RESOLUTION NO. 2021-553

A RESOLUTION APPROVING THE ADVANCEMENT OF A ROAD DIET AND OTHER SUBSTANTIVE SAFETY IMPROVEMENTS ON CHESTNUT AVENUE BETWEEN MAIN ROAD AND DELSEA DRIVE.

WHEREAS, New Jersey has been designated by the Federal Highway Administration (FHWA) as a Focus State for Pedestrians and Bicycles due to its disproportionally high and increasing number of serious injury and fatal crashes among bicyclists and pedestrians; and

WHEREAS, the New Jersey 2020 Strategic Highway Safety Plan (SHSP) has established the goal of reducing the occurrence of serious injury, fatality, and injury crashes by 14 percent over the next five years with bicyclists and pedestrian safety as an emphasis area; and

WHEREAS, bicycles and pedestrians are involved in 2.9 percent of crashes, but 21.6 percent of fatal and serious injury crashes in Cumberland County; and

WHEREAS, the South Jersey Transportation Planning Organization (SJTPO) has conducted bicycle and pedestrian crash data analyses associated with a Countywide Bicycle and Pedestrian Safety Action Plan; and

WHEREAS, these analyses have identified:

(1) Chestnut Avenue corridor, between Delsea Drive (RT 47) and Main Road (CR 555) as the number one ranked municipal roadway in Cumberland County for serious injuries and fatalities of pedestrians and serious injuries and fatalities of bicyclists; and

(2) Chestnut Avenue corridor, between Delsea Drive (RT 47) and Main Road (CR 555), as the number one ranked corridor in the City of Vineland by public votes for Bicycle and Pedestrian crashes; and

(3) Between 2012 and 2016, A total of 663 crashes occurred within the Chestnut Avenue corridor, between Delsea Drive (RT 47) and Main Road (CR 555). Of these 663 crashes, 224 resulted in some degree of injury with six (6) resulting in serious injury and fatality; and

(4) Right-Angle, Same Direction (Sideswipe), and Same Direction (Rear End) crashes represent 72% of all crashes within the Chestnut Avenue corridor, between Delsea Drive (RT 47) and Main Road (CR 555); and

WHEREAS, the above noted project corridor was analyzed by Pedestrian Road Safety Audit (PRSA) team in January 2020 to identify road safety concerns and opportunities for improvements, paying particular attention to pedestrians and bicyclists; and

WHEREAS, the City Vineland was a participant in this audit, and has reviewed, the recommendations of the audit team; and

WHEREAS, the report recommends the implementation of a 4-Lane to 3-Lane conversion, commonly referred to as a Road Diet, of Chestnut Avenue, between Delsea Drive (RT 47) and Main Road (CR 555); and

WHEREAS, the FHWA designated Road Diets (Roadway Reconfigurations) as a Proven Safety Countermeasure in January 2012; and

WHEREAS, Research approved by the FHWA on 4-Lane to 3-Lane Road Diet conversions have shown to reduce all crash types between 19 percent and 47 percent; and

WHEREAS, Road Diets are recommended on roadways with a current and future average daily traffic of 25,000 or less; and

WHEREAS, Chestnut Avenue, between Delsea Drive (RT 47) and Main Road (CR 555) has a current and projected average daily traffic of well under 25,000; and

WHEREAS, Travel-time analysis submitted to the City of Vineland shows that a 3-Lane "Road Diet" configuration between Delsea Drive (RT 47) and Main Road (CR 555) will not have a significant impact on travel times; and

WHEREAS, Community outreach was conducted by the City of Vineland's Health and Engineering Departments to identify the public's opinion of and experience traveling along Chestnut Avenue; and

WHEREAS, 521 residents submitted surveys to the City of Vineland documenting their thoughts and experiences; and

WHEREAS, these surveys have identified

(1) The majority of respondents feel that Chestnut Avenue is unsafe for walking, bicycling, and driving

(2) Major concerns were focused around speeding and difficulty making left turns

(3) Respondents ranked importance above 9 out of 10 for the need for safety improvements and their receptiveness to significant changes to achieve safety

(4) Respondents stated that their priorities about changes centered on pedestrian safety, speed reduction, and efficiency of traffic flow

NOW THEREFORE, BE IT RESOLVED, that the Mayor and City Council of the City of Vineland do hereby support substantive safety improvements on Chestnut Avenue, between Delsea Drive (RT 47) and Main Road (CR 555), specifically, the implementation of a 4-Lane to 3-Lane roadway conversion, commonly referred to as a Road Diet. The emphasis of this effort will be to substantively improve safety for all users, particularly focused on the safety of vulnerable bicyclists and pedestrians.

BE IT FURTHER RESOLVED that the Mayor and Council may consider any further recommendations from the City Engineer to further address, if necessary, safety for all users of Chestnut Avenue.

Adopted:

_____
President of Council

ATTEST:

_____
City Clerk

#2018400106 | March 2020

Pedestrian and Bicycle Road Safety Audit Report

City of Bridgeton, City of Millville, City of Vineland

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CUMBERLAND COUNTY, NJ

URBAN ENGINEERS

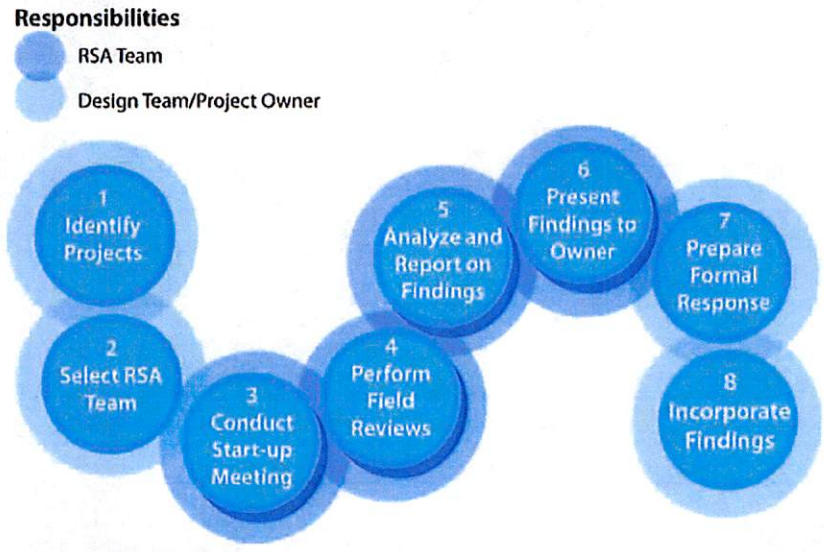
Table of Contents

1. Introduction

As the final report for the Cities of Bridgeton, Millville, and Vineland Pedestrian/Bicycle Road Safety Audits (PRSAs), this document represents an important step towards the implementation of the South Jersey Transportation Planning Organization's Cumberland County Bicycle and Pedestrian Safety Action Plan. This plan is intended to document a number of action-orientated tasks geared towards advancing data-driven bicycle and pedestrian projects via New Jersey's Local Safety Program and the Federal Highway Safety Improvement Program (HSIP). To that end, the task of conducting a series of Pedestrian/Bicycle Road Safety Audits was necessary to bring together a multi-disciplinary team of local, county, state and regional agencies and subject matter experts to 1) conduct a first-hand evaluation of existing conditions along the selected corridors, and 2) work together to develop improvement recommendations.

Pedestrian/Bicycle Road Safety Audit Process

Following the basic format of traditional Road Safety Audits (RSAs), the pedestrian/bicycle RSA is a focused and formal safety performance examination of an existing or future road or intersection by a multi-disciplinary audit team. PRSAs can be used on a project of any size and can be conducted on facilities with a history of crashes, or during the design phase of a new roadway or planned upgrade. PRSA audit teams 1) identify and evaluate any potential safety issues, and 2) develop pedestrian/bicycle related countermeasures for all abilities. PRSAs provide transportation agencies and team members a better understanding of the needs of pedestrians and bicyclists by following the *FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists (Publication FHWA-SA-07-007).* Implementation of improvement strategies identified through this process in New Jersey may be eligible for Federal Highway Safety Improvement Program (HSIP) funds. These identified improvements are noted in the following sections of this report.



Eight-Step RSA Process (FHWA-SA-07-07)

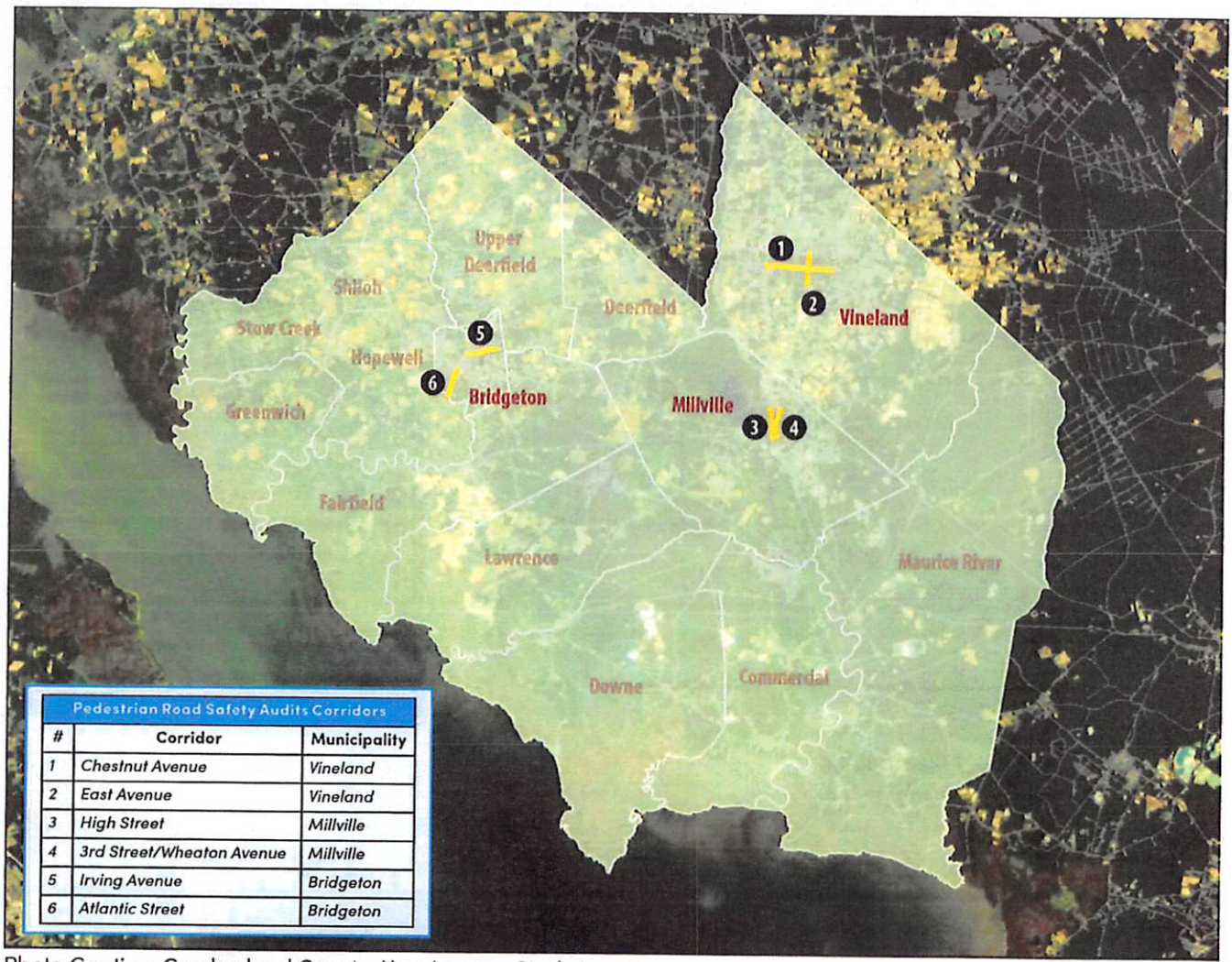
The PRSA event has three basic components:

- **Pre-Audit:** 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.

Site Selection Process

A central theme in the Cumberland County Bicycle and Pedestrian Safety Action Plan is public involvement and outreach. During the project's first round of public outreach, people informed the project team on their traveling experiences, in particular regarding bicycle and pedestrian safety in Cumberland County. Public outreach events throughout the County were conducted by transportation experts, these events included display boards highlighting high-crash locations. In addition to the events, an online website was created for the public to submit comments regarding bicycle pedestrian safety and map specific locations of concern.

The comments and feedback provided by the public during Phase 1 were combined with the technical analysis of the crash data and resulted in the decision to select six (6) high-crash corridors to become the focus of the project; top two highest crash corridors in Bridgeton, Millville, and Vineland. In order to gain a true understanding of the selected corridors' existing conditions, a focused and formal safety performance examination of each corridor was conducted by a multi-disciplinary audit team. These examination were conducted during four PRSA events. Following the FHWA guidance, the needs of bicyclists and pedestrians were stressed during these events. The report sections for each event note the results and recommendations of the PRSAs conducted.



Pedestrian Road Safety Audits Corridors		
#	Corridor	Municipality
1	Chestnut Avenue	Vineland
2	East Avenue	Vineland
3	High Street	Millville
4	3rd Street/Wheaton Avenue	Millville
5	Irving Avenue	Bridgeton
6	Atlantic Street	Bridgeton

Photo Caption: Cumberland County, New Jersey - Study Locations

2. Chestnut Avenue (Vineland)

The first Pedestrian/Bicycle Road Safety Audits was conducted on Thursday, December 25, 2019 at the Vineland Municipal Building in Vineland, Cumberland County, New Jersey. Eighteen stakeholders representing state, county, and local agencies participated in the audit. A list of all participants and their respective agencies is provided in *Appendix A*.

Study Location

As shown in *Figure 1*, the focus of this audit is a 2.3-mile section of Chestnut Avenue located in the urban area of Vineland, New Jersey. Audit limits are between NJ 47 (Delsea Drive) and CR 555 (Main Road)(MP 0.00-2.30). This corridor is a local east-west connector that bisects north-south collectors CR 615 (South West/South East Boulevard), West Avenue, and East Avenue. The corridor is surrounded by a mix of commercial and low to medium-density residential development. It is important to note that the corridor includes a park, nursing home, EMS station, two schools, and public housing.

Figure 1: Chestnut Avenue Study Area

Roadway Characteristics

Chestnut Avenue is classified as an urban major collector with a posted speed limit from (MP 0.00-0.24) of 25 mph and from (MP 0.24-2.30) of 40 mph. The corridor study area is 4-lanes, undivided, with no shoulder or on-street parking. The roadway's horizontal alignment is straight with 11 signalized and 16 unsignalized intersections.

Existing Bicycle/Pedestrian Facilities

Sidewalks are currently available along both sides of Chestnut Avenue and are typically 4'-5' in width. Sidewalk conditions vary from satisfactory to needing maintenance. Basic parallel style crosswalks are provided at signalized intersections although not always at every leg. Crosswalk conditions vary from newly stripped to in-need of restriping. There are no bicycle lanes or other bicycle infrastructure identified along the corridor.

Traffic Counts

Based on data from the NJDOT Straight Line Diagrams (SLDs), the 2017-2018 ADT along Chestnut Avenue is approximately 13,500 vehicles per day within the study area. A copy of available data can be found in *Appendix B*. Additional traffic counts of the study area will be conducted during upcoming project tasks. This data will be added to the PRSA report as a supplement to *Appendix B* and will used to 1) complete a Highway Safety Manual (HSM) analysis of the study area, and 2) inform the evaluation of potential countermeasures.

Transit

The study corridor is serviced by NJ Transit routes #313 and #553 with stops at NJ 47 (Delsea Drive) and route #408 with stops at CR 555 (Main Road). All NJ Transit routes mentioned only service stops at the termini of the Chestnut Avenue Study Corridor.

Community Profile

Population and income characteristics from the U.S. Census Bureau's 2013-2017 American Community Survey (ACS) estimates were used to compile a community profile of residents within 0.25 miles of the study area. A summary of the demographics is listed below.

Characteristics	Chestnut Avenue (0.25 mile buffer)	Cumberland County
Population	***5,849***	***154,952***
Black or African American	*18%*	*19%*
*Hispanic/Latino**	*61%*	*30%*
White	*62%*	*66%*
Asian	*<1%*	*1%*
American Indian/Alaskan	*<1%*	*1%*
Two or More Races	*3%*	*5%*
Other	*16%*	*8%*
Population by Age		
Age 0-4	*8%*	*7%*
Age 0-17	*26%*	*24%*
Age 18+	*74%*	*76%*
Age 65+	*11%*	*14%*
Households	***2,193***	***50,596***
*Linguistically Isolated Households***	*22%*	*8%*
*Speak Spanish****	*93%*	*91%*
Income		
<$15,000	*22%*	*14%*
$15,000 - $25,000	*16%*	*12%*
$25,000 - $50,000	*23%*	*24%*
$50,000 - $75,000	*16%*	*17%*
$75,000+	*23%*	*33%*

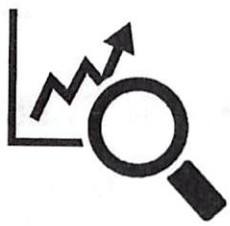


Table 1: Community Profile of Chestnut Avenue Study Corridor

*Hispanic population can be of any race, **Households in which no one 14 and over speaks English "very well", ***Percentage of Linguistically Isolated Households that speak spanish as their primary language

In addition to the community profile in *Table 1*, a map was created using U.S. Census Bureau's 2014-2018 American Community Survey (ACS) estimates to identify the prevalence of zero-vehicle households in proximity to the City of Vineland study areas. Many census tracts abutting the study corridors are above the County average of 10.3% for zero-vehicle households, as shown below in *Figure 2*.

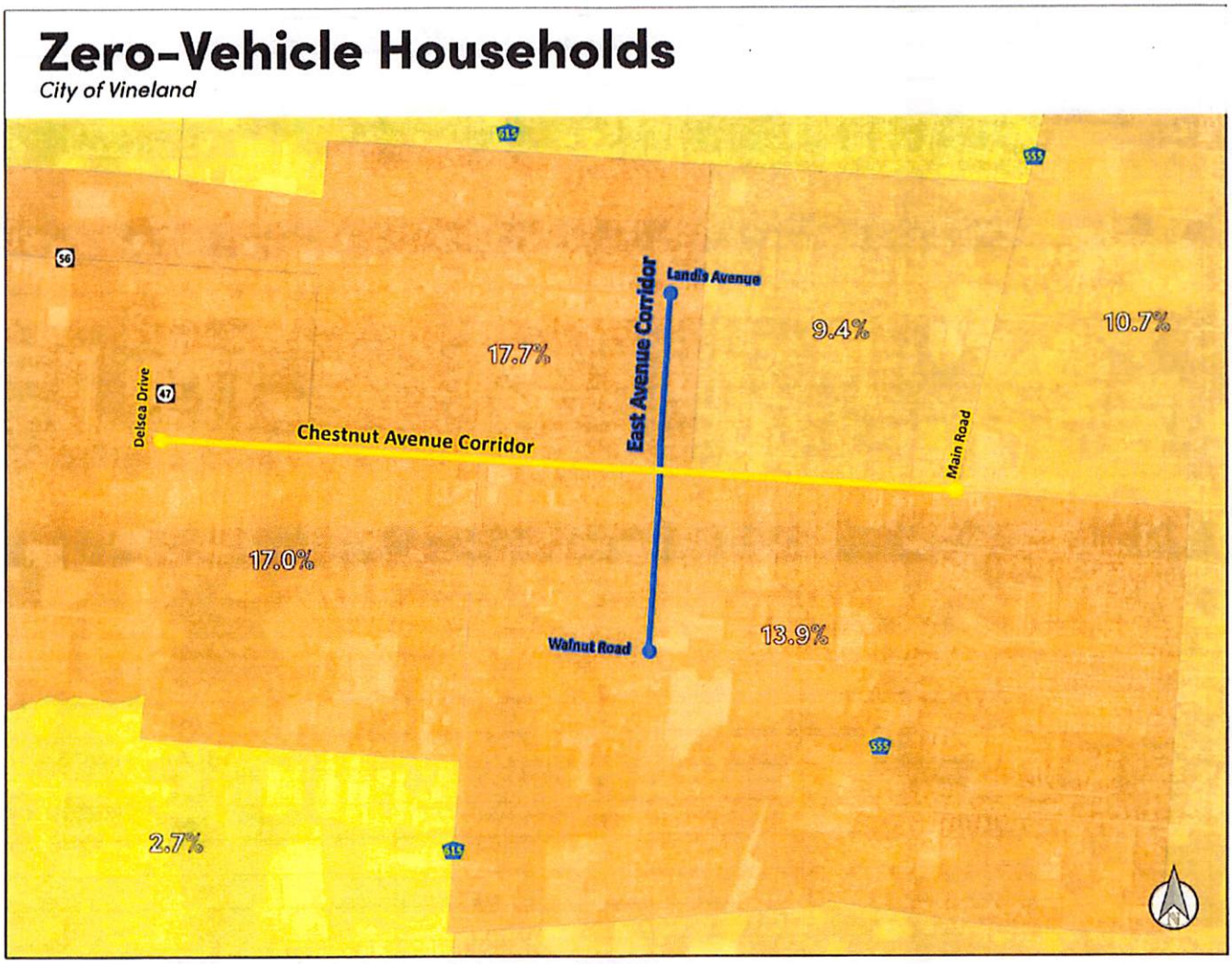


Figure 2: Percentage of Zero-Vehicle Households in Vineland, NJ

Crash Data Analysis

Crash data analysis was based on reportable crash records provided by the 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. Crash data between the years of 2012-2016 was obtained from the NJDOT via the SafetyVoyager data portal. Detailed crash maps of every bicycle crash, pedestrian crash, and motorist crash that resulted in serious injury or fatality, as well as, crash clusters 13> are provided in *Appendix C.*

Conducted using the HSM approved crash severity methodology of weighing incapacitating injury (A) and fatality (K) equally (K=A), the crash data analysis and crash maps consider both (K) and (A) crashes as equally serious. Crash data of the study area provided detailed information on the characteristics of each crash. Of note, it is important to mention that of the 8 crashes that occurred during Dark (Unlit) conditions, 3 were pedestrians. In New Jersey, 75% of all fatal

pedestrian crashes occur during dawn, dusk, or dark conditions. A summary of the study area crash data analysis and crash characteristics are as follows:

Year	Crashes	Injured	Killed/Incapacitated
2012	148	54	4
2013	112	40	1
2014	126	47	1
2015	155	51	0
2016	122	32	0
Total	663	224	6

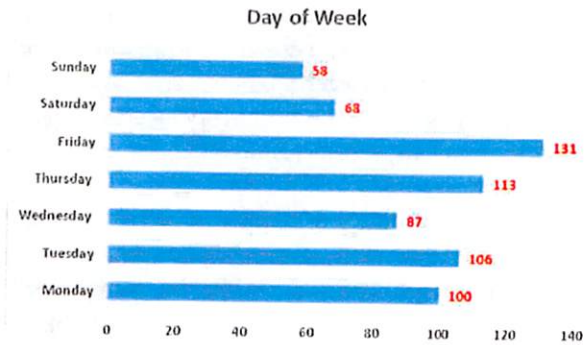
Table 2: Total Crashes by Year - Chestnut Avenue Study Corridor

		Total Crashes	Percentages
Road Surfaces	Dry	538	81.1%
	Wet	124	18.7%
Illumination	Daylight	515	77.7%
	Dusk	16	2.4%
	Dark (Lit)	122	18.4%
	Dark (Unlit)	8	1.2%

Table 3: Environmental Conditions - Chestnut Avenue Study Corridor

	Total Crashes	Percentage
Struck Parked Vehicle	21	3.2%
Fixed Object	38	5.7%
Animal	1	0.2%
Encroachment	3	0.5%
Backing	24	3.6%
Overturned	1	0.2%
Opposite Direction (Sideswipe)	6	0.9%
Opposite Direction (Head-on)	10	1.5%
Left-Turn/U-Turn	51	7.7%
Right Angle	**171**	**25.8%**
Same Direction (Sideswipe)	**92**	**13.9%**
Same Direction (Read End)	**218**	**32.9%**
Pedalcyclist	7	1.1%
Pedestrian	20	3.0%

Table 4: Collision Type - Chestnut Avenue Study Corridor



Pedestrian and Bicyclist Crashes

During the 2012-2016 analysis period there were a total of 20 pedestrian and 7 bicyclist crashes, representing 4.1% of all crashes within the study area. Of the total number of crashes during this period, pedestrian and bicyclist crashes disproportionately resulted in serious injury or fatality (KA), representing 20% of all KA crashes. Moreover, three of the 8 crashes that occurred under dark un-lit conditions involved pedestrians.

Crash Type	Total Crashes	Percentage
Collision with Pedestrian	*20*	*74.1%*
Collision with Cyclist	*7*	*25.9%*
Crash Severity		
Fatality	*0*	*0.0%*
Incapacitating Injury	*2*	*7.4%*
Moderate Injury	*4*	*14.8%*
Pain	*13*	*48.1%*
Property Damage Only	*8*	*29.6%*

Table 5: Pedestrian and Bicycle Crash Summary

Pedestrian and Bicyclist Crash Contributing Factors

To better understand the factors that contributed to pedestrian and bicyclist crashes, New Jersey TR-1 (NJ TR-1) crash reports were procured from NJDOT. The details in these reports were crucial to putting pedestrian and bicyclist related crashes in context. Pursuant the content of the NJ TR-1s, the following are contributing factors that were witnessed for crashes within the study corridor.

Pedestrian & Bicyclist Contributing Factors
Crashes often occur at or near intersections
Many crash victims have Limited English Proficiency (LEP)
Motorist speeds are too high
Crashes in crosswalks are often due to Left-Hand turn movements

Table 6: NJ TR-1 Report Analysis

Findings and Recommendations

Presented here are the findings and potential solutions identified during the Chestnut Avenue PRSA. The identified potential solutions are given ratings based on their projected safety benefit, cost, and time frame to implement. Safety benefit potential is based primarily on studies and research provided by the Federal Highway Administration's (FHWA) Crash Modification Factors (CMFs). When CMFs are not available, the FHWA Proven Safety Countermeasures, Highway Safety Manual (HSM), and current peer-reviewed research on countermeasures are used. All safety benefits are approximate.

This section describes the site-specific and corridor-wide recommended improvements. The recommendations derived from each PRSA event are noted along with their projected safety benefit, time frame, cost, as well as, the facility's jurisdiction. Ratings used in the recommendation tables are described as follows:

Legend

Symbol	Meaning	Definition
✔	*Limited safety benefit potential*	
✔✔	*Limited to moderate safety benefit potential*	
✔✔✔	*Moderate safety benefit potential*	
✔✔✔✔	*High safety benefit potential*	
$	*Low cost*	*Could be accomplished through maintenance*
$$	*Medium cost*	*May require some engineering or design and funding may be readily available*
$$$	*High cost*	*Longer term; may require full engineering, ROW acquisition and new funding*
◔	*Short term*	*Could be accomplished within 1 year*
◑	*Medium term*	*Could be accomplished in 1 to 3 years; may require some engineering*
◕	*Long term*	*Could be accomplished in 3 years or more; may require full engineering*

The following represents the specific findings and recommendations made by the PRSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Corridor-Wide					
1	*Road/bicycle-pedestrian safety code enforcement campaign (i.e. StreetSmart)*	✔	$	◔	*Vineland*
2	*Narrow driveways where possible*	✔	$$	◑	*Vineland/ Property Owners*
3	*Inspect and replace faded, damaged or outdated signage as needed (i.e. signs mounted below 7', faded lettering on speed limit signs, crooked stop signs)*	✔	$	◔	*Vineland*
4	*Conduct a bi-lingual road/bicycle-pedestrian safety campaign (i.e. StreetSmart)*	✔	$	◔	*Vineland*
5	*Inspect, repave and restripe the roadway as needed*	✔	$$	◑	*Vineland*
6	*Install or reinstall detached Detectable Warning Surfaces (DWS) to be aligned in compliance with ADA and inspect, repair, and construct sidewalks in compliance with ADA as needed*	✔	$$	◑	*Vineland/NJDOT*
7	*Carry sidewalks through driveways per ADA design standards*	✔	$$	◑	*Vineland*

8	*Develop an access management plan within the study area for vehicles and pedestrians (i.e. driveway consolidation, barriers to prevent jaywalking)*	✓✓	$	◑	*Vineland*
9	*Update complete streets policy in accordance with the NJDOT Complete & Green Streets for All Model Policy Guide*	✓✓	$	◔	*Vineland*
10	*Perform corridor-wide signal upgrades (replace 8" traffic signal heads with 12", install backplates with retro-reflective border, evaluate clearance intervals, update to countdown pedestrian signal heads, replace push buttons in compliance with ADA, etc.)*	✓✓	$$$	◕	*Vineland/NJDOT*
11	*Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment*	✓✓	$	◔	*Vineland/NJDOT*
12	*Remove sidewalk on southside of study corridor and install a shared-use path per NJ Complete Streets Design Guide*	✓✓	$$	◑	*Vineland/NJDOT*
13	*Convert Chestnut Avenue to a 3-lane section (2 travel lanes, TWLTL and shoulders; i.e. road diet)*	✓✓✓	$$	◕	*Vineland*
14	*Perform a lighting analysis of the study area, including roadway and pedestrian scale lighting; prepare plans/upgrades according to results*	✓✓✓	$$$	◑	*Vineland/NJDOT*
15	*Create a taskforce that meets after a pedestrian or bicycle fatality to perform a mini-road safety audit to better understand how the crash happened and what immediate improvements can be made to avoid repeat crashes at the location*	✓✓✓	$	◔	*Vineland*
Site-Specific					
Segment: 2nd Street-Earl Drive					
16	*Install midblock pedestrian crossing improvements (i.e. Pedestrian Hybrid Beacon (PHB) or Rectangular Rapid Flash Beacon (RRFB) with a high visibility continental or ladder style crosswalk and crossing island)*	✓✓✓	$$$	◕	*Vineland*
Segment: Tarkiln Drive-3rd Street					
17	*Conduct circulation study of 3rd Street*	✓	$$	◑	*Vineland*
18	*Close Normandie Lane access to Chestnut Avenue*	✓	$$	◔	*Vineland*
19	*Install barriers to prevent jaywalking (i.e. greenery, 2'-3' wall, fence, benches etc.)*	✓✓	$$	◔	*Vineland*

