



CR 534 (Blackwood-Clementon Road) Pedestrian and Bicyclist Road Safety Audit

Boroughs of Lindenwold, Pine Hill, and Clementon, NJ



May 2018



The Delaware Valley Regional Planning Commission

is the federally designated Metropolitan Planning Organization for a diverse nine-county region in two states: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey.



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Introduction

As the final report for the CR 534 (Blackwood-Clementon Road) Pedestrian and Bicyclist Road Safety Audit (PB-RSA), this document represents a step toward the implementation of the Delaware Valley Regional Planning Commission's Transportation Safety Action Plan (DVRPC # 15022). Improving traffic safety in the region is a key factor in the work performed by DVRPC. The Regional Safety Task Force (RSTF), a DVRPC committee facilitated by Safety Programs staff, acts as a forum for traffic safety professionals to share, collaborate, and take part in helping to increase traffic safety for all travelers in the region including non-motorized roadway users. At the pedestrian-focused RSTF meeting held in Fiscal Year 2015, member Warren Strumpfer, traffic safety advocate, expressed his concern about the safety of people walking and bicycling along a heavily traveled section of CR 534 Blackwood-Clementon Road in Camden County, marking the beginning of this road safety audit (RSA) effort. That year, six performance measures were developed to help the RSTF track progress toward meeting goals and expectations. One measure is specifically focused on members' involvement with a safety project:



Increase the effectiveness of one project or program per cycle through RSTF coordination. RSTF members will assist with a project they would not usually be involved with and measure success, preferably using before-and-after analysis.

The safety issues along CR 534 presented a great opportunity for RSTF members to participate in a safety project. After a preliminary crash trend screening, it was determined that an RSA would be the appropriate tool to investigate Mr. Strumpfer's traffic safety concerns.

The Pedestrian and Bicyclist Road Safety Audit (PB-RSA) Process

Following the basic format of traditional RSAs, the pedestrian and bicyclist RSA is a focused and formal safety performance examination of an existing or future road or intersection by a multidisciplinary audit team. RSAs can be used on a project of any size, 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. When performing any type of RSA (e.g. vehicular, pedestrian, bicyclist), 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 Federal Highway Safety Improvement Program (HSIP) funds. Because the RSA process is adaptable to local needs and conditions, recommendations can be implemented as time and resources permit.

The RSA event has three basic components:

- Pre-Audit – The audit team analyzes and discusses study area crash data and related issues.
- Field Visit – The audit team walks the corridor to identify safety issues and examine conditions.
- Post-Audit – The audit team shares findings and develops a list of problems and potential strategies.

This audit served as an opportunity for RSTF members to participate in a real-world safety project, satisfying the RSTF goal of engaging members to make the RSTF more effective. Mr. Strumpfer, who inspired this effort, worked closely with staff to help plan and execute the event.

The CR 534 Blackwood-Clementon Road PB-RSA Event

The one-day audit was conducted on Thursday, May 26, 2016. The pre-audit and post-audit meetings were held at the Pine Hill Municipal Building, in Pine Hill, Camden County, New Jersey. Sixteen stakeholders representing state, county, and local agencies participated in the audit (see Appendix A).

Corridor Description

Study Location

As shown in **Figure 1**, the focus of this audit is a 1.4-mile section of CR 534 Blackwood-Clementon Road located in central Camden County. Audit limits are between CR 673 (College Drive/Laurel Road) and Laurel Road. This corridor is a regional connector to NJ 42, CR 673, CR 703, and CR 686, and is surrounded by a mix of commercial and residential development.

Roadway Characteristics

CR 534 is classified as a principal arterial and has two distinct cross sections within the audit limits. Between CR 673 (Laurel Road) and New Road, CR 534 has a five-lane configuration with two through lanes and a center-left-turn lane; additional lanes accommodate turns at intersections. From New Road to Spring Garden Street this configuration continues but with only one through lane eastbound (EB). For the remainder of the audit corridor CR 534 is one lane per direction with intermittent widenings to accommodate turns at intersections. Throughout the corridor there is a mix of sidewalks, wide shoulders, and goat paths—worn paths through unimproved areas that indicate a desire line. There are no marked bike lanes. Posted speeds range from 35 to 45 MPH and there are 83 access points, including 22 intersections (two signalized) and 61 driveways. Crosswalks are found only at the two signalized intersections and rarely over cross street approaches.

Turning Movement Traffic Counts

Turning movement counts were taken at the intersection of CR 534 and CR 687 in March 2016, between the hours of 6:00 AM and 9:00 AM, and 3:00 PM and 6:00 PM. The morning peak hour was identified as 7:15 AM to 8:15 AM, and the afternoon peak hour as 4:30 PM to 5:30 PM. Counts at this signalized intersection were useful for identifying vehicular volume trends near the area of highest observed pedestrian and bicyclist traffic.

In the morning, nearly 1,900 vehicles traveled through the intersection, of which 71 percent made through movements: 729 EB and 615 westbound (WB) vehicles. Left turns made from the northbound (NB; 194 vehicles) approach were the next most frequent movement. WB left turns were the least common movement (53 vehicles).

In the PM period, between 3:00 PM and 6:00 PM, nearly 2,200 vehicles traveled through the intersection. Similar to AM volumes, through movements were dominant, accounting for 68 percent of traffic through the intersection: 827 EB and 678 WB vehicles. Left turns and right turns made from the NB approach were nearly equal at 200 and 194 vehicles, respectively.

NJ Transit

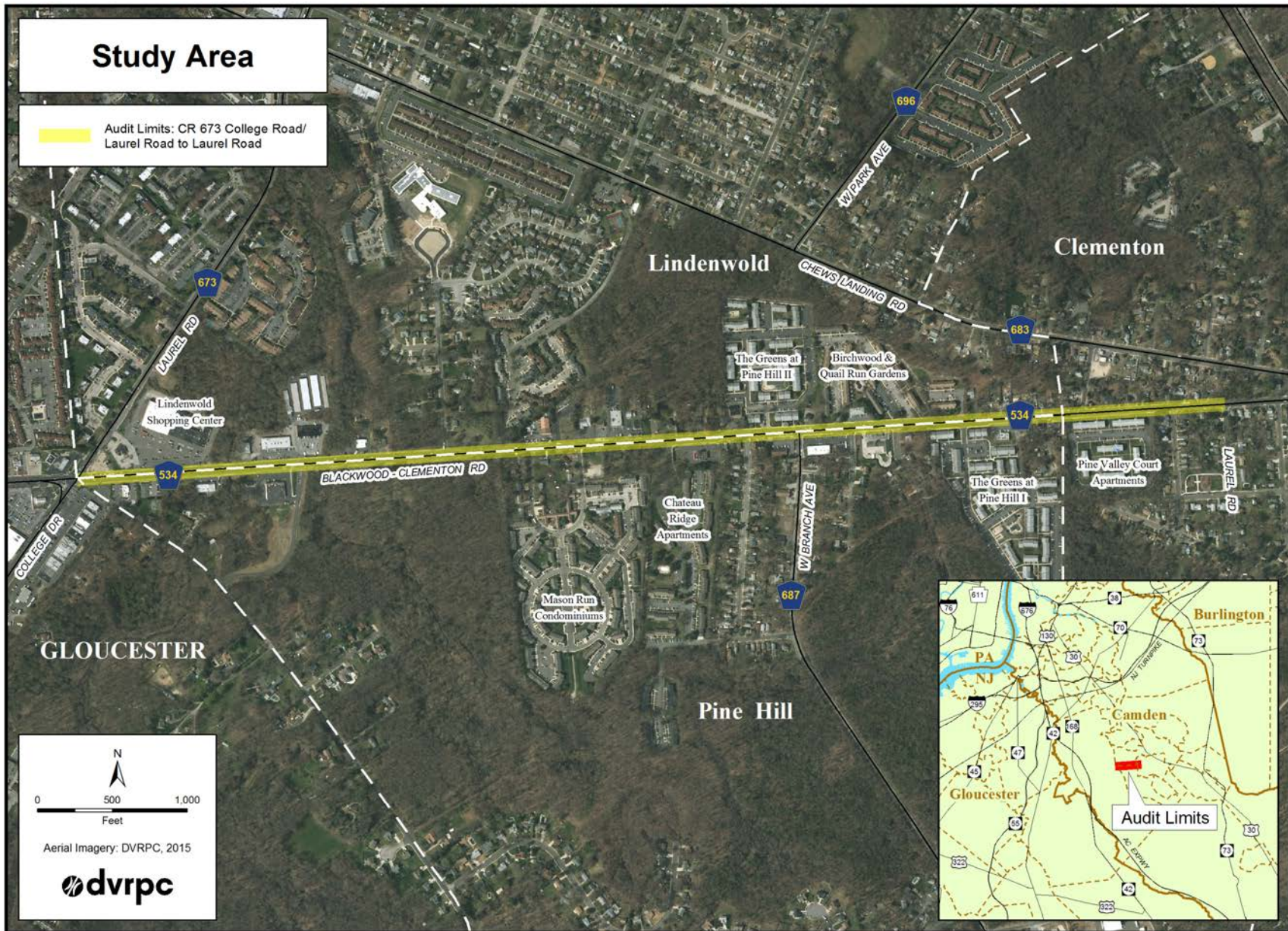
NJ Transit operates two buses within the study area. NJ Transit Bus 403 provides service to riders on CR 534 at 11 bus stop locations east of CR 687. Headways range from 20 minutes to two hours on weekdays, and 50 minutes to 2.5 hours on weekends. Hours of operation are 5:00 AM to 12:30 AM on weekdays, and 6:00 AM to 12:30 AM on weekends. The highest recorded ridership was at the two stops located at the intersection of CR 534 and

CR 687. The NJ Transit Bus 459 runs along the western edge of the study area through the intersection of CR 534 and CR 673. Both buses connect with the Lindenwold PATCO station. There are no NJ Transit bus stops along CR 534 between CR 673 and CR 687.

School Buses

During the school year, several school buses use CR 534, stopping at various locations to pick up children in the morning between 6:30 AM and 8:30 AM, and returning for drop-off in the afternoon between 2:00 PM and 4:00 PM. According to school district records, there were eight identified school bus stops along the corridor at the time of the study, largely concentrated near the apartment complexes located between CR 687 and Laurel Road.

Figure 1: Study Area



Crash Data Analysis

The crash data analysis was based on reportable crash records provided by New Jersey Department of Transportation (NJDOT). In New Jersey, a crash is considered reportable when there is property damage of \$500 or more, or a person is injured or killed.

