%)**	28.11%
Property Damage Only (PDO)	**166 (73.13%)**	54 (65.85%)	71.60%
INTERSECTON PROXIMITY			
Not at Intersection	153 (67.40%)	**60 (73.17%)**	70.73%
At Intersection	**74 (32.60%)**	22 (26.83%)	29.27%

Corridor-wide Crash Findings

ENVIRONMENTAL CONDITIONS

	US 130	US 206	2009 Statewide Average
SURFACE CONDITION			
Dry	**176 (77.53%)**	**65 (79.27%)**	71.39%
Wet	46 (20.26%)	17 (20.73%)	24.30%
Snowy	4 (1.76%)	N/A	2.19%
Icy	1 (0.44%)	N/A	1.40%
Unknown	N/A	N/A	0.29%
Other	N/A	N/A	0.43%
ILLUMINATION			
Day	**168 (74.01%)**	56 (68.29%)	69.74%
Dusk	2 (0.88%)	1 (1.22%)	2.49%
Night	55 (24.23%)	**25 (30.49%)**	26.08%
Dawn	1 (0.44%)	N/A	1.41%
Unknown	N/A	N/A	0.29%

Corridor-wide Crash Findings

PRE-CRASH ACTION

Pre-crash Action	US 130	US 206
Going Straight Ahead	180	52
Slowing or Stopping	60	24
Changing Lanes	60	9
Stopped in Traffic	42	25
Making Right Turn (not turn on red)	25	6
Making Left Turn	20	7
Starting in Traffic	15	14
Merging/Entering Traffic Lane	14	5
Making U-Turn	13	0

Corridor-wide Crash Findings

SUMMARY

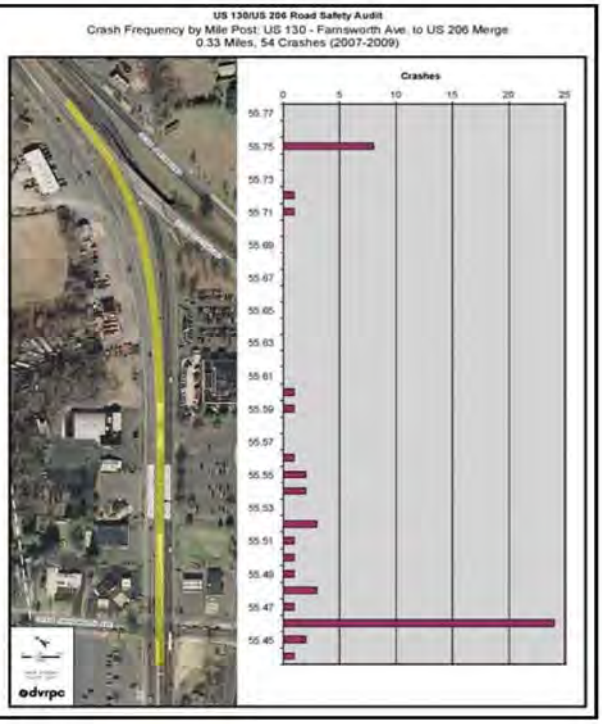
Issue	US 130	US 206
Three-year trend	Down	Up
Highest Crash Months	June, Oct	May, Nov
Highest Crash Days	Sun, Fri	Sun, Fri
Daily Trends	11AM-7PM, noon peak	11AM-7PM, 4PM peak
Collision Type Overrepresentations	SDSS, LT-UT, Bike	RT Angle, LT-UT, HFO, Animal
Injury Crashes	Over-represented	Below Average
Surface Cond./Illumination	Dry/Day	Dry/Night
Pre-crash Actions of Note	Changing lanes	Slowing or stopping

NJDOT Crash Rates by Cross-section Geometry

- Three road sections (highlighted in red) exceed statewide crash rate:
  - US 130 Farnsworth to merge
  - US 206 Farnsworth to merge
  - US 206 Split to E. Park St.

US 130 South Section

- Length – 0.33 miles
- Crashes – 54 (2007 – 2009)
- Crash Rate – 4.43 (state: 1.83)
- Directional Split
  - Northbound 34
  - Southbound 16
  - EB 2, WB 2
- Predominant Collision Types
  - Sideswipe, left turn, and pedalcyclist crashes exceed statewide crash rate
- Other Trends
  - Majority of crashes occurred during the daytime and on dry surface condition
- Crash Concentration
  - 57%: vicinity of Farnsworth Ave intersection (MP 55.44-MP 55.48 approx. 240 ft)



US 130 SOUTH SECTION

CRASH SUMMARY

Route 130 MP 55.44 - 55.77
Bordentown Township, Burlington County
01/01/2007 THRU 12/31/2009

TOTAL CRASHES: 54

SEVERITY	COUNT	% OF TOTAL	2009 Average
Fatal	0	0.00%	
Injury	13	24.07%	
Property Damage	41	75.93%	71.60%
Total	54		

INTERSECTION	COUNT	% OF TOTAL	2009 Average	**
At Signalized Intersection	21	38.89%	12.98%	
At Unsignalized Intersection	5	9.26%		
Between Intersections	28	51.85%		
Railroad Crossing	0	0.00%		
Total	54			

COLLISION TYPE	COUNT	% OF TOTAL	2009 Average	**
Same Dir.-Rear End	19	35.19%		
Same Dir.-Sideswipe	18	33.33%	15.72%	
Angle	5	9.26%		
Head On	0	0.00%		
Parked Vehicle	0	0.00%		
Left Turn / U Turn	7	12.96%	2.88%	
Backing	0	0.00%		
Encroachment	1	1.85%	0.23%	
Overturned	0	0.00%		
Fixed Object	1	1.85%		
Animal	0	0.00%		
Pedestrian	0	0.00%		
Pedalcycle	2	3.70%	0.55%	
Non-Fixed Object	1	1.85%	0.80%	
Unknown	0	0.00%		
Other	0	0.00%		
Total	54			