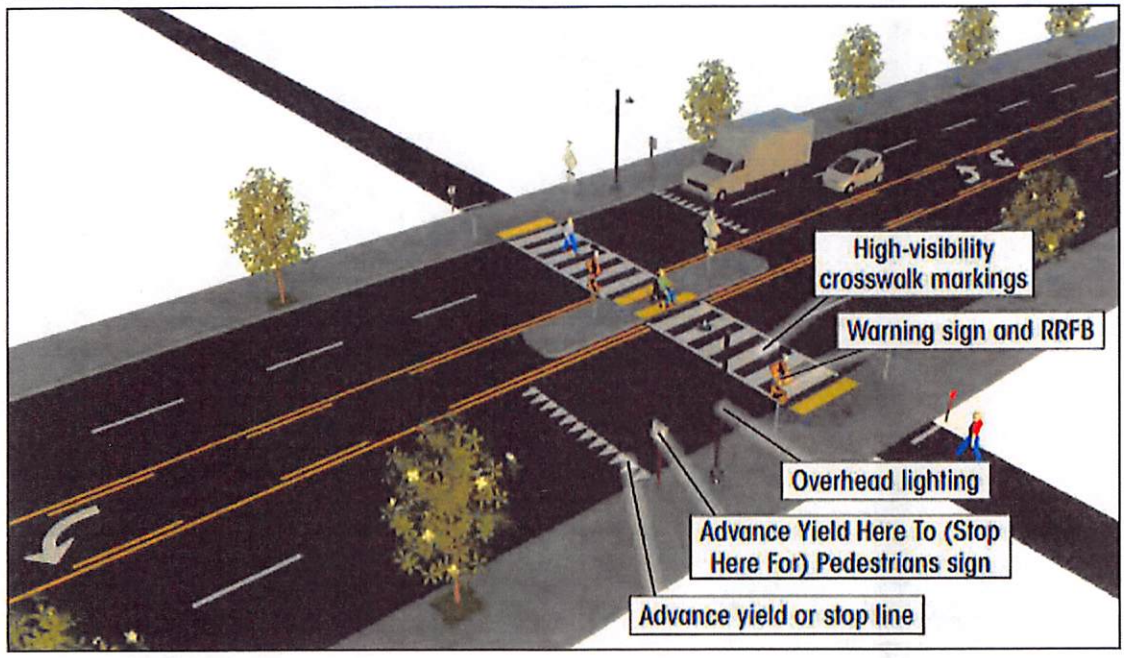
20	*Install midblock pedestrian crossing improvements (i.e. Pedestrian Hybrid Beacon (PHB) or Rectangular Rapid Flash Beacon (RRFB) with a high visibility continental or ladder style crosswalk and crossing island)*	✔✔✔	$$$	◕	*Vineland*
Intersection: "The Boulevards"					
21	*Install railroad crossing gates*	✔	$$	◕	*Vineland/ County/Conrail*
22	*Study and evaluate intersection (i.e. address non-compliant crossings, traffic and pedestrian safety, signal placement, and signal timing concerns)*	✔✔✔	$$$	◕	*Vineland/ County/Conrail*
Vineland Fire Station No. 1					
23	*Install advance warning signal and stripe roadway appropriately in front of Fire/EMS Station (i.e. "Do Not Block The Box")*	✔	$$	◑	*Vineland*
Intersection: East Avenue					
24	*Study intersection to reduce and realign lanes*	✔✔✔	$$	◑	*Vineland*
25	*Upgrade signals to current standards*	✔✔✔	$$	◑	
26	*Install leading pedestrian interval (LPI) or all pedestrian phase*	✔✔✔	$	◔	*Vineland*
Intersection: 7th Street					
27	*Complete signal upgrade to current standards*	✔✔	$$$	◑	*Vineland*
Intersection: State Street					
28	*Perform a MUTCD signal warrant analysis for removal*	✔	$$	◑	*Vineland*
Intersection: Valley Avenue					
29	*Consider replacement of signalized offset intersection with a modern roundabout; must be accompanied by a 3-lane section (2 travel lanes, TWLTL and shoulders; i.e. road diet)*	✔✔✔✔	$$$	◕	*Vineland*
Intersection: Main Road					
30	*Address lane confusions (i.e. delineate lane configuration at the intersection approaches)*	✔	$	◔	*Vineland/County*
31	*Install bumpouts or reduce turning radii*	✔✔	$$	◑	*Vineland/County*
32	*Install leading pedestrian interval (LPI) or all pedestrian phase*	✔✔✔	$	◔	*Vineland/County*

Table 7: Chestnut Avenue PRSA Recommendations

Recommendation Visualizations

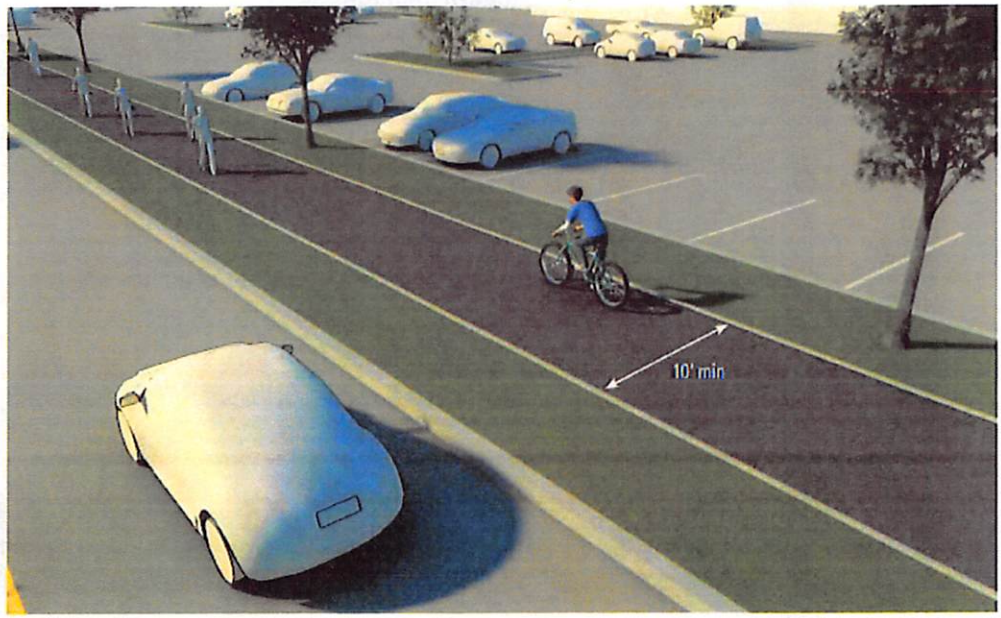
Examples of some of the site-specific and corridor-wide safety recommendations identified in *Tables 7* are shown below. These examples are based on current best practices and design standards from the *2017 NJ Complete Streets Design Guide* (CSDG), NACTO's *Urban Street Design Guide* (NACTO-US), and the Federal Highway Administration (FHWA), including sources contained therein. Visual representations of select aforementioned recommendations help to better communicate their potential safety benefit, cost, and time frame.

Midblock Pedestrian Crossing Improvements (i.e. RRFB or PHB with crosswalk and crossing island)



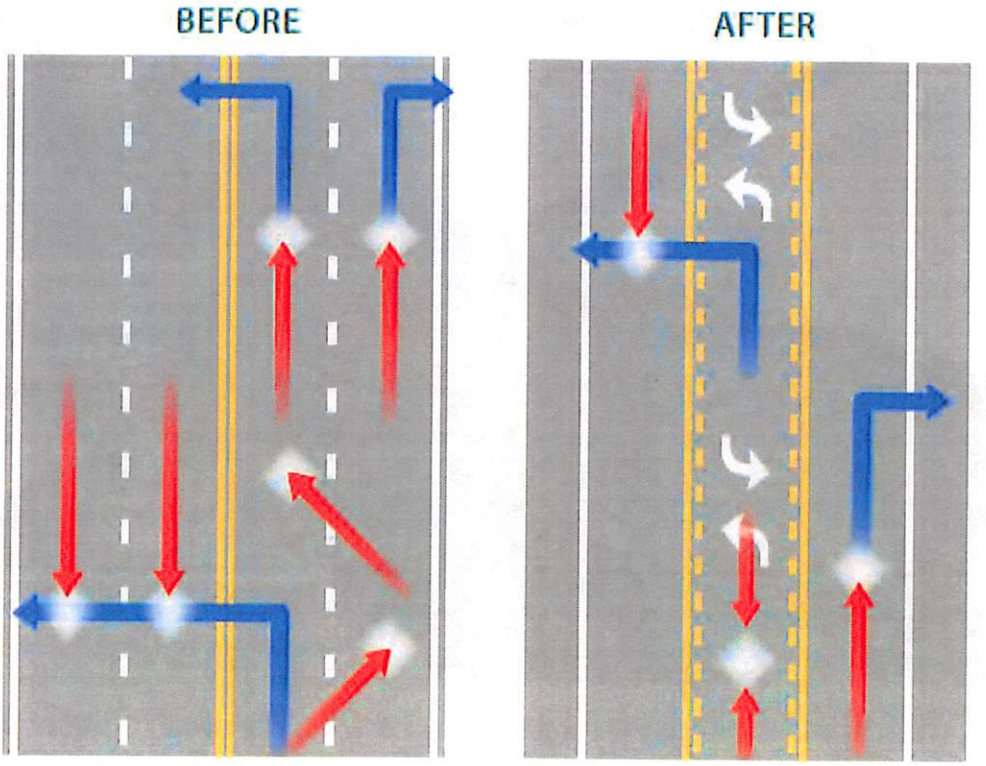
Source: (FHWA-SA-18-018)

Shared-use path



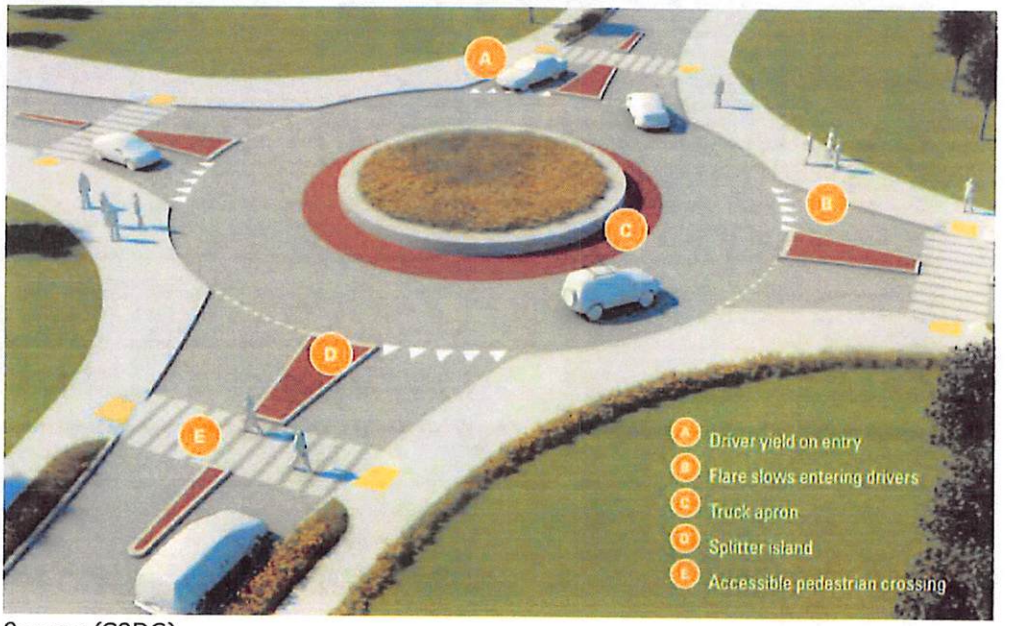
Source: (CSDG)

Road Diet Configuration (i.e. 3-lane section, 2 travel lanes with TWLTL)



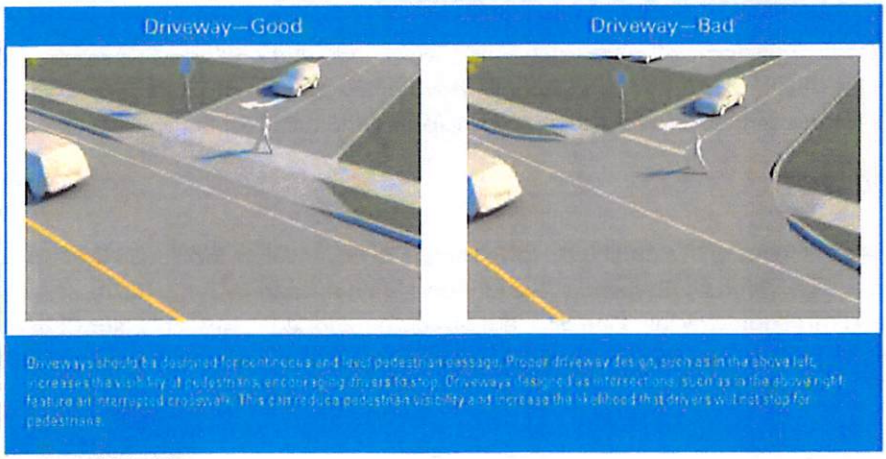
Source: (FHWA-SA-14-028)

Modern Roundabout



Source: (CSDG)

Driveway Design (i.e. Carrying sidewalk through driveway)



Source: (CSDG)

Pedestrian Access Management (i.e. barriers, fences etc.)

Photo Caption: (Google Earth) Newark, DE

Road Owner Response

As the roadway owner, City of Vineland is encouraged to use the findings of the PRSA as a guide for designing improvements to address the safety issues. Whereas the PRSA findings and recommendations are numerous, City of Vineland should use its experience in planning and engineering to determine which recommendations in ***Table 7*** can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the PRSA process is the road owner's response: an acknowledgment of the audit's findings and recommendations, and their planned follow-up. In responding to the PRSA's findings, the road owner must take into account all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as the time and funds allow in coordination with other projects, priorities and intersecting roadway owners (i.e. NJDOT, Cumberland County).

City of Vineland delivered their response following the finalization of the findings and recommendations, a copy of which can be found in *Appendix D.*

3. East Avenue (Vineland)

The East Avenue Pedestrian/Bicycle Road Safety Audit was conducted on Friday, December 20, 2019 at the Vineland Municipal Building in Vineland, Cumberland County, New Jersey. Six stakeholders representing regional, county, and local agencies participated in the audit. A list of all participants and their respective agencies is provided in *Appendix A*.

Study Location

As shown in *Figure 1*, the focus of this audit is a 1-mile section of East Avenue located in the urban area of Vineland, New Jersey. Audit limits are between NJ 56 (Landis Avenue) and Walnut Road (MP 1.77-0.76). This corridor is a local north-south connector and rural gateway into Vineland that bisects a major east-west collector Chestnut Avenue. The corridor is surrounded by low to medium-density residential development. It is important to note that the corridor includes a school.

Roadway Characteristics

East Avenue is classified as an urban major collector with a posted speed limit from Walnut Road to Chestnut Avenue (MP 0.76-1.27) of 30 mph. This segment of the corridor study area is 2-lanes, undivided, with varying segments of 4-8 foot shoulder widths. Along the corridor there are posted signs for "No Stopping Or Standing" and "No Parking Anytime" however there is no ordinance restricting parking in 8 foot shoulders. North of Chestnut Avenue to Landis Avenue (MP 1.27-1.77) has a posted speed limit of 35 mph, with exception to the school zone between Almond Street and Grape Street (MP 1.49-1.62) with a mandatory posted speed limit of 25 mph when children are present. This corridor study area segment is narrower with 2-lanes, undivided, with no shoulder or on-street parking. Altogether, the roadway's horizontal alignment is straight with 2 signalized and 12 unsignalized intersections.

Figure 1: East Avenue Study Area

Existing Bicycle/Pedestrian Facilities

Sidewalks are currently available along both sides of East Avenue between Chestnut Avenue and Landis Avenue (MP 1.27-1.77) and are typically 4'-5' in width, with exception to a much wider sidewalk segment fronting Cunningham Academy. Sidewalks are provided along both sides of East Avenue from Chestnut Avenue to a point approximately 500 feet south thereof. From this point only one sidewalk is available along the west curbline until Florence Avenue (MP 0.98) where a sidewalk is available along both sides until a point approximately 50 feet north of Humbert Street (MP 0.92). A brief section of sidewalk then reappears south of Humbert Street along the east curbline for approximately 400 feet.

Sidewalk conditions vary from satisfactory to needing maintenance. Basic parallel style crosswalks are provided at signalized intersections. Crosswalk conditions vary from newly stripped to in-need of restriping. There are no bicycle lanes or other bicycle infrastructure identified along the corridor. However, the *2015 Cumberland County Bikeways Inventory* and *2010 Cumberland County Rails to Trails Feasibility Study* both propose East Avenue as a potential bikeway.

Traffic Counts

Based on data from the NJDOT Straight Line Diagrams (SLDs), the 2017-2018 ADT along East Avenue is approximately 6,500 vehicles per day within the study area. A copy of available data can be found in ***Appendix B***. Additional traffic counts of the study area will be conducted during upcoming project tasks. This data will be added to the PRSA report as a supplement to *Appendix B* and will used to 1) complete a Highway Safety Manual (HSM) analysis of the study area, and 2) inform the evaluation of potential countermeasures.

Community Profile

Population and income characteristics from the U.S. Census Bureau's 2013-2017 American Community Survey (ACS) estimates were used to compile a community profile of residents within 0.25 miles of the study area. A summary of the demographics is listed below.

Characteristics	East Avenue (0.25 mile buffer)	Cumberland County
Population	***3,394***	***154,952***
Black or African American	*23%*	*19%*
*Hispanic/Latino**	*59%*	*30%*
White	*54%*	*66%*
Asian	*<1%*	*1%*
American Indian/Alaskan	*2%*	*1%*
Two or More Races Alone	*3%*	*5%*
Other	*18%*	*8%*
Population by Age		
Age 0-4	*8%*	*7%*
Age 0-17	*26%*	*24%*
Age 18+	*74%*	*76%*
Age 65+	*8%*	*14%*
Households	***1,271***	***50,596***
*Linguistically Isolated Households***	*18%*	*8%*
*Speak Spanish****	*91%*	*91%*
Income		
<$15,000	*24%*	*14%*
$15,000 - $25,000	*19%*	*12%*
$25,000 - $50,000	*21%*	*24%*
$50,000 - $75,000	*17%*	*17%*
$75,000+	*19%*	*33%*

Table 1: Community Profile of East Avenue Study Corridor

*Hispanic population can be of any race, **Households in which no one 14 and over speaks English "very well", ***Percentage of Linguistically Isolated Households that speak spanish as their primary language

In addition to the community profile in ***Table 1***, a map was created using U.S. Census Bureau's 2014-2018 American Community Survey (ACS) estimates to identify the prevalence of zero-vehicle households in proximity to the City of Vineland study areas. Many census tracts abutting the study corridors are above the County average of 10.3% for zero-vehicle households, as shown in ***Figure 2***.

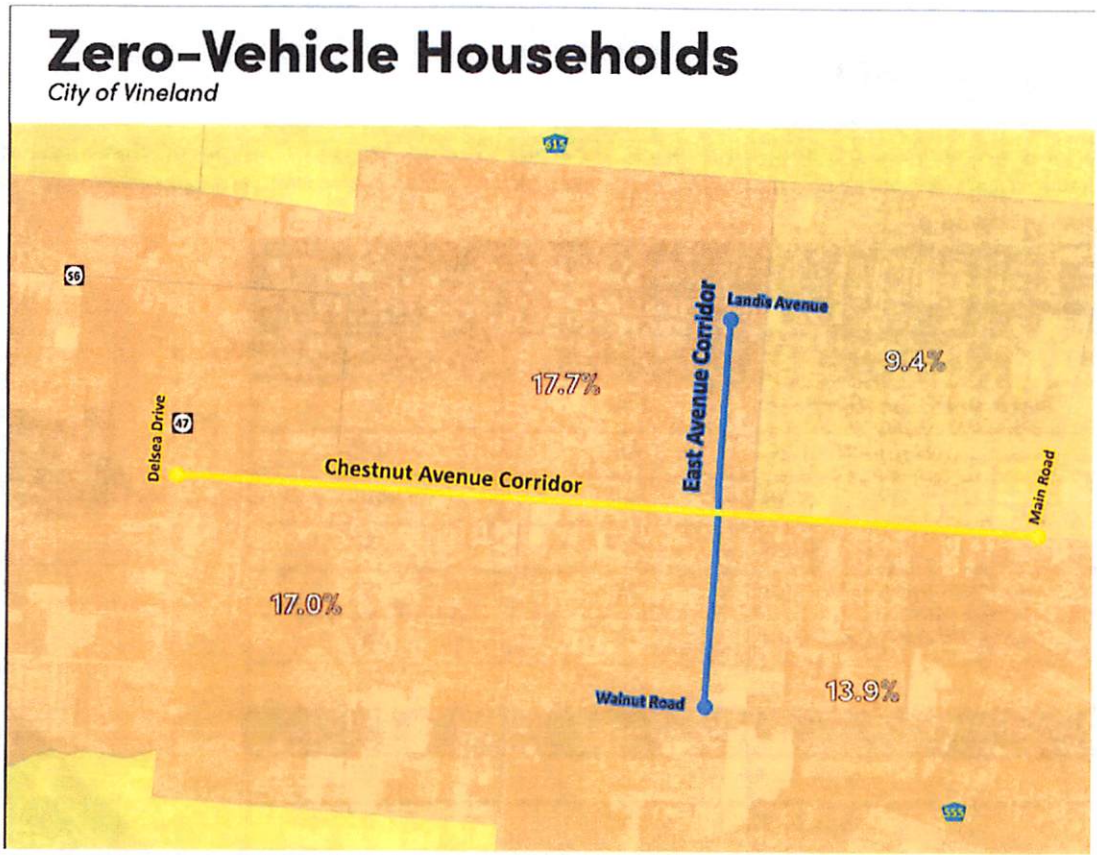


Figure 2: Percentage of Zero-Vehicle Households in Vineland, NJ

Crash Data Analysis

Crash data analysis was based on reportable crash records provided by the 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. Crash data between the years of 2012-2016 was obtained from the NJDOT via the SafetyVoyager data portal. Detailed crash maps of every bicycle crash, pedestrian crash, and motorist crash that resulted in serious injury or fatality, as well as, crash clusters 13> are provided in *Appendix C*.

Conducted using the HSM approved crash severity methodology of weighing incapacitating injury (A) and fatality (K) equally (K=A), the crash data analysis and crash maps consider both (K) and (A) crashes as equally serious. Crash data of the study area provided detailed information on the characteristics of each crash. A summary of the study area crash data analysis and crash characteristics are as follows:

Year	Crashes	Injured	Killed/Incapacitated
2012	44	19	1
2013	37	12	0
2014	28	8	0
2015	37	8	0
2016	38	10	0
Total	184	57	1

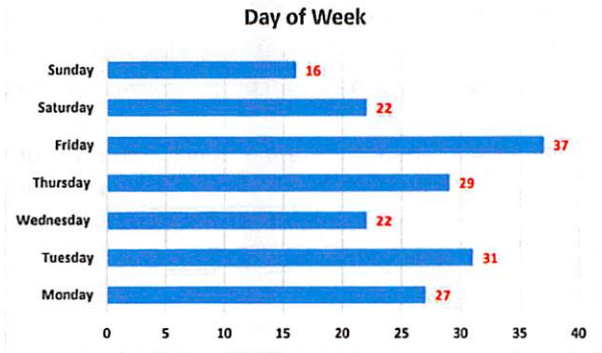
Table 2: Total Crashes by Year - East Avenue Study Corridor

		Total Crashes	Percentages
Road Surfaces	Dry	145	78.8%
	Wet	38	20.7%
Illumination	Daylight	151	82.1%
	Dusk	4	2.2%
	Dark (Lit)	23	12.5%
	Dark (Unlit)	1	0.5%

Table 3: Environmental Conditions - East Avenue Study Corridor

	Total Crashes	Percentage
Struck Parked Vehicle	7	3.8%
Fixed Object	18	9.8%
Animal	0	0.0%
Encroachment	0	0.0%
Backing	4	2.2%
Overturned	0	0.0%
Opposite Direction (Sideswipe)	1	0.9%
Opposite Direction (Head-on)	2	1.5%
Left-Turn/U-Turn	8	7.7%
Right Angle	**53**	**28.8%**
Same Direction (Sideswipe)	**21**	**11.4%**
Same Direction (Read End)	**62**	**33.7%**
Pedalcyclist	2	1.1%
Pedestrian	6	3.3%

Table 4: Collision Type - East Avenue Study Corridor



Pedestrian and Bicyclist Crashes

During the 2012-2016 analysis period there were a total of 6 pedestrian and 2 bicyclist crashes, representing 4.4% of all crashes within the study area. Of the total number of crashes during this period, pedestrian and bicyclist crashes disproportionately resulted in injuries, representing 13.2% of all injury crashes.

Crash Type	Total Crashes	Percentage
Collision with Pedestrian	*6*	*75.0%*
Collision with Cyclist	*2*	*25.0%*
Crash Severity		
Fatality	*0*	*0.0%*
Incapacitating Injury	*1*	*12.5%*
Moderate Injury	*3*	*37.5%*
Pain	*4*	*50.0%*
Property Damage Only	*0*	*0.0%*

Table 5: Pedestrian and Bicycle Crash Summary

Pedestrian and Bicyclist Crash Contributing Factors

To better understand the factors that contributed to pedestrian and bicyclist crashes, New Jersey TR-1 (NJ TR-1) crash reports were procured from NJDOT. The details in these reports were crucial to putting pedestrian and bicyclist related crashes in context. Pursuant the content of the NJ TR-1s, the following are contributing factors that were witnessed for crashes within the study corridor.

Pedestrian & Bicyclist Contributing Factors
Crashes often occur at or near intersections
No bicycle facilities
Lack of sidewalk connectivity & continuity
Crashes in crosswalks are often due to Left-Hand turn movements

Table 6: NJ TR-1 Report Analysis

Findings and Recommendations

Presented here are the findings and potential solutions identified during the East Avenue PRSA. The identified potential solutions are given ratings based on their projected safety benefit, cost, and time frame to implement. Safety benefit potential is based primarily on studies and research provided by the Federal Highway Administration's (FHWA) Crash Modification Factors (CMFs). When CMFs are not available, the FHWA Proven Safety Countermeasures, Highway Safety Manual (HSM), and current peer-reviewed research on countermeasures are used. All safety benefits are approximate.

This section describes the site-specific and corridor-wide recommended improvements. The recommendations derived from each PRSA event are noted along with their projected safety benefit, time frame, cost, as well as, the facility's jurisdiction. Ratings used in the recommendation tables are described as follows:

Legend

Symbol	Meaning	Definition
✔	*Limited safety benefit potential*	
✔✔	*Limited to moderate safety benefit potential*	
✔✔✔	*Moderate safety benefit potential*	
✔✔✔✔	*High safety benefit potential*	
$	*Low cost*	*Could be accomplished through maintenance*
$$	*Medium cost*	*May require some engineering or design and funding may be readily available*
$$$	*High cost*	*Longer term; may require full engineering, ROW acquisition and new funding*
◔	*Short term*	*Could be accomplished within 1 year*
◑	*Medium term*	*Could be accomplished in 1 to 3 years; may require some engineering*
◕	*Long term*	*Could be accomplished in 3 years or more; may require full engineering*

The following represents the specific findings and recommendations made by the PRSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Corridor-Wide					
1	*Inspect and replace faded, damaged or outdated signage as needed (i.e. signs mounted below 7', faded lettering on speed limit signs, crooked stop signs)*	✔	$	◔	*Vineland*
2	*Inspect, repave and restripe the roadway as needed*	✔	$$	◑	*Vineland*
3	*Install or reinstall detached Detectable Warning Surfaces (DWS) to be aligned in compliance with ADA and inspect, repair, and construct sidewalks in compliance with ADA as needed*	✔	$$	◑	*Vineland*
4	*Remove sidewalk obstructions per ADA requirements*	✔	$	◔	*Vineland*
5	*Update complete streets policy in accordance with the NJDOT Complete & Green Streets for All Model Policy Guide*	✔✔	$	◔	*Vineland*
6	*Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment*	✔✔	$	◔	*Vineland*
7	*Consider installing sharrows or bicycle lanes in a shoulder, when possible, to improve multimodal accommodations*	✔✔	$	◑	*Vineland*

8	*After improvements are made conduct speed study to investigate reducing speed limit (i.e. Consider reducing Speed Limit to 30 mph)*	✔✔	$	◑	*Vineland*
9	*Perform a lighting analysis of the study area, including roadway and pedestrian scale lighting; prepare plans/upgrades according to results*	✔✔✔	$$$	◑	*Vineland*
10	*Create a taskforce that meets after a pedestrian or bicycle fatality to perform a mini-road safety audit to better understand how the crash happened and what immediate improvements can be made to avoid repeat crashes at the location*	✔✔✔	$	◔	*Vineland*
11	*Extend and connect existing sidewalks to provide continuous sidewalks along both sides of roadway from Landis Avenue to Humbert Street*	✔✔✔	$$$	◕	*Vineland*
Site-Specific					
Intersection: Florence Avenue					
12	*Install midblock pedestrian crossing improvements (i.e. Pedestrian Hybrid Beacon (PHB) or Rectangular Rapid Flash Beacon (RRFB) with a high visibility continental or ladder style crosswalk and crossing island)*	✔✔✔	$$$	◕	*Vineland*
Intersection: Chestnut Avenue					
13	*Study intersection to reduce and realign lanes*	✔✔	$$	◑	*Vineland*
14	*Upgrade signals to current standards*	✔✔	$$	◑	
15	*Install leading pedestrian interval (LPI) or all pedestrian phase*	✔✔✔	$	◔	*Vineland*
Segment: Almond Street-Grape Street					
16	*Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment*	✔✔	$	◔	*Vineland*
17	*Install in-street pedestrian crossing signage at crosswalks in school zone*	✔✔	$	◔	*Vineland*
18	*Install a pull-in loading zone in front of Cunningham Academy for bus and vehicle loading and unloading*	✔✔	$$	◑	*Vineland*
Segment: Chestnut Avenue-Walnut Road					
19	*Widen existing sidewalks per NJ Complete Streets Design Guide (i.e. 5' minimum)*	✔	$$$	◕	*Vineland*
20	*Install gateway treatments to calm traffic and communicate transition from rural Vineland to urbanized Vineland (i.e. signage in median island, neckdowns with plantings)*	✔✔	$$$	◑	*Vineland*

21	*Narrow roadway segment width (i.e. moving curblines closer to each other, installing median islands with planting strips, install buffered bicycle lanes to reduce travel lane widths)*	✔✔✔	$$$	◕	*Vineland*
Intersection: Walnut Road					
22	*Install double 36" stop signs at all approaches*	✔	$	◔	*Vineland*
23	*Install LED strip around perimeter of stop signs with solar power supply to increase visibility*	✔	$	◔	*Vineland*
24	*Install advance warning treatments at the southern approach*	✔✔	$	◔	*Vineland*

Table 7: East Avenue PRSA Recommendations

Recommendation Visualizations

Examples of some of the site-specific and corridor-wide safety recommendations identified in ***Tables 7*** are shown below. These examples are based on current best practices and design standards from the *2017 NJ Complete Streets Design Guide* (CSDG), NACTO's *Urban Street Design Guide* (NACTO-US), and the Federal Highway Administration (FHWA), including sources contained therein. Visual representations of select aforementioned recommendations help to better communicate their potential safety benefit, cost, and time frame.