Corridor-Wide Crash Summary

There were 254 crashes reported during the years 2010–2014, including one fatal crash, 99 injury crashes, and 154 property-damage-only crashes. The crash trend was relatively consistent over the five-year study period, with 65 crashes in 2010, 48 crashes in 2011, 41 crashes in 2012, 55 crashes in 2013, and 45 crashes in 2014. Rear-end collisions were the most common type at 41 percent (105 crashes), more than double right-angle crashes—the second most common crash type at 15 percent (39 crashes). Additional crash summary information is in the audit day presentation found in Appendix D.

Pedestrian and Bicyclist Crashes

During the 2010–2014 analysis period there were a total of nine pedestrian and three bicyclist crashes, representing 4.7 percent of all crashes. The only fatal crash during the analysis period was a pedestrian fatality in 2013. Nine of the 12 combined pedestrian and bicyclist crashes occurred under dark lighting conditions, most at night. As shown in **Table 1**, pedestrian and bicyclist crash data were compared with 2014 New Jersey statewide crash averages for county roads to determine if crashes within the audit limits are over represented, which helps put the numbers in context and aids in determining appropriate strategies to reduce crashes. Both pedestrian and bicyclist crash percentages exceeded state-wide averages for county routes. The maps shown in **Figure 2 and Figure 3** depict the location of each pedestrian and bicyclist crash, and provide select details about each.

Table 1: Pedestrian and Bicyclist Crash Data State-Wide Comparison

Crash Type	Total # of Crashes	Overall Percentage of Crashes in Study Period	2014 State-Wide Average
Pedestrian	9	3.54%	1.19%
Bicyclist	3	1.18%	0.51%

Source: DVRPC

Figure 2: Pedestrian Crash Details

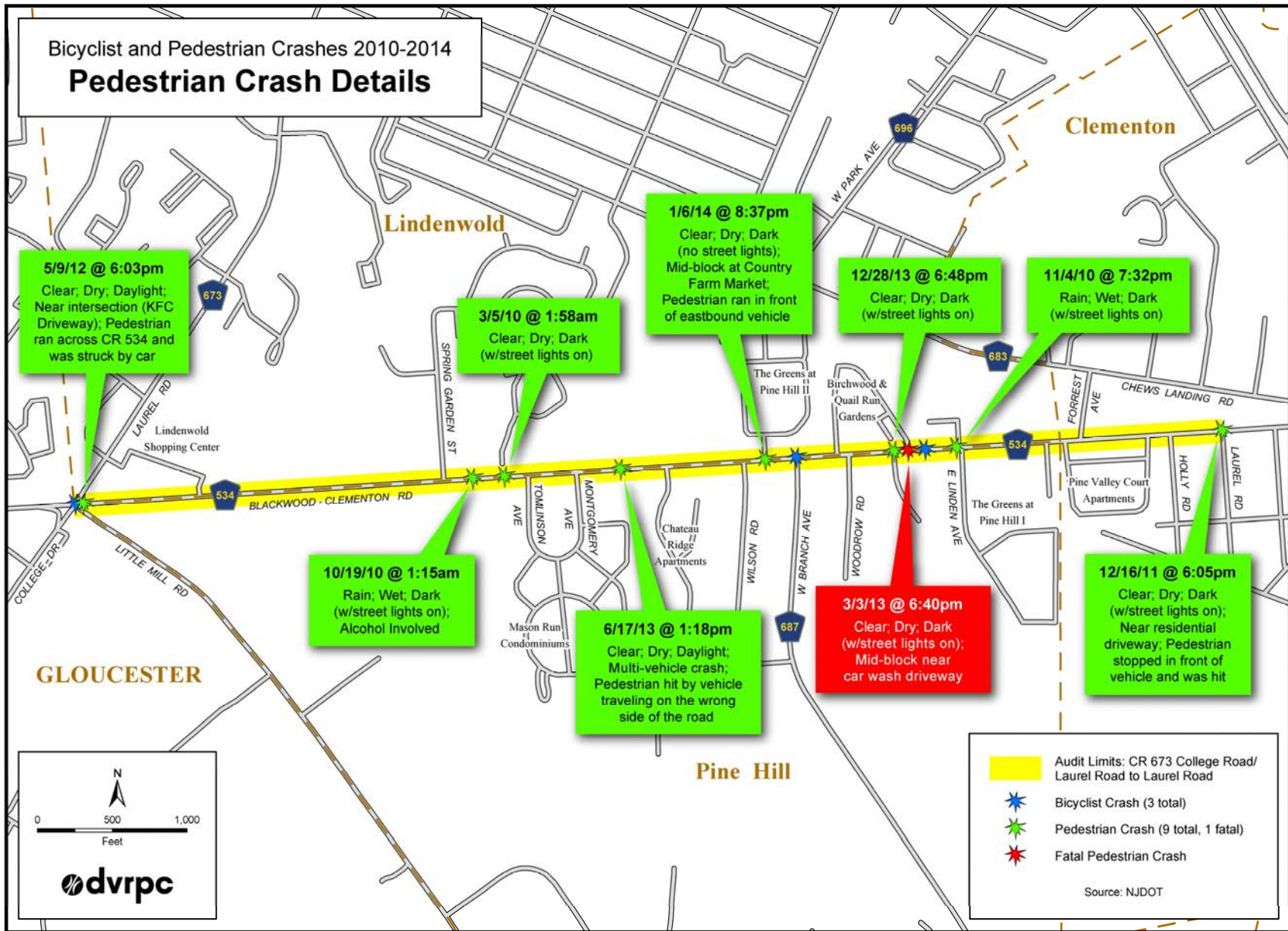
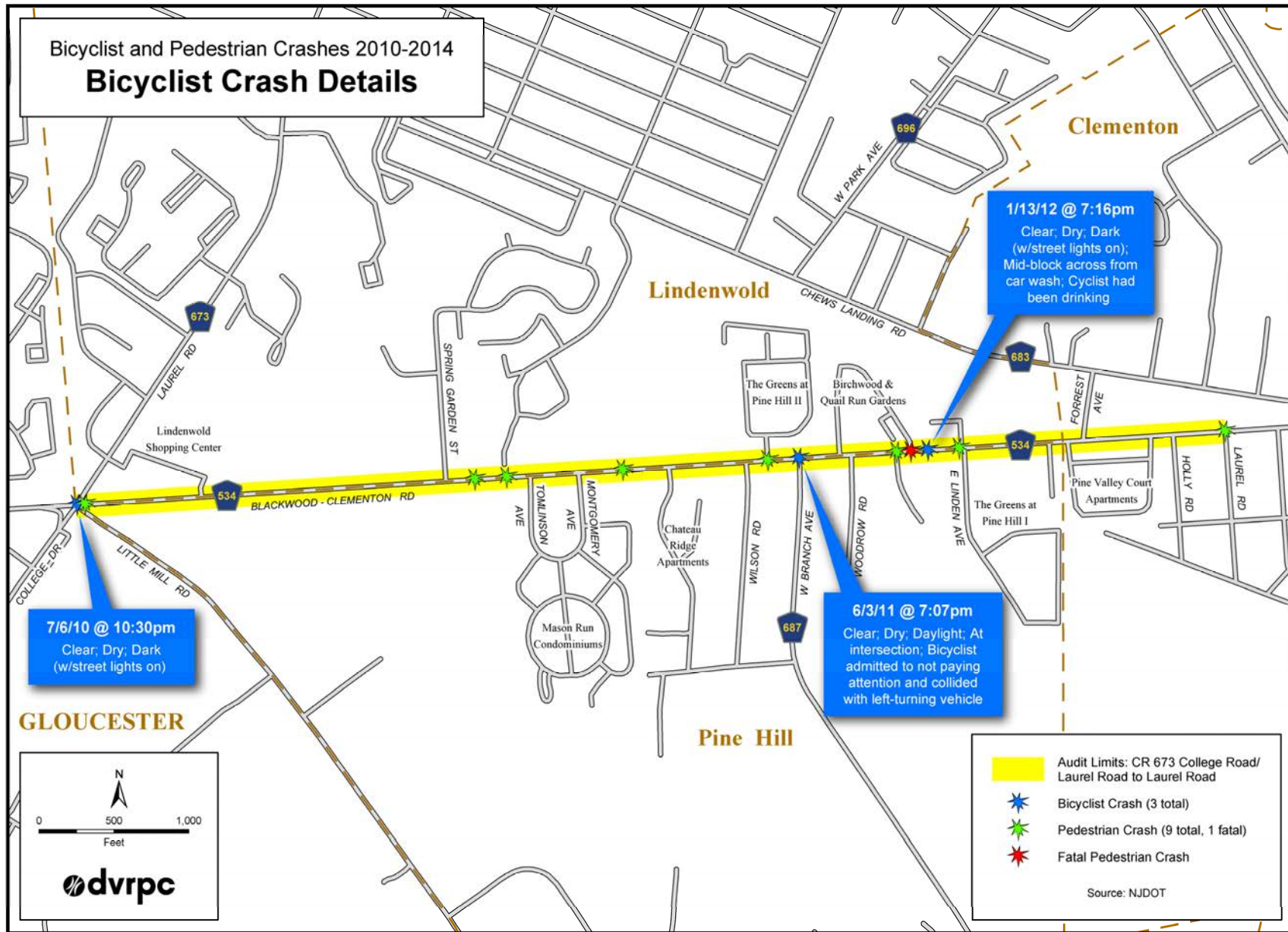


Figure 3: Bicyclist Crash Details



Pedestrian and Bicyclist Counts

DVRPC staff conducted volume counts via video camera to identify travel patterns of pedestrians and bicyclists along CR 534. These counts were taken on March 22, 2016, over one 24-hour period. As shown in **Figures 4 and 5**, the video cameras were mounted on light poles at seven key pedestrian activity locations along the corridor; four cameras faced east and three cameras faced west. 1,240 pedestrians and 179 bicyclists were captured. There may be some double counting in those instances where the video captured the same pedestrians and bicyclists traveling both directions (coming and going) along CR 534, although it is not likely that a significant number of pedestrians and bicyclists were double counted.

Findings from Pedestrian Video Counts

The highest pedestrian volumes were recorded between 12:00 noon and 6:00 PM. Two cameras captured both school students and transit riders boarding or alighting their respective services.

As shown below, the highest pedestrian activity was recorded in the vicinity of the CR 534 and CR 687 intersection (three video cameras each captured totals of 298, 228, and 291 people walking along or crossing CR 534). This area has dense housing and commercial development, as well as the two NJ Transit bus stops with the highest ridership on the corridor. This is also the area where one pedestrian was killed. With few crosswalks on CR 534, people commonly crossed CR 534 mid-block, the busiest area of the central section of the corridor.