SURFACE CONDITION	COUNT	% OF TOTAL	2009 Average	**
Dry	46	85.19%	71.39%	
Wet Surface	8	14.81%		
Snow	0	0.00%		
Ice	0	0.00%		
Unknown	0	0.00%		
Other	0	0.00%		
Total	54			

LIGHT	COUNT	% OF TOTAL	2009 Average	**
Day	41	75.93%	69.74%	
Dusk	0	0.00%		
Night	13	24.07%		
Dawn	0	0.00%		
Unknown	0	0.00%		
Total	54			

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

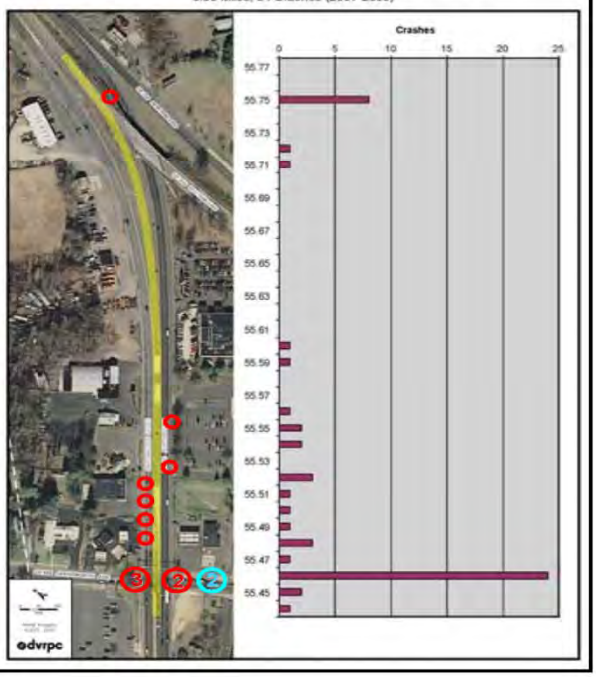
Length of Segment	0.33
Number of Years	3
AADT	33702
Crash Rate/MVM	4.43
2009 Statewide Crash Rate/MVM	1.83

US 130 South Section

Injury Crashes

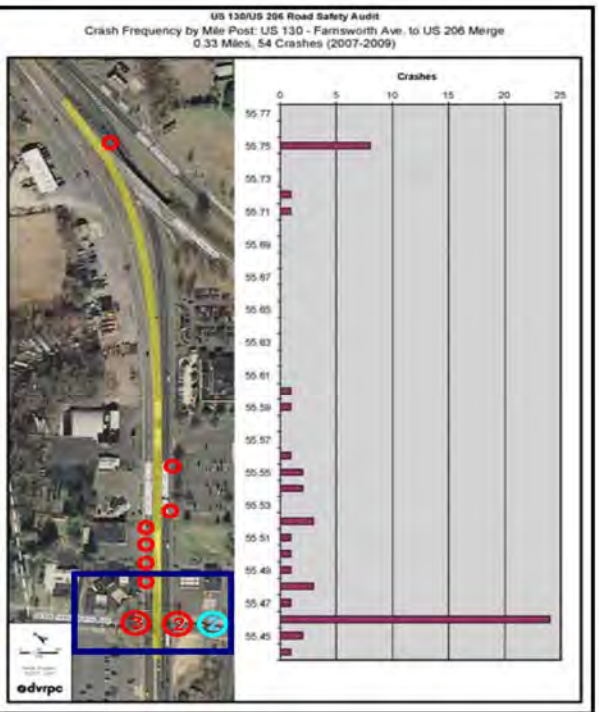
- **Severity (crashes)**
  - 13 injury crashes
  - 41 property damage only
  - NB 6
  - SB 7 (EB 1)
  - At Signalized Intersection: 5
- **Bicycle Crashes**
  - 2 in vicinity of Farnsworth Ave intersection

US 130/US 206 Road Safety Audit
Crash Frequency by Mile Post: US 130 - Farnsworth Ave. to US 206 Merge
0.33 Miles, 54 Crashes (2007-2009)



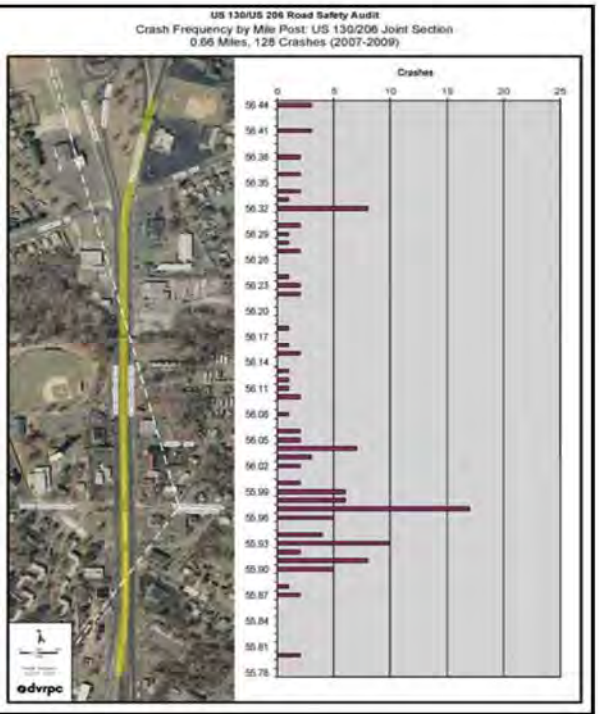
US 130 South Section
Concentration Area

- Vicinity of Farnsworth Ave int.
- Length – 0.04 miles
- Crashes – 31, 57% (2007 – 2009)
- Collision Types by Direction
  - Rear End
    - Northbound 5
    - Southbound 7
  - Left Turn/U Turn
    - Northbound 4
    - Southbound 1
    - EB 1, WB 1
  - Side Swipe
    - Northbound 4
    - Southbound 1
  - Right Angle
    - Northbound 2
    - Southbound 1
    - Eastbound 1
  - Pedalcyclist
    - Northbound 2