Reduce Road Segment Width (i.e. Buffered bike lane typical)

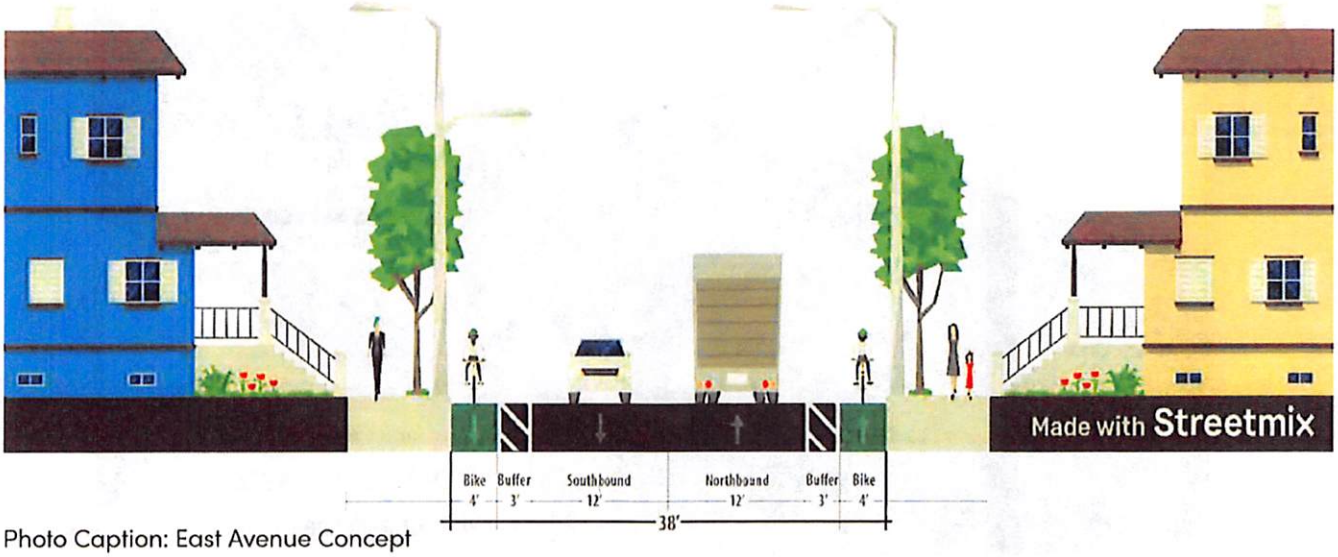
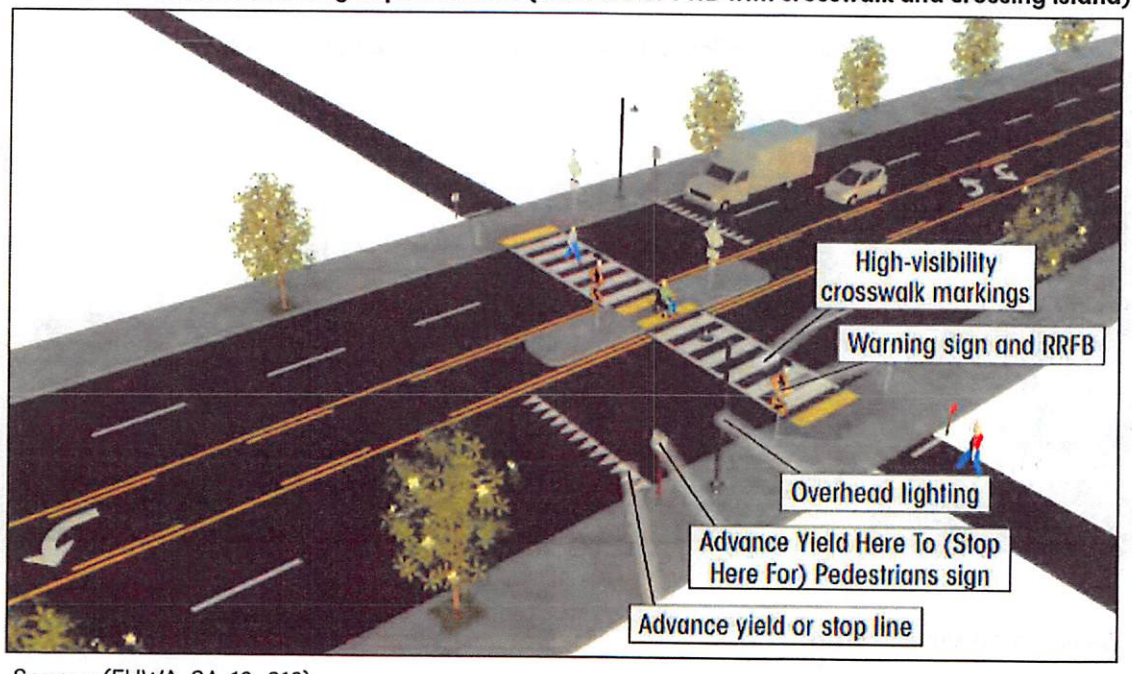


Photo Caption: East Avenue Concept

Reduce Road Segment Width (i.e. Median Island, Boulevard)

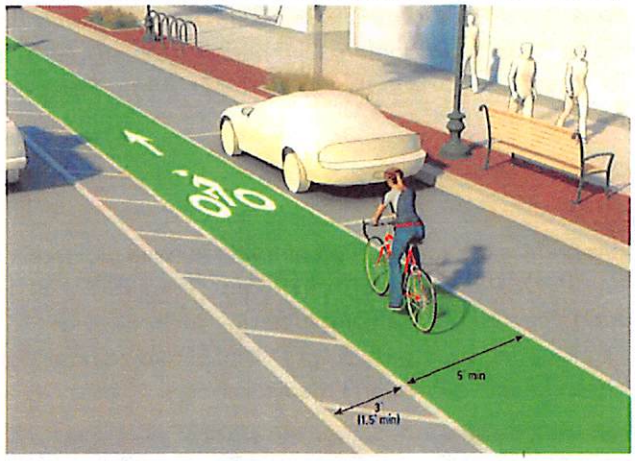
Source: (Google Earth) Haven Avenue, Ocean City, NJ

Midblock Pedestrian Crossing Improvements (i.e. RRFB or PHB with crosswalk and crossing island)



Source: (FHWA-SA-18-018)

Reduce Road Segment Width (i.e. Buffered bike lane)



Source: (CSDG)

Road Owner Response

As the roadway owner, City of Vineland is encouraged to use the findings of the PRSA as a guide for designing improvements to address the safety issues. Whereas the PRSA findings and recommendations are numerous, City of Vineland should use its experience in planning and engineering to determine which recommendations in *Table 7* can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the PRSA process is the road owner's response: an acknowledgment of the audit's findings and recommendations, and their planned follow-up. In responding to the PRSA's findings, the road owner must take into account all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as the time and funds allow in coordination with other projects, priorities and intersecting roadway owners (i.e. NJDOT, Cumberland County).

City of Vineland delivered their response following the finalization of the findings and recommendations, a copy of which can be found in *Appendix D*.

4. Irving Avenue (Bridgeton)

The Irving Avenue Pedestrian/Bicycle Road Safety Audit was conducted on Wednesday, December 11, 2019 at the Cumberland County Administration Building in Bridgeton, Cumberland County, New Jersey. Fourteen stakeholders representing state, county, and local agencies participated in the audit. A list of all participants and their respective agencies is provided in *Appendix A*.

Study Location

As shown in *Figure 1*, the focus of this audit is a 1-mile section of Irving Avenue located in the urban area of Bridgeton, New Jersey. Audit limits are between CR 606 (Laurel Street) and Rogers Street (MP 0.00-1.02). This corridor runs east to west and is a rural gateway into Bridgeton that bisects notable north-south roadways NJ 77 (Pearl Street) and CR 669 (Manheim Avenue). The corridor is surrounded by low-density residential and commercial development. It is important to note that the corridor includes a hospital and a children's medical clinic.

Figure 1: Irving Avenue Study Area

Roadway Characteristics

CR 552 (Irving Avenue) is classified as an urban minor arterial with a posted speed limit of 25 mph from CR 606 (Laurel Street) to CR 669 (Manheim Avenue) (MP 0.00-0.71), and a posted speed limit of 35 from CR 669 (Manheim Avenue) to Rogers Street (MP 0.71-1.02). The corridor study area is 2-lanes, undivided, with no shoulder, and on-street parking where permitted. The roadway's horizontal alignment is mostly straight with curvilinear bends between Lakeview Avenue and Nixon Avenue, and at the Magnolia Avenue intersection, with 3 signalized intersections and 15 unsignalized. The roadway also includes a freight railroad crossing (MP 0.57).

Existing Bicycle/Pedestrian Facilities

Sidewalks are currently available along both sides of Irving Avenue between CR 606 (Laurel Street and CR 669 (Manheim Avenue) (MP 0.00-0.71) and are typically 4'-5' in width, with exception to a much wider sidewalk segment fronting the shopping plaza. From CR 669 (Manheim Avenue) to Rogers Street (MP 0.71-1.02) a sidewalk is provided only along the northern curbline. Sidewalk conditions vary from satisfactory to very poor. Sidewalk segments in very poor condition are typically of slate and brick materials and are notably hazardous to pedestrians.

Basic parallel style crosswalks are provided across Irving Avenue at the signalized intersections of NJ 77 (Pearl Street) and CR 669 (Manheim Avenue). Basic parallel style crosswalks are also provided across Irving Avenue at high volume unsignalized intersections Bank Street, Walnut Street, and York Street. However, two of the three (2/3) signalized intersections in the study corridor do not provide marked crosswalks at each leg. Marked crosswalks at Magnolia Avenue, and two of the four (2/4) marked crosswalks at CR 669 (Manheim Avenue) are high-visibility continental style.

Crosswalk conditions vary from newly stripped to in-need of restriping. There are no bicycle lanes or other bicycle infrastructure identified along the corridor. However, the *2015 Cumberland County Bikeways Inventory* and *2010 Cumberland County Rails to Trails Feasibility Study* both propose Irving Avenue as a potential bikeway.

Traffic Counts

Based on data from the NJDOT Straight Line Diagrams (SLDs), the 2017 ADT along Irving Avenue is approximately 6,500 vehicles per day within the study area. A copy of available data can be found in Appendix B. Additional traffic counts of the study area will be conducted during upcoming project tasks. This data will be added to the PRSA report as a supplement to Appendix B and will used to 1) complete a Highway Safety Manual (HSM) analysis of the study area, and 2) inform the evaluation of potential countermeasures.

Transit

The study corridor is serviced by the Cumberland Area Transit System's (CATS) Greater Bridgeton Area Transit Shuttle (Shuttle). The Shuttle provided fixed route service in the Bridgeton area with stops in the study area at Laurel Street and Manheim Avenue intersections. NJ Transit Route #410 and #553 service is also provided at the Irving Avenue/Pearl Street intersection.

Community Profile

Population and income characteristics from the U.S. Census Bureau's 2013-2017 American Community Survey (ACS) estimates were used to compile a community profile of residents within 0.25 miles of the study area. A summary of the demographics is listed on the following page. In addition to the community profile in ***Table 1***, a map was created using U.S. Census Bureau's 2014-2018 American Community Survey (ACS) estimates to identify the prevalence of zero-vehicle households in proximity to the City of Bridgeton study areas. Many census tracts abutting the study corridors are above the County average of 10.3% for zero-vehicle households, as shown in *Figure 2*.

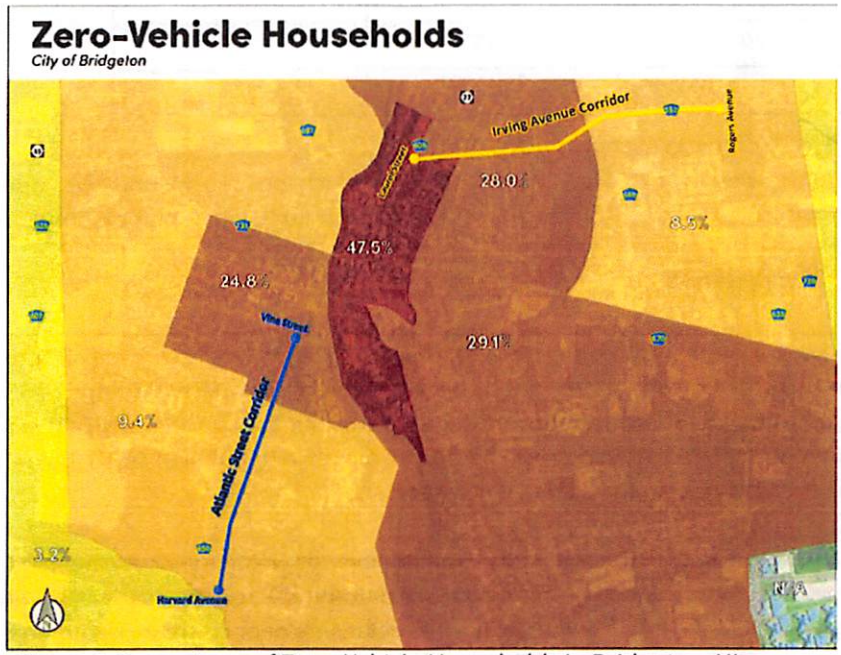


Figure 2: Percentage of Zero-Vehicle Households in Bridgeton, NJ

Characteristics	Irving Avenue (0.25 mile buffer)	Cumberland County
Population	***4,799***	***154,952***
Black or African American	*18%*	*19%*
*Hispanic/Latino**	*69%*	*30%*
White	*59%*	*66%*
Asian	*<1%*	*1%*
American Indian/Alaskan	*2%*	*1%*
Two or More Races Alone	*2%*	*5%*
Other	*19%*	*8%*
Population by Age		
Age 0-4	*11%*	*7%*
Age 0-17	*35%*	*24%*
Age 18+	*65%*	*76%*
Age 65+	*5%*	*14%*
Households	***1,168***	***50,596***
*Linguistically Isolated Households***	*35%*	*8%*
*Speak Spanish****	*99%*	*91%*
Income		
<$15,000	*14%*	*14%*
$15,000 - $25,000	*19%*	*12%*
$25,000 - $50,000	*33%*	*24%*
$50,000 - $75,000	*16%*	*17%*
$75,000+	*18%*	*33%*

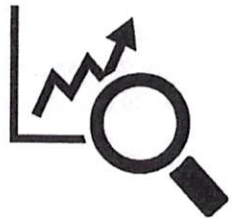


Table 1: Community Profile of Irving Avenue Study Corridor
*Hispanic population can be of any race, **Households in which no one 14 and over speaks English "very well", ***Percentage of Linguistically Isolated Households that speak spanish as their primary language

Crash Data Analysis

Crash data analysis was based on reportable crash records provided by the 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. Crash data between the years of 2012-2016 was obtained from the NJDOT via the SafetyVoyager data portal. Detailed crash maps of every bicycle crash, pedestrian crash, and motorist crash that resulted in serious injury or fatality, as well as, crash clusters 7> are provided in ***Appendix C.***

Conducted using the HSM approved crash severity methodology of weighing incapacitating injury (A) and fatality (K) equally (K=A), the crash data analysis and crash maps consider both (K) and (A) crashes as equally serious. Crash data of the study area provided detailed information on the characteristics of each crash. A summary of the study area crash data analysis and crash characteristics are as follows:

Year	Crashes	Injured	Killed/Incapacitated
2012	36	6	0
2013	40	6	0
2014	40	7	0
2015	34	7	0
2016	30	9	0
Total	180	35	0

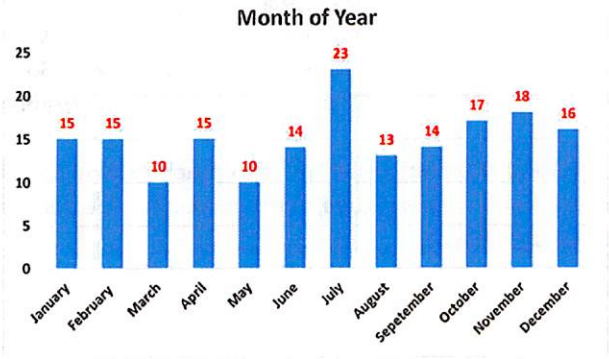
Table 2: Total Crashes by Year - Irving Avenue Study Corridor

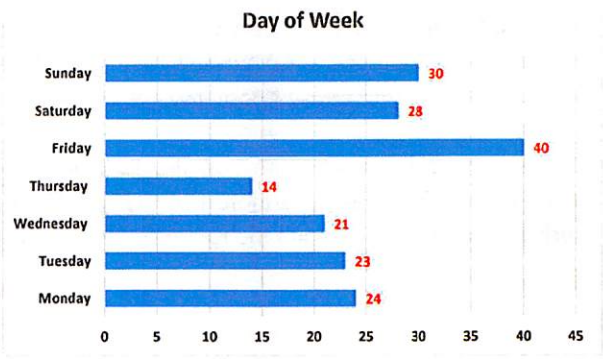
		Total Crashes	Percentages
Road Surfaces	Dry	143	77.7%
	Wet	37	20.1%
Illumination	Daylight	93	50.5%
	Dusk	6	3.3%
	Dark (Lit)	72	39.1%
	Dark (Unlit)	7	3.8%

Table 3: Environmental Conditions - Irving Avenue Study Corridor

	Total Crashes	Percentage
Struck Parked Vehicle	**50**	**27.8%**
Fixed Object	19	10.6%
Animal	3	1.7%
Encroachment	0	0.0%
Backing	8	4.4%
Overturned	0	0.0%
Opposite Direction (Sideswipe)	4	2.2%
Opposite Direction (Head-on)	8	4.4%
Left-Turn/U-Turn	5	2.8%
Right Angle	**37**	**20.6%**
Same Direction (Sideswipe)	18	10.0%
Same Direction (Read End)	**21**	**11.7%**
Pedalcyclist	1	0.6%
Pedestrian	6	3.3%

Table 4: Collision Type - Irving Avenue Study Corridor





Pedestrian and Bicyclist Crashes

During the 2012-2016 analysis period there were a total of 6 pedestrian and 1 bicyclist crashes, representing 3.9% of all crashes within the study area. Of the total number of crashes during this period, pedestrian and bicyclist crashes disproportionately resulted in injuries, representing 17.1% of all injury crashes.

Crash Type	Total Crashes	Percentage
Collision with Pedestrian	*6*	*85.7%*
Collision with Cyclist	*1*	*14.3%*
Crash Severity		
Fatality	*0*	*0.0%*
Incapacitating Injury	*0*	*0.0%*
Moderate Injury	*2*	*28.6%*
Pain	*4*	*57.1%*
Property Damage Only	*1*	*14.3%*

Table 5: Pedestrian and Bicycle Crash Summary

Pedestrian and Bicyclist Crash Contributing Factors

To better understand the factors that contributed to pedestrian and bicyclist crashes, New Jersey TR-1 (NJ TR-1) crash reports were procured from NJDOT. The details in these reports were crucial to putting pedestrian and bicyclist related crashes in context. Pursuant the content of the NJ TR-1s, the following are contributing factors that were witnessed for crashes within the study corridor.

Pedestrian & Bicyclist Contributing Factors
Crashes often occur at or near intersections
Speeding
Many crash victims have Limited English Proficiency (LEP)
Crashes in crosswalks are often due to Left-Hand turn movements

Table 6: NJ TR-1 Report Analysis

Findings and Recommendations

Presented here are the findings and potential solutions identified during the Irving Avenue PRSA. The identified potential solutions are given ratings based on their projected safety benefit, cost, and time frame to implement. Safety benefit potential is based primarily on studies and research provided by the Federal Highway Administration's (FHWA) Crash Modification Factors (CMFs). When CMFs are not available, the FHWA Proven Safety Countermeasures, Highway Safety Manual (HSM), and current peer-reviewed research on countermeasures are used. All safety benefits are approximate.

This section describes the site-specific and corridor-wide recommended improvements. The recommendations derived from each PRSA event are noted along with their projected safety benefit, time frame, cost, as well as, the facility's jurisdiction. Ratings used in the recommendation tables are described as follows:

Legend

Symbol	Meaning	Definition
✔	*Limited safety benefit potential*	
✔✔	*Limited to moderate safety benefit potential*	
✔✔✔	*Moderate safety benefit potential*	
✔✔✔✔	*High safety benefit potential*	
$	*Low cost*	*Could be accomplished through maintenance*
$$	*Medium cost*	*May require some engineering or design and funding may be readily available*
$$$	*High cost*	*Longer term; may require full engineering, ROW acquisition and new funding*
◔	*Short term*	*Could be accomplished within 1 year*
◑	*Medium term*	*Could be accomplished in 1 to 3 years; may require some engineering*
◕	*Long term*	*Could be accomplished in 3 years or more; may require full engineering*

The following represents the specific findings and recommendations made by the PRSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Corridor-Wide					
1	*Inspect and replace faded, damaged or outdated signage as needed (i.e. signs mounted below 7', faded lettering on speed limit signs, crooked stop signs)*	✔	$	◔	*County*
2	*Road/bicycle-pedestrian safety code enforcement campaign (i.e. StreetSmart)*	✔	$	◔	*Bridgeton*
3	*Conduct a bi-lingual road/bicycle-pedestrian safety campaign (i.e. StreetSmart)*	✔	$	◔	*Bridgeton*
4	*Inspect, repave and restripe the roadway as needed*	✔	$$	◑	*County*
5	*Install or reinstall detached Detectable Warning Surfaces (DWS) to be aligned in compliance with ADA and inspect, repair, and construct sidewalks in compliance with ADA as needed*	✔	$$	◑	*County/NJDOT*
6	*Perform parking study and develop parking management plan*	✔	$$	◔	*Bridgeton/ County*
7	*Remove sidewalk obstructions per ADA requirements*	✔	$	◔	*County*
8	*Enact a complete streets policy in accordance with the NJDOT Complete & Green Streets for All Model Policy Guide*	✔✔	$	◔	*Bridgeton/ County*

9	*Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment*	✓✓	$	◔	*County*
10	*Consider installing sharrows or bicycle lanes in a shoulder, when possible, to improve multimodal accommodations*	✓✓	$	◑	*County*
11	*Install high-visibility marked crosswalks at all legs of signalized intersections*	✓✓	$	◑	*County/NJDOT*
12	*Daylight intersections per NJ Title 39 (i.e. education/enforcement campaigns, stripings, bollards, bicycle parking, planters etc.)*	✓✓	$	◔	*County*
13	*Remove sight line obstacles (i.e. trees, utility poles, signage)*	✓✓	$$	◑	*County/NJDOT*
14	*Perform a lighting analysis of the study area, including roadway and pedestrian scale lighting; prepare plans/upgrades according to results*	✓✓✓	$$$	◑	*Bridgeton/ County*
15	*Create a taskforce that meets after a pedestrian or bicycle fatality to perform a mini-road safety audit to better understand how the crash happened and what immediate improvements can be made to avoid repeat crashes at the location*	✓✓✓	$	◔	*Bridgeton*
16	*Perform corridor-wide signal upgrades (replace 8" traffic signal heads with 12", install backplates with retro-reflective border, evaluate clearance intervals, update to countdown pedestrian signal heads, replace push buttons in compliance with ADA, etc.)*	✓✓✓	$$$	◕	*County/NJDOT*
Site-Specific					
Segment: Walnut Street-Church Street					
17	*Install advance yield pedestrian crossing treatments (i.e. in-street signage, stripings)*	✓	$	◔	*County*
18	*Install midblock pedestrian crossing improvements (i.e. Rectangular Rapid Flash Beacon (RRFB) with a high visibility continental or ladder style raised crosswalk)*	✓✓✓	$$$	◕	*County*
Intersection: Manheim Avenue					
19	*Install leading pedestrian interval (LPI) or all pedestrian phase*	✓✓✓	$	◔	*County*
Intersection: Laurel Street					
20	*Consider installing "No Turn on Red"*	✓	$	◔	*County*
21	*Install channelization island at eastern approach*	✓	$$	◑	*County*
Intersection: Pearl Street					
22	*Consider installing "No Turn on Red"*	✓	$	◔	*NJDOT*

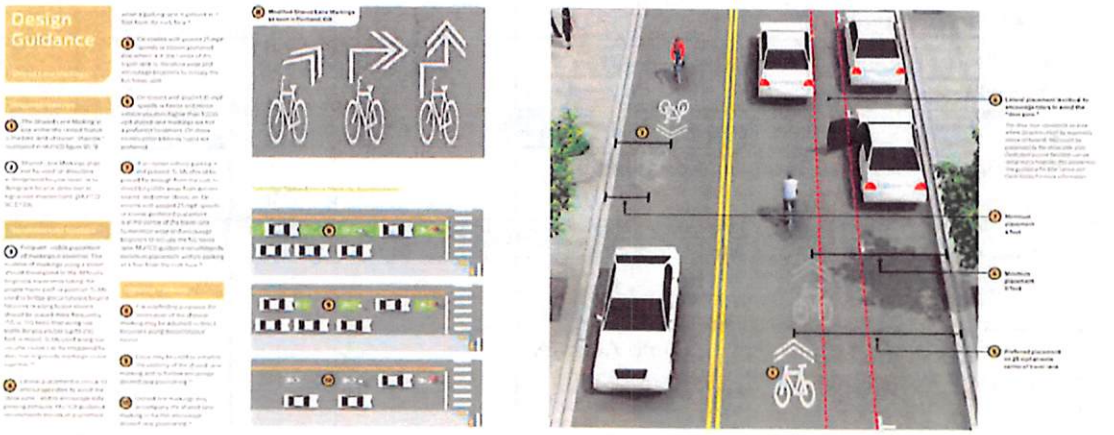
23	*Install bus box stripings for bus stops in coordination with NJ Transit per NACTO Transit Street Design Guide*	✔	$$	◑	*NJDOT/NJ Transit*
24	*Reevaluate signal timing (i.e. shorter cycle lengths)*	✔✔	$$	◔	*NJDOT*
Segment: Pearl Street-Bank Street					
25	*Fix drainage spouts on south side of Irving Avenue (i.e. 172 Bank Street)*	✔	$$	◔	*County*
Segment: East Avenue-Lakeview Avenue					
26	*Investigate parking supply*	✔	$	◔	*Bridgeton/ County*
27	*Remove parking on north side of Irving Avenue, stripe shoulder edgeline and push centerline north*	✔✔	$	◔	*County*
28	*Install bumpouts and neckdowns*	✔✔✔	$$$	◑	*County*
Intersection: York Street					
29	*Install curb ramp and extend sidewalk to align with existing crosswalk*	✔	$$	◑	*County*
30	*Install bumpouts and neckdowns*	✔✔✔	$$$	◑	*County*
Intersection: Magnolia Avenue					
31	*Install advance yield pedestrian crossing treatments (i.e. in-street signage, stripings, advance warning signal)*	✔	$	◔	*County*
32	*Install a Rectangular Rapid Flash Beacon (RRFB)*	✔✔	$$	◔	*County*
33	*Install a raised continental or ladder style crosswalk and/or provide a median refuge island*	✔✔	$$	◑	*County*
Segment: Magnolia Avenue-Manheim Avenue					
34	*Investigate closing access from parking lot to Magnolia Avenue marked crosswalk*	✔	$	◔	*County/Owner*
35	*Install wayfinding signage encouraging pedestrians to use Manheim Avenue crosswalks*	✔	$	◔	*County/Owner*

Table 7: Irving Avenue PRSA Recommendations

Recommendation Visualizations

Examples of some of the site-specific and corridor-wide safety recommendations identified in ***Tables 7*** are shown below. These examples are based on current best practices and design standards from the *2017 NJ Complete Streets Design Guide* (CSDG), NACTO's *Urban Street Design Guide* (NACTO-US), and the Federal Highway Administration (FHWA), including sources contained therein. Visual representations of select aforementioned recommendations help to better communicate their potential safety benefit, cost, and time frame.

Bicycle Sharrows

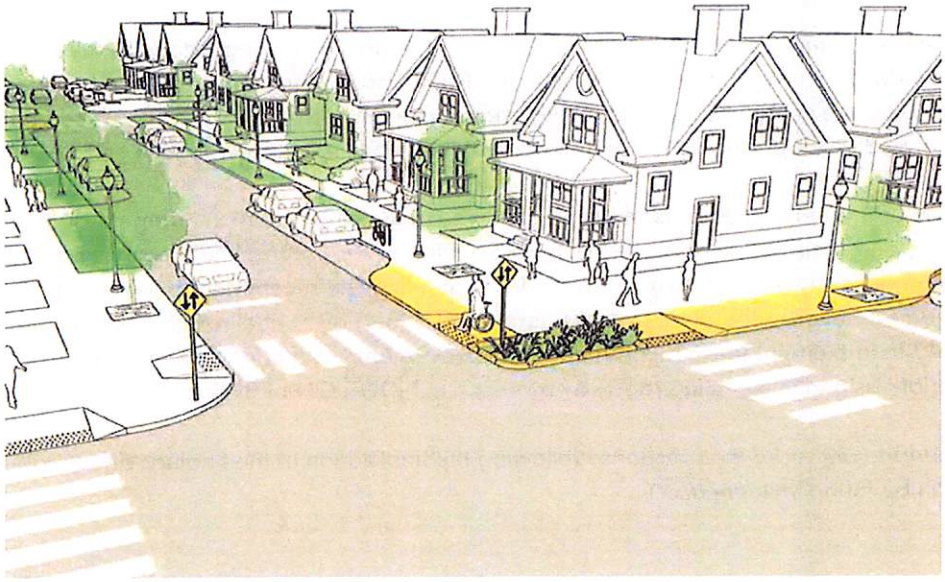


Source: (NACTO-US)

Daylighting Intersection (i.e. Bicycle parking, plastic bollards, stripings)

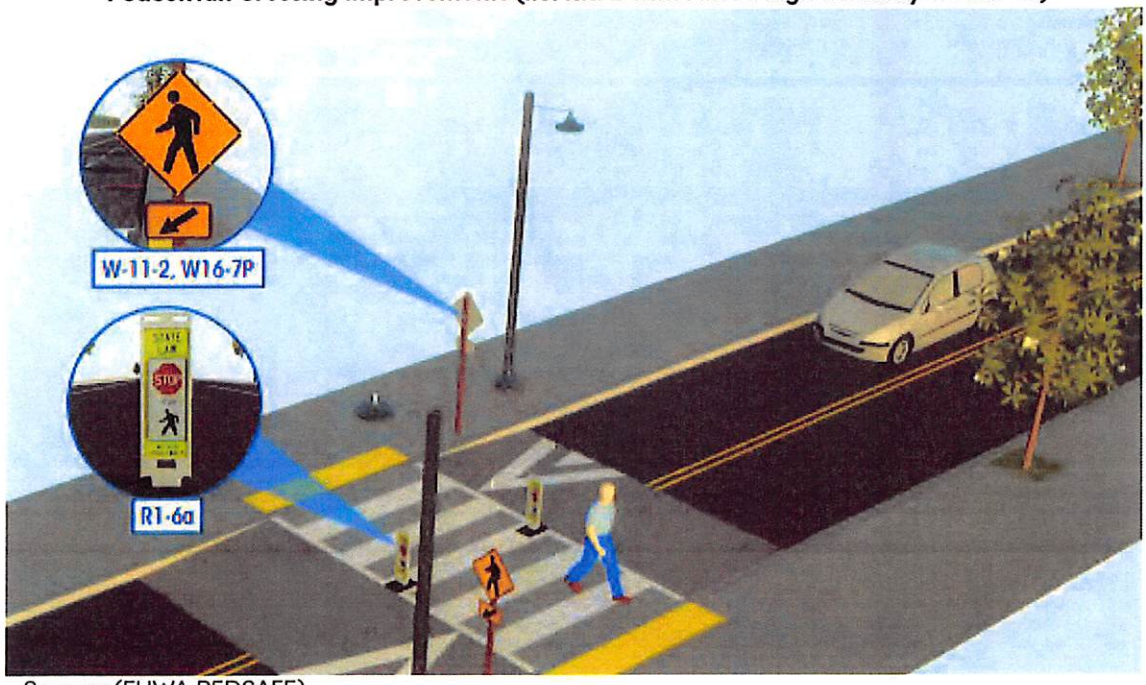
Photo Caption: (NJBPRC) New Brunswick, NJ

Curb extensions/bumpouts



Source: (NACTO-US)

Pedestrian Crossing Improvements (i.e. RRFB with raised high-visibility crosswalk)



Source: (FHWA PEDSAFE)

Road Owner Response

As the roadway owner, County of Cumberland is encouraged to use the findings of the PRSA as a guide for designing improvements to address the safety issues. Whereas the PRSA findings and recommendations are numerous, County of Cumberland should use its experience in planning and engineering to determine which recommendations in *Table 7* can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the PRSA process is the road owner's response: an acknowledgment of the audit's findings and recommendations, and their planned follow-up. In responding to the PRSA's findings, the road owner must take into account all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as the time and funds allow in coordination with other projects, priorities and intersecting roadway owners (i.e. NJDOT, City of Bridgeton).

County of Cumberland delivered their response following the finalization of the findings and recommendations, a copy of which can be found in *Appendix D*.

5. Atlantic Street (Bridgeton)

The Atlantic Street Pedestrian/Bicycle Road Safety Audit was conducted on Wednesday, December 11, 2019 at the Cumberland County Administration Building in Bridgeton, Cumberland County, New Jersey. Fourteen stakeholders representing state, county, and local agencies participated in the audit. A list of all participants and their respective agencies is provided in *Appendix A*.

Study Location

As shown in *Figure 1*, the focus of this audit is a 1-mile section of Atlantic Street located in the urban area of Bridgeton, New Jersey. Audit limits are between CR 697 (Vine Street) and Harvard Avenue (MP 0.90-0.06). This corridor runs north-south and is a local thoroughfare into Bridgeton that bisects quiet residential streets. The corridor is surrounded by low-density residential. It is important to note that the corridor is adjacent to the Cumberland County Jail and Courthouse, which contribute to traffic and circulation patterns on Atlantic Street and its bisecting roadways, primarily CR 697 (Vine Street).