Findings from Bicyclist Video Counts

Similar to the pedestrian count summary, the most active area for bicyclists was in the vicinity of the CR 534 and CR 687 intersection (cameras 4 and 5, respectively, captured 39 and 45 bicyclists riding along and crossing CR 534). Bicyclist activity on the corridor varies throughout the day depending on location. Six of the cameras showed no overnight activity (12:00 AM to 6:00 AM), and the cameras captured the most bicycle activity between 6:00 PM and 12:00 midnight.

Figure 4: Pedestrian Video Count Summary

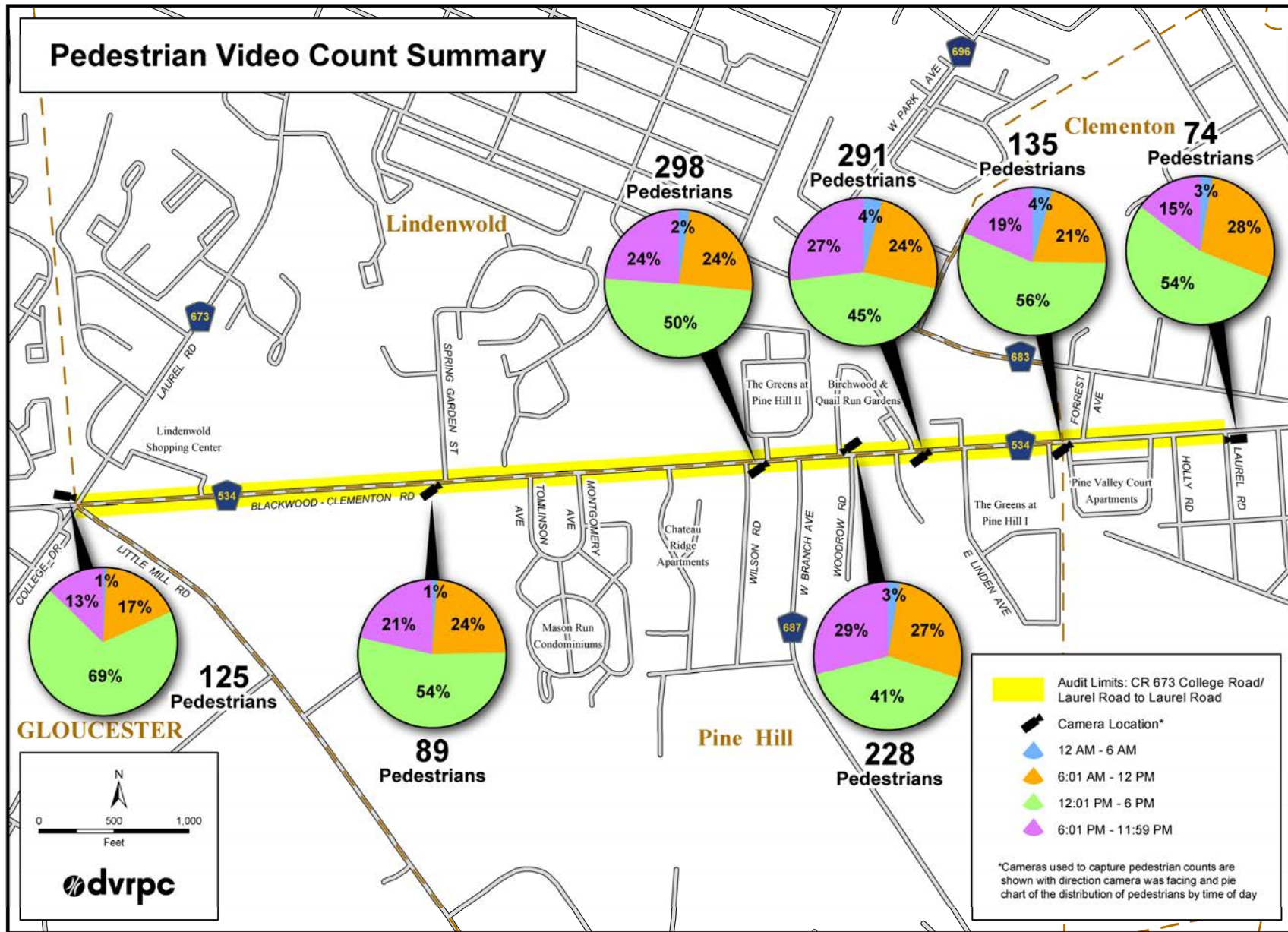
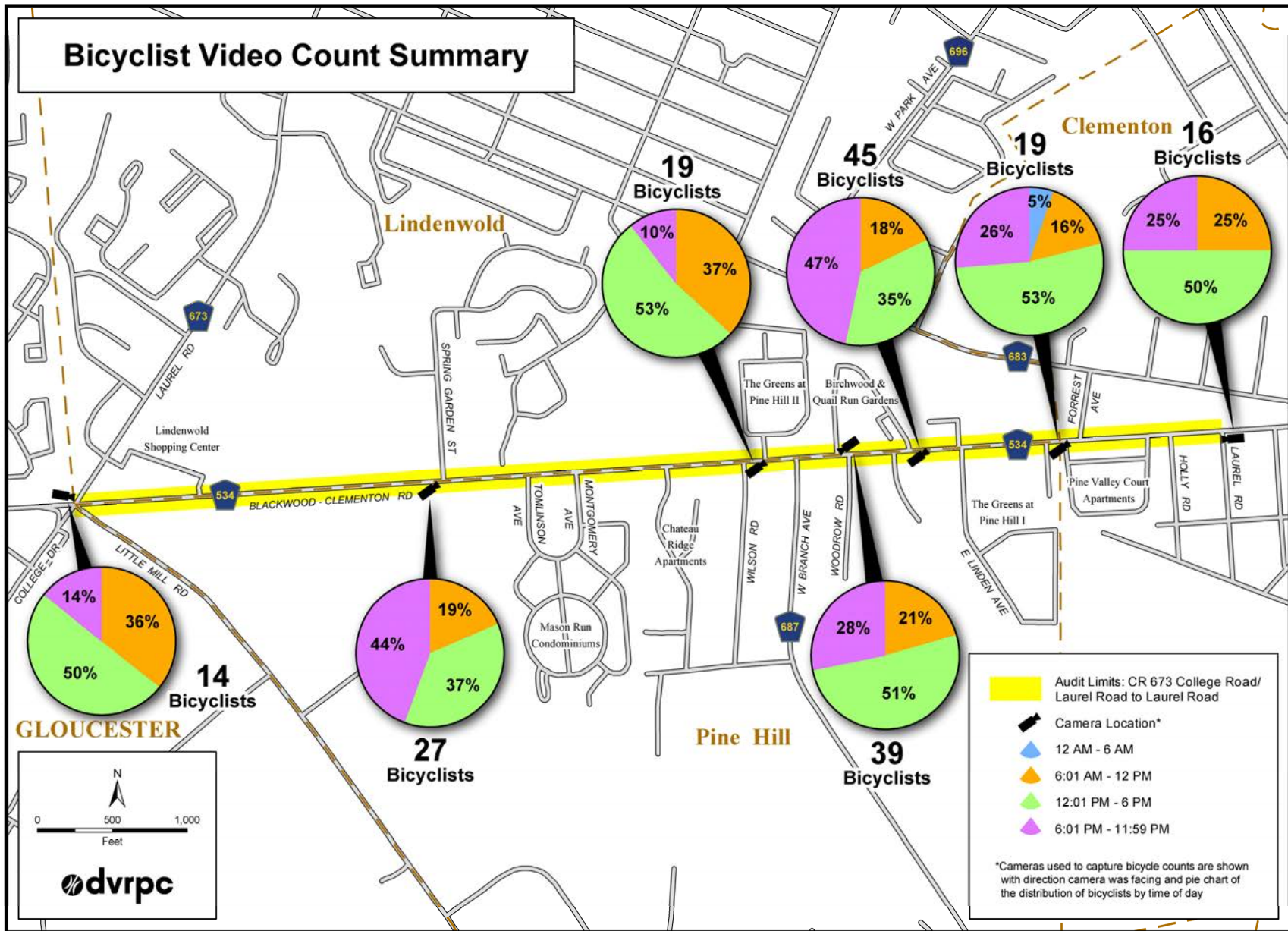


Figure 5: Bicyclist Video Count Summary



Findings and Recommendations

Presented here are the findings, potential strategies, and priorities identified during the CR 534 PB-RSA. **Table 2** identifies corridor-wide safety issues and potential strategies, general ratings for difficulty to implement, estimated safety benefits, and the respective responsible agency. 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 an existing or new contract and some engineering, and funding may be readily available; and
- High – longer-term project, may need full engineering, and may require right-of-way acquisition and new funding.

The qualitative ratings for estimated safety benefit favor changes or upgrades to the system like engineering improvements. Maintenance items are considered upkeep, and although important, do not carry as much weight. Shading identifies issues that have a low rating for difficulty to implement that will produce a medium/high safety benefit. These improvements can typically be addressed through maintenance, and/or without beginning a new planning or engineering effort. It is expected that implementing these recommendations will improve safety and operations along the study corridor.

Audit Team Priorities

The audit team priorities process provides an opportunity for team members to advocate for what they consider the most important issue to be addressed as a result of the audit. These items are important because they are endorsed by individuals who spent the day familiarizing themselves with the corridor’s statistics; listening to the perspectives of local participants including local police, and experiencing the issues first-hand having walked the entire corridor during the field visit. Camden County, the roadway owner, is encouraged to consider the following items both in follow-up maintenance work and to give them a high priority when doing long-term planning for the corridor:

- Upgrade the pedestrian environment to meet Americans with Disability Act (ADA) standards, including installation of mid-block crosswalks at high-volume pedestrian crossings, specifically restriping the crosswalk on the east side of CR 687 and repairing or adding new sidewalks where needed.
- Upgrade the bicyclist environment, giving strong consideration to changing roadway striping to accommodate bike lanes, and installing “Share the Road” signs.
- Replace and/or upgrade all signs where needed, and add school bus stops at appropriate locations.
- Incorporate measures to help reduce speeding, including investigating posted speed limit reductions, increased enforcement, and modified lane striping.

Table 2, below, lists a combination of 11 higher-priority, location-specific and corridor-wide issues identified during the audit, and Appendix B provides a table describing more site-specific issues.