US 130 Central Section

- Length – 0.67 miles
- Crashes – 128 (2007 – 2009)
- Crash Rate – 2.25 (state: 2.86)
- Directional Split
  - Northbound 57
  - Southbound 58
  - EB 3, WB 10
- Predominant Collision Types
  - Sideswipe, non-fixed object, and pedalcyclist crashes exceed statewide crash rate
- Other Trends
  - Majority of crashes occurred during the daytime and on dry surface condition
- Crash Concentration
  - 50%: vicinity of the Butts/Crosswicks intersection (MP 55.90-MP 56.00 aprx. 530 ft)



US 130 CENTRAL SECTION

CRASH SUMMARY

Route 130 MP 55.77 - 56.44
Bordentown City - Bordentown Township, Burlington County
01/01/2007 THRU 12/31/2009

TOTAL CRASHES: 128

SEVERITY	COUNT	% OF TOTAL	2009 Average
Fatal	0	0.00%	
Injury	36	28.13%	
Property Damage	92	71.88%	71.60%
Total	**128**		

INTERSECTION	COUNT	% OF TOTAL	2009 Average	**
At Signalized Intersection	21	16.41%	12.98%	
At Unsignalized Intersection	18	14.06%		
Between Intersections	89	69.53%		
Railroad Crossing	0	0.00%		
Total	**128**			

COLLISION TYPE	COUNT	% OF TOTAL	2009 Average	**
Same Dir.-Rear End	47	36.72%		
Same Dir.-Sideswipe	49	38.28%	15.72%	
Angle	12	9.38%		
Head On	0	0.00%		
Parked Vehicle	0	0.00%		
Left Turn / U Turn	2	1.56%		
Backing	0	0.00%		
Encroachment	0	0.00%		
Overturned	1	0.78%		
Fixed Object	12	9.38%		
Animal	0	0.00%		
Pedestrian	1	0.78%		
Pedalcycle	1	0.78%	0.55%	
Non-Fixed Object	3	2.34%	0.80%	
Unknown	0	0.00%		
Other	0	0.00%		
Total	**128**			

SURFACE CONDITION	COUNT	% OF TOTAL	2009 Average	**
Dry	97	75.78%	71.39%	
Wet Surface	26	20.31%		
Snow	4	3.13%	2.19%	
Ice	1	0.78%		
Unknown	0	0.00%		
Other	0	0.00%		
Total	**128**			

LIGHT	COUNT	% OF TOTAL	2009 Average	**
Day	95	74.22%	69.74%	
Dusk	1	0.78%		
Night	30	23.44%		
Dawn	1	0.78%		
Unknown	1	0.78%	0.29%	
Total	**128**			

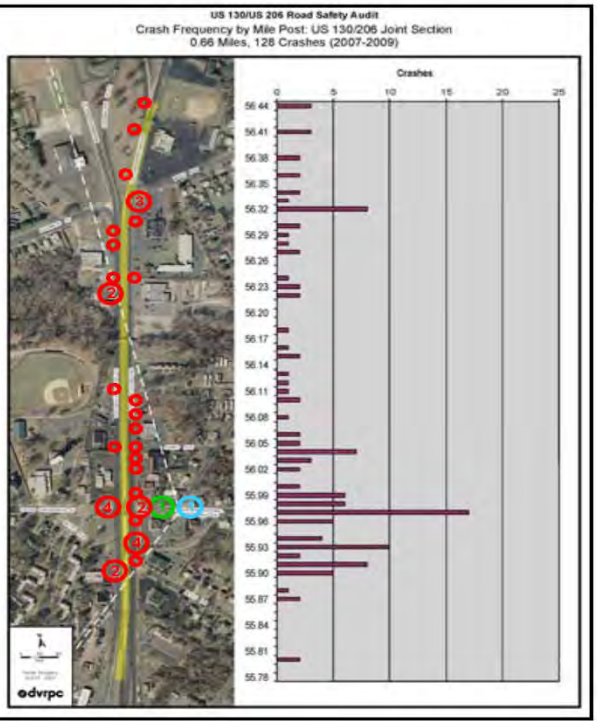
Note:
** These columns indicate the number of fatal crashes in each accident category.