Roadway Characteristics

Atlantic Street is classified as an urban major collector with a posted speed limit of 25 mph (MP 0.06-0.90). The corridor study area is 2-lanes, undivided, with no shoulder, and on-street parking where permitted. The roadway's horizontal alignment is straight with 12 unsignalized intersection. The vertical alignment generally is flat with an incline at the northern terminus of the study corridor.

Figure 1: Atlantic Street Study Area

Existing Bicycle/Pedestrian Facilities

Sidewalks are currently available along both sides of Irving Avenue between CR 606 (Laurel Street and CR 669 (Manheim Avenue) (MP 0.00-0.71) and are typically 4'-5' in width. Sidewalk conditions are generally satisfactory with few heaved segments due to tree roots. There are also small segments of the sidewalk that are brick material between Hampton Street and Vine Street (MP 0.80-0.90).

Basic parallel style crosswalks are provided across Atlantic Street at only Lincoln Avenue (MP 0.67). There is also a parallel style crosswalk along the east side of Atlantic Street at Woodland Drive (MP 0.63). There are no bicycle lanes or other bicycle infrastructure identified along the corridor.

Traffic Counts

Based on data from the NJDOT Straight Line Diagrams (SLDs), the 2017 ADT along Atlantic Street is approximately 1,800 vehicles per day within the study area. A copy of available data can be found in Appendix B. Additional traffic counts of the study area will be conducted during upcoming project tasks. This data will be added to the PRSA report as a supplement to Appendix B and will used to 1) complete a Highway Safety Manual (HSM) analysis of the study area, and 2) inform the evaluation of potential countermeasures.

Community Profile

Population and income characteristics from the U.S. Census Bureau's 2013-2017 American Community Survey (ACS) estimates were used to compile a community profile of residents within 0.25 miles of the study area. A summary of the demographics is listed on the following page. In addition to the community profile in ***Table 1***, a map was created using U.S. Census Bureau's 2014-2018 American Community Survey (ACS) estimates to identify the prevalence of zero-vehicle households in proximity to the City of Bridgeton study areas. Many census tracts abutting the study corridors are above the County average of 10.3% for zero-vehicle households, as shown in ***Figure 2***.

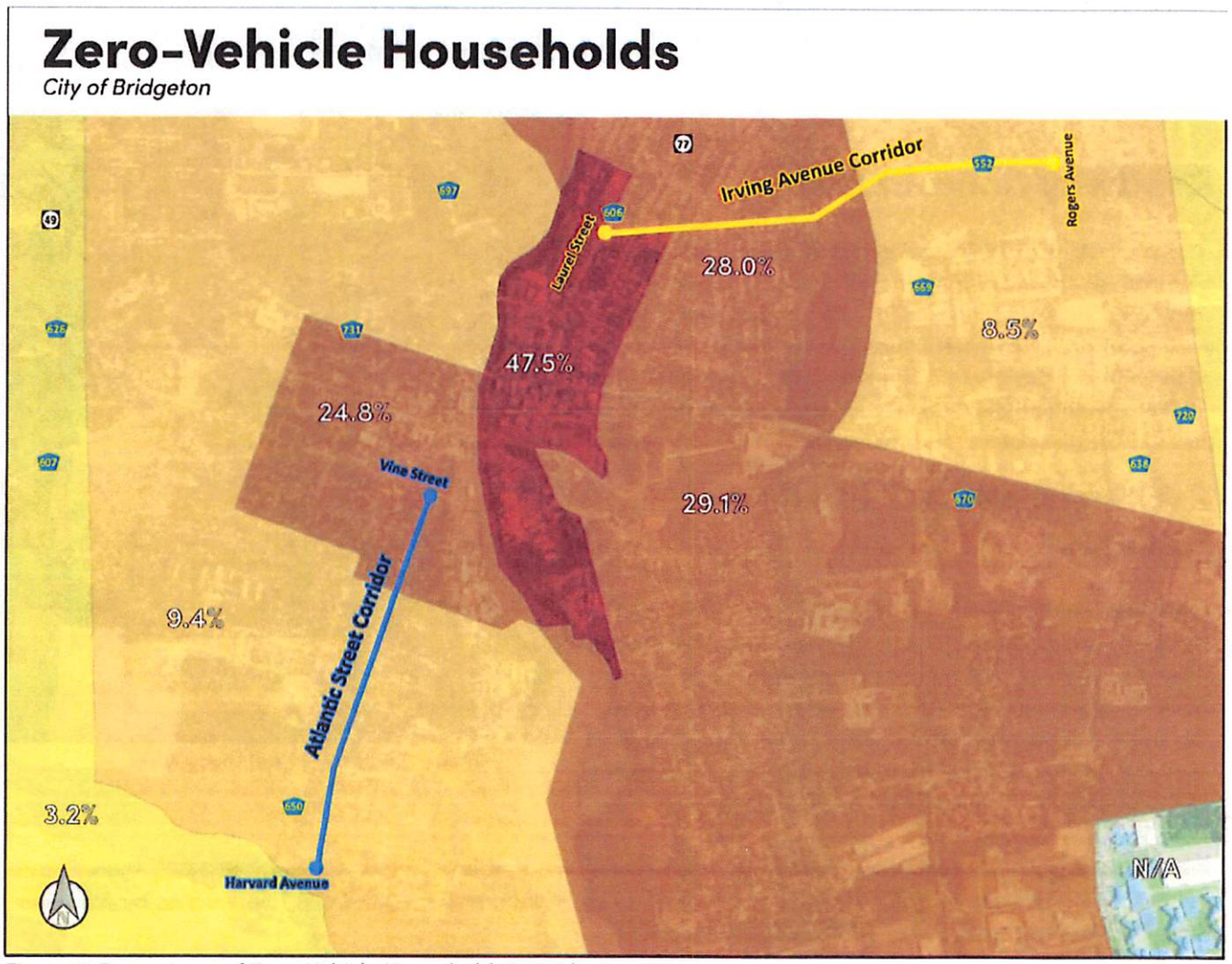


Figure 2: Percentage of Zero-Vehicle Households in Bridgeton, NJ

Characteristics	Atlantic Street (0.25 mile buffer)	Cumberland County
Population	***3,579***	***154,952***
Black or African American	*23%*	*19%*
*Hispanic/Latino**	*61%*	*30%*
White	*51%*	*66%*
Asian	*1%*	*1%*
American Indian/Alaskan	*1%*	*1%*
Two or More Races Alone	*2%*	*5%*
Other	*22%*	*8%*
Population by Age		
Age 0-4	*10%*	*7%*
Age 0-17	*37%*	*24%*
Age 18+	*63%*	*76%*
Age 65+	*6%*	*14%*
Households	***934***	***50,596***
*Linguistically Isolated Households***	*21%*	*8%*
*Speak Spanish****	*99%*	*91%*
Income		
<$15,000	*16%*	*14%*
$15,000 - $25,000	*20%*	*12%*
$25,000 - $50,000	*24%*	*24%*
$50,000 - $75,000	*13%*	*17%*
$75,000+	*27%*	*33%*

Table 1: Community Profile of Atlantic Street Study Corridor
*Hispanic population can be of any race, **Households in which no one 14 and over speaks English "very well", ***Percentage of Linguistically Isolated Households that speak spanish as their primary language

Crash Data Analysis

Crash data analysis was based on reportable crash records provided by the 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. Crash data between the years of 2012-2016 was obtained from the NJDOT via the SafetyVoyager data portal. Detailed crash maps of every bicycle crash, pedestrian crash, and motorist crash that resulted in serious injury or fatality, as well as, crash clusters 6> are provided in ***Appendix C.***

Conducted using the HSM approved crash severity methodology of weighing incapacitating injury (A) and fatality (K) equally (K=A), the crash data analysis and crash maps consider both (K) and (A) crashes as equally serious. Crash data of the study area provided detailed information on the characteristics of each crash. A summary of the study area crash data analysis and crash characteristics are as follows:

Year	Crashes	Injured	Killed/Incapacitated
2012	14	2	0
2013	8	2	0
2014	11	0	0
2015	15	4	0
2016	6	2	0
Total	54	10	0

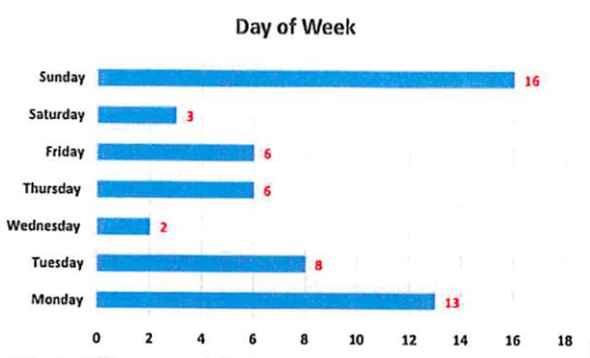
Table 2: Total Crashes by Year - Atlantic Street Study Corridor

		Total Crashes	Percentages
Road Surfaces	Dry	46	25.0%
	Wet	6	3.3%
Illumination	Daylight	26	14.1%
	Dusk	2	1.1%
	Dark (Lit)	17	9.2%
	Dark (Unlit)	3	1.6%

Table 3: Environmental Conditions - Atlantic Street Study Corridor

	Total Crashes	Percentage
Struck Parked Vehicle	**33**	**61.1%**
Fixed Object	3	5.6%
Animal	0	0.0%
Encroachment	0	0.0%
Backing	2	3.7%
Overturned	0	0.0%
Opposite Direction (Sideswipe)	1	1.9%
Opposite Direction (Head-on)	0	0.0%
Left-Turn/U-Turn	0	0.0%
Right Angle	**7**	**13.0%**
Same Direction (Sideswipe)	1	1.9%
Same Direction (Read End)	2	3.7%
Pedalcyclist	0	0.0%
Pedestrian	**5**	**9.3%**

Table 4: Collision Type - Atlantic Street Study Corridor



Pedestrian and Bicyclist Crashes

During the 2012-2016 analysis period there were a total of 5 pedestrian and 0 bicyclist crashes, representing 9.3% of all crashes within the study area, well above the county and state averages. Of the total number of crashes during this period, pedestrian and bicyclist crashes disproportionately resulted in injuries, representing 50% of all injury crashes.

Crash Type	Total Crashes	Percentage
Collision with Pedestrian	*5*	*100.0%*
Collision with Cyclist	*0*	*0.0%*
Crash Severity		
Fatality	*0*	*0.0%*
Incapacitating Injury	*0*	*0.0%*
Moderate Injury	*2*	*40.0%*
Pain	*2*	*40.0%*
Property Damage Only	*1*	*20.0%*

Table 5: Pedestrian and Bicycle Crash Summary

Pedestrian and Bicyclist Crash Contributing Factors

To better understand the factors that contributed to pedestrian and bicyclist crashes, New Jersey TR-1 (NJ TR-1) crash reports were procured from NJDOT. The details in these reports were crucial to putting pedestrian and bicyclist related crashes in context. Pursuant the content of the NJ TR-1s, the following are contributing factors that were witnessed for crashes within the study corridor.

Pedestrian & Bicyclist Contributing Factors
Crashes often occur at or near intersections
Speeding
Inadequate lighting

Table 6: NJ TR-1 Report Analysis

Findings and Recommendations

Presented here are the findings and potential solutions identified during the Atlantic Street PRSA. The identified potential solutions are given ratings based on their projected safety benefit, cost, and time frame to implement. Safety benefit potential is based primarily on studies and research provided by the Federal Highway Administration's (FHWA) Crash Modification Factors (CMFs). When CMFs are not available, the FHWA Proven Safety Countermeasures, Highway Safety Manual (HSM), and current peer-reviewed research on countermeasures are used. All safety benefits are approximate.

This section describes the site-specific and corridor-wide recommended improvements. The recommendations derived from each PRSA event are noted along with their projected safety benefit, time frame, cost, as well as, the facility's jurisdiction. Ratings used in the recommendation tables are described as follows:

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The following represents the specific findings and recommendations made by the PRSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Corridor-Wide					
1	*Inspect and replace faded, damaged or outdated signage as needed (i.e. signs mounted below 7', faded lettering on speed limit signs, crooked stop signs)*	✔	$	◔	*Bridgeton*
2	*Inspect, repave and restripe the roadway as needed*	✔	$$	◑	*Bridgeton*
3	*Install or reinstall detached Detectable Warning Surfaces (DWS) to be aligned in compliance with ADA and inspect, repair, and construct sidewalks in compliance with ADA as needed*	✔	$$	◑	*Bridgeton*
4	*Install wayfinding signage (i.e. Street signs)*	✔	$	◔	*Bridgeton*
5	*Enact a complete streets policy in accordance with the NJDOT Complete & Green Streets for All Model Policy Guide*	✔✔	$	◔	*Bridgeton/ County*
6	*Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment*	✔✔	$	◔	*Bridgeton/ County*
7	*Consider installing sharrows or bicycle lanes in a shoulder, when possible, to improve multimodal accommodations*	✔✔	$	◑	*Bridgeton*

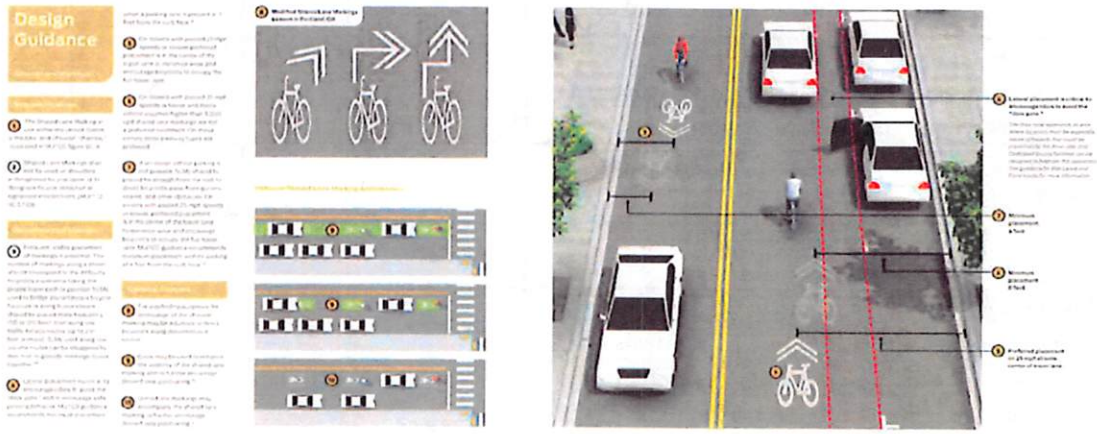
8	*Install high-visibility marked crosswalks at all legs of Vine Street and Hampton Street intersections*	✓✓	$	◑	*Bridgeton/ County*
9	*Daylight intersections per NJ Title 39 (i.e. education/enforcement campaigns, stripings, bollards, bicycle parking, planters etc.)*	✓✓	$	◔	*Bridgeton/ County*
10	*Remove sight line obstacles (i.e. trees, utility poles, signage)*	✓✓	$$	◑	*Bridgeton/ County*
11	*Delineate pavement with centerline and edgeline stripings*	✓✓	$	◔	*Bridgeton*
12	*Install speed management treatments (i.e. speed cushions, speed tables, neckdowns etc.)*	✓✓✓	$$	◑	*Bridgeton*
13	*Perform a lighting analysis of the study area, including roadway and pedestrian scale lighting; prepare plans/upgrades according to results*	✓✓✓	$$$	◑	*Bridgeton*
14	*Create a taskforce that meets after a pedestrian or bicycle fatality to perform a mini-road safety audit to better understand how the crash happened and what immediate improvements can be made to avoid repeat crashes at the location*	✓✓✓	$	◔	*Bridgeton*
Site-Specific					
Intersection: Vine Street					
16	*Install all-way stop*	✓✓	$	◔	*Bridgeton/ County*
17	*Install curb extensions/bumpouts to reduce turning radii and daylight intersection*	✓✓✓	$$$	◑	*Bridgeton/ County*
Intersection: Woodland Drive					
18	*Reduce roadway width (i.e. install median crossing island, curb extensions etc.)*	✓✓	$$S	◑	*Bridgeton*

Table 7: Atlantic Street PRSA Recommendations

Recommendation Visualizations

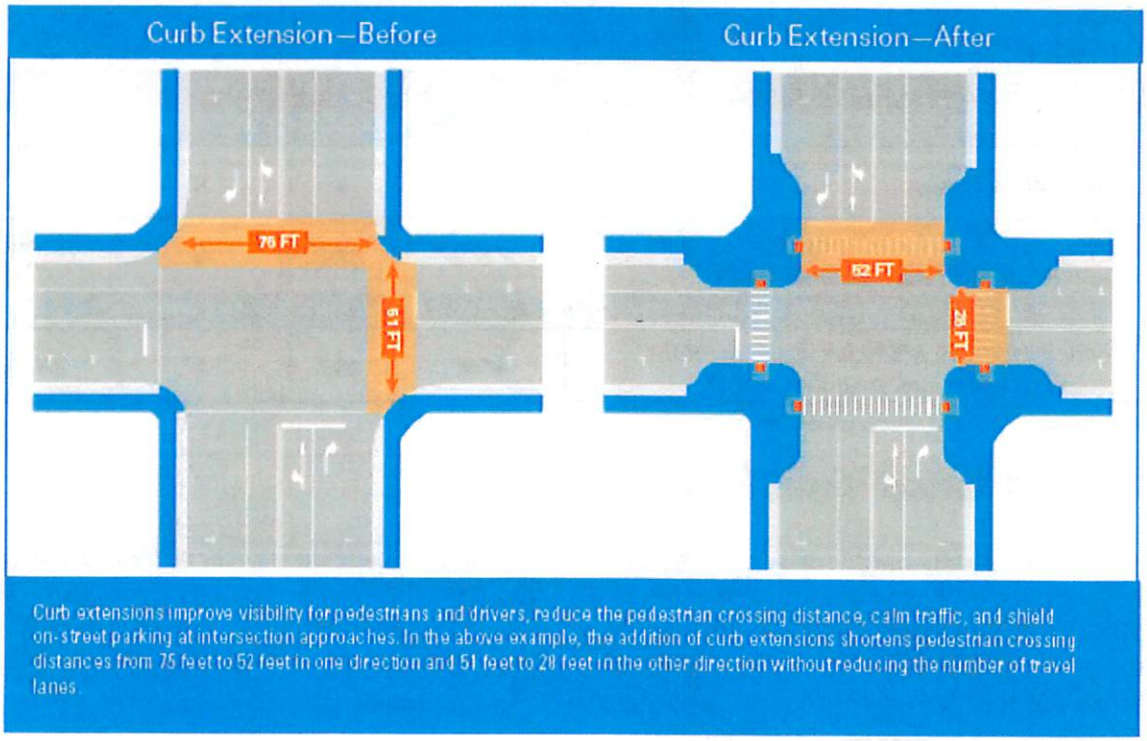
Examples of some of the site-specific and corridor-wide safety recommendations identified in ***Tables 7*** are shown below. These examples are based on current best practices and design standards from the *2017 NJ Complete Streets Design Guide* (CSDG), NACTO's *Urban Street Design Guide* (NACTO-US), and the Federal Highway Administration (FHWA), including sources contained therein. Visual representations of select aforementioned recommendations help to better communicate their potential safety benefit, cost, and time frame.

Bicycle Sharrows



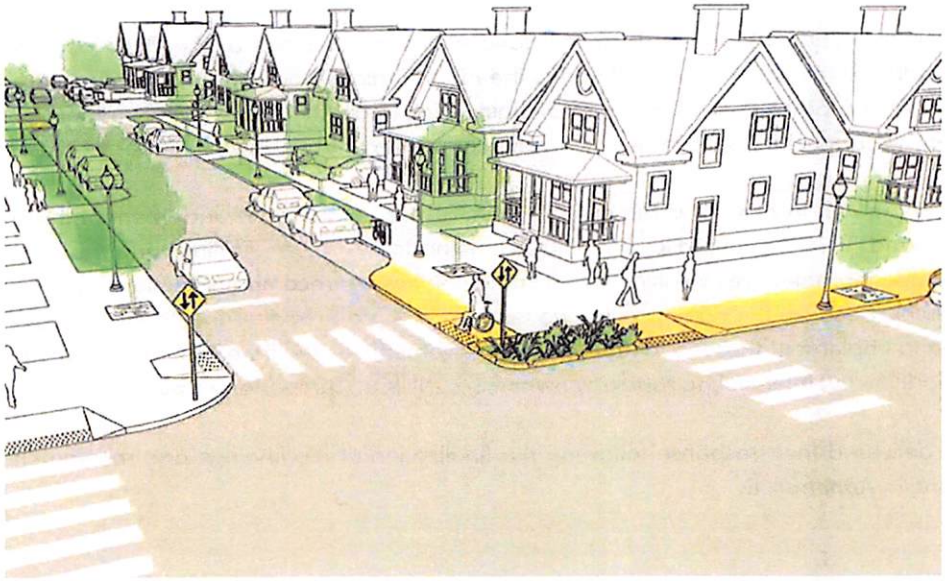
Source: (NACTO-US)

Daylighting Intersection/Traffic Calming/Pedestrian Safety (i.e. Curb extension/bumpout)



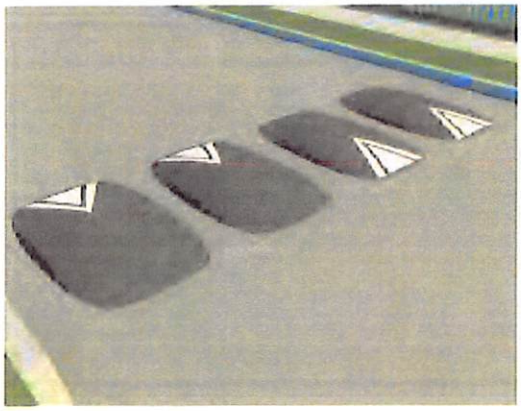
Source: (CSDG)

Curb extensions/bumpouts



Source: (NACTO-US)

Traffic Calming/Speed Management Treatments (i.e. speed cushions, neckdowns, speed tables)



Speed Cushions

Speed cushions are speed humps or speed tables that include wheel cutouts that allow larger vehicles to pass unaffected but reduce passenger vehicle speeds. They are often used on key emergency response routes to allow emergency vehicles to pass unimpeded while causing the typical passenger vehicle to slow down. Speed cushions should be used with caution, however, as drivers will often seek out the space in between the humps.

Neckdowns

Neckdowns create pinch points by extending the curbline to narrow the roadway, which deters motorists from operating at high speeds on local streets and significantly expands the sidewalk realm for pedestrians.

Source: (CSDG)

Road Owner Response

As the roadway owner, City of Bridgeton is encouraged to use the findings of the PRSA as a guide for designing improvements to address the safety issues. Whereas the PRSA findings and recommendations are numerous, City of Bridgeton should use its experience in planning and engineering to determine which recommendations in *Table 7* can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the PRSA process is the road owner's response: an acknowledgment of the audit's findings and recommendations, and their planned follow-up. In responding to the PRSA's findings, the road owner must take into account all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as the time and funds allow in coordination with other projects, priorities and intersecting roadway owners (i.e. NJDOT, Cumberland County).

City of Bridgeton delivered their response following the finalization of the findings and recommendations, a copy of which can be found in *Appendix D*.

6. High Street (Millville)

The High Street Pedestrian/Bicycle Road Safety Audit was conducted on Friday, January 6, 2020 at the Millville Municipal Building in Millville, Cumberland County, New Jersey. Sixteen stakeholders representing state, county, and local agencies participated in the audit. A list of all participants and their respective agencies is provided in ***Appendix A***.

Study Location

As shown in *Figure 1*, the focus of this audit is a 1-mile section of High Street located in the urban area of Millville, New Jersey. Audit limits are between NJ 49 (Main Street) and Harrison Avenue (MP 0.00-0.99). This corridor runs north-south along the central business district of Millville. The corridor is surrounded by mixed-use commercial and residential. It is important to note that the corridor is located within the Glasstown Arts District (Arts District)which includes the historic Levoy Theatre and the Rowan College of South Jersey - Cumberland County Arts & Innovation Center.

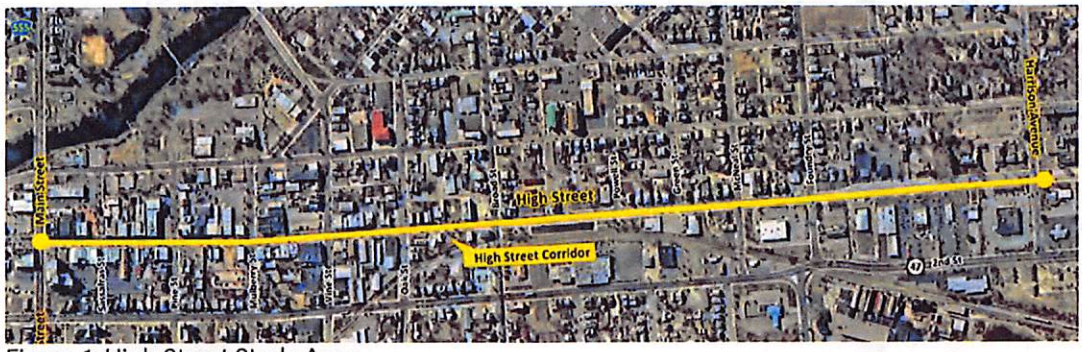


Figure 1: High Street Study Area

Roadway Characteristics

High Street is classified as an urban major collector with a posted speed limit of 25 mph (MP 0.00-0.99). The corridor study area is 2-lanes, undivided, with no shoulder, and on-street parking where permitted from NJ 49 (Main Street) to Foundry Street (MP 0.00-0.77). Between Foundry Street and Harrison Avenue (MP 0.77-0.99) the roadway substantially widens creating a 24' shoulder along the west curbline and an 8' shoulder on the east. The roadway's horizontal alignment is straight with 4 signalized intersections and 9 unsignalized.

Existing Bicycle/Pedestrian Facilities

Sidewalks are currently available along both sides of High Street between NJ 49 (Main Street) and Harrison Avenue (MP 0.00-0.99). Sidewalks north of McNeal Street (MP 0.69) are typically 4'-5' in width while sidewalks south of this point thereof are typically 6'-14'. The widest segments of sidewalk are brick material and located within the streetscaped Glasstown Arts District from NJ 49 (Main Street) to Broad Street (MP 0.00-0.45). Sidewalk conditions are generally satisfactory with a few heaved segments due to tree roots. Within the Arts District there are also ample pedestrian and vehicular scale lighting and benches.

Basic parallel style crosswalks are provided at every four-way intersection within the study area, with exception to the crosswalk art at the Pine Street intersection. Crosswalk conditions vary from newly stripped to in-need of restriping. There are no bicycle lanes or other bicycle infrastructure identified along the corridor. However, the *2015 Cumberland County Bikeways Inventory* and *2010 Cumberland County Rails to Trails Feasibility Study* both propose High Street as a potential bikeway.

Traffic Counts

Based on data from the NJDOT Straight Line Diagrams (SLDs), the 2017-2018 ADT along High Street is approximately 8,500 vehicles per day within the study area. A copy of available data can be found in Appendix B. Additional traffic counts of the study area will be conducted during upcoming project tasks. This data will be added to the PRSA report as a supplement to Appendix B and will used to 1) complete a Highway Safety Manual (HSM) analysis of the study area, and 2) inform the evaluation of potential countermeasures.

Community Profile

Population and income characteristics from the U.S. Census Bureau's 2013-2017 American Community Survey (ACS) estimates were used to compile a community profile of residents within 0.25 miles of the study area. A summary of the demographics is listed on the following page. In addition to the community profile in ***Table 1***, a map was created using U.S. Census Bureau's 2014-2018 American Community Survey (ACS) estimates to identify the prevalence of zero-vehicle households in proximity to the City of Millville study areas. Many census tracts abutting the study corridors are above the County average of 10.3% for zero-vehicle households, as shown in ***Figure 2***.

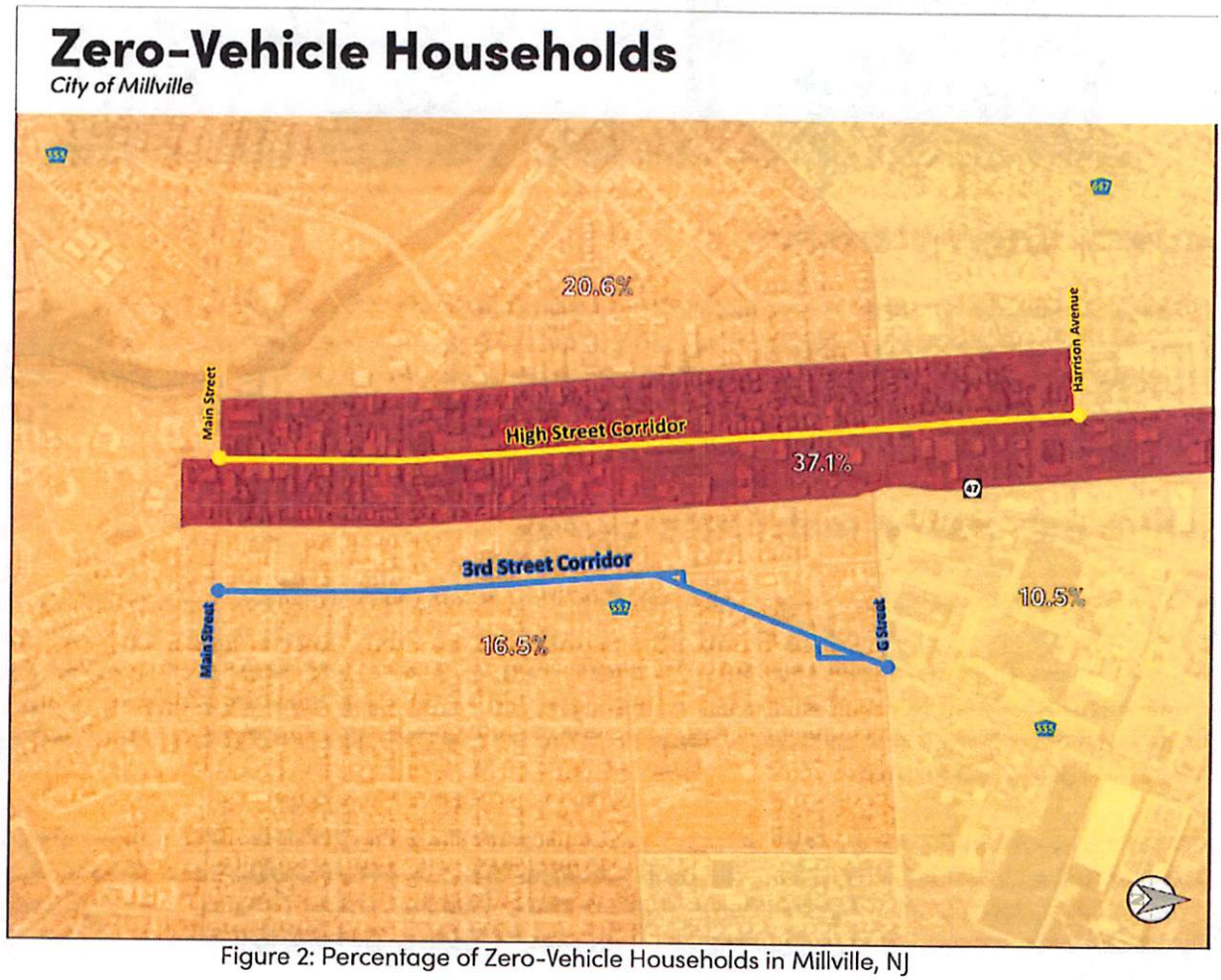


Figure 2: Percentage of Zero-Vehicle Households in Millville, NJ

Characteristics	High Street (0.25 mile buffer)	Cumberland County
Population	**4,059**	**154,952**
Black or African American	31%	19%
Hispanic/Latino*	22%	30%
White	60%	66%
Asian	<1%	1%
American Indian/Alaskan	<1%	1%
Two or More Races Alone	7%	5%
Other	2%	8%
Population by Age		
Age 0-4	5%	7%
Age 0-17	28%	24%
Age 18+	72%	76%
Age 65+	13%	14%
Households	**1,690**	**50,596**
Linguistically Isolated Households**	4%	8%
Speak Spanish***	96%	91%
Income		
<$15,000	27%	14%
$15,000 - $25,000	16%	12%
$25,000 - $50,000	28%	24%
$50,000 - $75,000	17%	17%
$75,000+	12%	33%

Table 1: Community Profile of High Street Study Corridor
*Hispanic population can be of any race, **Households in which no one 14 and over speaks English "very well", ***Percentage of Linguistically Isolated Households that speak spanish as their primary language

Crash Data Analysis

Crash data analysis was based on reportable crash records provided by the 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. Crash data between the years of 2012-2016 was obtained from the NJDOT via the SafetyVoyager data portal. Detailed crash maps of every bicycle crash, pedestrian crash, and motorist crash that resulted in serious injury or fatality, as well as, crash clusters 4> are provided in *Appendix C.*

Conducted using the HSM approved crash severity methodology of weighing incapacitating injury (A) and fatality (K) equally (K=A), the crash data analysis and crash maps consider both (K) and (A) crashes as equally serious. Crash data of the study area provided detailed information on the characteristics of each crash. A summary of the study area crash data analysis and crash characteristics are as follows:

Year	Crashes	Injured	Killed/Incapacitated
2012	56	14	0
2013	48	10	0
2014	40	7	0
2015	36	14	0
2016	28	12	0
Total	208	56	0

Table 2: Total Crashes by Year - High Street Study Corridor

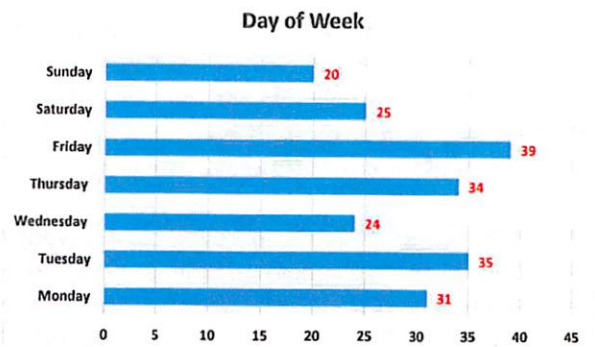
		Total Crashes	Percentages
Road Surfaces	Dry	143	77.7%
	Wet	37	20.1%
Illumination	Daylight	93	50.5%
	Dusk	6	3.3%
	Dark (Lit)	72	39.1%
	Dark (Unlit)	7	3.8%

Table 3: Environmental Conditions - High Street Study Corridor

	Total Crashes	Percentage
Struck Parked Vehicle	18	8.7%
Fixed Object	8	3.8%
Animal	0	0.0%
Encroachment	0	0.0%
Backing*	29	13.9%
Overturned	0	0.0%
Opposite Direction (Sideswipe)	2	1.0%
Opposite Direction (Head-on)	4	1.9%
Left-Turn/U-Turn	11	5.3%
Right Angle	**50**	**24.0%**
Same Direction (Sideswipe)	**26**	**12.5%**
Same Direction (Read End)	**45**	**11.7%**
Pedalcyclist	4	0.6%
Pedestrian	11	3.3%

Table 4: Collision Type - High Street Study Corridor

*Crashes may be attributed to adjacent parking lots



Pedestrian and Bicyclist Crashes

During the 2012-2016 analysis period there were a total of 11 pedestrian and 4 bicyclist crashes, representing 3.9% of all crashes within the study area. Of the total number of crashes during this period, pedestrian and bicyclist crashes disproportionately resulted in injuries, representing 21% of all injury crashes.