Table 2: Site-Specific and Corridor-Wide Issues and Potential Strategies

Issue	Potential Strategy	Difficulty to Implement	Estimated Benefit	Responsible Agency
1. Sidewalk is either missing or in poor condition with broken and deteriorated sections. These issues force pedestrians and wheelchair users into the street.	1. Investigate which properties are considered public responsibility and address through a repair schedule; at private property locations approach the property owners and enforce codes.	Medium	Medium/High	Lindenwold, Pine Hill, and/or Clementon boroughs
2. Street lighting is inconsistent throughout the corridor making it difficult for drivers to see pedestrians and bicyclists when traveling at night through low-lit areas.	2. Further investigate low-lit areas (e.g. light bulbs may need replacement); contact utility company to consider adding light poles in dark areas.	Medium/High	Medium/High	Camden County/Atlantic City Electric Company
3. Average speed of traffic is excessive and driver behavior often erratic, both potentially dangerous for vulnerable road users. Numerous incidents of drivers illegally bypassing stopped school buses during pick-up or drop off of children. During the RSA field visit, using Light Detection and Ranging (LIDAR) devices police officers clocked speeds in excess of 65 mph in a 45-mph posted speed zone area.	3. Consider spot treatments of traffic calming and increased enforcement. At school bus stops use mobile variable message sign to warn motorists of children in the area, and to advertise enforcement efforts.	Medium	Medium	Camden County/ Lindenwold, Pine Hill, and/or Clementon police departments
4. High volume of pedestrians crossing CR 534 in the dense residential section in vicinity of the CR 687 intersection. A crosswalk on the east side of CR 687 intersection is missing.	4. Consider installing a mid-block crosswalk at the higher-volume pedestrian crossings; add pedestrian-oriented type signage; restripe crosswalk on east side of CR 687.	Low/Medium	Medium/High	Camden County
5. Stop bars and crosswalks are missing from side streets.	5. Restripe stop bars and crosswalks as needed.	Low	Low/Medium	Lindenwold, Pine Hill, and/or Clementon boroughs
6. Bicyclist accommodations are missing throughout the corridor (no marked bike lanes, no "Share the Road" signage).	6. Investigate minimum lane widths required for accommodating bicyclists; consider change to roadway striping as part of a future repaving project along CR 534.	Medium	Medium/High	Camden County

7. Many curb ramps at driveways are either missing or in poor condition. Missing curb ramps, present a hazard for baby strollers, wheelchair users, and the lesser-abled, often forcing them into the street.	7. Perform an inventory of curb ramps along the corridor; repair and install ADA-compliant curb ramps where needed.	Medium	High	Camden County
8. There are numerous locations where school children are forced to load and unload school buses in unmarked, unregulated bus stops along the corridor.	8. Investigate the proper location of school bus stop signs; install signs according to standards; possibly pursue Safe Routes to School (SRTS) funding.	Low	Medium/High	Camden County/local school districts/Pine Hill, Lindenwold, Clementon boroughs
9. Variable shoulder widths are common throughout the corridor, especially between Spring Garden Street and Laurel Road. Bicyclists could use shoulders if properly accommodated on consistently wide shoulders.	9. Consider change to roadway striping to accommodate bike lanes as part of the next scheduled restriping or repaving along CR 534. In areas where shoulder width is narrow, consider installing "Share the Road" signage.	Low/Medium	Medium	Camden County
10. Given the amount of foot and bicycle traffic on the corridor, there is a lack of non-motorized specific signage posted on CR 534.	10. Conduct a signage inventory and post signage as needed, including "Share-the-Road", pedestrian crossing ahead, bus-stop ahead, etc.	Low	Medium/High	Camden County, local school districts (for bus signage)
11. Pedestrian and bicyclist behavior is sometimes erratic, including pedestrians not using nearby crosswalks and bicyclists riding against traffic.	11. Consider applying for grants to educate walkers and bikers on traffic safety, possibly employing the NJDOT education program Street Smarts.	Low/Medium	Medium	Camden County/Lindenwold, Pine Hill, Clementon, boroughs, CCCTMA

Source: DVRPC

Roadway Owner Response

As the roadway owner, Camden County is encouraged to use the findings of the PB-RSA as a guide for designing improvements to address these issues. Whereas the RSA findings are numerous, Camden County should use its experience in safety planning and engineering to determine which issues from **Table 2** can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the audit process is the road owner's response: an acknowledgement of the audit's findings and recommendations, and their planned follow-up. Camden County's response is located in Appendix C. DVRPC was fortunate to have worked closely with Camden County in gathering data for the audit and as an audit team member, and will continue to collaborate with them in the pursuit of federal safety funds to implement audit recommendations.

In responding to the RSA's findings, the road owner must bear in mind all the competing objectives involved when implementing the recommendations, available resources and staff capacity being foremost among them. Because the audit process generated a long and wide-ranging list of improvements (site-specific issues listed in Panels 1 to 8 in Appendix B), the road owner is encouraged to implement as time and funds allow in coordination with other projects and priorities. The identified safety issues and recommendations are intended to inform development of long-term improvement projects and serve as a punch list of maintenance tasks. As mentioned, the items highlighted in tan are considered to be low difficulty to implement and will produce a medium/high safety benefit; these should be the highest priorities.



Appendix A

Appendix A: Audit Team

Table A-1: Audit Team Members

Name	Agency
Ray Rauanheimo	AARP—PA
John Boyle	Bicycle Coalition of Greater Philadelphia
Diane Kozak	Camden County Highway Traffic Safety
Sam Spino	Camden County Highway Traffic Safety
Andrew Levecchia	Camden County Planning Department
Matt Zochowski	Camden County Planning Department
Warren Strumpfer	Citizen
Bill Ragozine	Cross County Connection TMA
Logan Axelson	DVRPC
Regina Moore	DVRPC
Kevin Murphy	DVRPC
Jason Gittens	Gloucester Township Police
Adam McKillop	Gloucester Township Police
Richard Roach	Lindenwold Borough
Rich Woelpper	Mason Run Condominiums
Eric Hicken	New Jersey Department of Health/Office of Emergency Medical Services
Ray Reeve	New Jersey Division of Highway Traffic Safety
Eric Oberle	NJDOT
Derek Kramer	Pine Hill Borough Police



Appendix B

Appendix B: Site-Specific Issues and Potential Strategies

Table B-1: Panel 1 (CR 687 intersection and Lindenwold Shopping Center)

Issue	Potential Strategy	Difficulty to Implement	Estimated Safety Benefit	Responsible Agency
1. At CR 534 and CR 673 (Laurel Road/College Drive) intersection: <ol style="list-style-type: none"> Existing pedestrian crossings are faded. The east side crosswalk is very long. Timing for pedestrian crossing phase seemed inadequate. No advance warning sign of merge after KFC driveway. 	<ol style="list-style-type: none"> Restripe crosswalks. Investigate the length of crosswalk. Investigate pedestrian signal timing. Install advance warning signs for lane drop. 	<ol style="list-style-type: none"> Low Low Low Low 	<ol style="list-style-type: none"> Medium Medium Medium/High Low/Medium 	<ol style="list-style-type: none"> Camden County Camden County Camden County Camden County
2. Excess lane capacity leads to speeding and merge issues after lane drop on EB CR 534 near KFC driveway. Turning left out of the Lindenwold Shopping Center to head east on CR 534 is difficult due to crossing three lanes (two WB and one center-left-turn lane).	Consider performing a road diet (Panels 1 through 3 at Spring Garden Street).	Medium/High	High	Camden County
3. There are no street lights in this section, only ambient lighting from businesses.	Investigate low-lit areas; contact utility company to consider adding light poles in low-lit areas.	Medium/High	Low/Medium	Camden County/Atlantic City Electric Company
4. Curbing is not consistent.	Consider conducting a curb inventory.	Low/Medium	Low/Medium	Camden County
5. There are no speed limit signs posted in area.	Add speed limit signs.	Low	Medium	Camden County

Table B-2: Panel 2: (Lindenwold Shopping Center and New Road intersection)

Issue	Potential Strategy	Difficulty to Implement	Estimated Safety Benefit	Responsible Agency
<p>1. At New Rd/Laurelwood Plaza driveway:</p> <ul style="list-style-type: none"> a. The crosswalk over New Road is 81 feet long with large curb radii. b. The right-turn lane on the EB approach to New Road seems unnecessary; the shoulder that leads into the lane could be extended to allow for a potential lane for bicyclists. c. The ADA ramp on the east side of New Road is overgrown and hard to traverse. d. Drivers speed in the area, making it difficult for motorists turning onto CR 534 from New Road and the Laurelwood Plaza driveways. Audit team witnessed a crash at this location between a driver leaving Laurelwood Plaza and another traveling on CR 534. 	<ul style="list-style-type: none"> a. Change curb radii to slow turning vehicles; install curb bump-out to shorten crossing. b. Consider eliminating the right-turn lane and restripe shoulder to accommodate bicyclists. c. Clear and maintain vegetation. d. Consider traffic calming alternatives like a roundabout or a road diet to help reduce speeds. 	<ul style="list-style-type: none"> a. Low/Medium b. Low c. Low d. Medium/High 	<ul style="list-style-type: none"> a. Medium b. Medium c. Low/Medium d. High 	<ul style="list-style-type: none"> a. Pine Hill Borough b. Camden County c. Camden County d. Camden County
<p>2. There are no speed limit signs posted in the area.</p>	<p>Add speed limit signs.</p>	<p>Low</p>	<p>Medium</p>	<p>Camden County</p>

Table B-3: Panel 3 (Spring Garden intersection)

Issue	Potential Strategy	Difficulty to Implement	Estimated Safety Benefit	Responsible Agency
<p>1. At Spring Garden Street:</p> <ul style="list-style-type: none"> a. East of Spring Garden Street the sidewalk ends (on both sides of CR 534) which restricts pedestrian access. b. Drivers tend to speed west of Spring Garden Street where CR 534 widens to two travel lanes, presenting a 	<ul style="list-style-type: none"> a. Where possible, consider continuing sidewalk east of Spring Garden Street. b. For pedestrians, consider adding a hard-scaped gore area on east side of Spring Garden Street as a pedestrian refuge to facilitate safe 	<ul style="list-style-type: none"> a. Medium/High b. Medium 	<ul style="list-style-type: none"> a. Medium/High b. Medium/High 	<ul style="list-style-type: none"> a. Lindenwold and Pine Hill boroughs b. Camden County

<p>hazard for pedestrians and drivers turning onto and from Spring Garden Street.</p> <p>c. Spring Garden Street serves as the main school bus entrance for Lindenwold School #5 and to The Crossings residential development. There is a substantial amount of traffic from this street.</p>	<p>crossing.</p> <p>c. Conduct traffic counts at CR 534 and Spring Garden St., and explore safety benefits of adding a traffic signal.</p>	<p>c. Low/Medium</p>	<p>c. Medium/High</p>	<p>c. Camden County</p>
<p>2. There is no speed limit sign posted west of Spring Garden Street.</p>	<p>Add speed limit sign.</p>	<p>Low</p>	<p>Medium</p>	<p>Camden County</p>