Length of Segment	0.67
Number of Years	3
AADT	77630
Crash Rate/MVM	2.25

2009 Statewide Crash Rate/MVM: 2.86

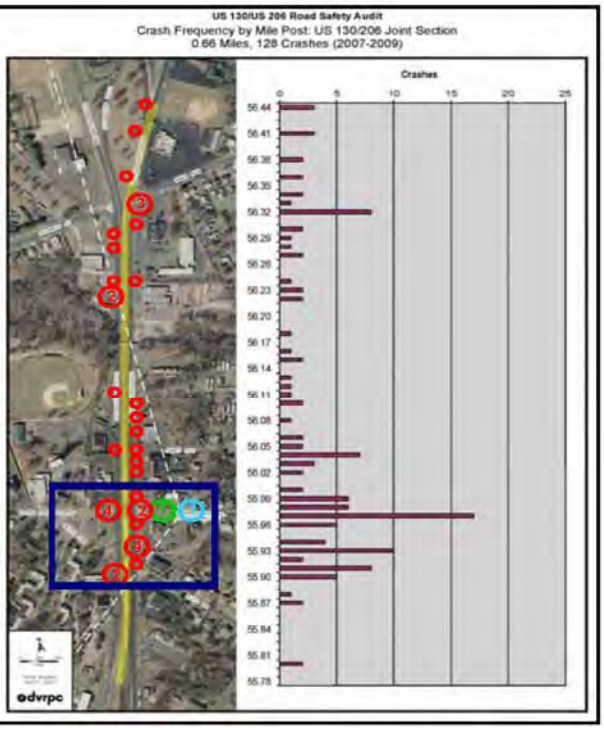
US 130 Central Section
Injury Crashes

- **Severity (crashes)**
  - 36 injury crashes
  - 92 property damage only
  - NB 20 (WB 4)
  - SB 16 (EB 1)
  - At Signalized Intersection: 6
- **Bicycle/Pedestrian Crashes**
  - 1 each in vicinity of the Crosswicks intersection



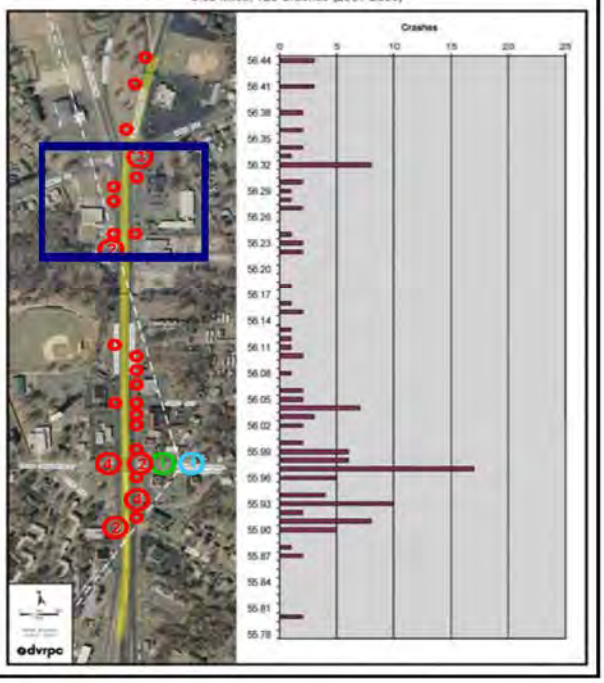
US 130 Central Section
Concentration Area - A

- Vicinity of Butts/Crosswicks int.
- Length – 0.10 miles
- Crashes – 62, 50% (2007 – 2009)
- Collision Types by Direction
  - Rear End
    - Northbound 14
    - Southbound 11
  - Side Swipe
    - Northbound 8
    - Southbound 13
  - Fixed Object
    - Southbound 1
  - Left Turn/U Turn
    - SB 1, NB 1
  - Pedalcyclist/Pedestrian
    - NB 1 / SB 1



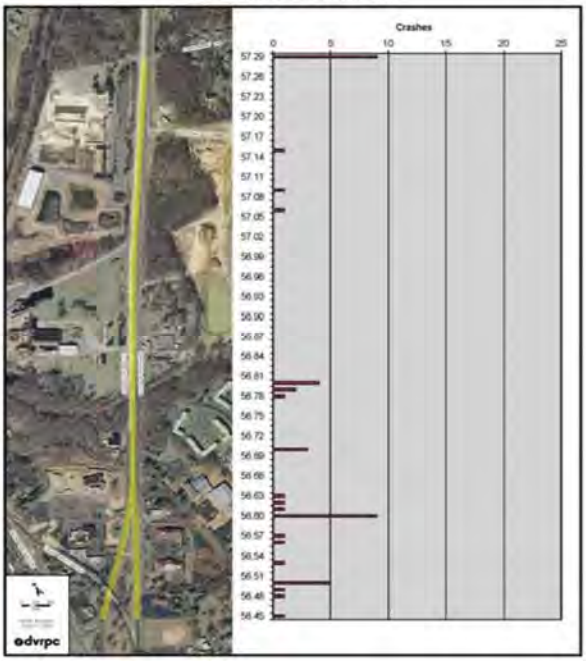
US 130 Central Section
Concentration Area - B

- South of Ward Ave.
- Length – 0.10 miles
- Hit Fixed Object Crashes – 11 (2007 – 2009)
- HFO Collisions by Direction
  - Northbound 4
  - Southbound 7



US 130 North Section

- Length – 0.85 miles
- Crashes – 45 (2007 – 2009)
- Crash Rate – 1.73 (state: 2.12)
- Directional Split
  - Northbound 15
  - Southbound 29
  - EB 0, WB 1
- Predominant Collision Types
  - Sideswipe, left turn, backing, hit fixed object, hit animal, and non-fixed object crashes exceed statewide crash rate
- Other Trends
  - Majority of crashes occurred during the daytime and on dry surface condition
- Crash Concentrations
  - 26%: vicinity of Mastori's access (MP 56.60-MP 56.63 aprx. 180 ft)
  - 20%: vicinity of Highbridge Rd (MP 57.29 at intersection)



US 130 NORTH SECTION

CRASH SUMMARY

Route 130 MP 56.44 - 57.29
Bordentown Township, Burlington County
01/01/2007 THRU 12/31/2009

TOTAL CRASHES: 45

SEVERITY	COUNT	% OF TOTAL	2009 Average
Fatal	0	0.00%	
Injury	12	26.67%	
Property Damage	33	73.33%	71.60%
Total	45		