Crash Type	Total Crashes	Percentage
Collision with Pedestrian	*11*	*73.3%*
Collision with Cyclist	*4*	*26.7%*
Crash Severity		
Fatality	*0*	*0.0%*
Incapacitating Injury	*0*	*0.0%*
Moderate Injury	*4*	*26.7%*
Pain	*8*	*53.3%*
Property Damage Only	*3*	*20.0%*

Table 5: Pedestrian and Bicycle Crash Summary

Pedestrian and Bicyclist Crash Contributing Factors

To better understand the factors that contributed to pedestrian and bicyclist crashes, New Jersey TR-1 (NJ TR-1) crash reports were procured from NJDOT. The details in these reports were crucial to putting pedestrian and bicyclist related crashes in context. Pursuant the content of the NJ TR-1s, the following are contributing factors that were witnessed for crashes within the study corridor.

Pedestrian & Bicyclist Contributing Factors
Crashes often occur at or near intersections
Speeding
Mid-block crossings
Crashes in crosswalks are often due to Left-Hand turn movements

Table 6: NJ TR-1 Report Analysis

Findings and Recommendations

Presented here are the findings and potential solutions identified during the High Street PRSA. The identified potential solutions are given ratings based on their projected safety benefit, cost, and time frame to implement. Safety benefit potential is based primarily on studies and research provided by the Federal Highway Administration's (FHWA) Crash Modification Factors (CMFs). When CMFs are not available, the FHWA Proven Safety Countermeasures, Highway Safety Manual (HSM), and current peer-reviewed research on countermeasures are used. All safety benefits are approximate.

This section describes the site-specific and corridor-wide recommended improvements. The recommendations derived from each PRSA event are noted along with their projected safety benefit, time frame, cost, as well as, the facility's jurisdiction. Ratings used in the recommendation tables are described as follows:

Legend

Symbol	Meaning	Definition
✔	*Limited safety benefit potential*	
✔✔	*Limited to moderate safety benefit potential*	
✔✔✔	*Moderate safety benefit potential*	
✔✔✔✔	*High safety benefit potential*	
$	*Low cost*	*Could be accomplished through maintenance*
$$	*Medium cost*	*May require some engineering or design and funding may be readily available*
$$$	*High cost*	*Longer term; may require full engineering, ROW acquisition and new funding*
◔	*Short term*	*Could be accomplished within 1 year*
◑	*Medium term*	*Could be accomplished in 1 to 3 years; may require some engineering*
◕	*Long term*	*Could be accomplished in 3 years or more; may require full engineering*

The following represents the specific findings and recommendations made by the PRSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Corridor-Wide					
1	*Inspect and replace faded, damaged or outdated signage as needed (i.e. signs mounted below 7', faded lettering on speed limit signs, crooked stop signs)*	✔	$	◔	*Millville/NJDOT*
2	*Road/bicycle-pedestrian safety code enforcement campaign (i.e. StreetSmart)*	✔	$	◔	*Millville*
3	*Inspect, repave and restripe the roadway as needed*	✔	$$	◑	*Millville*
4	*Install or reinstall detached Detectable Warning Surfaces (DWS) to be aligned in compliance with ADA and inspect, repair, and construct sidewalks in compliance with ADA as needed*	✔	$$	◑	*Millville/NJDOT*
5	*Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment*	✔✔	$	◔	*Millville/NJDOT*
6	*Daylight intersections per NJ Title 39 (i.e. education/enforcement campaigns, stripings, bollards, bicycle parking, planters etc.)*	✔✔	$	◔	*Millville*
7	*Develop an access management plan (i.e. consolidate redundant driveways, shared parking agreements etc.)*	✔✔	$	◑	*Millville/Owners*

9	*Perform a lighting analysis of the study area, including roadway and pedestrian scale lighting; prepare plans/upgrades according to results*	✓✓✓	$$$	◑	*Millville*
10	*Create a taskforce that meets after a pedestrian or bicycle fatality to perform a mini-road safety audit to better understand how the crash happened and what immediate improvements can be made to avoid repeat crashes at the location*	✓✓✓	$	◔	*Millville*
11	*Perform corridor-wide signal upgrades (replace 8" traffic signal heads with 12", install backplates with retro-reflective border, evaluate clearance intervals, update to countdown pedestrian signal heads, replace push buttons in compliance with ADA, etc.)*	✓✓✓	$$$	◕	*Millville/NJDOT*
Site-Specific					
Segment: Main Street-Foundry Street					
12	*Install curb extensions/bumpouts at every intersection*	✓✓✓	$$$	◕	*Millville/NJDOT*
Segment: Main Street-Foundry Street					
13	*Consider installing bicycle sharrows to improve multimodal accommodations*	✓✓	$	◔	*Millville*
Intersection: Main Street					
14	*Extend queue lane*	✓✓	$$	◑	*NJDOT*
15	*Install leading pedestrian interval (LPI) or all pedestrian phase*	✓✓✓	$	◔	*NJDOT*
Intersection: Mulberry Street					
16	*Perform a MUTCD signal warrant analysis for removal*	✓	$$	◑	*Millville*
Intersection: Broad Street					
17	*Consider a raised intersection with artwork and gateway treatments (i.e. Arts District branding)*	✓✓	$$$	◑	*Millville*
Intersection: Foundry Street					
18	*Install gateway median crossing island at north leg of intersection*	✓✓	$$	◑	*Millville*
Segment: Foundry Street-Harrison Avenue					
19	*Make connections to existing bicycle network on 2nd Street (i.e. buffered bike lanes, shared-use path etc.)*	✓✓	$	◑	*Millville*
20	*Install a shared-use path along the frontage road*	✓✓	$$	◕	*Millville*
21	*Install a frontage road in the west shoulder*	✓✓✓	$$$	◕	*Millville*
22	*Convert section to a 3-lane section (2 travel lanes, TWLTL and shoulders; i.e. road diet)*	✓✓✓	$	◔	*Millville*
23	*Install bumpouts and neckdowns*	✓✓✓	$$$	◑	*Millville*

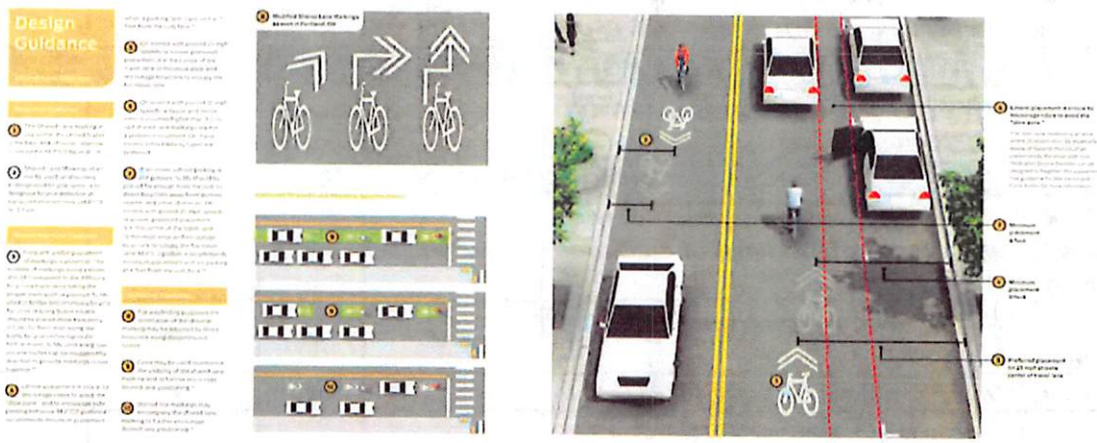
Intersection: Powell Street					
24	*Install advance yield pedestrian crossing treatments (i.e. in-street signage, stripings)*	✔	$	◔	*Millville*
25	*Install midblock pedestrian crossing improvements (i.e. Rectangular Rapid Flash Beacon (RRFB) with a high visibility continental or ladder style raised crosswalk)*	✔✔✔	$$	◑	*Millville*
26	*Install bumpouts and neckdowns*	✔✔✔	$$$	◑	*Millville*
Segment: Broad Street-McNeal Street					
27	*Install advance yield pedestrian crossing treatments (i.e. in-street signage, stripings)*	✔	$	◔	*Millville*
28	*Delineate pavement (i.e. add edgeline/parking lane striping)*	✔	$	◔	*Millville*
29	*Remove parking on east curbline*	✔	$	◔	*Millville*
30	*Install midblock pedestrian crossing improvements (i.e. Rectangular Rapid Flash Beacon (RRFB) with a high visibility continental or ladder style raised crosswalk)*	✔✔✔	$$	◑	*Millville*

Table 7: High Street PRSA Recommendations

Recommendation Visualizations

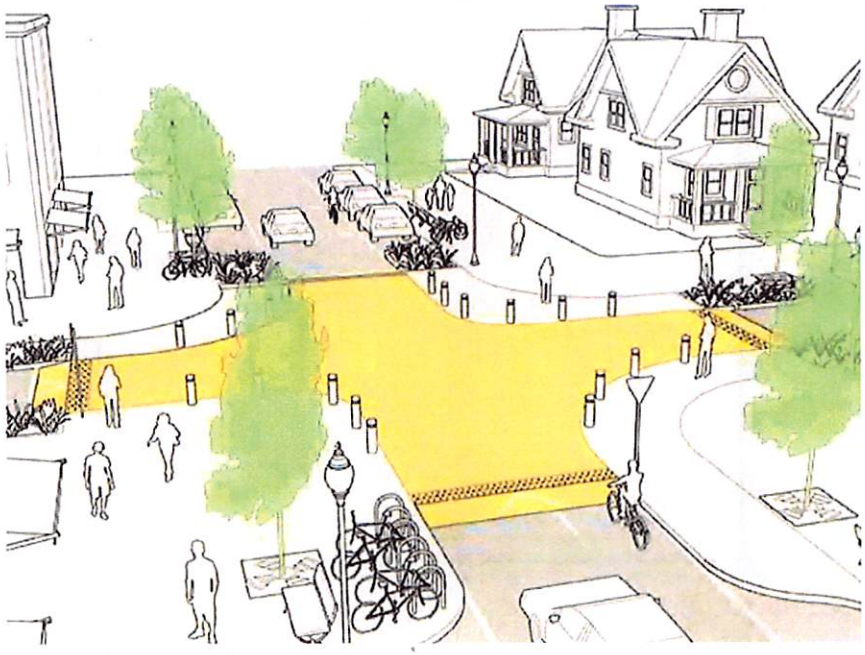
Examples of some of the site-specific and corridor-wide safety recommendations identified in ***Tables 7*** are shown below. These examples are based on current best practices and design standards from the *2017 NJ Complete Streets Design Guide* (CSDG), NACTO's *Urban Street Design Guide* (NACTO-US), and the Federal Highway Administration (FHWA), including sources contained therein. Visual representations of select aforementioned recommendations help to better communicate their potential safety benefit, cost, and time frame.

Bicycle Sharrows



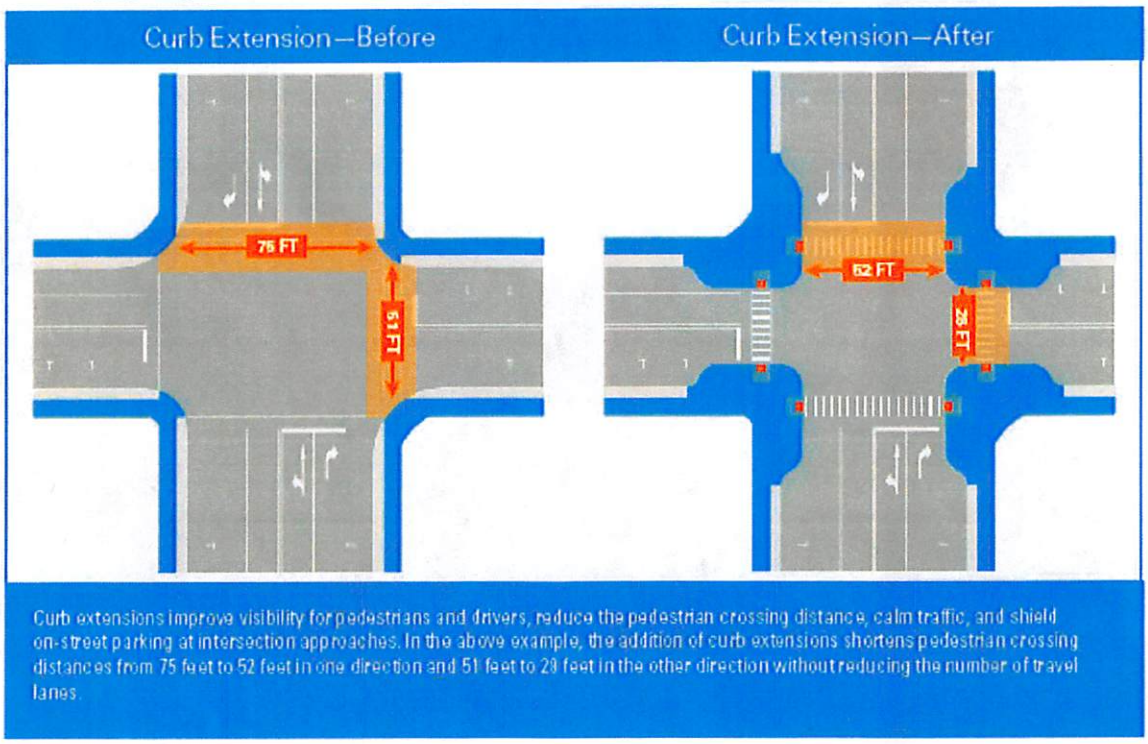
Source: (NACTO-US)

Raised Intersection



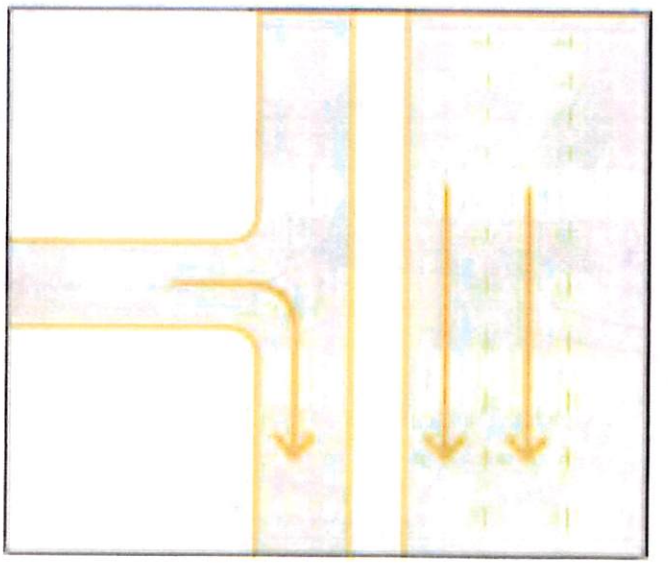
Source: (NACTO-US)

Daylighting Intersection/Traffic Calming/Pedestrian Safety (i.e. Curb extension/bumpout)



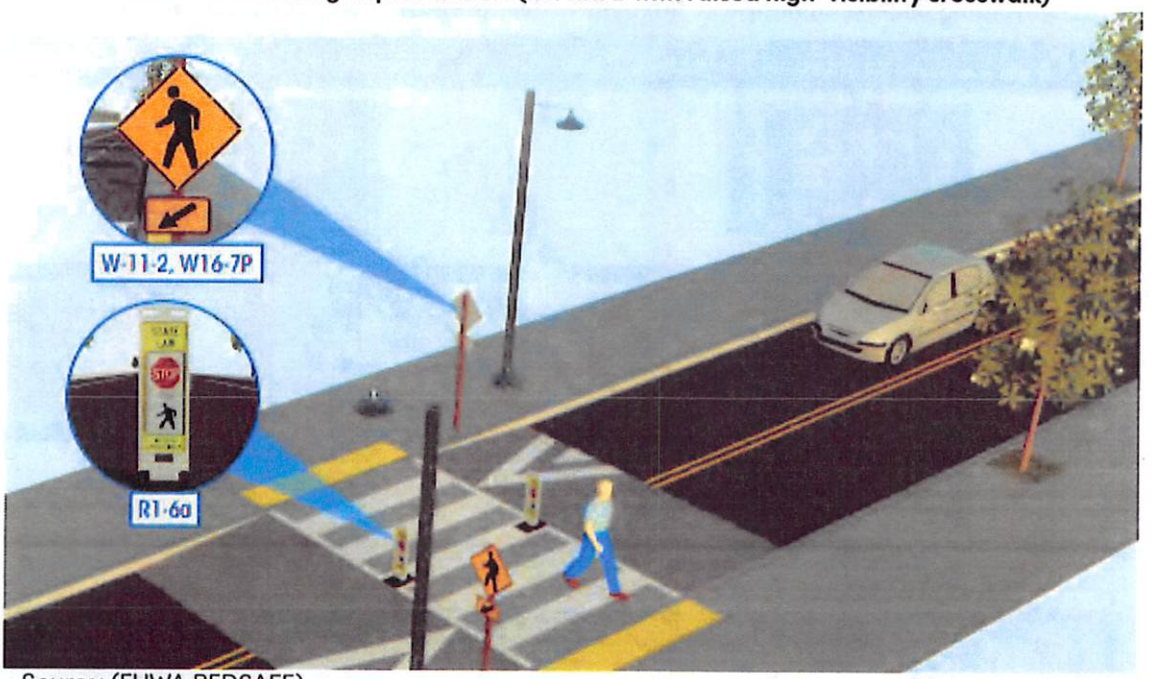
Source: (CSDG)

Frontage Road



Source: (NACTO-US)

Pedestrian Crossing Improvements (i.e. RRFB with raised high-visibility crosswalk)



Source: (FHWA PEDSAFE)

Road Owner Response

As the roadway owner, City of Millville is encouraged to use the findings of the PRSA as a guide for designing improvements to address the safety issues. Whereas the PRSA findings and recommendations are numerous, City of Millville should use its experience in planning and engineering to determine which recommendations in *Table 7* can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the PRSA process is the road owner's response: an acknowledgment of the audit's findings and recommendations, and their planned follow-up. In responding to the PRSA's findings, the road owner must take into account all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as the time and funds allow in coordination with other projects, priorities and intersecting roadway owners (i.e. NJDOT, Cumberland County).

City of Millville delivered their response following the finalization of the findings and recommendations, a copy of which can be found in *Appendix D.*

7. 3rd Street (Millville)

The 3rd Street Pedestrian/Bicycle Road Safety Audit was conducted on Friday, January 6, 2020 at the Millville Municipal Building in Millville, Cumberland County, New Jersey. Sixteen stakeholders representing state, county, and local agencies participated in the audit. A list of all participants and their respective agencies is provided in ***Appendix A***.

Study Location

As shown in ***Figure 1***, the focus of this audit is a 1-mile section of CR 555 (3rd Street/Wheaton Avenue). At a point approximately 100 feet south of D Street (MP 10.58) the study area changes from 3rd Street to Wheaton Avenue. For the sake of clarity the study corridor will be referred to as 3rd Street. Located in the urban area of Millville, New Jersey. Audit limits are between NJ 49 (Main Street) and G Street (MP 10.05-10.83). This corridor runs north-south. The corridor is surrounded by low-density residential and some commercial development.

Figure 1: 3rd Street Study Area

Roadway Characteristics

3rd Street is classified as an urban local from NJ 49 (Main Street) to Broad Street (MP 10.05-10.50) and an urban minor arterial from Broad Street to G Street (MP 10.50-10.83). Both functional classification segments have a posted speed limit of 25 mph (MP 10.05-10.83). The corridor study area is 2-lanes, undivided, with no shoulder, and on-street parking from NJ 49 (Main Street) to the beginning of Wheaton Avenue.

Pavement widths change dramatically as the study corridor transitions between Wheaton Avenue and 3rd Street. 3rd Street has a pavement width of approximately 40' feet while Wheaton Avenue is approximately 22' feet. Due to the narrowness of Wheaton Avenue vehicles ride, when possible, along the centerline of the corridor. The study area roadways' horizontal alignments are straight with 3 signalized intersections and 10 unsignalized. The roadway also includes a freight railroad crossing (MP 10.27).

Existing Bicycle/Pedestrian Facilities

Sidewalks are currently available along both sides of 3rd Street between NJ 49 (Main Street) to G Street (MP 10.05-10.83). Sidewalks from NJ 49 (Main Street) to Broad Street (MP 10.05-10.50) are typically 6' wide and in excellent condition. Sidewalks from Broad Street to G Street (MP 10.50-10.83) are typically 4'-6' wide and in very good condition with exception to sever obstacles located in the sidewalk along the west curbline (i.e. utility poles, signs).

Basic parallel style crosswalks are provided at every signalized intersection within the study area. Crosswalk conditions vary from newly stripped to very-poor and in-need of restriping. There are no bicycle lanes or other bicycle infrastructure

identified along the corridor. However, the *2015 Cumberland County Bikeways Inventory* and *2010 Cumberland County Rails to Trails Feasibility Study* both propose 3rd Street as a potential bikeway.

Traffic Counts

Based on data from the NJDOT Straight Line Diagrams (SLDs), the 2018 ADT along CR 555 (3rd Street/Wheaton Avenue) is approximately 3,500 vehicles per day within the study area. A copy of available data can be found in Appendix B. Additional traffic counts of the study area will be conducted during upcoming project tasks. This data will be added to the PRSA report as a supplement to Appendix B and will used to 1) complete a Highway Safety Manual (HSM) analysis of the study area, and 2) inform the evaluation of potential countermeasures.

Transit

NJ Transit bus service does not run along 3rd Street but does service the study area with bisecting routes #408 and #553 providing service with stops at the intersection of Broad Street. Service is also provided by route #408 at the intersection of G Street.

Cumberland County Area Transit System (CATS) runs fixed route service within the study area with a Millville Area Connector shuttle stop at 3rd Street & Sassafras Street.

Community Profile

Population and income characteristics from the U.S. Census Bureau's 2013-2017 American Community Survey (ACS) estimates were used to compile a community profile of residents within 0.25 miles of the study area. A summary of the demographics is listed on the following page. In addition to the community profile in ***Table 1***, a map was created using U.S. Census Bureau's 2014-2018 American Community Survey (ACS) estimates to identify the prevalence of zero-vehicle households in proximity to the City of Millville study areas. Many census tracts abutting the study corridors are above the County average of 10.3% for zero-vehicle households, as shown in ***Figure 2***.

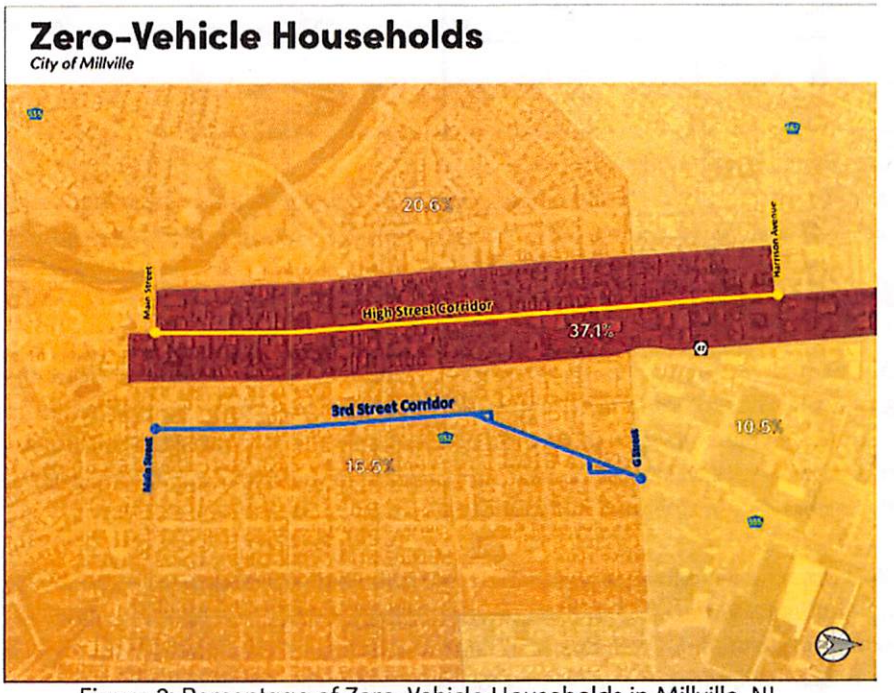
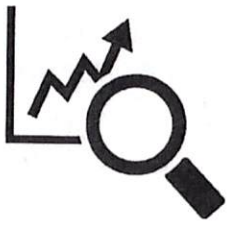


Figure 2: Percentage of Zero-Vehicle Households in Millville, NJ

Characteristics	3rd Street (0.25 mile buffer)	Cumberland County
Population	**3,714**	**154,952**
Black or African American	28%	19%
Hispanic/Latino*	29%	30%
White	65%	66%
Asian	<1%	1%
American Indian/Alaskan	1%	1%
Two or More Races Alone	3%	5%
Other	3%	8%
Population by Age		
Age 0-4	6%	7%
Age 0-17	29%	24%
Age 18+	71%	76%
Age 65+	11%	14%
Households	**1,411**	**50,596**
Linguistically Isolated Households**	4%	8%
Speak Spanish***	100%	91%
Income		
<$15,000	27%	14%
$15,000 - $25,000	16%	12%
$25,000 - $50,000	28%	24%
$50,000 - $75,000	17%	17%
$75,000+	12%	33%



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*Hispanic population can be of any race, **Households in which no one 14 and over speaks English "very well", ***Percentage of Linguistically Isolated Households that speak spanish as their primary language

Crash Data Analysis

Crash data analysis was based on reportable crash records provided by the 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. Crash data between the years of 2012-2016 was obtained from the NJDOT via the SafetyVoyager data portal. Detailed crash maps of every bicycle crash, pedestrian crash, and motorist crash that resulted in serious injury or fatality, as well as, crash clusters 4> are provided in *Appendix C.*

Conducted using the HSM approved crash severity methodology of weighing incapacitating injury (A) and fatality (K) equally (K=A), the crash data analysis and crash maps consider both (K) and (A) crashes as equally serious.
Crash data of the study area provided detailed information on the characteristics of each crash. A summary of the study area crash data analysis and crash characteristics are as follows:

Year	Crashes	Injured	Killed/Incapacitated
2012	26	6	1
2013	34	11	0
2014	29	9	0
2015	34	7	0
2016	31	8	0
Total	154	41	1

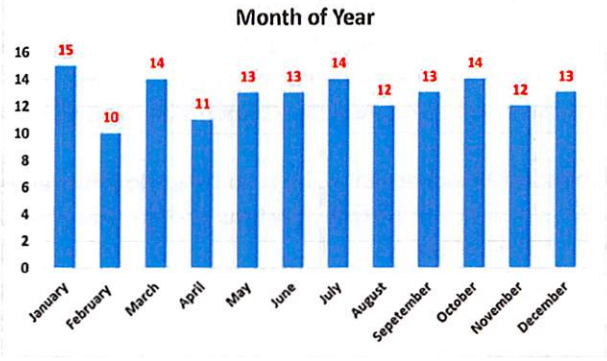
Table 2: Total Crashes by Year - 3rd Street Study Corridor

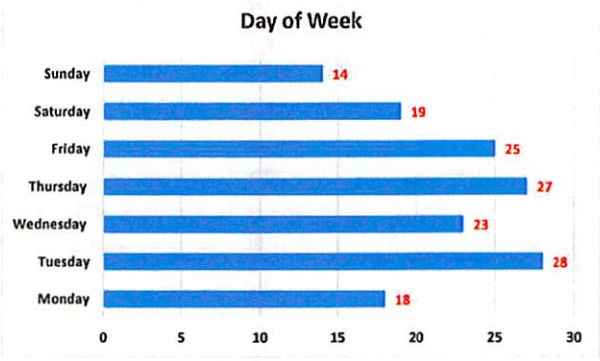
		Total Crashes	Percentages
Road Surfaces	Dry	143	77.7%
	Wet	37	20.1%
Illumination	Daylight	93	50.5%
	Dusk	6	3.3%
	Dark (Lit)	72	39.1%
	Dark (Unlit)	7	3.8%

Table 3: Environmental Conditions - 3rd Street Study Corridor

	Total Crashes	Percentage
Struck Parked Vehicle	**18**	**11.5%**
Fixed Object	12	7.7%
Animal	0	0.0%
Encroachment	1	0.6%
Backing	6	3.8%
Overturned	0	0.0%
Opposite Direction (Sideswipe)	3	1.9%
Opposite Direction (Head-on)	2	1.3%
Left-Turn/U-Turn	9	5.8%
Right Angle	**76**	**48.7%**
Same Direction (Sideswipe)	10	6.4%
Same Direction (Read End)	**15**	**9.6%**
Pedalcyclist	0	0.0%
Pedestrian	4	2.6%

Table 4: Collision Type - 3rd Street Study Corridor





Pedestrian and Bicyclist Crashes

During the 2012-2016 analysis period there were a total of 4 pedestrian and 0 bicyclist crashes, representing 2.6% of all crashes within the study area. Of the total number of crashes during this period, pedestrian crashes disproportionately resulted in serious injury and fatality (KA), representing 100% of all KA crashes.