Table B-4: Panel 4 (Tomlinson Avenue intersection and Montgomery Avenue intersection)

Issue	Potential Strategy	Difficulty to Implement	Estimated Safety Benefit	Responsible Agency
<p>1. WB drivers use the shoulder to bypass vehicles queueing to turn left onto Montgomery Avenue, creating a hazard for pedestrians.</p>	<p>a. Consider installing “Keep Off Shoulder” signage.</p> <p>b. Consider adding a sidewalk.</p>	<p>a. Low</p> <p>b. High</p>	<p>a. Medium</p> <p>b. Medium/High</p>	<p>a. Camden County</p> <p>b. Lindenwold Borough</p>
<p>2. Montgomery Avenue and Tomlinson Avenue:</p> <p>a. There are missing stop bars on both side streets.</p> <p>b. There are unmarked school bus stops.</p>	<p>a. Add stop bars.</p> <p>b. Investigate the proper location of school bus stop signs; install signs accordingly to standards; possibly pursue SRTS funding.</p>	<p>a. Low</p> <p>b. Medium</p>	<p>a. Low/Medium</p> <p>b. Medium/High</p>	<p>a. Pine Hill Borough</p> <p>b. Lindenwold and Pine Hill school districts</p>
<p>3. Curbing is not consistent.</p>	<p>Consider conducting a curb inventory.</p>	<p>Low/Medium</p>	<p>Low/Medium</p>	<p>Camden County</p>

Table B-5: Panel 5 (Chateau Drive to CR 687 intersection)

Issue	Potential Strategy	Difficulty to Implement	Estimated Safety Benefit	Responsible Agency
<p>1. At The Greens at Pine Hill II and Chateau Ridge Apartments:</p> <p>a. There are no crosswalks or ADA ramps on the driveways.</p>	<p>a. Investigate crosswalk and ADA compliance across driveways.</p>	<p>a. Low/Medium</p> <p>b. Medium</p>	<p>a. High</p> <p>b. Medium/High</p>	<p>a. Apartment complex owners</p>

<ul style="list-style-type: none"> b. There are no school bus stop signs to alert drivers of children in the area. 	<ul style="list-style-type: none"> b. Investigate the proper location of school bus stop signs; install signs according to standards; possibly pursue SRTS funding. 			<ul style="list-style-type: none"> b. Lindenwold and Pine Hill borough school districts
<ul style="list-style-type: none"> 2. EB CR 534 drivers use the wide shoulder (located prior to the dedicated right-turn lane) to make right turns onto CR 687, Branch Avenue, often during the afternoon peak period. Pedestrians were observed walking on the shoulder at this location. 	<ul style="list-style-type: none"> a. Consider installing “Keep Off Shoulder” signage. b. Consider adding a sidewalk. 	<ul style="list-style-type: none"> a. Low b. High 	<ul style="list-style-type: none"> a. Medium b. Medium/High 	<ul style="list-style-type: none"> a. Camden County b. Pine Hill Borough
<ul style="list-style-type: none"> 3. At CR 687 intersection: <ul style="list-style-type: none"> a. The traffic signal is outdated (older signal heads; no left-turn phase for WB left-turn drivers; no pedestrian phase). b. Missing crosswalk on east side of intersection. This area has the highest pedestrian volume. c. NJ Transit bus stop at the intersection approach contributes to pedestrian and bus conflicts with vehicles turning at CR 687. 	<ul style="list-style-type: none"> a. Consider upgrading the traffic signal. b. Add missing crosswalk. c. Consider relocating bus stop to protect transit riders and discourage mid-block crossings. 	<ul style="list-style-type: none"> a. Medium/High b. Low c. Low/Medium 	<ul style="list-style-type: none"> a. High b. High c. Medium/High 	<ul style="list-style-type: none"> a. Camden County b. Camden County c. NJ Transit
<ul style="list-style-type: none"> 4. At Wilson Road: <ul style="list-style-type: none"> a. Despite the posted speed limit of 45 mph, many drivers appear to be speeding along the corridor. b. The stop bar is missing at the approach, and ADA ramp is not compliant. c. On the south side of CR 534 there is a goat path indicating high foot traffic in the area. 	<ul style="list-style-type: none"> a. Consider traffic calming spot treatments, and increase enforcement. b. Add stop bar and fix ramp. c. Consider adding a sidewalk. At private property locations approach the property owners and enforce codes. 	<ul style="list-style-type: none"> a. Medium b. Low c. Medium 	<ul style="list-style-type: none"> a. Medium/High b. Low/Medium c. Medium/High 	<ul style="list-style-type: none"> a. Camden County/Pine Hill and Lindenwold borough police b. Pine Hill Borough c. Pine Hill Borough

Table B-6: Panel 6 (Woodrow Drive intersection to The Greens at Pine Hill)

Issue	Potential Strategy	Difficulty to Implement	Estimated Safety Benefit	Responsible Agency
1. There are no crosswalks or ADA ramps on the driveways to the Birchwood & Quail Run Gardens Apartments and The Green at Pine Hill II Apartments (north side of CR 534).	Investigate crosswalk and ADA compliance across driveways.	Low/Medium	High	Apartment complex owners
2. There are no explicit bicyclist accommodations, but there are wide shoulder widths along both sides of CR 534 especially in front of Crown Fried Chicken Restaurant and Birchwood & Quail Run Garden Apartments.	Consider new roadway striping to accommodate bike lanes as part of a future repaving project along CR 534. In areas where shoulder width is narrow, consider installing Share-the-Road signage.	Low/Medium	Medium	Camden County

Table B-7: Panel 7 (E. Linden Avenue intersection to Pine Valley Court Apartments)

Issue	Potential Strategy	Difficulty to Implement	Estimated Safety Benefit	Responsible Agency
1. Missing stop bar and crosswalk on E. Linden Avenue.	Restripe stop bar and crosswalk.	Low	Low/Medium	Pine Hill Borough
2. The speed limit sign on the north side of CR 534 at Beech Avenue is old and faded.	Replace speed limit sign.	Low	Low/Medium	Camden County
3. West of Forrest Avenue (along both sides of CR 534), the sidewalk is either missing or is in poor condition.	For adding sidewalks, investigate which properties are considered public responsibility and address through a repair schedule; at private property locations approach the property owners.	Medium	Medium/High	Lindenwold, Pine Hill, and/or Clementon boroughs
3. Bus stops a. School bus stops are not marked in this section. b. NJ Transit bus stops are not marked in this section.	a. Investigate the proper location of school bus stop signs; install signs accordingly to standards; possibly pursue SRTS funding. b. Contact NJ Transit to investigate unmarked bus stop locations.	a. Medium b. Low/Medium	a. Medium/High b. Medium	a. Lindenwold and Pine Hill school districts b. NJ Transit

c. There are no warning signs alerting motorists of pedestrians in the area.	c. Conduct a sign inventory and post signs as needed, including “Share the Road”, pedestrian crossing ahead, bus stop ahead, etc.	c. Low/Medium	c. Medium	c. Camden County
4. There is a significant amount of EB vehicles turning left onto Forrest Avenue, which causes EB through vehicles to use the wide shoulder to bypass left-turning vehicles. This wide shoulder is in front of the Pine Valley Court Apartments where ambulances are often observed parked to load and unload patients; and a WB NJ Transit bus stop is located at the corner of this intersection, causing a bottleneck.	Document observations and perform traffic counts at CR 534 and Forrest Avenue to determine if a dedicated left-turn lane is required.	Low/Medium	Medium/High	Camden County

Table B-8: Panel 8 (Pine Valley Court Apartments to Laurel Road intersection)

Issue	Potential Strategy	Difficulty to Implement	Estimated Safety Benefit	Responsible Agency
1. Sidewalks are deteriorated on the north side of CR 534 across from Holly Road and Laurel Road.	Consider adding sidewalks. On private property approach property owners; enforce codes.	Medium	Medium/High	Clementon Borough
2. Bus stops: a. School bus stops are not marked in this section. b. NJ Transit bus stops are not marked in this section. c. There are no warning signs alerting motorists of pedestrians in the area.	a. Investigate location of school bus stop signs; install signs according to standards; pursue SRTS. b. Ask NJ Transit to review unmarked bus stops. c. Conduct a sign inventory and post signs as needed, including “Share the Road”, pedestrian crossing ahead, bus-stop ahead, etc.	a. Medium b. Low/Medium c. Low/Medium	a. Medium/High b. Medium c. Medium	a. Clementon School District b. NJ Transit c. Camden County



Appendix C

Appendix C: Road Owner Response

Camden County Response to CR 534 Pedestrian and Bicyclist Road Safety Audit

Although the difficulty to implement something might be low and easily accomplished through maintenance, at this time the County is not in a position to be able to commit to a timeframe for when these improvements will be implemented.

The responses below indicate if the County agrees or disagrees with the assessment but should in no way be perceived as a commitment to the implementation of such suggestions.

Rather than focus on each individual item Panel by Panel, the focus was on the eleven (11) corridor-wide issues.

Corridor-Wide Issues

1. Sidewalk issues – the county does not maintain sidewalk issues on any county highway. Sidewalk maintenance is the responsibility of the municipality.
2. Street lighting – the county agrees with this assessment, any work involving utility pole lighting maintenance should be coordinated with Atlantic City Electric.
3. Enforcement – traffic enforcement is not something that Camden County is responsible for, and this issue will have to be addressed by the municipality.
4. Crosswalk – all crosswalks will be updated during the next regularly scheduled maintenance event for this corridor. Please note that the county does not promote the use of, nor will it maintain any mid-block crosswalks. If a municipality is interested in a mid-block crosswalk, several steps are required by the county concluding with a Freeholder Resolution dedicating all responsibilities of the mid-block crosswalk to the municipal entity.
5. Stop bars on side streets – the county does not maintain striping issues on local roadways. Local streets are the responsibility of the municipalities.
6. Agree – the county agrees with the assessment but cannot define a course of action until a full engineering review of the corridor is completed to determine if the cart way can be redesigned to accommodate a bike lane.
7. Agree - all ADA-compliant curb ramps will be updated during the next regularly scheduled maintenance event for this corridor.

8. Unmarked bus zones for school buses - the county has no authority over the location and signing school bus stop zones. This is determined by the municipality and their respective school districts.
9. Agree – all roadway striping will be updated during the next regularly scheduled maintenance event for this corridor. As stated in #6, the county cannot make a decision on striping to accommodate a bike lane; however special consideration will be given to add “Share the Road” or similar signage to alert drivers of foot and bike traffic on the corridor.
10. Agree – all signage issues will be addressed during the next regularly scheduled maintenance event for this corridor.
11. Agree - traffic enforcement, in this instance of pedestrians and bicyclists is not something that Camden County is responsible for, and this issue will have to be addressed by the municipality.