INTERSECTION	COUNT	% OF TOTAL	2009 Average	**
At Signalized Intersection	0	0.00%		
At Unsignalized Intersection	9	20.00%	16.29%	
Between Intersections	36	80.00%	70.73%	
Railroad Crossing	0	0.00%		
Total	45			

COLLISION TYPE	COUNT	% OF TOTAL	2009 Average	**
Same Dir.-Rear End	14	31.11%		
Same Dir.-Sideswipe	10	22.22%	15.72%	
Angle	3	6.67%		
Head On	0	0.00%		
Parked Vehicle	0	0.00%		
Left Turn / U Turn	5	11.11%	2.88%	
Backing	3	6.67%	0.80%	
Encroachment	0	0.00%		
Overturned	0	0.00%		
Fixed Object	6	13.33%	12.01%	
Animal	3	6.67%	3.58%	
Pedestrian	0	0.00%		
Pedalcycle	0	0.00%		
Non-Fixed Object	1	2.22%	0.80%	
Unknown	0	0.00%		
Other	0	0.00%		
Total	45			

SURFACE CONDITION	COUNT	% OF TOTAL	2009 Average	**
Dry	33	73.33%	71.39%	
Wet Surface	12	26.67%	24.30%	
Snow	0	0.00%		
Ice	0	0.00%		
Unknown	0	0.00%		
Other	0	0.00%		
Total	45			

LIGHT	COUNT	% OF TOTAL	2009 Average	**
Day	32	71.11%		
Dusk	1	2.22%		
Night	12	26.67%	26.08%	
Dawn	0	0.00%		
Unknown	0	0.00%		
Total	45			

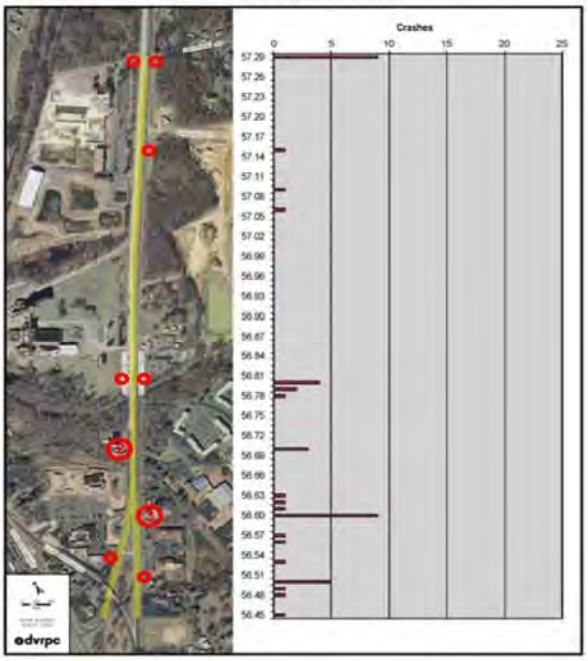
Note:
** These columns indicate the number of fatal crashes in each accident category.

Length of Segment	0.85
Number of Years	3
AADT	27970
Crash Rate/MVM	1.73

2009 Statewide Crash Rate/MVM 2.12

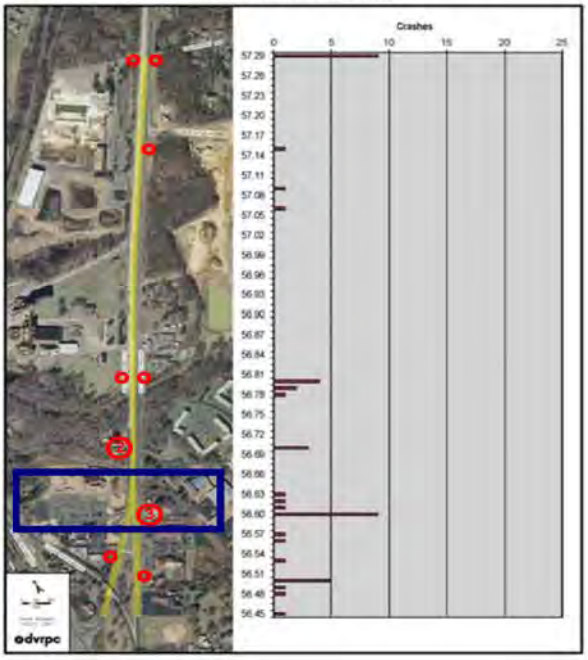
US 130 North Section
Injury Crashes

- Severity (crashes)
  - 12 injury crashes
  - 33 property damage only
  - NB 7
  - SB 5
  - At Signalized Intersection: 0
- No Bicycle or Pedestrian Crashes



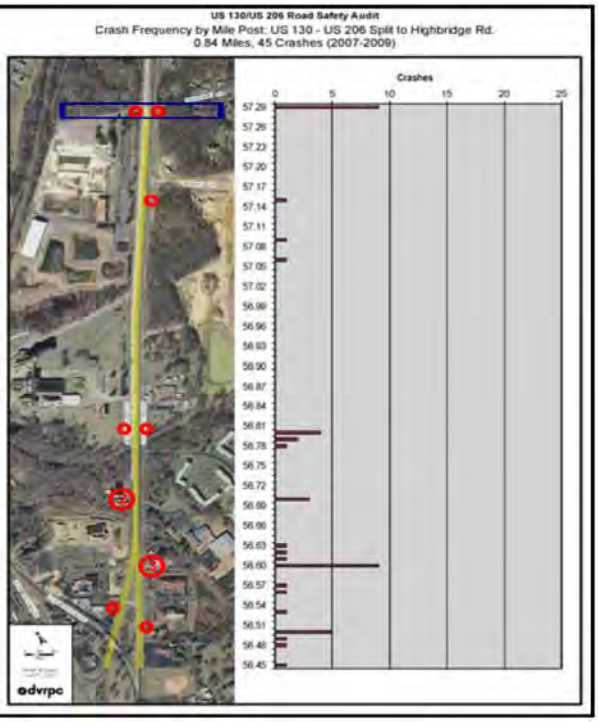
US 130 North Section
Concentration Area - A