Crash Type	Total Crashes	Percentage
Collision with Pedestrian	*4*	*100.0%*
Collision with Cyclist	*0*	*0.0%*
Crash Severity		
Fatality	*0*	*0.0%*
Incapacitating Injury	*1*	*25.0%*
Moderate Injury	*2*	*50.0%*
Pain	*0*	*0.0%*
Property Damage Only	*1*	*25.0%*

Table 5: Pedestrian and Bicycle Crash Summary

Pedestrian and Bicyclist Crash Contributing Factors

To better understand the factors that contributed to pedestrian and bicyclist crashes, New Jersey TR-1 (NJ TR-1) crash reports were procured from NJDOT. The details in these reports were crucial to putting pedestrian and bicyclist related crashes in context. Pursuant the content of the NJ TR-1s, the following are contributing factors that were witnessed for crashes within the study corridor.

Pedestrian & Bicyclist Contributing Factors
Crashes often occur at or near intersections
Speeding
Inadequate lighting
Crashes in crosswalks are often due to Left-Hand turn movements

Table 6: NJ TR-1 Report Analysis

Findings and Recommendations

Presented here are the findings and potential solutions identified during the 3rd Street PRSA. The identified potential solutions are given ratings based on their projected safety benefit, cost, and time frame to implement. Safety benefit potential is based primarily on studies and research provided by the Federal Highway Administration's (FHWA) Crash Modification Factors (CMFs). When CMFs are not available, the FHWA Proven Safety Countermeasures, Highway Safety Manual (HSM), and current peer-reviewed research on countermeasures are used. All safety benefits are approximate.

This section describes the site-specific and corridor-wide recommended improvements. The recommendations derived from each PRSA event are noted along with their projected safety benefit, time frame, cost, as well as, the facility's jurisdiction. Ratings used in the recommendation tables are described as follows:

Legend

Symbol	Meaning	Definition
✔	*Limited safety benefit potential*	*May reduce total crashes by 1%-25%*
✔✔	*Limited to moderate safety benefit potential*	*May reduce total crashes by 26%-49%*
✔✔✔	*Moderate safety benefit potential*	*May reduce total crashes by 50%-74%*
✔✔✔✔	*High safety benefit potential*	*May reduce total crashes by +75%*
$	*Low cost*	*Could be accomplished through maintenance*
$$	*Medium cost*	*May require some engineering or design and funding may be readily available*
$$$	*High cost*	*Longer term; may require full engineering, ROW acquisition and new funding*
◔	*Short term*	*Could be accomplished within 1 year*
◑	*Medium term*	*Could be accomplished in 1 to 3 years; may require some engineering*
◕	*Long term*	*Could be accomplished in 3 years or more; may require full engineering*

The following represents the specific findings and recommendations made by the PRSA team. All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to all applicable codes, standards, and best practices.

No.	Recommendation	Safety Benefit	Cost	Time Frame	Jurisdiction
Corridor-Wide					
1	*Inspect and replace faded, damaged or outdated signage as needed (i.e. signs mounted below 7', faded lettering on speed limit signs, crooked stop signs)*	✔	$	◔	*Millville/County*
2	*Road/bicycle-pedestrian safety code enforcement campaign (i.e. StreetSmart)*	✔	$	◔	*Millville*
3	*Inspect, repave and restripe the roadway as needed*	✔	$$	◑	*Millville/County/ NJDOT*
4	*Remove obstacles in sidewalk in compliance with ADA requirements (i.e. utility poles, signs)*	✔	$$	◑	*Millville/County*
5	*Install or reinstall detached Detectable Warning Surfaces (DWS) to be aligned in compliance with ADA and inspect, repair, and construct sidewalks in compliance with ADA as needed*	✔	$$	◑	*Millville/NJDOT/ County*
6	*Convert existing crosswalks to high-visibility continental or ladder style, check placement and alignment*	✔✔	$	◔	*Millville/County/ NJDOT*
7	*Consider installing sharrows or bicycle lanes, when possible, to improve multimodal accommodations*	✔✔	$	◑	*Millville/County*

8	*Perform a lighting analysis of the study area, including roadway and pedestrian scale lighting; prepare plans/upgrades according to results*	✓✓✓	$$$	◑	*Millville*
9	*Create a taskforce that meets after a pedestrian or bicycle fatality to perform a mini-road safety audit to better understand how the crash happened and what immediate improvements can be made to avoid repeat crashes at the location*	✓✓✓	$	◔	*Millville*
10	*Perform corridor-wide signal upgrades (replace 8" traffic signal heads with 12", install backplates with retro-reflective border, evaluate clearance intervals, update to countdown pedestrian signal heads, replace push buttons in compliance with ADA, etc.)*	✓✓✓	$$$	◕	*Millville/NJDOT*
Site-Specific					
3rd Street					
11	*Consider installing buffered bike lanes per NJ Complete Street Design Guide*	✓✓✓	$	◑	*Millville/County*
12	*Consider installing parking protected bike lanes per NACTO Urban Bikeway Design Guide*	✓✓✓	$	◑	*Millville/County*
Segment: Main Street-Broad Street					
13	*Install curb extensions/bumpouts at every intersection*	✓✓✓	$$$	◕	*Millville/NJDOT/ County*
Intersection: Main Street					
14	*Extend queue lane*	✓✓	$$	◑	*NJDOT*
15	*Install leading pedestrian interval (LPI) or all pedestrian phase*	✓✓✓	$	◔	*NJDOT*
Intersection: Broad Street					
16	*Install leading pedestrian interval (LPI) or all pedestrian phase*	✓✓✓	$	◔	*County*
Intersection: Oak Street					
17	*Install advance yield pedestrian crossing treatments (i.e. in-street signage, stripings, advance warning signal)*	✓	$	◔	*Millville/County*
18	*Install high-visibility marked crosswalks*	✓✓	$	◔	*Millville/County*
Segment: D Street Triangle					
19	*Coordinate improvements between D Street & F Street Triangles*	✓	$	◑	*Millville/County*
20	*Evaluate reconfiguration of street network to remove number of conflicts*	✓✓✓	$	◑	*Millville/County*
21	*Consider replacement of unsignalized y-intersection with a modern roundabout*	✓✓✓✓	$$$	◕	*Millville/County*
Segment: F Street Triangle					

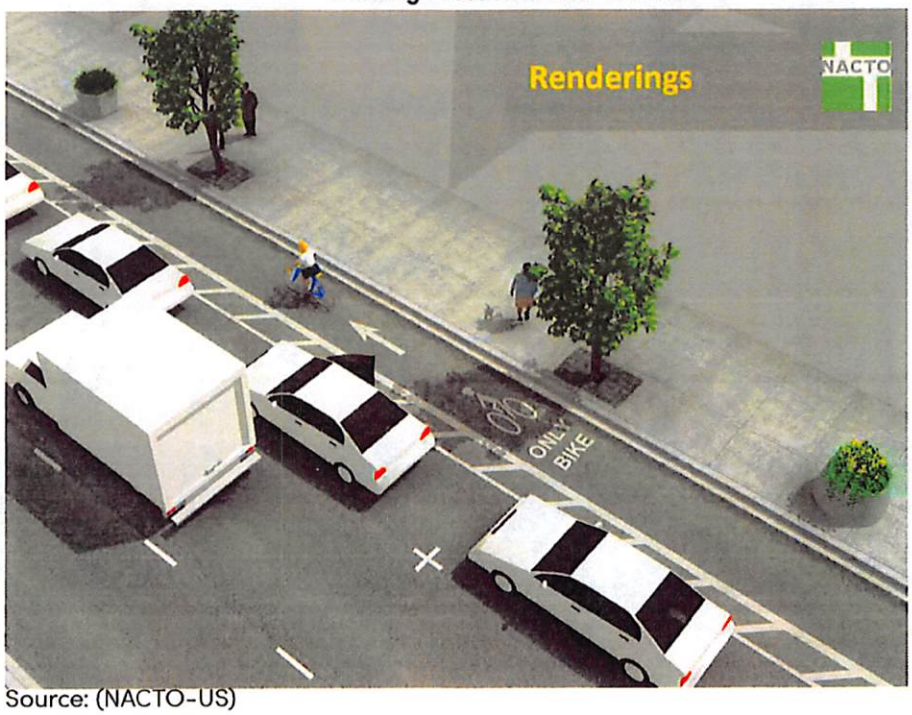
22	*Coordinate improvements between D Street & F Street Triangles*	✔	$	◑	*Millville/County*
23	*Evaluate reconfiguration of street network to remove number of conflicts*	✔✔✔	$	◑	*Millville/County*
Intersection: G Street					
24	*Install right-turn lane onto G Street from Wheaton Avenue southern approach*	✔	$$	◑	*Millville/County*
25	*Install right-turn signal phasing*	✔	$	◑	*Millville/County*
26	*Remove sight line obstacles (i.e. trees, utility poles etc.)*	✔✔	$$	◑	*Millville/County*
Wheaton Avenue					
27	*Install stop bars on east-west approaches*	✔	$	◔	*Millville*
28	*Move stop signs closer to intersection at east-west approaches*	✔✔	$	◔	*Millville*
29	*Closure of roadway segment to through traffic. Divert traffic from G Street to 3rd Street*	✔✔✔	$$$	◑	*Millville/County/ NJDOT*

Table 7: 3rd Street PRSA Recommendations

Recommendation Visualizations

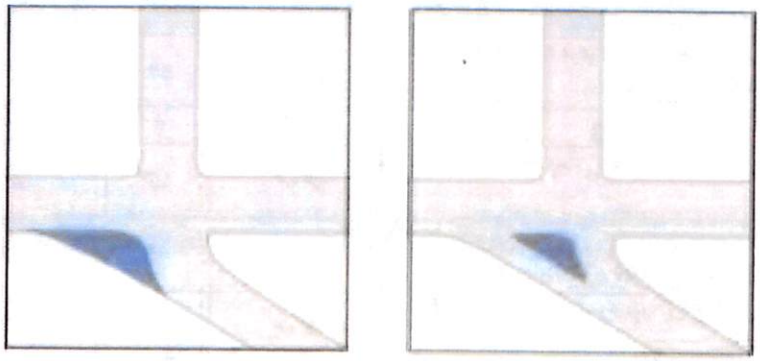
Examples of some of the site-specific and corridor-wide safety recommendations identified in ***Tables 7*** are shown below. These examples are based on current best practices and design standards from the *2017 NJ Complete Streets Design Guide* (CSDG), NACTO's *Urban Street Design Guide* (NACTO-US), and the Federal Highway Administration (FHWA), including sources contained therein. Visual representations of select aforementioned recommendations help to better communicate their potential safety benefit, cost, and time frame.

Parking Protected Bike Lanes



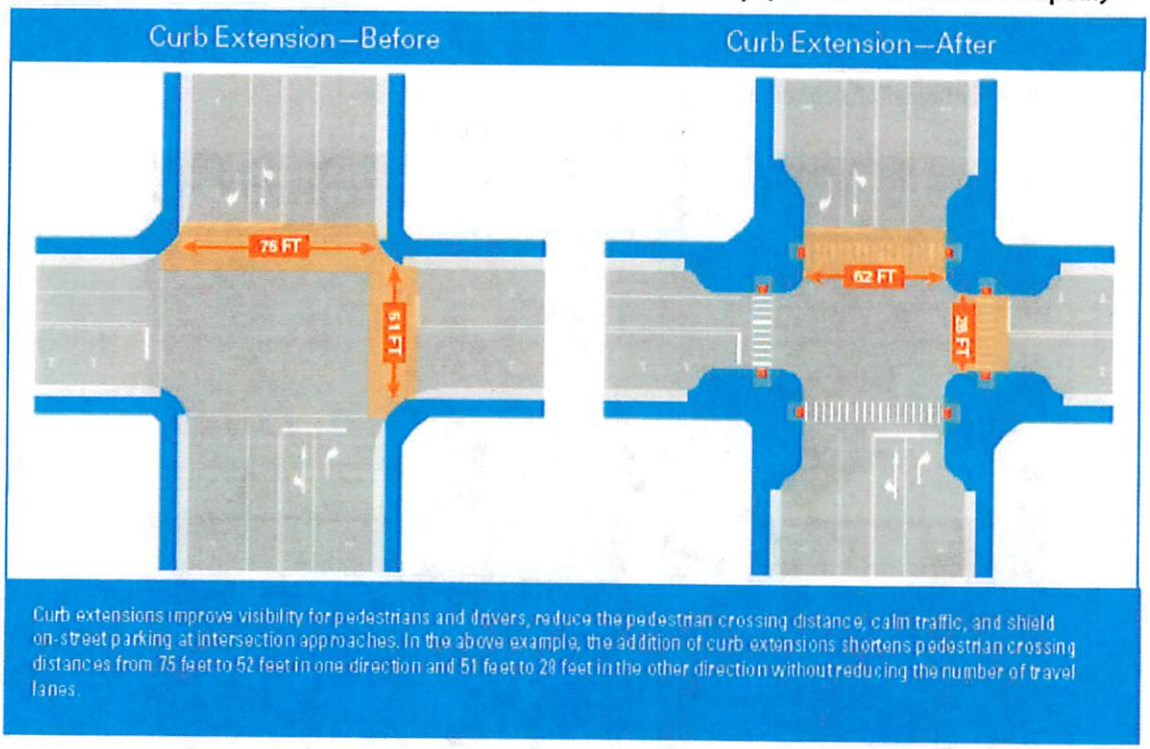
Source: (NACTO-US)

Triangle Reconfigurations



Source: (NACTO-US)

Daylighting Intersection/Traffic Calming/Pedestrian Safety (i.e. Curb extension/bumpout)



Source: (CSDG)

Road Owner Response

As the roadway owners, City of Millville and County of Cumberland are encouraged to use the findings of the PRSA as a guide for designing improvements to address the safety issues. Whereas the PRSA findings and recommendations are numerous, City of Millville and County of Cumberland should use its experience in planning and engineering to determine which recommendations in *Table 7* can be prioritized, and seek opportunities to implement maintenance recommendations at their earliest convenience.

An important part of the PRSA process is the road owner's response: an acknowledgment of the audit's findings and recommendations, and their planned follow-up. In responding to the PRSA's findings, the road owner must take into account all the competing objectives involved when implementing the recommendations, and foremost among them is available resources. Because the audit process generated a long and wide-ranging list of improvements, the road owner is expected to implement these recommended improvements as the time and funds allow in coordination with other projects, priorities and intersecting roadway owners (i.e. NJDOT, Cumberland County, City of Millville).

City of Millville and County of Cumberland delivered their response following the finalization of the findings and recommendations, a copy of which can be found in *Appendix D*.

Appendix A

Audit Team Members

Name	Agency
City of Vineland	
Chestnut Avenue Corridor - Pedestrian Road Safety Audit - December 5, 2019	
Alan Huff	*SJTPO*
Stephanie Wakeley	*SJTPO*
Joe Rapp	*NJDOT*
Leroy Gould	*NJDOT*
Jelena Lasko	*NJDOT*
Robert Brewer	*Cumberland County Planning Department*
Cassandra Rodriguez	*Cumberland County Planning Department*
David Maillet	*Vineland Engineering Department*
Rick Caudill	*Vineland Engineering Department*
Ryan Headley	*Vineland Planning Department*
Amy Holmes	*Vineland Health Department*
Nicholas English	*Vineland Health Department*
Douglas Whitaker	*Cumberland County Engineering Department*
Patrick Farley	*Cross County Connection TMA*
Scott Diehl	*Urban Engineers*
Bill McGarrigel	*Urban Engineers*
Daniel Hutton	*Urban Engineers*
Jay Etzel	*Urban Engineers*
East Avenue Corridor - Pedestrian Road Safety Audit - December 20, 2019	
Alan Huff	*SJTPO*
Stephanie Wakeley	*SJTPO*
Douglas Whitaker	*Cumberland County Engineering Department*
David Maillet	*Vineland Engineering Department*
Ryan Headley	*Vineland Planning Department*
Daniel Hutton	*Urban Engineers*
City of Bridgeton	
Irving Avenue Corridor & Atlantic Street Corridor - Pedestrian Road Safety Audits - December 11, 2019	
Alan Huff	*SJTPO*
Stephanie Wakeley	*SJTPO*
Leroy Gould	*NJDOT*
Jelena Lasko	*NJDOT*
William Riviere	*NJDOT*
Robert Brewer	*Cumberland County Planning Department*
Cassandra Rodriguez	*Cumberland County Planning Department*
Jessica Atkinson	*Cumberland County Health Department*
Douglas Whitaker	*Cumberland County Engineering Department*
Anthony Bertolini	*Bridgeton Police Department*
Todd Bowen	*Bridgeton Fire Department*
Eric Derer	*Cross County Connection TMA*
Daniel Hutton	*Urban Engineers*
Scott Diehl	*Urban Engineers*
Jay Etzel	*Urban Engineers*

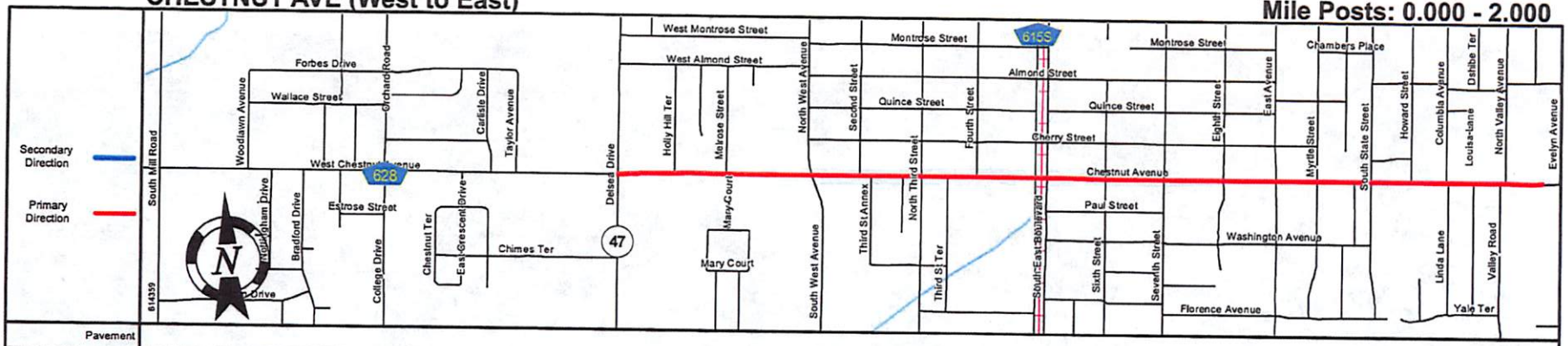
City of Millville	
High Street Corridor & 3rd Street Corridor - Pedestrian Road Safety Audits - January 6, 2020	
Alan Huff	*SJTPO*
Stephanie Wakeley	*SJTPO*
Joe Rapp	*NJDOT*
Leroy Gould	*NJDOT*
William Riviere	*NJDOT*
Robert Brewer	*Cumberland County Planning Department*
Cassandra Rodriguez	*Cumberland County Planning Department*
Jessica Atkinson	*Cumberland County Health Department*
Brian Prohowich	*Millville Engineering Department*
Michelle Baker	*Millville Engineering Department*
Samantha Silvers	*Millville Planning Department*
William Stonick III	*Millville Police Department*
Douglas Whitaker	*Cumberland County Engineering Department*
Jason Simmons	*Cross County Connection TMA*
Daniel Hutton	*Urban Engineers*
Scott Diehl	*Urban Engineers*

Appendix B

Traffic Counts

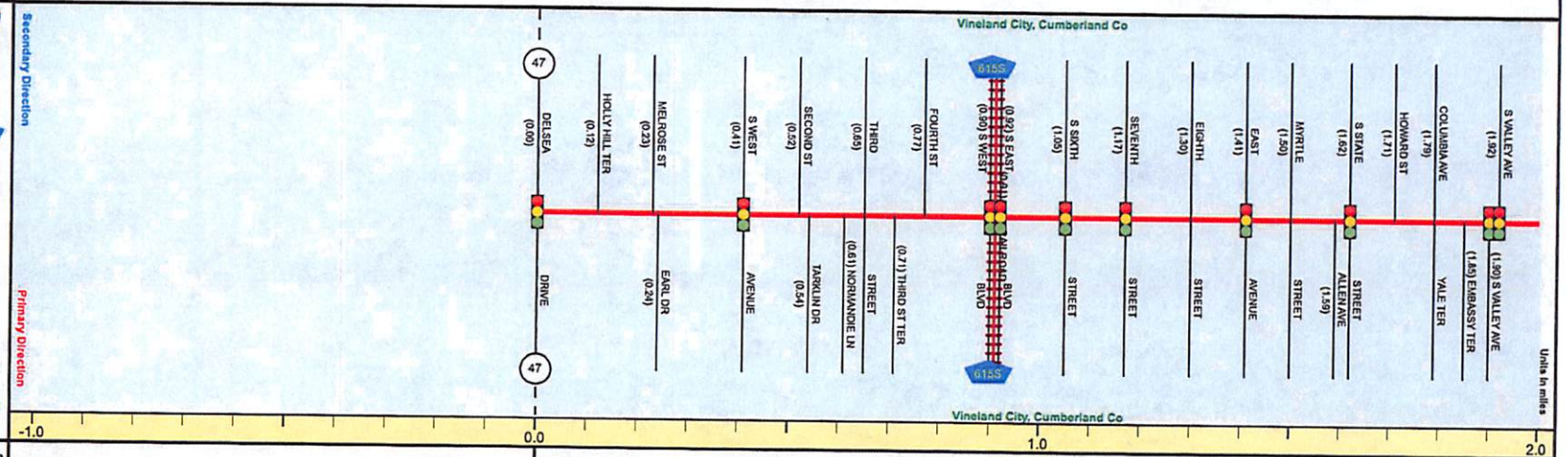
CHESTNUT AVE (West to East)

Mile Posts: 0.000 - 2.000



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	

Interstate Route 287
US Route 22
NJ Route 33
County Road 689
Interchange Number 2
Grade Separated Interchange
Traffic Signal
Traffic Monitoring Sites WIM AVC VOL
Road Underpass
Road Overpass



Street Name	Chestnut Avenue
Jurisdiction	Municipal
Functional Class	Urban Major Collector
Federal Aid - NHS Sy	STP
Control Section	
Speed Limit	25 — 40
Number of Lanes	4
Med. Type	None
Med. Width	0
Pavement	48
Shoulder	0
Traffic Volume	14,246 (2018) — 11,685 (2018) — 11,990 (2017)
Traffic Sta. ID	8-8 107 — 8-8 106 — 8-7 104
Structure No.	
Enlarged Views	

Begin Chestnut Ave MP=0.00

Page Created: March, 2019

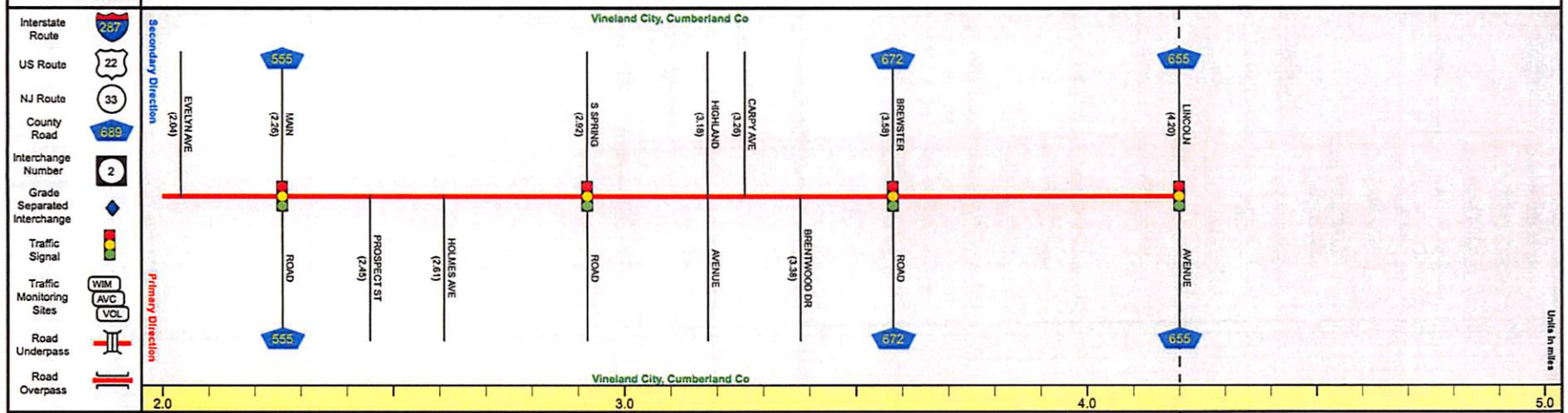
SRI = 06141029__

Date last inventoried: October 2015

CHESTNUT AVE (West to East)

Mile Posts: 2.000 - 4.200

Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



Street Name	Chestnut Avenue						
Jurisdiction	Municipal						
Functional Class	Urban Major Collector						
Federal Aid - NHS Sy	STP						
Control Section							
Speed Limit	40		50				
Number of Lanes	4		2				
Med. Type	None						
Med. Width	0						
Pavement	48	24	36	24	36	24	
Shoulder	0	8	1	8	0	8	
Traffic Volume	16,240 (2018)	11,433 (2017)				4,668 (2018)	
Traffic Sta. ID	8-8-103	8-8-102				8-8-100	
Structure No.							
Enlarged Views							

Ent Chestnut Ave MP=4.20

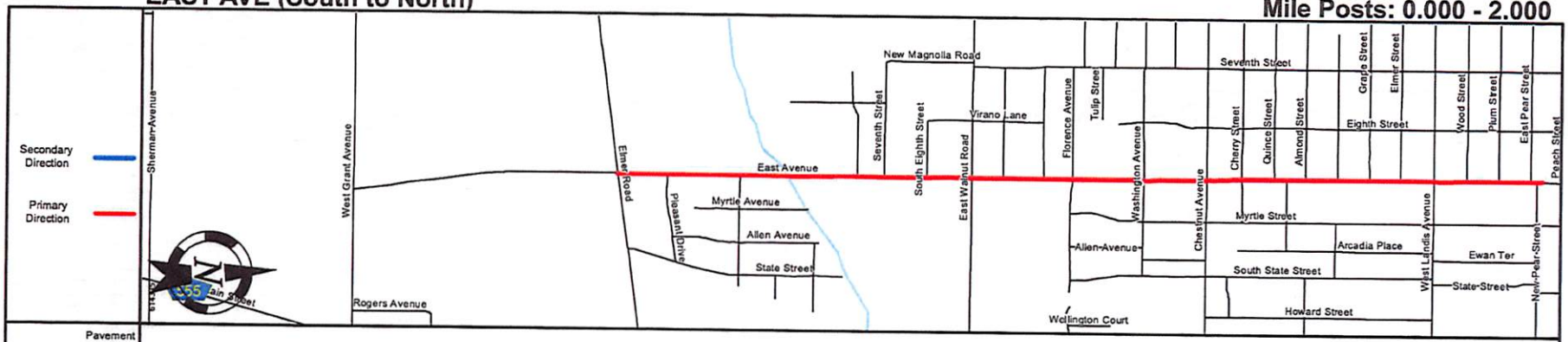
Page Created: March, 2019

SRI = 06141029__

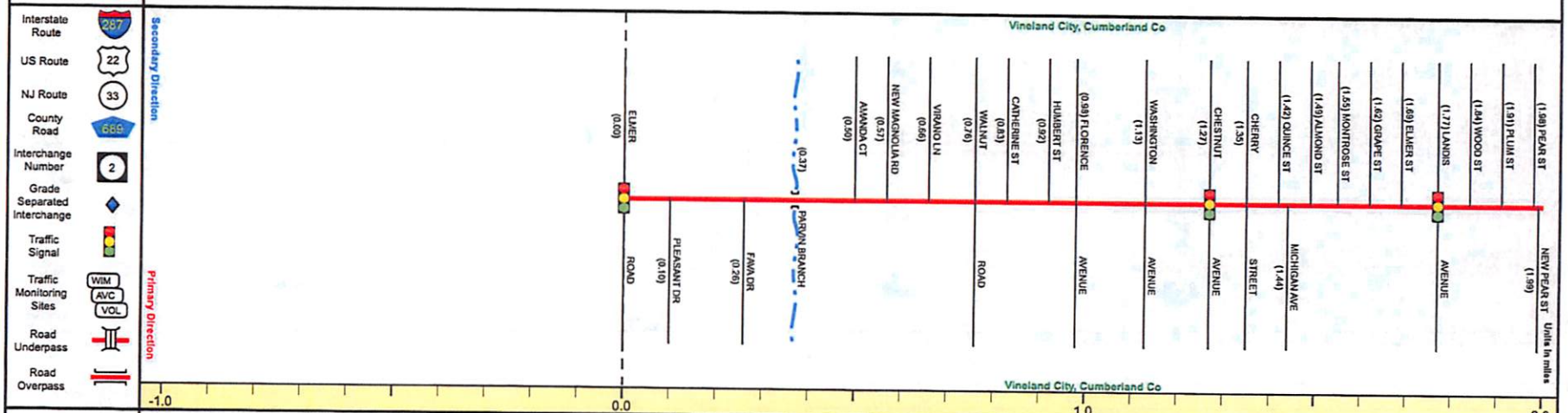
Date last inventoried: October 2015

EAST AVE (South to North)

Mile Posts: 0.000 - 2.000



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



Street Name	East Avenue
Jurisdiction	Municipal
Functional Class	Urban Major Collector
Federal Aid - NHS Sy	STP
Control Section	
Speed Limit	45 | 30 | 35
Number of Lanes	2
Med. Type	None
Med. Width	0
Pavement	22 | 36 | 28 | 30
Shoulder	4 | 6 | 0
Traffic Volume	5,265 (2017) | 5,478 (2018) | 7,695 (2017)
Traffic Sta. ID	8-4-650 | 8-4-651 | 8-4-652
Structure No.	LS-69
Enlarged Views	