Appendix D

Appendix D: Presentation

(Presentation slides begin on page D - 2.)



CR 534 (Blackwood-Clementon Road) Pedestrian and Bicyclist Road Safety Audit

Boroughs of Lindenwold, Pine Hill, and Clementon, NJ
Thursday, May 26, 2016



DVRPC

- ∞ Metropolitan Planning Organization of the Delaware Valley serving 9 counties:
 - PA: Bucks, Chester, Delaware, Montgomery, and Philadelphia
 - NJ: Burlington, Camden, Gloucester, and Mercer
- ∞ Core Functions
 - Facilitate a regional body to oversee the allocation of federal transportation funds
 - Conduct planning studies, data analysis, and mapping to support local, county, regional, and state partners

Audit Team Introductions

☞ Name

☞ Affiliation



CR 534 (Blackwood-Clementon Road)

☞ Why this route?

- Citizen concern of pedestrian and bicyclist safety on high traffic roadway
- Opportunity for Regional Safety Task Force (RSTF) members to participate in safety project
- Highway Safety Improvement Program (HSIP) Eligible
 - Pedestrian and Intersection List

☞ Collaboration among:

- DVRPC RSTF
- NJ Division of Highway Traffic Safety
- Camden County Highway Traffic Safety Task Force
- Camden County Planning Division

RSA Schedule

Pre-Audit

- Analyze and discuss study area crash data and related safety issues

Field Visit

- Foot survey of the corridor to identify safety issues and examine conditions
- Working lunch

Post Audit

- Define problems
- Brainstorm improvements ideas
- Wrap up before 4:00PM

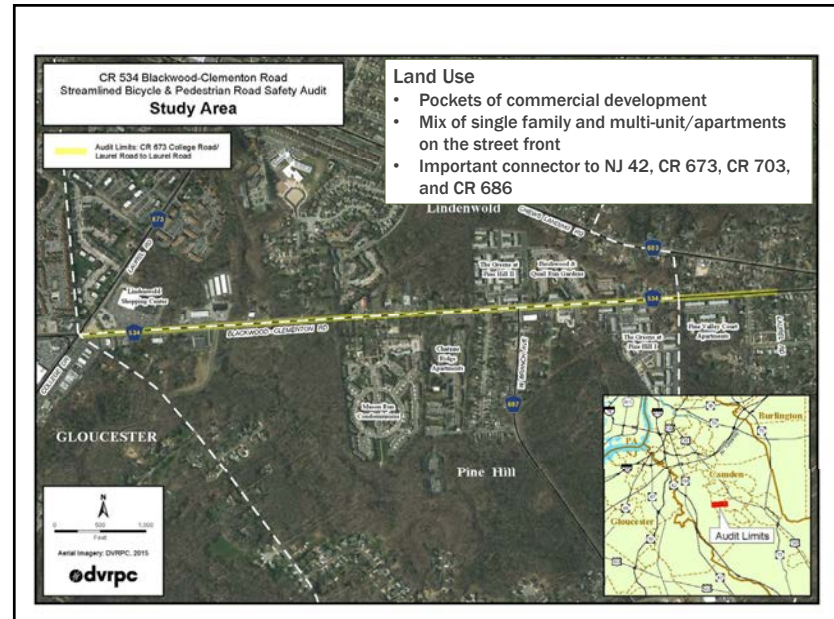
What is a Pedestrian and Bicyclist RSA?

RSA

- RSA is a safety performance examination of an existing or future road or intersection by an independent, multidisciplinary audit team
- A Pedestrian and Bicyclist RSA considers pedestrian and bicyclist crashes, and their circumstances, more closely
- Benefits
 - Adaptable to local needs and conditions
 - Short-term
 - Recommendations can be implemented in stages as time and resources permit

Audit Team

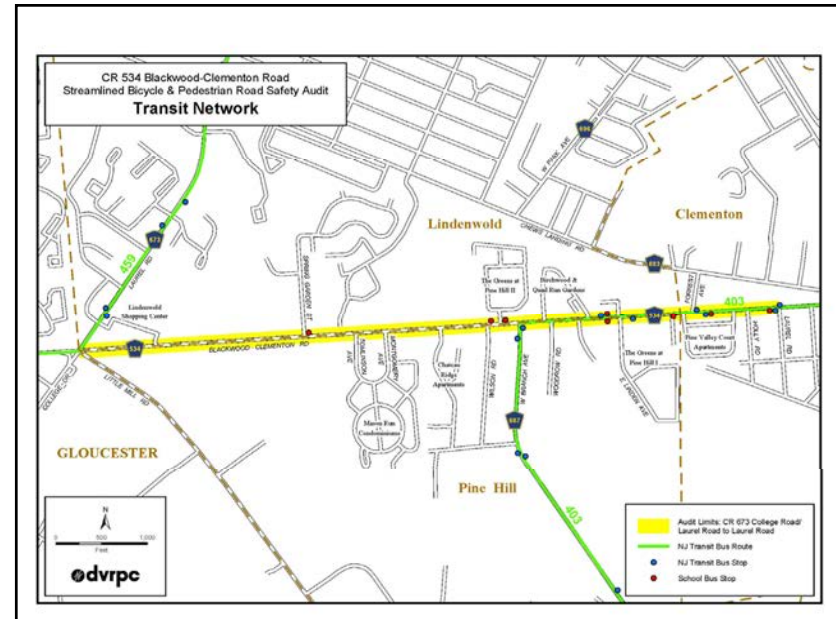
- § Concerned citizens
- § Camden County Planning Division
- § Lindenwold Borough
- § Clementon Borough
- § Pine Hill Borough
- § Gloucester Township
- § Cross County Connection TMA
- § NJDOT Transportation Data and Safety
- § Bicycle Coalition of Greater Philadelphia
- § Mason Run Condominiums
- § AARP – Montgomery Co. PA
- § DVRPC
 - Office of Transportation Safety and Congestion Management
 - Office of Transit, Bike, and Pedestrian Planning



Operational Conditions

50 Roadway

- Principal arterial
- 1.4 miles
- Orientation: east-west
- CR 673 to Spring Garden St.
 - 5 lanes w/a lane drop to 4 lanes
 - Center-left-turn lane
- Spring Garden St. to Laurel Rd.
 - 2 lanes
- Inconsistent sidewalks, wide shoulders, goat paths
- No marked bike lanes
- Variable posted speeds (35 to 45 MPH)
- 83 access points:
 - 22 intersections (2 signalized; 20 unsignalized)
 - 61 driveways (29 business; 32 residential)
- Crosswalks at the two signalized intersections and over some of the cross streets



NJ Transit



- ⌘ NJ Transit Bus 403
 - No service between CR 673 to CR 687
 - Follows CR 687 N/S and CR 534 E/W for less than ½ our study limits
 - 11 posted bus stops
 - Headways: 20 mins – 2 hours on weekdays; 50 mins – 2 ½ hours on weekends
 - Hours of operations: 5AM to 12:30AM on weekdays; 6AM to 12:30AM on weekends
 - Single day ridership at bus stops: 100+ weekday boardings; 80+ weekend boardings
 - Higher ridership numbers at CR 687 bus stops

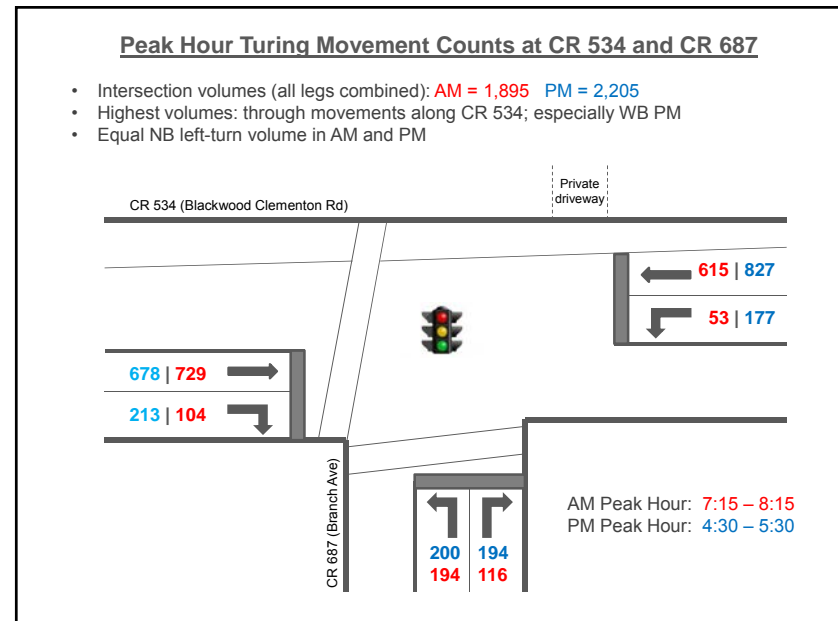
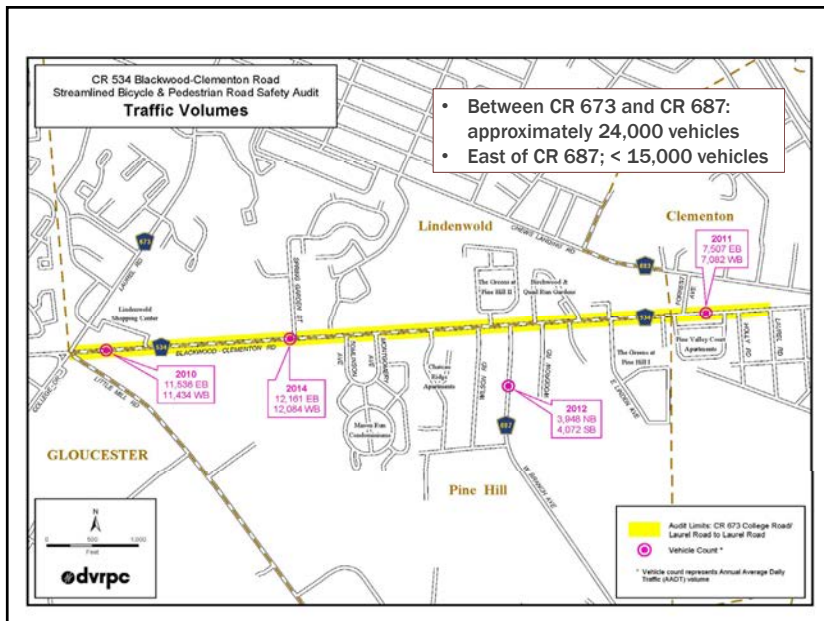