- Vicinity of Mastori's Access
- Length – 0.03 miles
- Crashes – 12, 26% (2007 – 2009)
- Collision Types by Direction
  - Side Swipe
    - Southbound 5
  - Rear End
    - Northbound 2
    - Southbound 2
  - Left Turn/U Turn
    - Northbound 2
    - Southbound 1



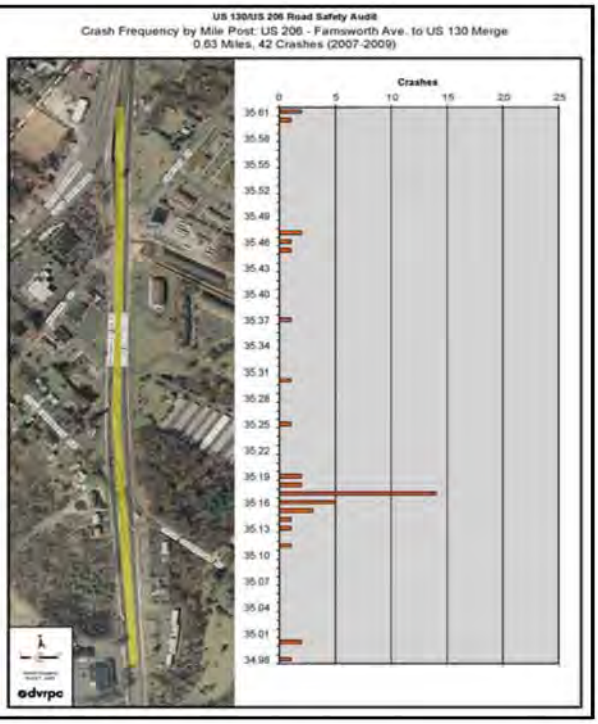
US 130 North Section
Concentration Area - B

- Vicinity of Highbridge Rd. int.
- Length – 0.01 miles
- Crashes – 9, 20% (2007 – 2009)
- Collision Types by Direction
  - Rear End
    - Northbound 1
    - Southbound 1
  - Left Turn/U Turn
    - Northbound 1
    - Southbound 1
  - Side Swipe
    - Southbound 1
  - Right Angle
    - Westbound 1
  - Fixed Object
    - Northbound 1
  - Backing
    - Southbound 1
  - Animal
    - Northbound 1



US 206 South Section

- Length – 0.63 miles
- Crashes – 42 (2007 – 2009)
- Crash Rate – **2.98** (state: 2.12)
- Directional Split
  - Northbound 24
  - Southbound 16
  - EB 2, WB 0
- Predominant Collision Types
  - Rear end, hit parked vehicle, hit animal, pedestrian, and pedalcyclist crashes exceed statewide crash rate
- Other Trends
  - Majority of crashes occurred during the daytime and on dry surface condition
- Crash Concentration
  - 62%: vicinity of Farnsworth Ave int. (MP 35.15-MP 35.19 aprx. 240 ft)



US 206 SOUTH SECTION

CRASH SUMMARY

Route 206 MP 34.98 - 35.61
Bordentown Township, Burlington County
01/01/2007 THRU 12/31/2009

TOTAL CRASHES: 42

SEVERITY	COUNT	% OF TOTAL	2009 Average
Fatal	0	0.00%	
Injury	13	30.95%	28.11%
Property Damage	29	69.05%	
Total	**42**		

INTERSECTION	COUNT	% OF TOTAL	2009 Average	**
At Signalized Intersection	9	21.43%	12.98%	
At Unsignalized Intersection	1	2.38%		
Between Intersections	32	76.19%	70.73%	
Railroad Crossing	0	0.00%		
Total	**42**			

COLLISION TYPE	COUNT	% OF TOTAL	2009 Average	**
Same Dir.-Rear End	23	54.76%	47.12%	
Same Dir.-Sideswipe	6	14.29%		
Angle	0	0.00%		
Head On	0	0.00%		
Parked Vehicle	1	2.38%	1.30%	
Left Turn / U Turn	2	4.76%	2.88%	
Backing	1	2.38%	0.80%	
Encroachment	0	0.00%		
Overturned	0	0.00%		
Fixed Object	4	9.52%		
Animal	3	7.14%	3.58%	
Pedestrian	1	2.38%	0.93%	
Pedalcycle	1	2.38%	0.55%	
Non-Fixed Object	0	0.00%		
Unknown	0	0.00%		
Other	0	0.00%		
Total	**42**			

SURFACE CONDITION	COUNT	% OF TOTAL	2009 Average	**
Dry	34	80.95%	71.39%	
Wet Surface	8	19.05%		
Snow	0	0.00%		
Ice	0	0.00%		
Unknown	0	0.00%		
Other	0	0.00%		
Total	**42**			

LIGHT	COUNT	% OF TOTAL	2009 Average	**
Day	35	83.33%	69.74%	
Dusk	0	0.00%		
Night	7	16.67%		
Dawn	0	0.00%		
Unknown	0	0.00%		
Total	**42**			