Begin East Ave MP=0.00

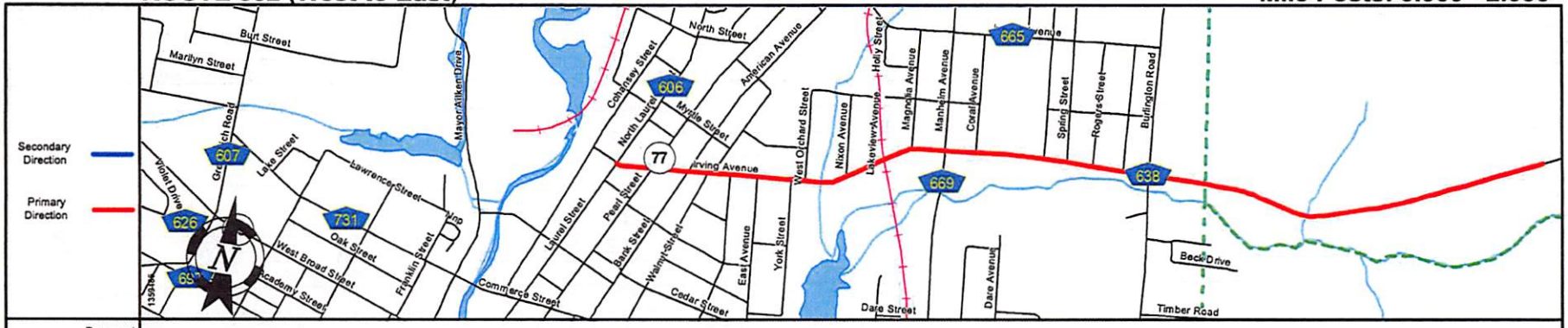
SRI = 06141025__

Date last inventoried: October 2015

Page Created: March, 2019

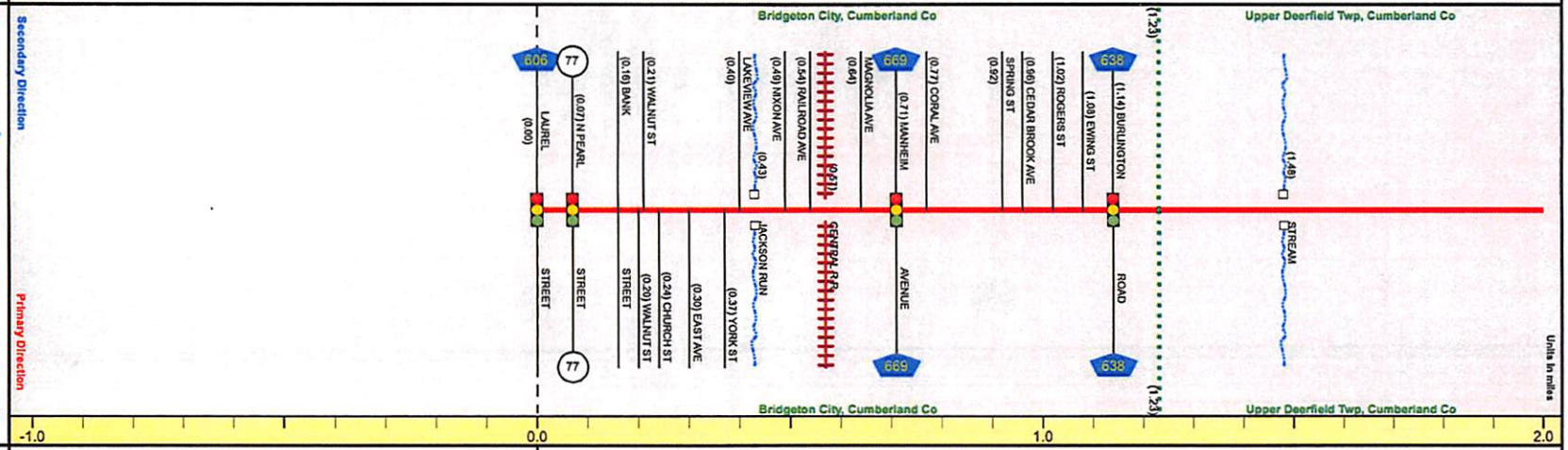
ROUTE 552 (West to East)

Mile Posts: 0.000 - 2.000



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	

Interstate Route 287 | US Route 22 | NJ Route 33 | County Road 689 | Interchange Number 2 | Grade Separated Interchange | Traffic Signal | Traffic Monitoring Sites WIM AVC VOL | Road Underpass | Road Overpass



Street Name	Irving Avenue
Jurisdiction	County
Functional Class	Urban Minor Arterial
Federal Aid - NHS Sy	STP
Control Section	
Speed Limit	25 | 35
Number of Lanes	2
Med. Type	None
Med. Width	0
Pavement	36 | 24
Shoulder	0 | 8
Traffic Volume	6,652 (2017) | 7,351 (2018)
Traffic Sta. ID	7-7-065 | 120632
Structure No.	
Enlarged Views	

Begin Rt 552 MP=0.00

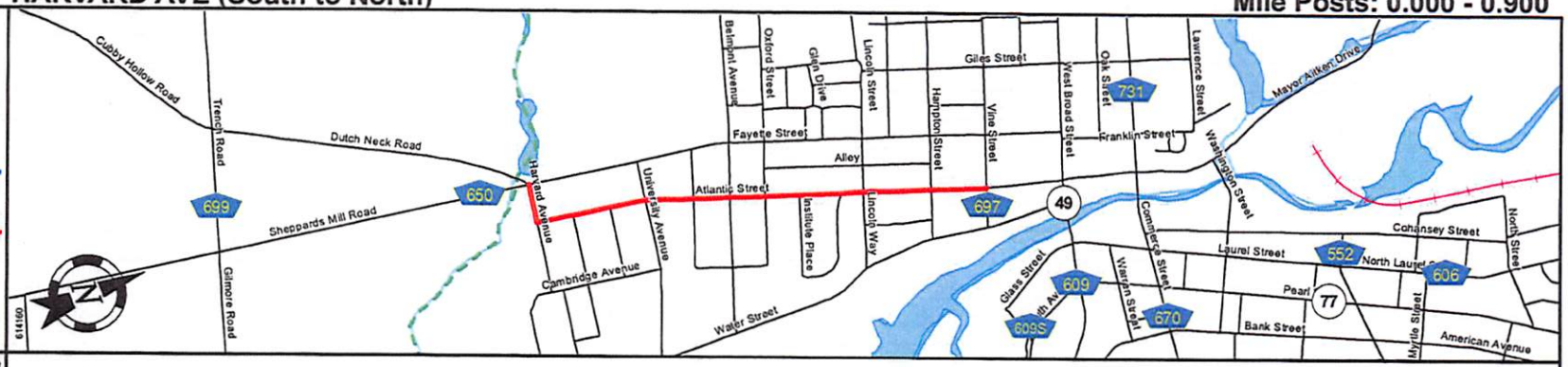
Page Created: March, 2019

SRI = 00000552__

Date last inventoried: June 2012

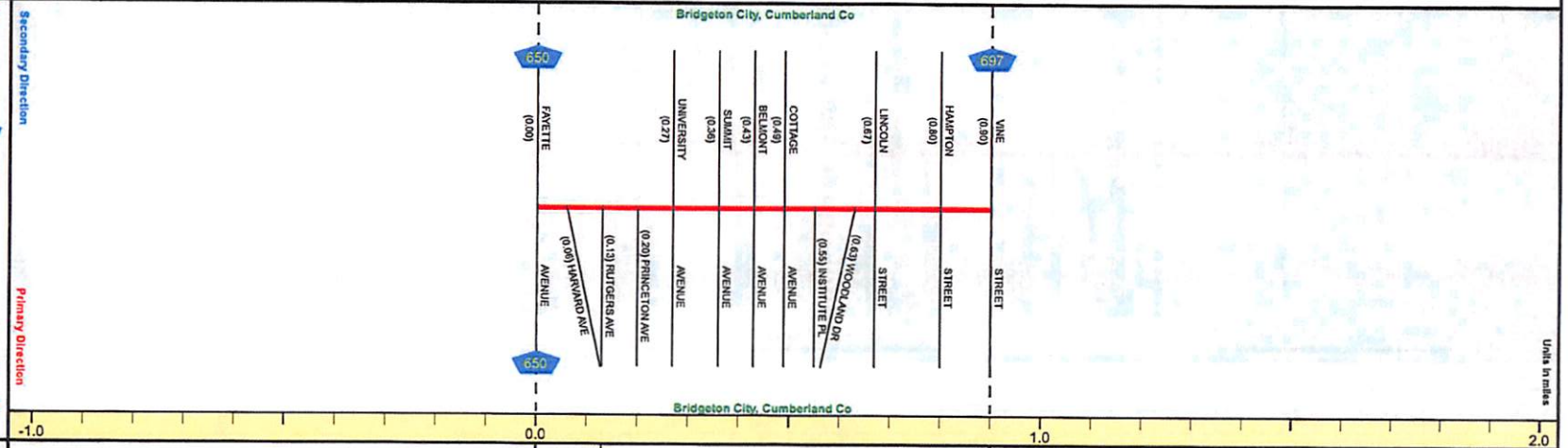
HARVARD AVE (South to North)

Mile Posts: 0.000 - 0.900



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	

Interstate Route 287 | US Route 22 | NJ Route 33 | County Road 689 | Interchange Number 2 | Grade Separated Interchange | Traffic Signal | Traffic Monitoring Sites WIM AVC VOL | Road Underpass | Road Overpass



Street Name	Harvard Avenue — Atlantic Street
Jurisdiction	Municipal
Functional Class	Urban Major Collector
Federal Aid - NHS Sy	STP
Control Section	
Speed Limit	25
Number of Lanes	2
Med. Type	None
Med. Width	0
Pavement	34
Shoulder	0
Traffic Volume	1,829 (2017)
Traffic Sta. ID	7-6-041
Structure No.	
Enlarged Views	

Begin Harvard Ave MP=0.00

End Harvard Ave MP=0.90

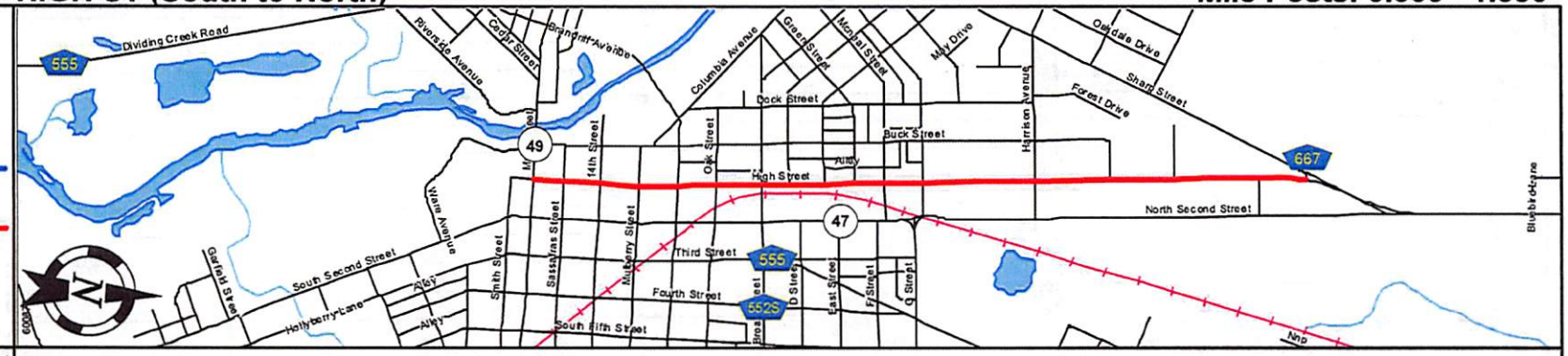
Page Created: March, 2019

SRI = 06011182__

Date last inventoried: September 2015

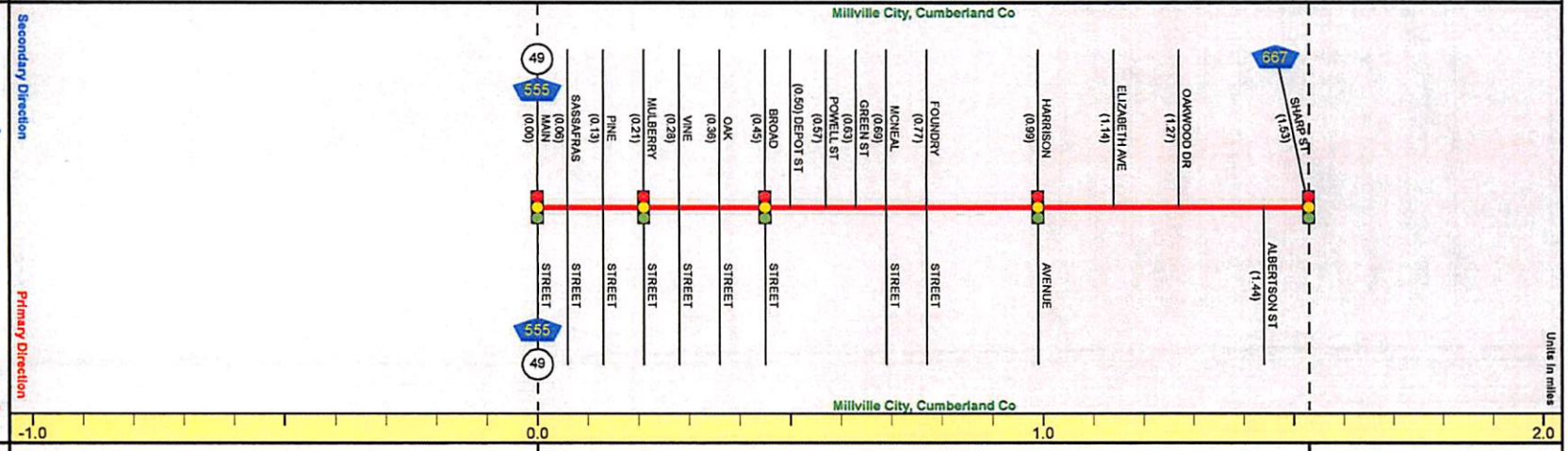
HIGH ST (South to North)

Mile Posts: 0.000 - 1.530



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	

Interstate Route 287 | US Route 22 | NJ Route 33 | County Road 689 | Interchange Number 2 | Grade Separated Interchange | Traffic Signal | Traffic Monitoring Sites WIM AVC VOL | Road Underpass | Road Overpass



Street Name	High Street
Jurisdiction	Municipal
Functional Class	Urban Major Collector
Federal Aid - NHS Sy	STP
Control Section	
Speed Limit	25 | 35
Number of Lanes	2
Med. Type	None
Med. Width	0
Pavement	40 | 72 | 40 | 22
Shoulder	0 | 8
Traffic Volume	5,193 (2010) 7,900 (2011) 11,554 (2012)
Traffic Sta. ID	8-5-075 8-8-578 120623
Structure No.	
Enlarged Views	

Begin High St MP=0.00

End High St MP=1.53

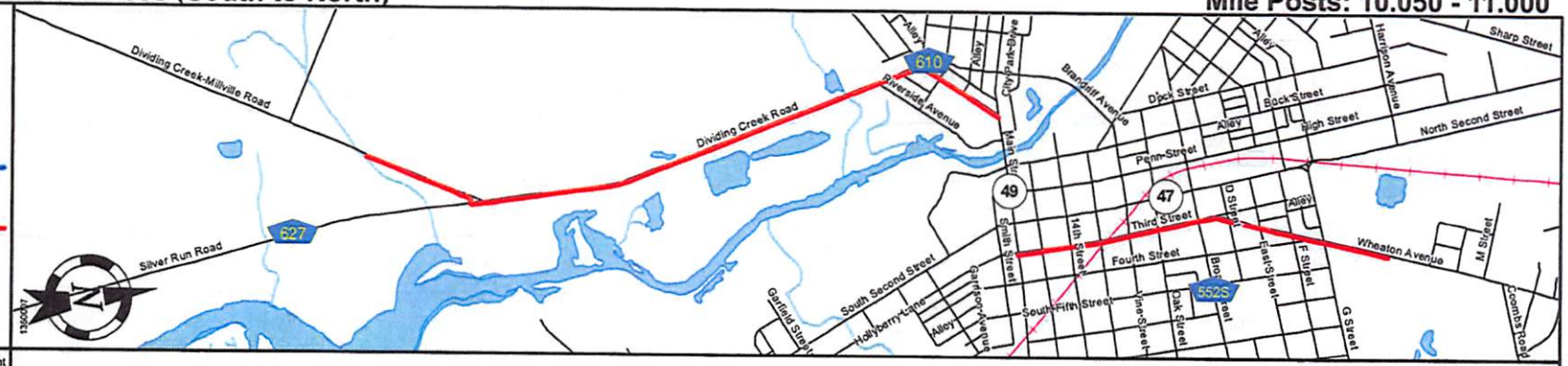
Page Created: June, 2015

SRI = 06101010__

Date last inventoried: August 2011

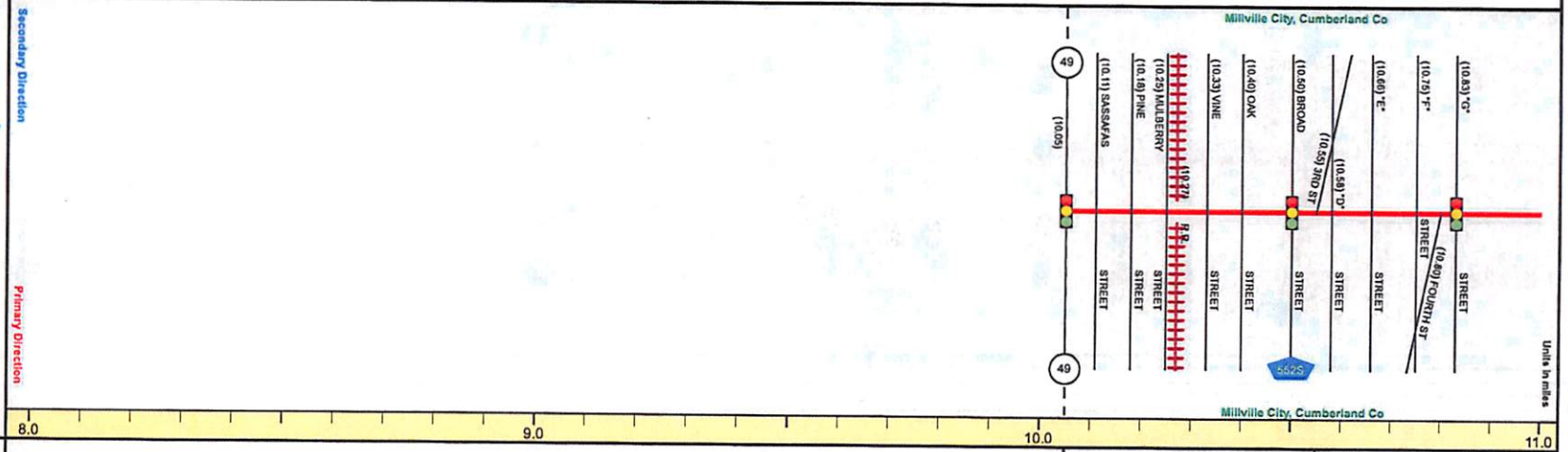
ROUTE 555 (South to North)

Mile Posts: 10.050 - 11.000



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	

Interstate Route 287 | US Route 22 | NJ Route 33 | County Road 689 | Interchange Number 2 | Grade Separated Interchange | Traffic Signal | Traffic Monitoring Sites WIM AVC VOL | Road Underpass | Road Overpass



Street Name	Third Street	Wheaton Avenue
Jurisdiction	Municipal	County
Functional Class	Urban Local	Urban Minor Arterial
Federal Aid - NHS Sy	Non-Federal Aid	STP
Control Section		
Speed Limit	25	45
Number of Lanes	2	
Med. Type	None	
Med. Width	0	
Pavement	40	22 / 24
Shoulder	0	8
Traffic Volume	3,574 (2018)	12,236 (2017)
Traffic Sta. ID	8-8-034	8-4-412
Structure No.		
Enlarged Views		