- ⌘ NJ Transit Bus 459
 - Western edge of study area
 - Travels N/S direction along CR 673
- ⌘ Both buses connect to Lindenwold PATCO

School Buses



- ⌘ Several buses travel and stop along CR 534
 - 6:30 to 8:30 AM
 - 2:00 to 4:00 PM
- ⌘ 8 identified school bus stops
 - Video counts
 - School districts
- ⌘ No school bus stop signs posted in study area



Crash Data

254 Reportable Crashes

- In NJ, reportable criteria; personal injury, or minimum of \$500 of property damage, determined by officer on the scene.
- 2010 to 2014
- Police reports, detail sheets, crash rates

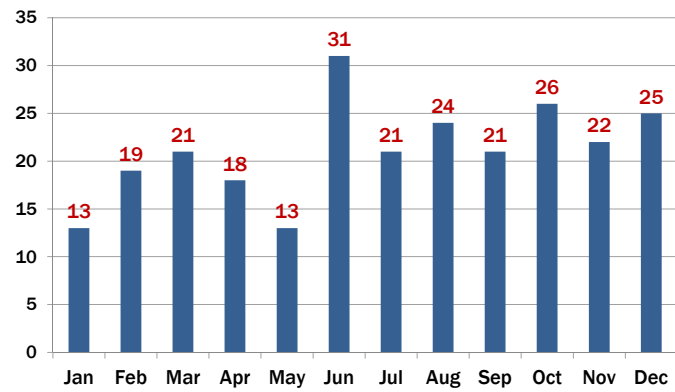
Corridor-wide Crash Findings

Year

YEAR	Reportable	
	TOTAL	PERCENTAGE
2010	65	25%
2011	48	19%
2012	41	16%
2013	55	22%
2014	45	18%
Total	254	

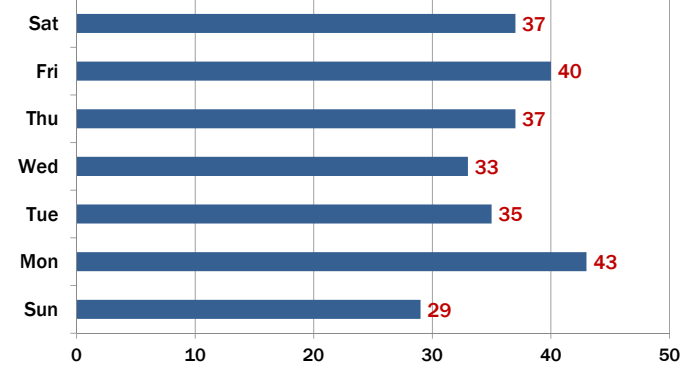
Corridor-wide Crash Findings

Month of Year



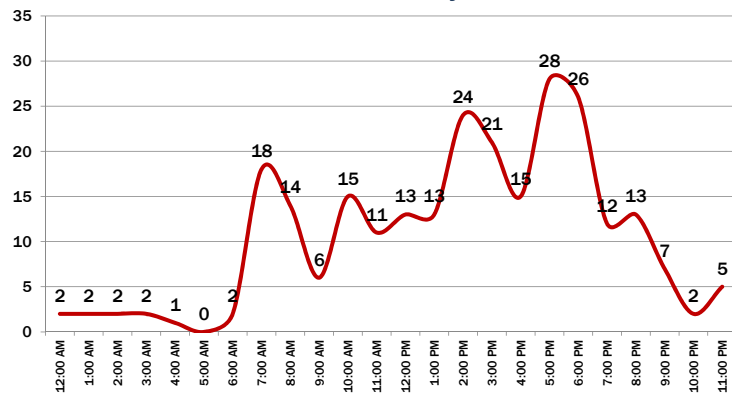
Corridor-wide Crash Findings

Day of Week



Corridor-wide Crash Findings

Time of Day



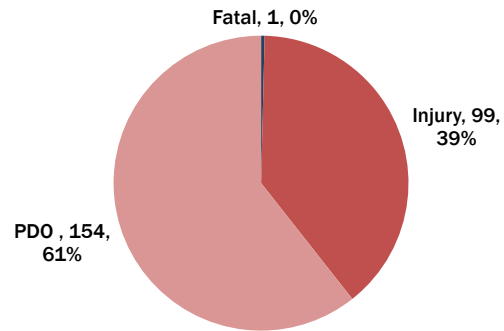
Corridor-wide Crash Findings

Collision Type

Collision Type	Total Crashes	Percentage
Pedalcyclist	3	1%
Pedestrian	9	4%
Unknown	2	1%
Animal	6	2%
Fixed Object	17	7%
Overtaken	1	0%
Encroachment	3	1%
Backing	3	1%
Left Turn/U Turn	27	11%
Struck Vehicle	1	0%
Opposite Direction (Sideswipe)	6	2%
Opposite Direction (Head-on)	8	3%
Right Angle	39	15%
Same Direction (Sideswipe)	24	9%
Same Direction (Rear End)	105	41%

Corridor-wide Crash Findings

Severity



Corridor-wide Crash Findings

Environmental Conditions

		Total Crashes	Percentage
Road Surface	Dry	188	74%
	Wet	60	24%
	Snowy	5	2%
	Icy	1	0%
Illumination	Daylight	183	72%
	Dusk	6	2%
	Night	62	24%
	Dawn	3	1%

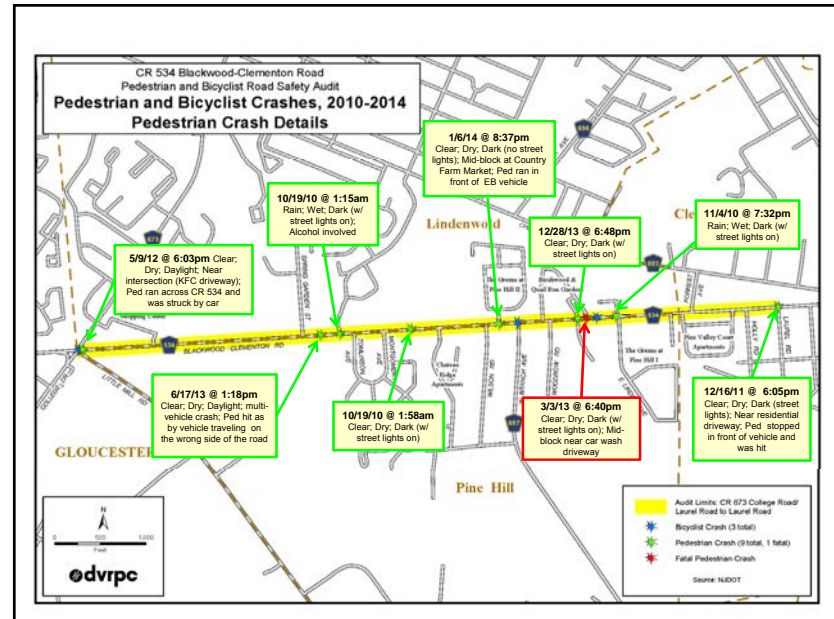
Pedestrian and Bicyclist Crashes

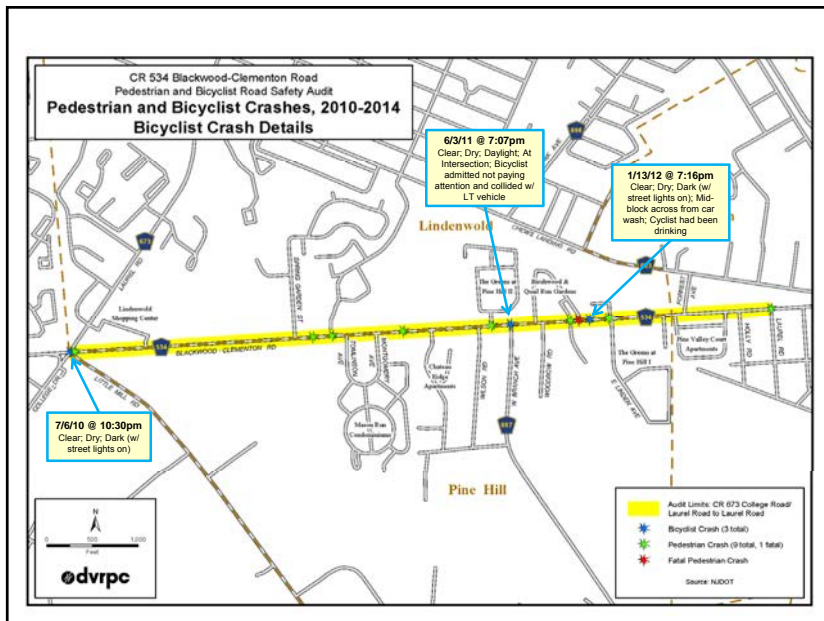
Summary

- 12 Crashes
 - 9 Pedestrian
 - 3 Bicyclist
- Represent 4.7% of crashes in analysis period
- All crashes occurred between 1PM to 2AM
- 2014 Statewide County Road System

	Crash	Percentage	2014 State Average
Pedestrian	9	3.54%	1.19%
Bicyclists	3	1.18%	0.51%