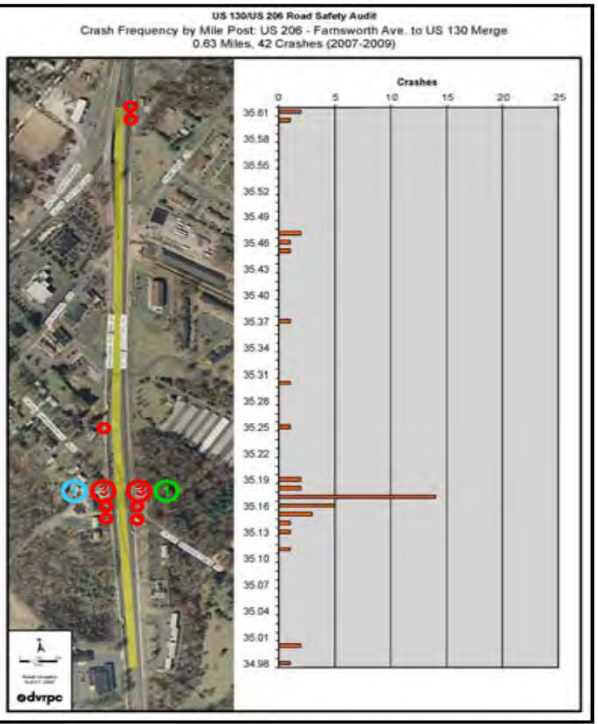
Note:
** These columns indicate the number of fatal crashes in each accident category

Length of Segment	0.63
Number of Years	3
AADT	20420
Crash Rate/MVM	2.98
2009 Statewide Crash Rate/MVM	2.12

US 206 South Section

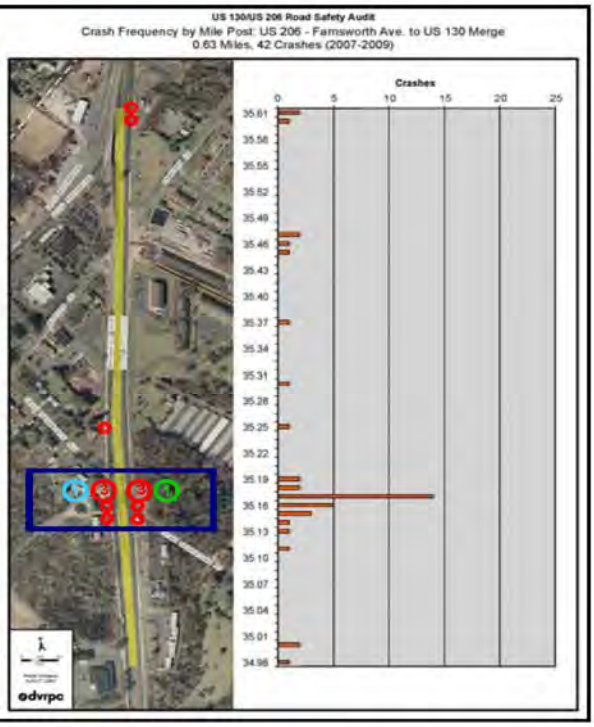
Injury Crashes

- **Severity (crashes)**
  - 13 injury crashes
  - 29 property damage only
  - NB 7
  - SB 4 (EB 2)
  - At Signalized Intersection: 6
- **Bicycle/Pedestrian Crashes**
  - 1 each in vicinity of Farnsworth Ave intersection



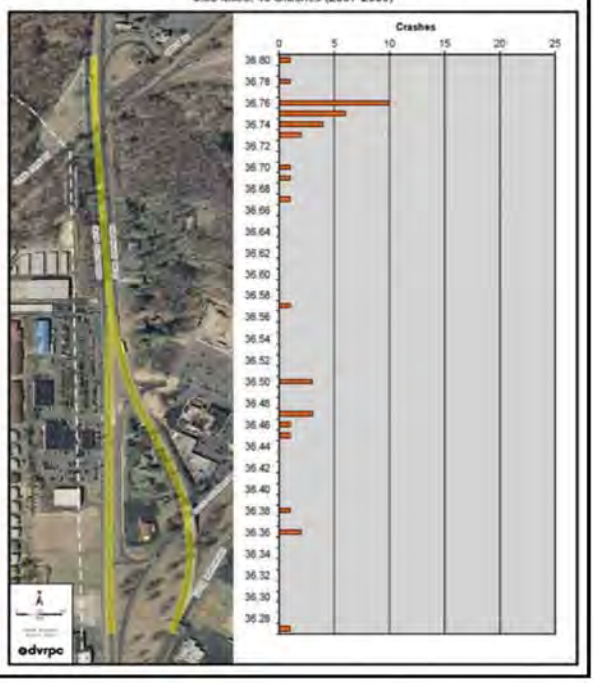
US 206 South Section
Concentration Area

- Vicinity of Farnsworth Ave int.
- Length – 0.04 miles
- Crashes – 26, 62% (2007 – 2009)
- Collision Types by Direction
  - Rear End
    - Northbound 12
    - Southbound 6
  - Sideswipe
    - Southbound 2
  - Fixed Object
    - Northbound 2
  - Left Turn/U Turn
    - Southbound 1
  - Pedalcyclist
    - Eastbound 1
  - Pedestrian
    - Southbound 1



US 206 North Section

- Length – 0.53 miles
- Crashes – 40 (2007 – 2009)
- Crash Rate – 2.93 (state: 2.12)
- Directional Split
  - Northbound 15
  - Southbound 19
  - EB 4, WB 2
- Predominant Collision Type
  - Right angle, left turn, overturned, hit fixed object, and hit animal crashes exceed '09 statewide crash rate
- Other Trends
  - Nearly half (45%) of crashes occurred at nighttime
  - 78% of crashes occurred on dry surface condition
- Crash Concentration
  - 55%: vicinity of E Park St int. (MP 36.73-MP 36.76 aprx. 180 ft)



US 206 NORTH SECTION

CRASH SUMMARY

Route 206 MP 36.27 - 36.80
Bordentown Township, Burlington County
01/01/2007 THRU 12/31/2009