- Pedestrian and bicyclist crashes in study area above the statewide average

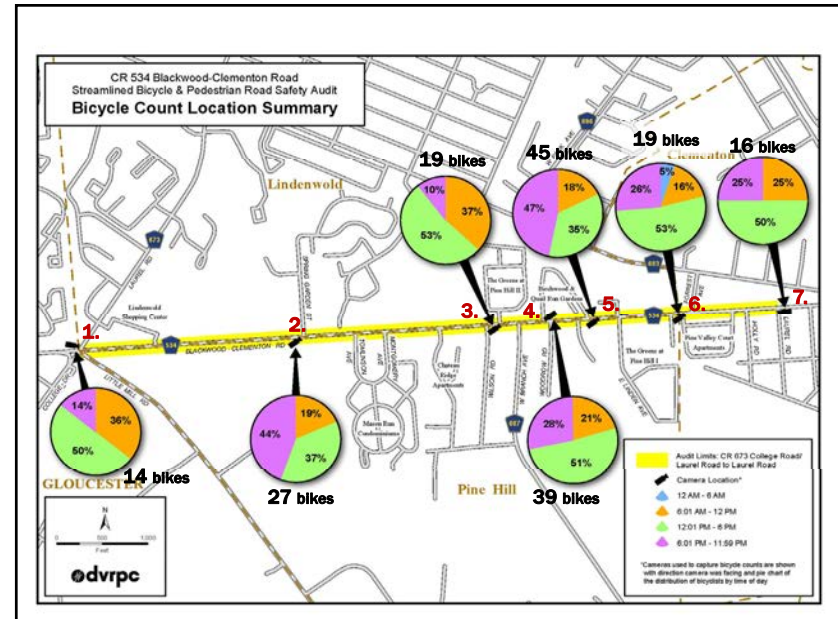
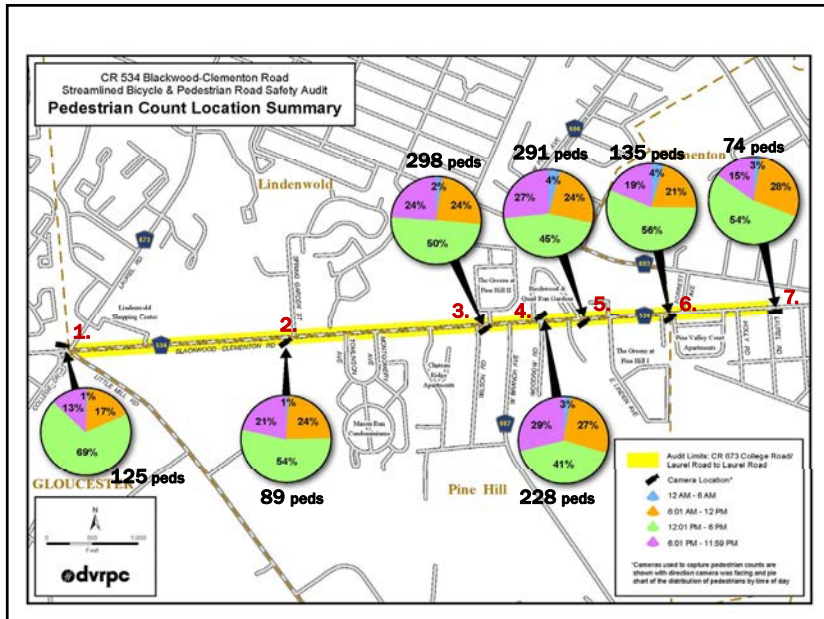




Pedestrian and Bicyclist Counts

- ☞ March 22, 2016
 - Clear, dry, conditions
- ☞ 24-Hour Counts
 - Post mounted cameras
- ☞ 7 Count Locations
 - 4 facing east
 - 3 facing west
- ☞ Study Area Tally
 - 1,240 pedestrians
 - 179 bicyclists





Crossing Mid-block (video)



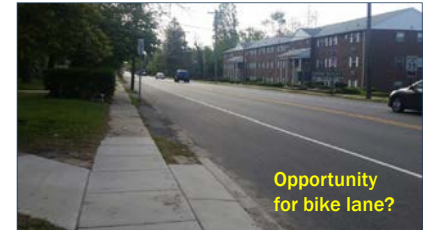
Potential Conflict with Drivers (video)



Amenities



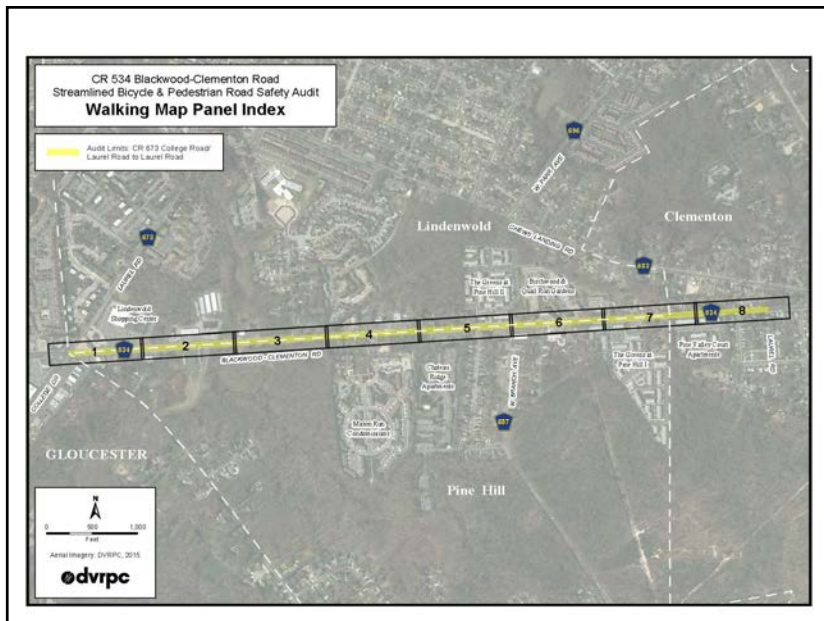
Bicyclists (video)



Other Issues

- ☞ **Lack of signage**
 - Indicating pedestrians and school bus stops
- ☞ **Pavement markings**
- ☞ **Wide shoulders**
- ☞ **ADA ramps**
- ☞ **Signalized intersections**

Nighttime Video



Field View Checklist

- ☞ **Drainage**
 - Inlets bicycle compatible
- ☞ **Public utilities**
 - Does placement obstruct sight line, or pedestrian path?
- ☞ **Access management**
 - Driveway spacing, redundancy
- ☞ **Pedestrian crossings**
 - Curb ramps in place
 - Crosswalks adequately marked
- ☞ **Signage**
- ☞ **Driver expectation**
- ☞ **Transit considerations**
- ☞ **Lighting**

Field View

☞ Materials

- Notes sheet
- Aerial maps

☞ Safety vests

☞ Clipboards



Post Audit Analysis

☞ Working lunch

☞ Debriefing from field visit

☞ Define problems

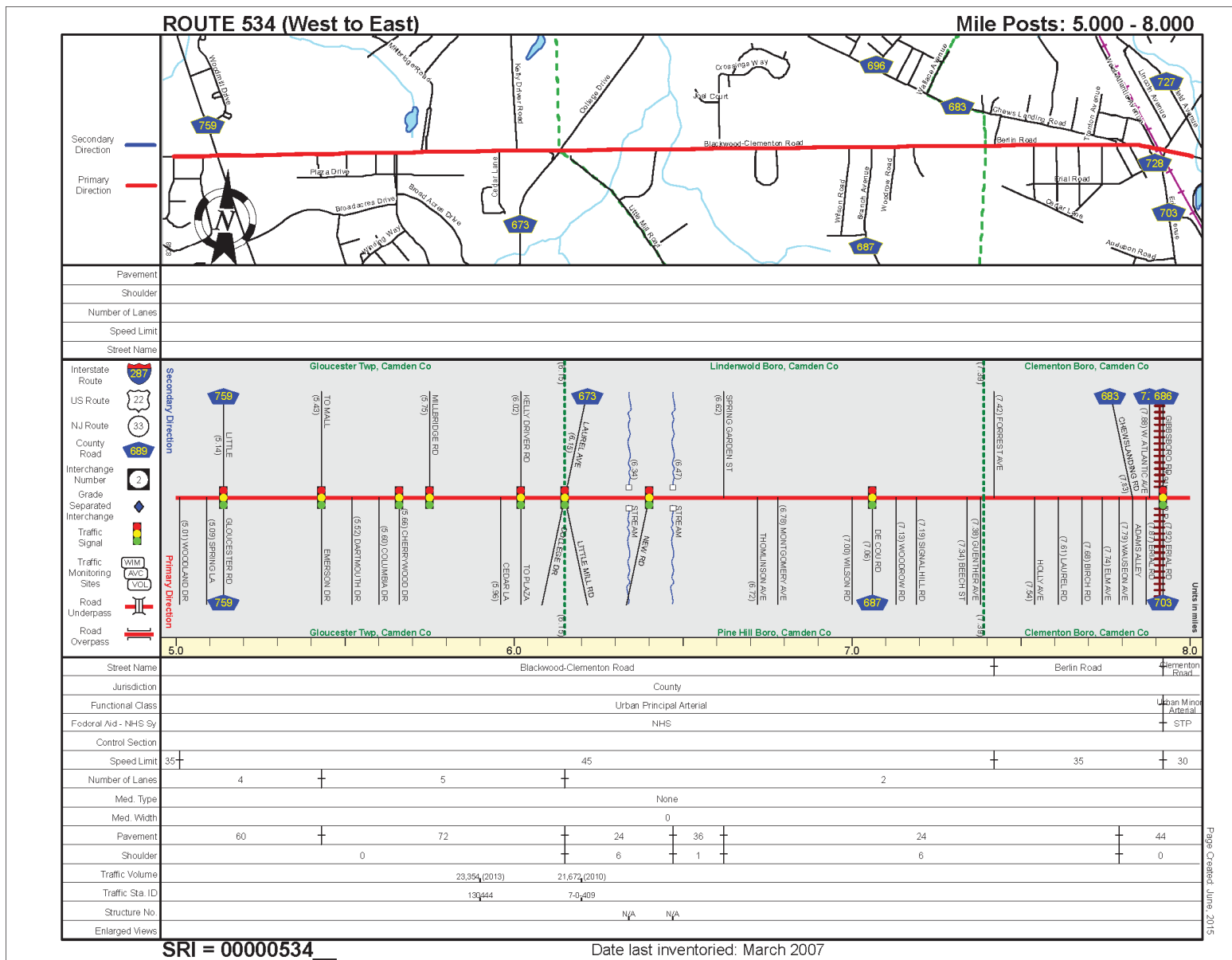
☞ Next steps

☞ Expected to end 3:30 - 4:00PM



Appendix E

Appendix E: New Jersey Straight Line Diagram



Page Created June 2015

Publication Title: CR 534 (Blackwood-Clementon Road)
Pedestrian and Bicyclist Road Safety Audit

Publication Number: TM 16015

Date Published: May 2018

Geographic Area Covered:

Clementon Borough, Lindenwold Borough, Pine Hill Borough, and Gloucester Township in Camden County, New Jersey

Key Words:

Road Safety Audit, Pedestrian, Bicyclist, Walking, Biking, Crashes, Speed Limit, Crosswalk, Lindenwold Borough, Pine Hill Borough, Clementon Borough, Speeding, Signs, Sidewalks, Enforcement, CR 534, Blackwood-Clementon Road, Camden County

Abstract:

This report documents the process and findings of the CR 534 (Blackwood-Clementon Road) Pedestrian and Bicyclist Road Safety Audit (PB-RSA) jointly undertaken by the Delaware Valley Regional Planning Commission (DVRPC) and members from the Regional Safety Task Force (RSTF). This report details safety issues identified by the audit team at the study location and remedial strategies to address them. Emphasis is placed on identifying low-cost, quick-turnaround safety projects to address the identified issues, where possible. This process represents a step toward implementation of DVRPC's Transportation Safety Action Plan.

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