TOTAL CRASHES: 40

SEVERITY	COUNT	% OF TOTAL	2009 Average
Fatal	0	0.00%	
Injury	15	37.50%	28.11%
Property Damage	25	62.50%	
Total	40		

INTERSECTION	COUNT	% OF TOTAL	2009 Average	**
At Signalized Intersection	8	20.00%	12.98%	
At Unsignalized Intersection	4	10.00%		
Between Intersections	28	70.00%		
Railroad Crossing	0	0.00%		
Total	40			

COLLISION TYPE	COUNT	% OF TOTAL	2009 Average	**
Same Dir.-Rear End	13	32.50%		
Same Dir.-Sideswipe	5	12.50%		
Angle	9	22.50%	10.71%	
Head On	0	0.00%		
Parked Vehicle	0	0.00%		
Left Turn / U Turn	2	5.00%	2.88%	
Backing	0	0.00%		
Encroachment	0	0.00%		
Overturned	1	2.50%	0.76%	
Fixed Object	8	20.00%	12.01%	
Animal	2	5.00%	3.58%	
Pedestrian	0	0.00%		
Pedalcycle	0	0.00%		
Non-Fixed Object	0	0.00%		
Unknown	0	0.00%		
Other	0	0.00%		
Total	40			

SURFACE CONDITION	COUNT	% OF TOTAL	2009 Average	**
Dry	31	77.50%	71.39%	
Wet Surface	9	22.50%		
Snow	0	0.00%		
Ice	0	0.00%		
Unknown	0	0.00%		
Other	0	0.00%		
Total	40			

LIGHT	COUNT	% OF TOTAL	2009 Average	**
Day	21	52.50%		
Dusk	1	2.50%	2.49%	
Night	18	45.00%	26.08%	
Dawn	0	0.00%		
Unknown	0	0.00%		
Total	40			

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

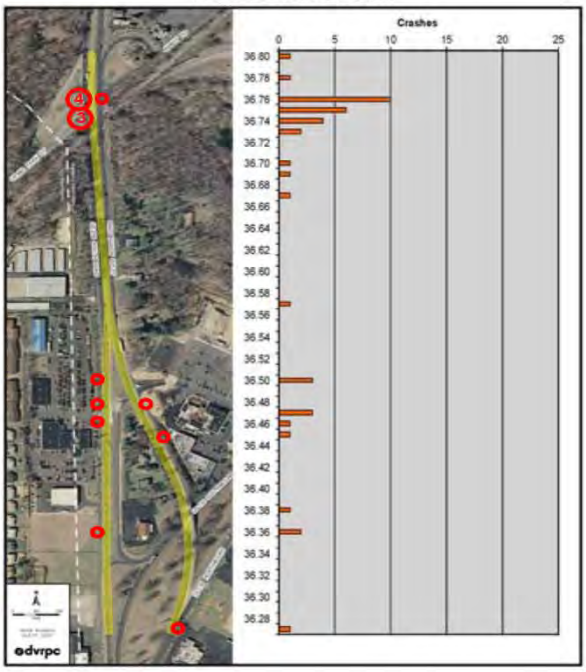
Length of Segment	0.53
Number of Years	3
AADT	23556
Crash Rate/MVM	2.93

2009 Statewide Crash Rate/MVM: 2.12

US 206 North Section

Injury Crashes

- **Severity (crashes)**
  - 15 injury crashes
  - 25 property damage only
  - NB direction 4
  - SB direction 8
  - EB 3, WB 0
  - At Signalized Intersection: 8
- **No Bicycle or Pedestrian Crashes**



Field View Checklist

- Drainage
- Public utilities
- Access management
  - Driveway spacing, redundancy
- Lighting
- Driver expectation
  - Sight distance adequate
  - Street signs visible
- Transit considerations
- Pedestrian crossings
- Pavement markings and lane delineation

Field View

- Material
  - Notes sheet
  - Aerial maps
- Clipboards
- Vests

Post Audit Analysis

- Debriefing from field visit
- Define the problems
- Next steps
- Expected end by 5:00 PM

QUESTIONS ?

Publication Title:	US130 / US206 Road Safety Audit
Publication Number:	10012
Date Published:	September 2012
Geographic Area Covered:	Bordentown City and Bordentown Township, New Jersey
Key Words:	Road safety audit, RSA, crashes, injuries, fatalities, issues, strategies, traffic signal, coordination, engineering, enforcement, education, stakeholders, prioritize, intersection, speed limit, traffic volumes, stakeholders, audit team, geometry, pavement markings, signs, crosswalk, sidewalk, pedestrian, bicyclist, US 130, US 206

Abstract:

This report documents the process and findings of the US 130/US 206 Road Safety Audit (RSA) undertaken by the Delaware Valley Regional Planning Commission (DVRPC). The report details safety issues identified by the audit team at the study location and remedial strategies to address them. The goal of the audit is to generate improvement recommendations for the study area in an effort to reduce the incidence of motor vehicle crashes. Emphasis is placed on identifying low-cost, quick-turnaround safety projects to address the identified issues, where possible. This project represents a step toward implementation of DVRPC's Safety Action Plan. Implementation of improvement strategies may be eligible for Local Federal Aid Safety Funds.

Staff Contact:

Kevin S. Murphy
Principal Planner, Transportation Safety and Congestion Management
☏ (215) 238-2864
kmurphy@dvrpc.org

Delaware Valley Regional Planning Commission
190 N. Independence Mall West, 8th Floor
Philadelphia PA 19106
Phone: (215) 592-1800
Fax: (215) 592-9125
Internet: www.dvrpc.org

REGIONAL
SAFETY
PROGRAMS