MP 10.05 = End Coinc With NJ 49 MP 36.48

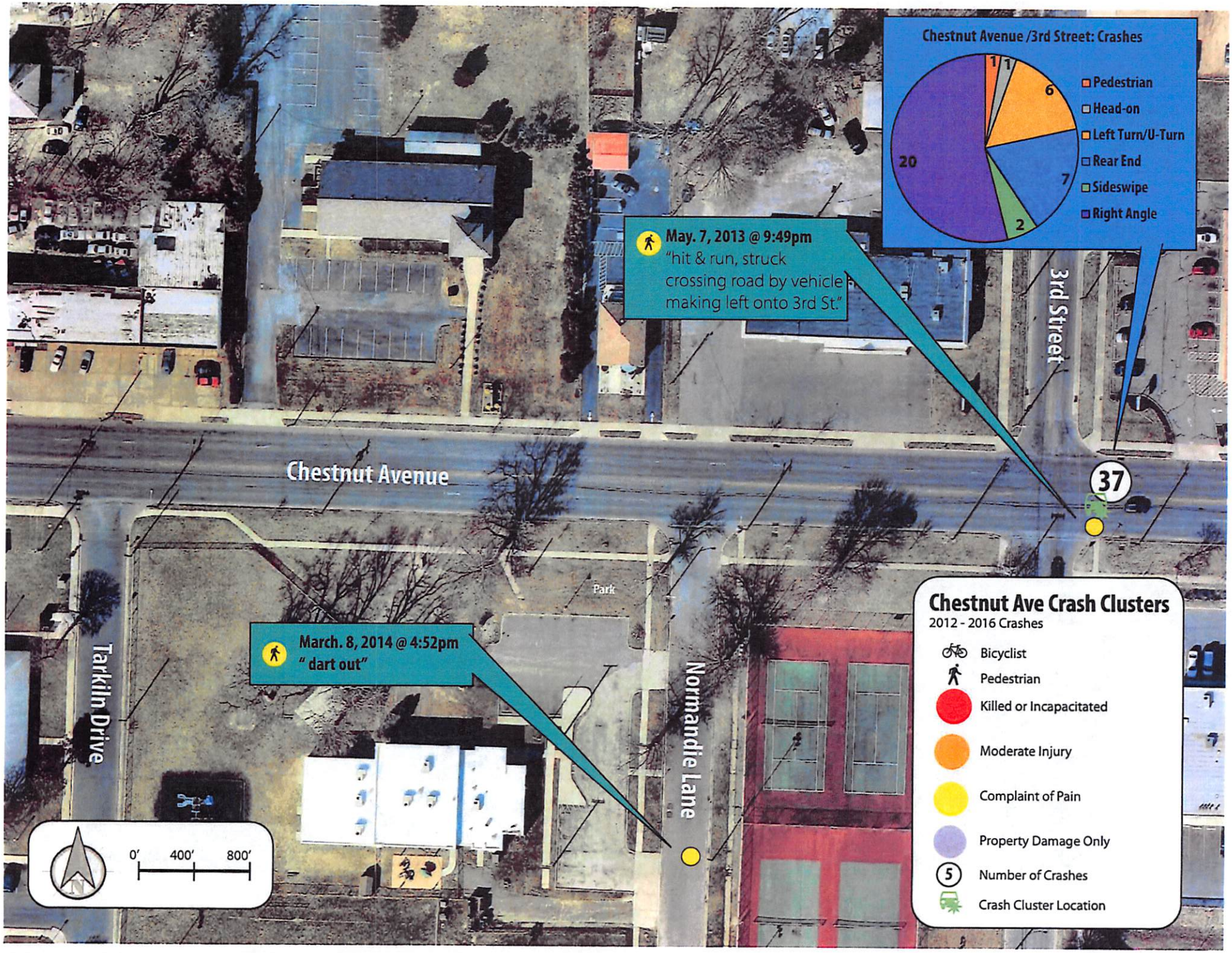
Page Created: March, 2019

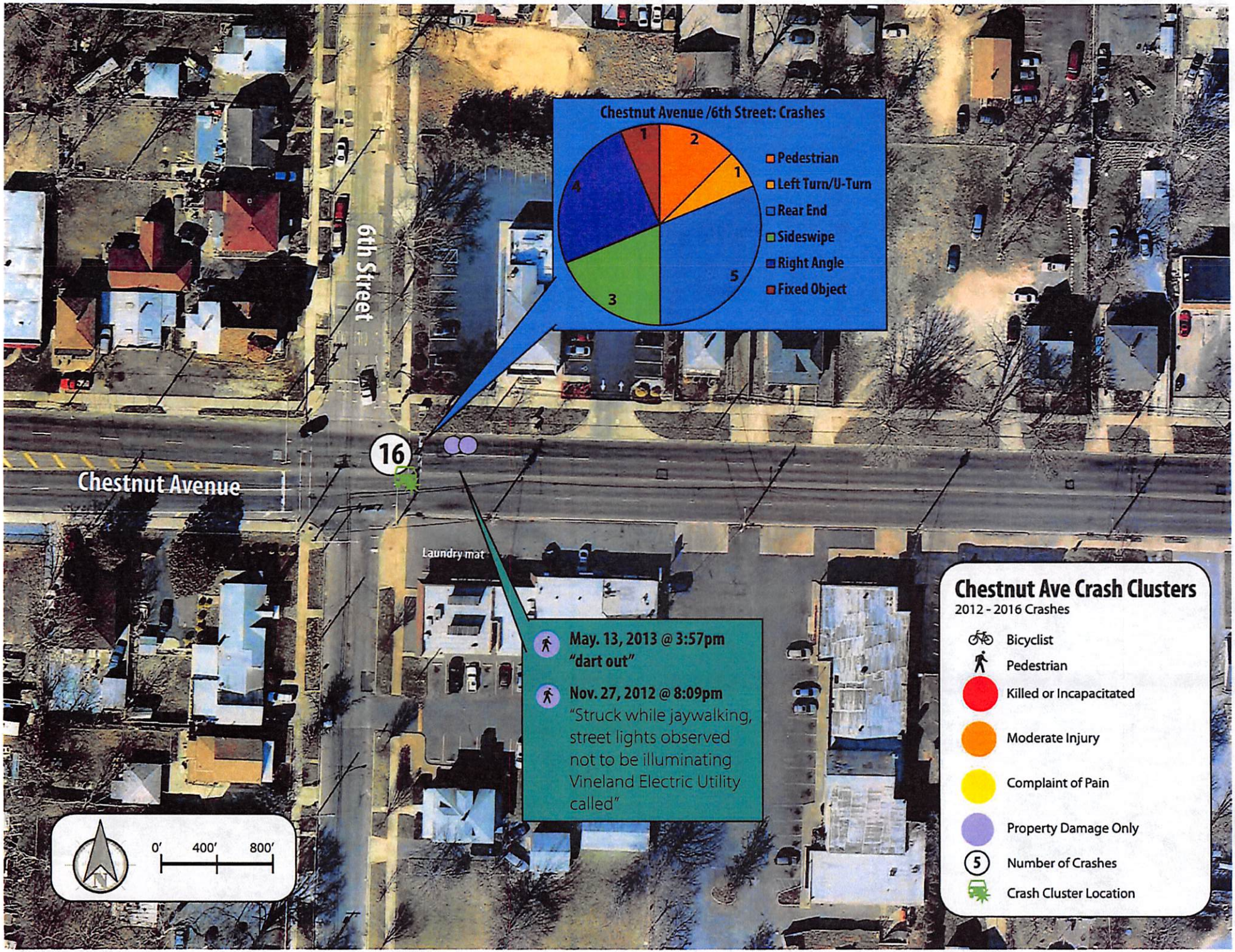
SRI = 00000555__

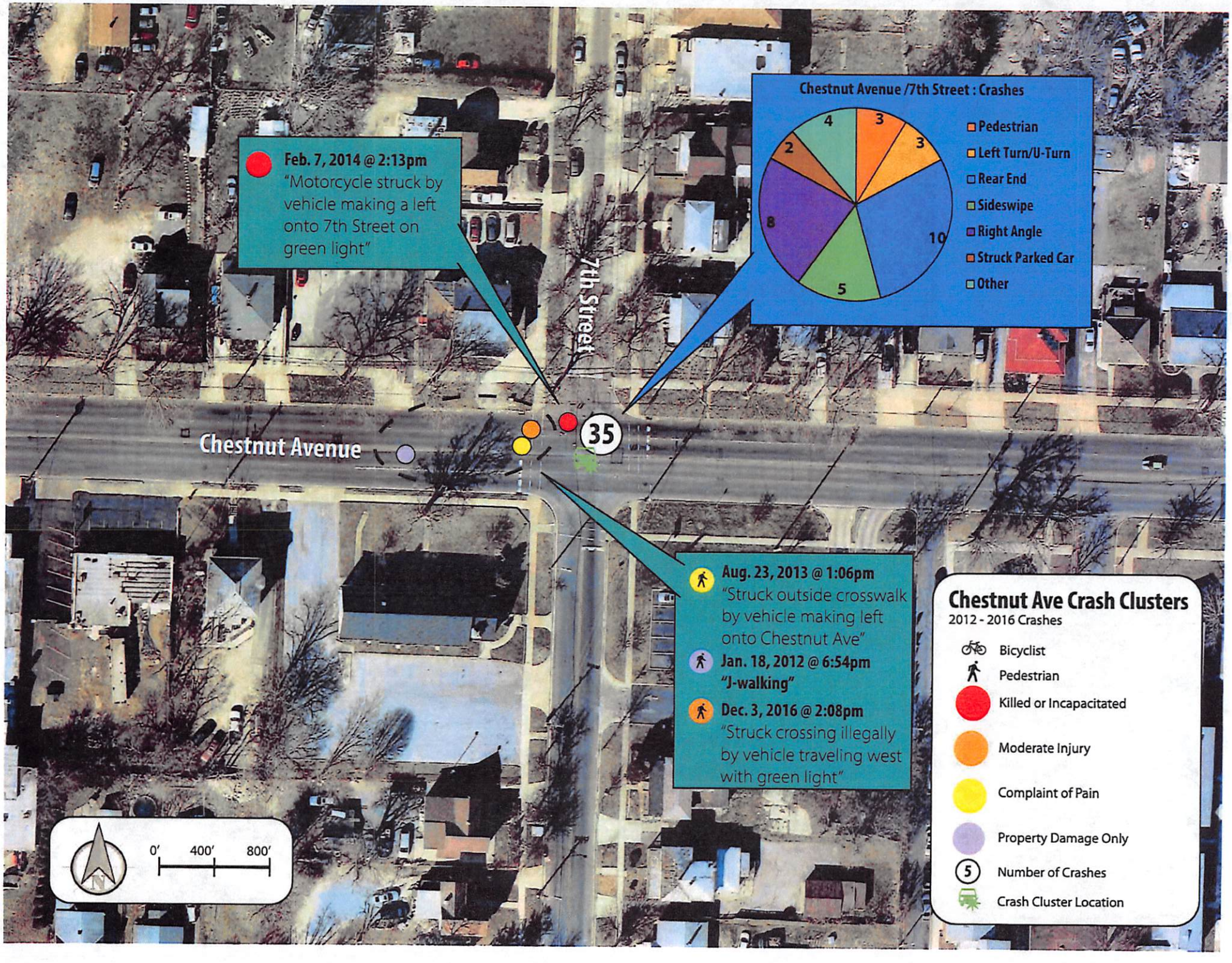
Date last inventoried: June 2012

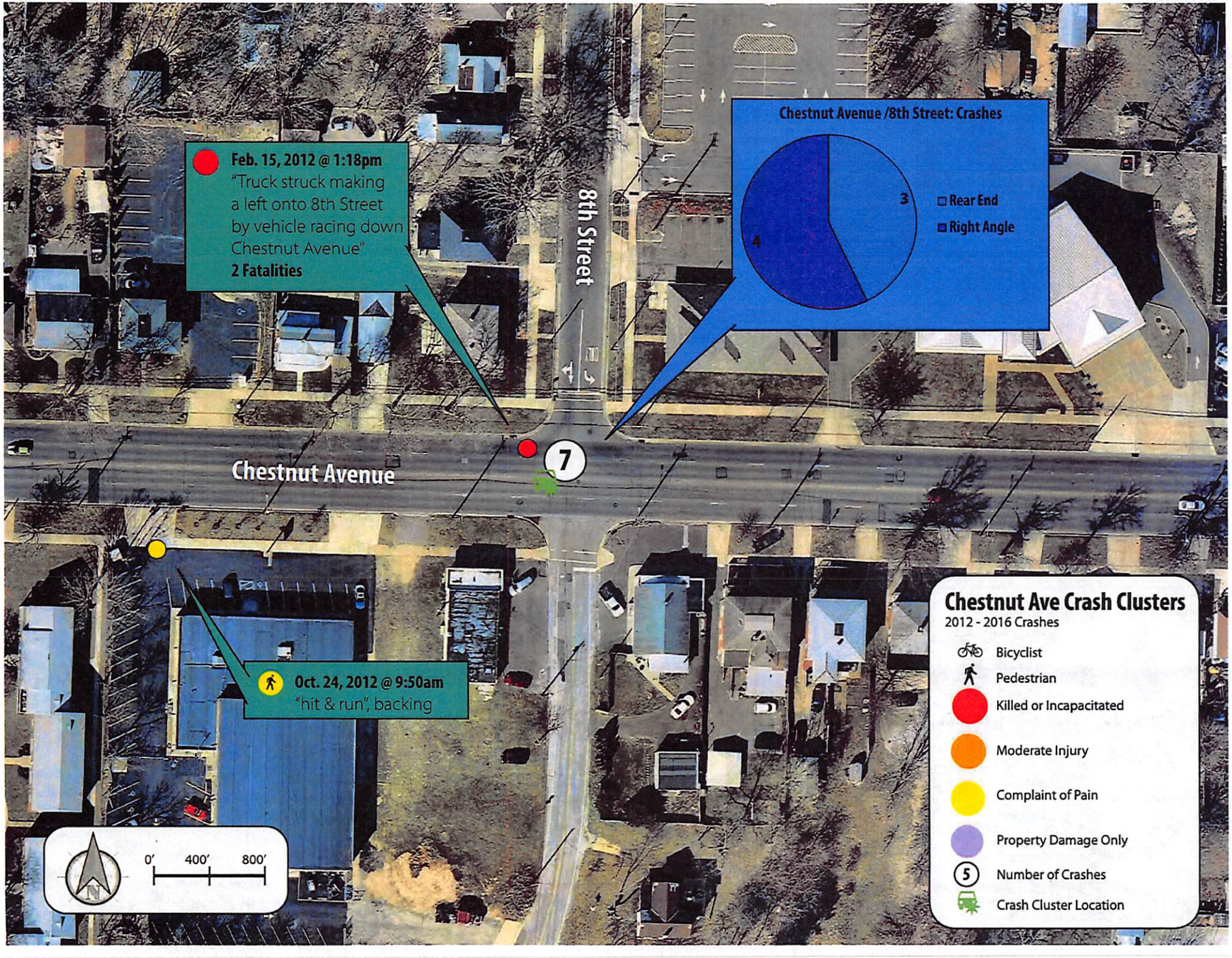
Appendix C

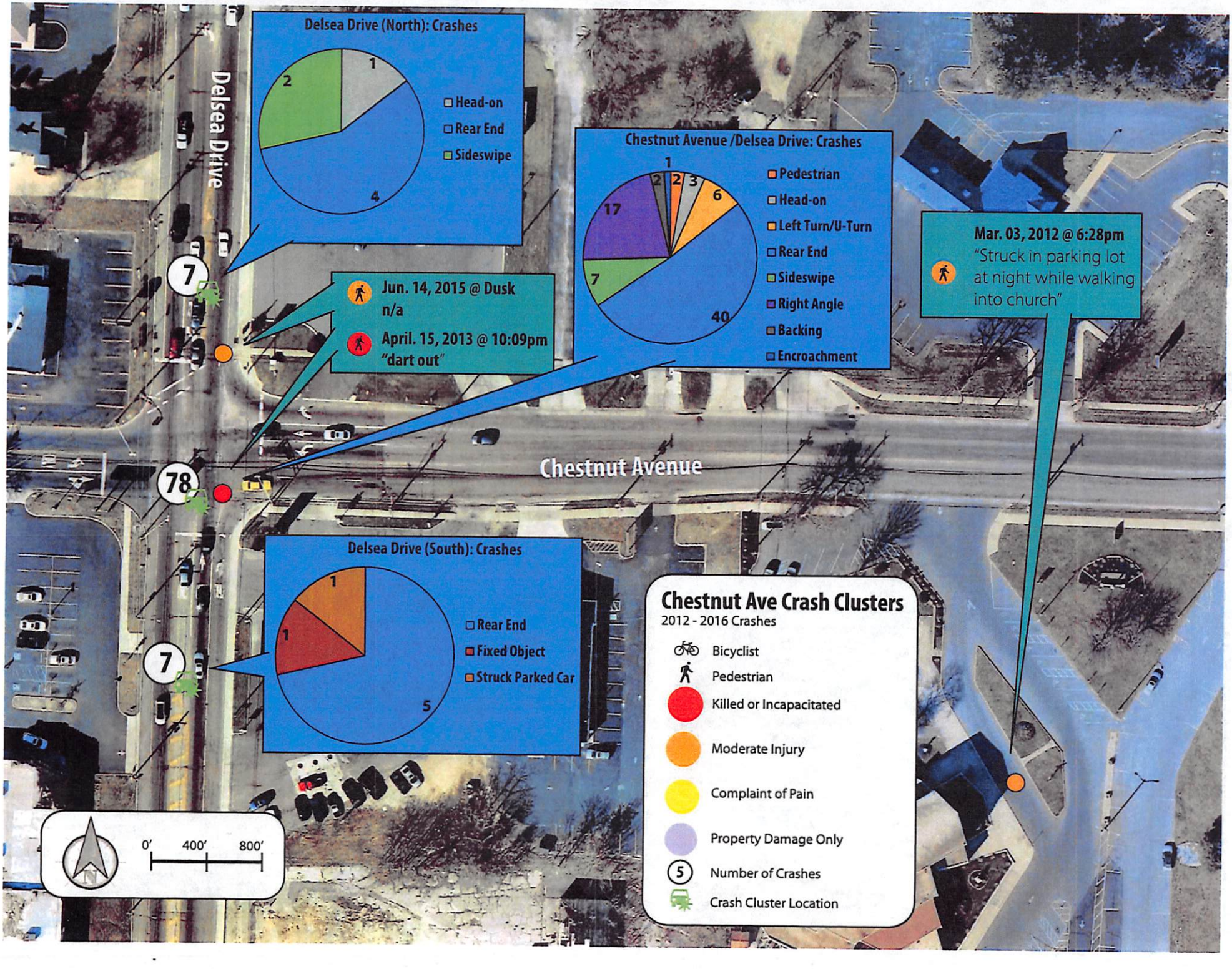
Crash Maps

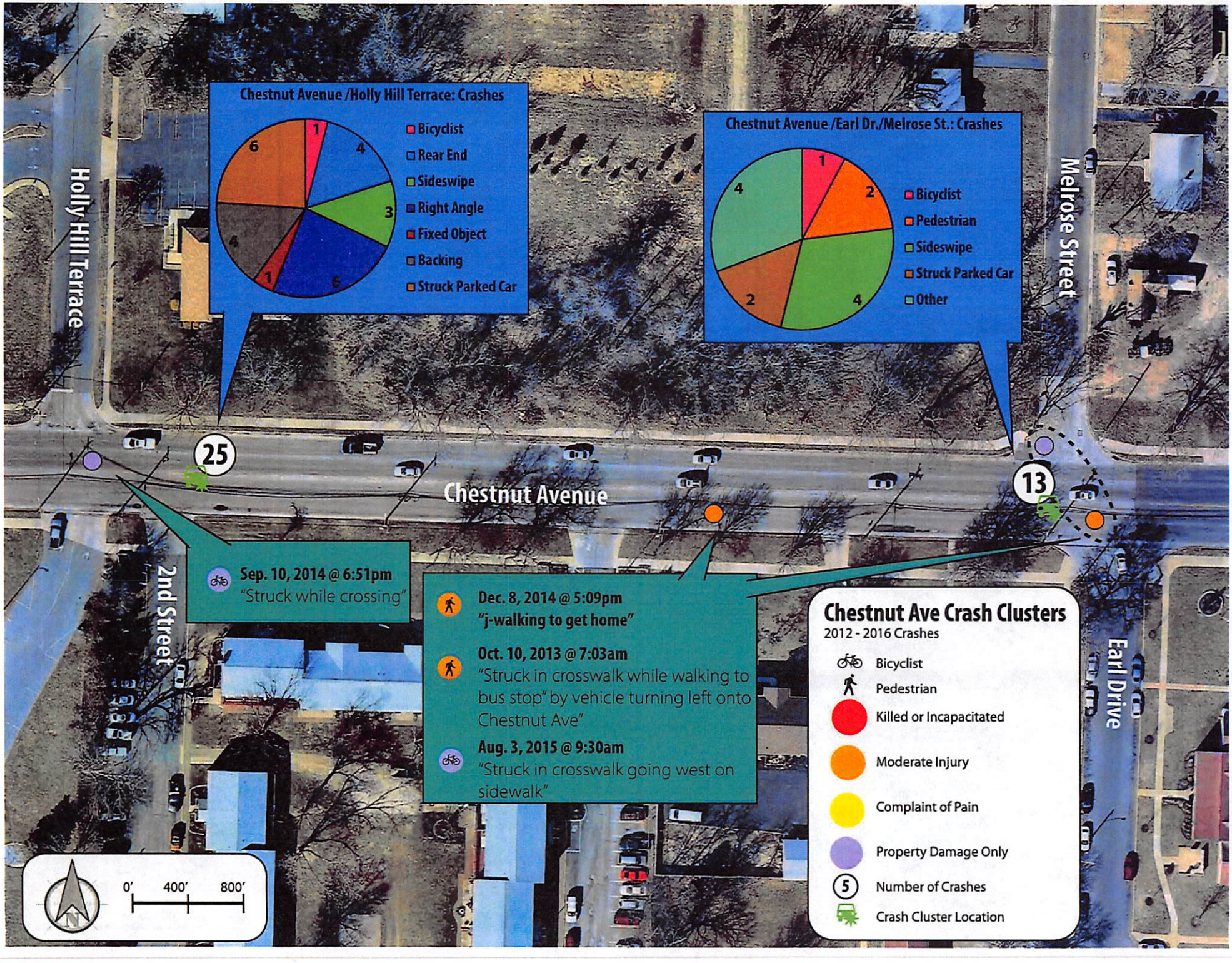

Chestnut Avenue /3rd Street: Crashes
1
1
6
7
2
20
Pedestrian
Head-on
Left Turn/U-Turn
Rear End
Sideswipe
Right Angle
May. 7, 2013 @ 9:49pm
"hit & run, struck crossing road by vehicle making left onto 3rd St."
3rd Street
Chestnut Avenue
37
Park
March. 8, 2014 @ 4:52pm
" dart out"
Tarkiln Drive
Normandie Lane
0'
400'
800'
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

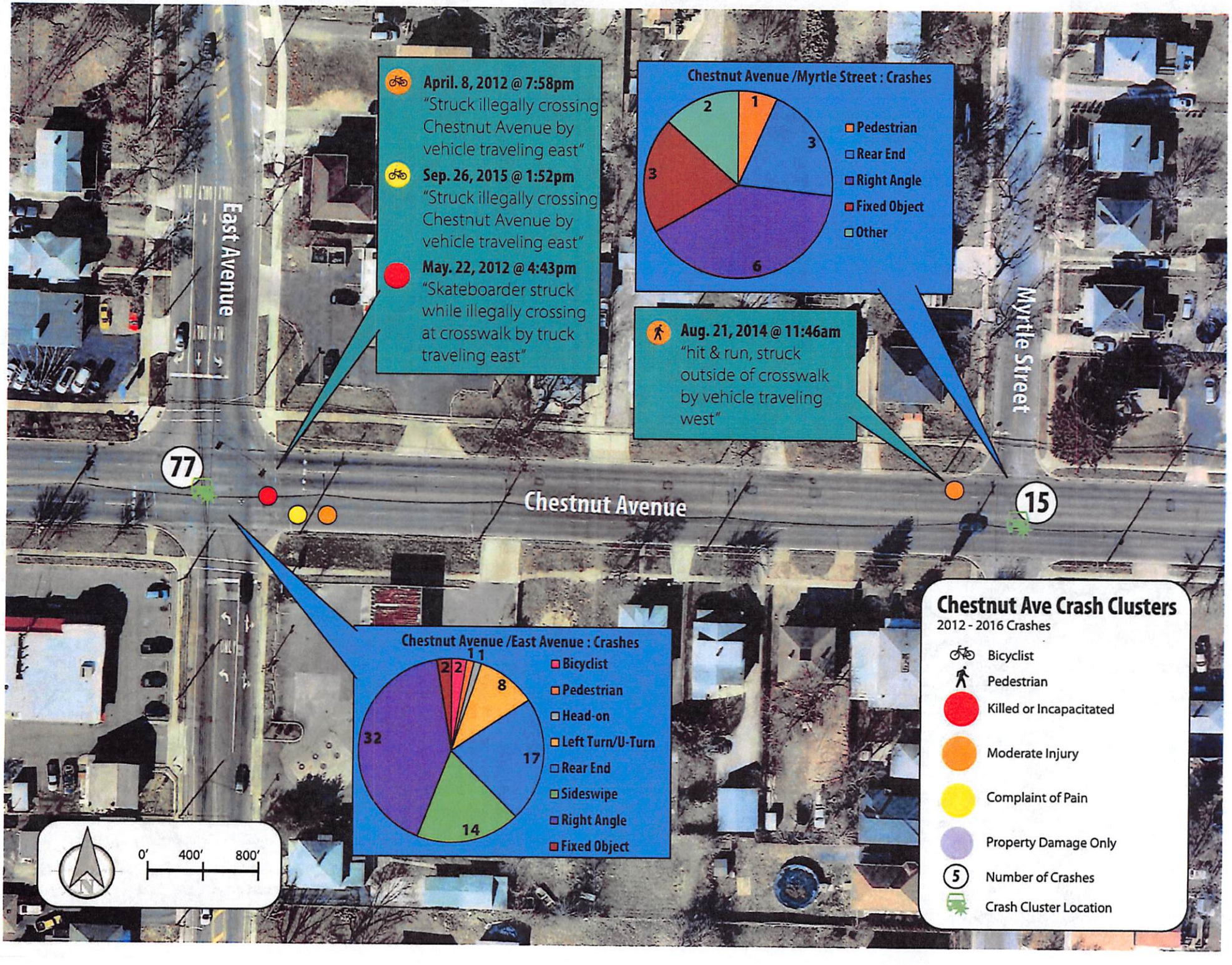

Chestnut Avenue /6th Street: Crashes
1
2
1
4
5
3
Pedestrian
Left Turn/U-Turn
Rear End
Sideswipe
Right Angle
Fixed Object
6th Street
16
Chestnut Avenue
Laundry mat
May. 13, 2013 @ 3:57pm
"dart out"
Nov. 27, 2012 @ 8:09pm
"Struck while jaywalking, street lights observed not to be illuminating Vineland Electric Utility called"
0'
400'
800'
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

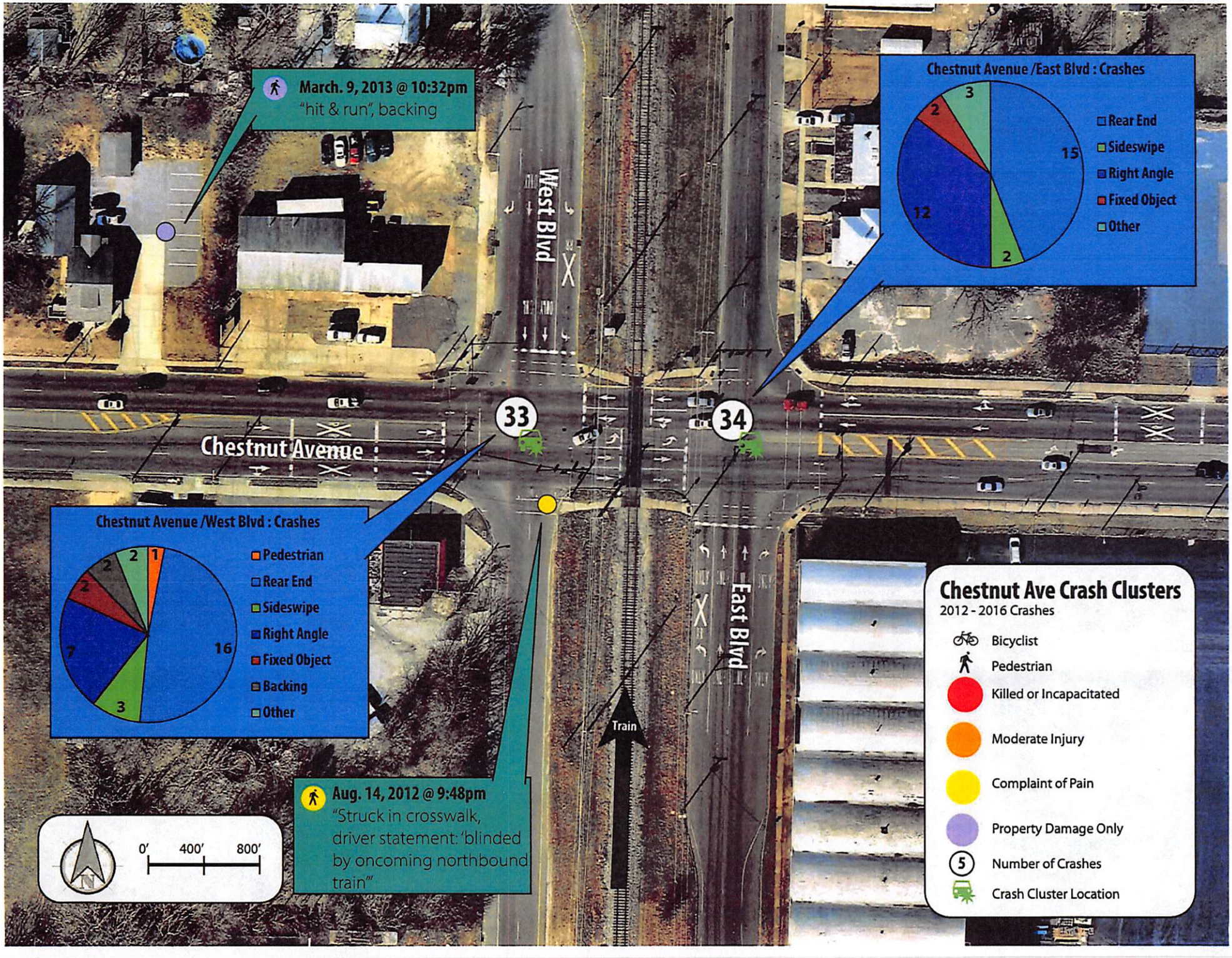

Chestnut Avenue /7th Street : Crashes
4
3
2
3
8
10
5
Pedestrian
Left Turn/U-Turn
Rear End
Sideswipe
Right Angle
Struck Parked Car
Other
Feb. 7, 2014 @ 2:13pm
"Motorcycle struck by vehicle making a left onto 7th Street on green light"
7th Street
Chestnut Avenue
35
Aug. 23, 2013 @ 1:06pm
"Struck outside crosswalk by vehicle making left onto Chestnut Ave"
Jan. 18, 2012 @ 6:54pm
"J-walking"
Dec. 3, 2016 @ 2:08pm
"Struck crossing illegally by vehicle traveling west with green light"
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location
N
0'
400'
800'

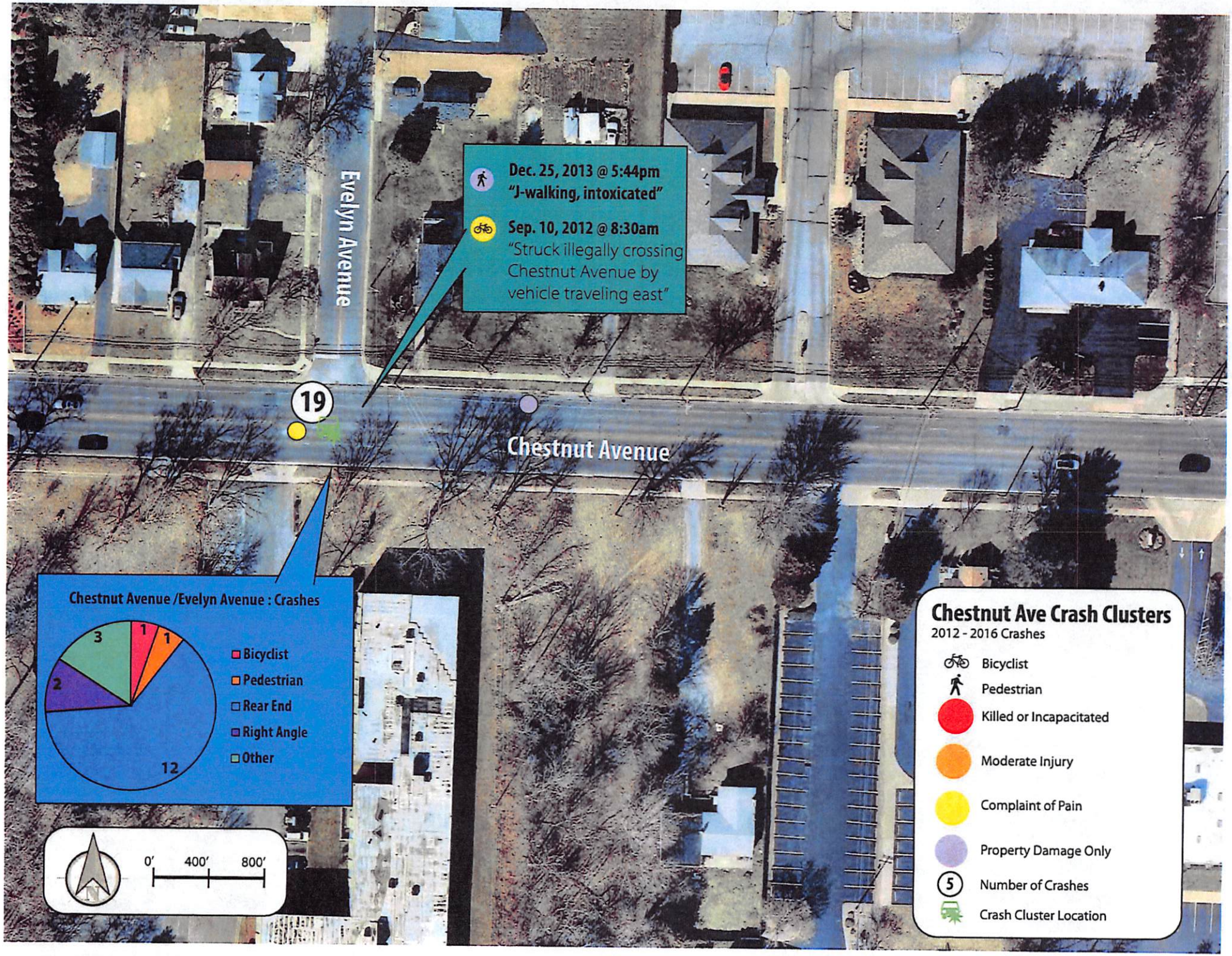

Feb. 15, 2012 @ 1:18pm
"Truck struck making a left onto 8th Street by vehicle racing down Chestnut Avenue"
2 Fatalities
8th Street
Chestnut Avenue /8th Street: Crashes
3
4
Rear End
Right Angle
Chestnut Avenue
7
Oct. 24, 2012 @ 9:50am
"hit & run", backing
0'
400'
800'
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

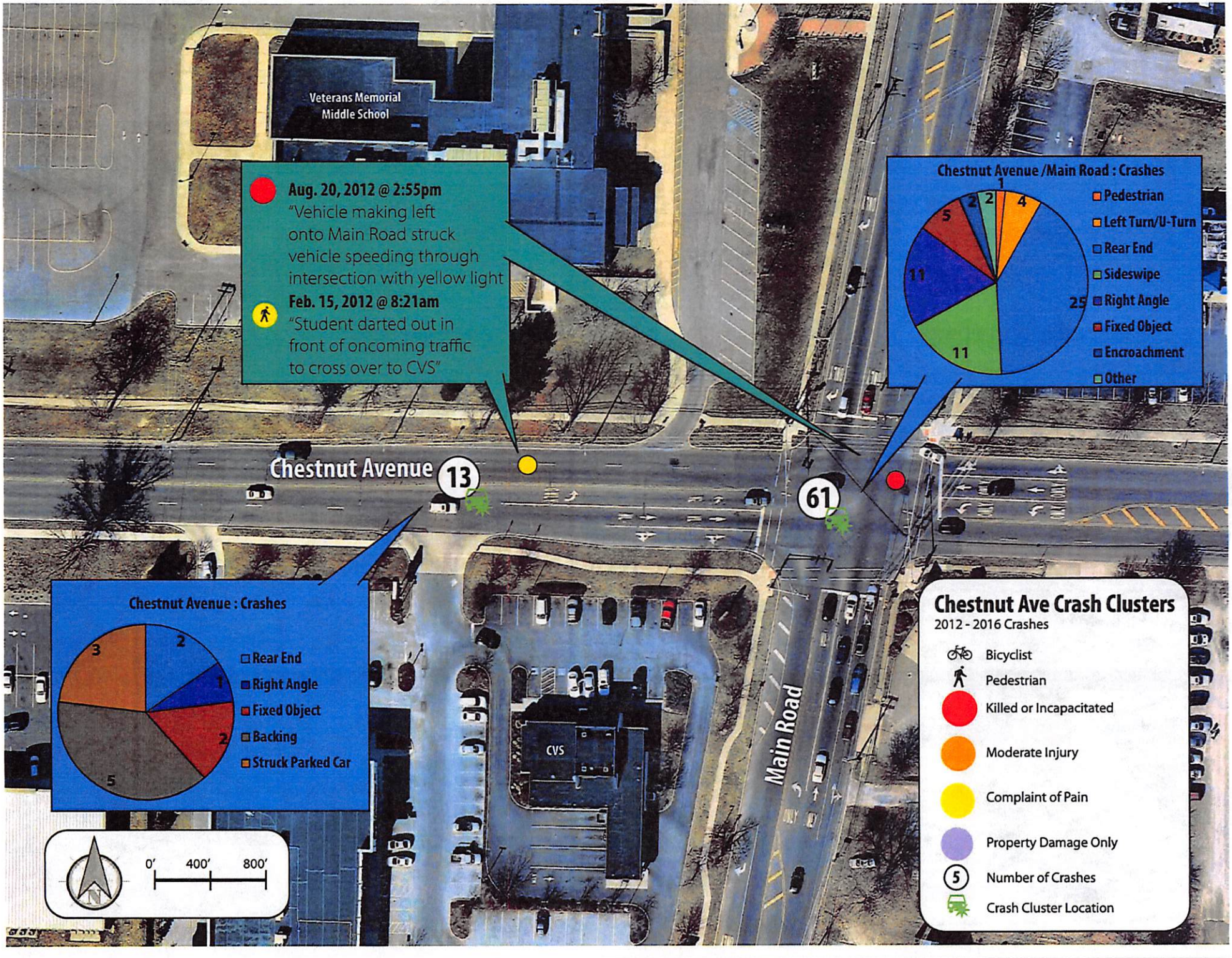

Delsea Drive (North): Crashes
1
2
4
Head-on
Rear End
Sideswipe
Chestnut Avenue /Delsea Drive: Crashes
1
2
2
3
6
17
7
40
Pedestrian
Head-on
Left Turn/U-Turn
Rear End
Sideswipe
Right Angle
Backing
Encroachment
Jun. 14, 2015 @ Dusk
n/a
April. 15, 2013 @ 10:09pm
"dart out"
Mar. 03, 2012 @ 6:28pm
"Struck in parking lot at night while walking into church"
Delsea Drive
Chestnut Avenue
7
78
7
Delsea Drive (South): Crashes
1
1
5
Rear End
Fixed Object
Struck Parked Car
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location
0'
400'
800'

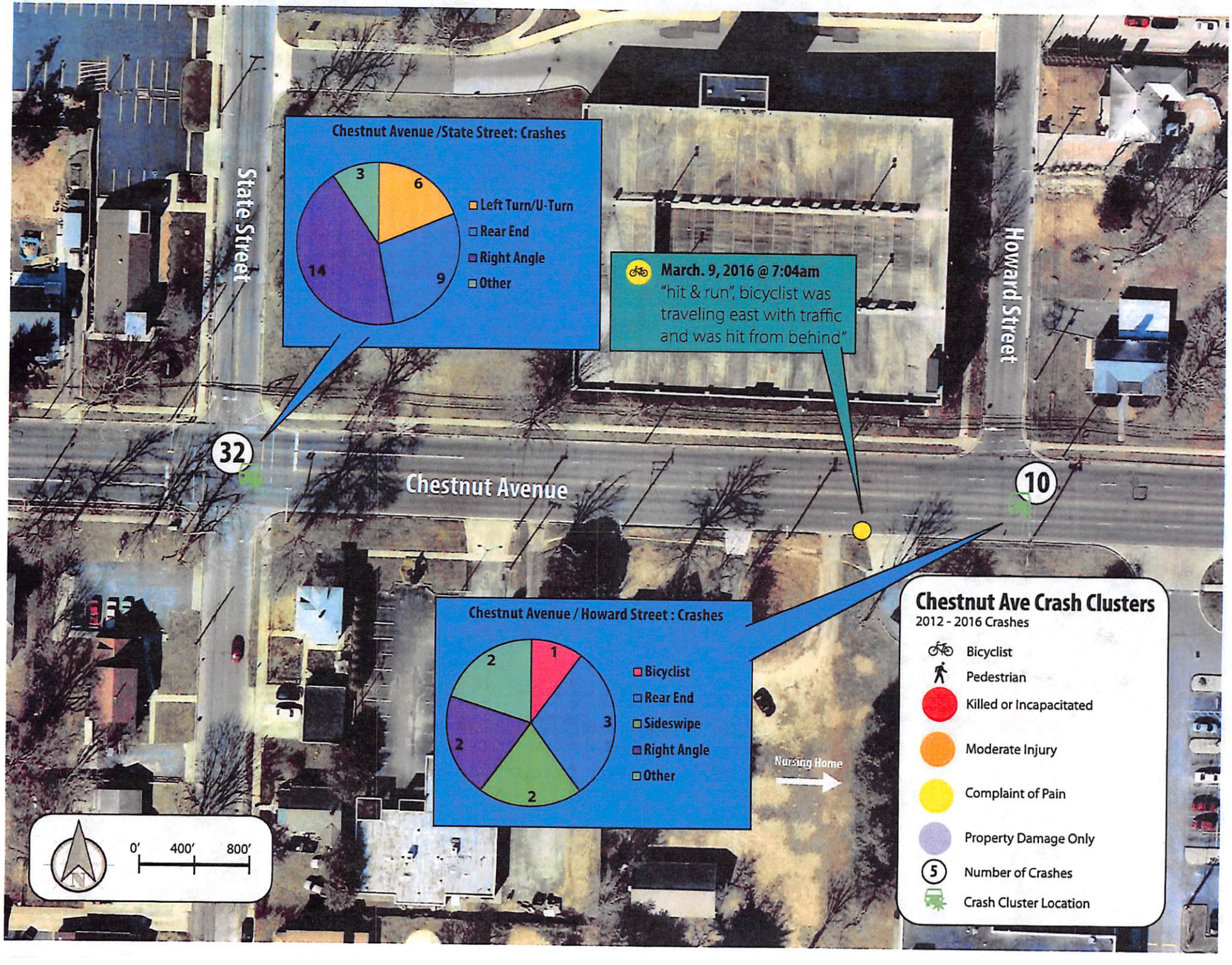

Chestnut Avenue /Holly Hill Terrace: Crashes
Bicyclist
Rear End
Sideswipe
Right Angle
Fixed Object
Backing
Struck Parked Car
Chestnut Avenue /Earl Dr./Melrose St.: Crashes
Bicyclist
Pedestrian
Sideswipe
Struck Parked Car
Other
Holly Hill Terrace
Melrose Street
Chestnut Avenue
2nd Street
Earl Drive
25
13
Sep. 10, 2014 @ 6:51pm
"Struck while crossing"
Dec. 8, 2014 @ 5:09pm
"j-walking to get home"
Oct. 10, 2013 @ 7:03am
"Struck in crosswalk while walking to bus stop" by vehicle turning left onto Chestnut Ave"
Aug. 3, 2015 @ 9:30am
"Struck in crosswalk going west on sidewalk"
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
Number of Crashes
Crash Cluster Location
0'
400'
800'

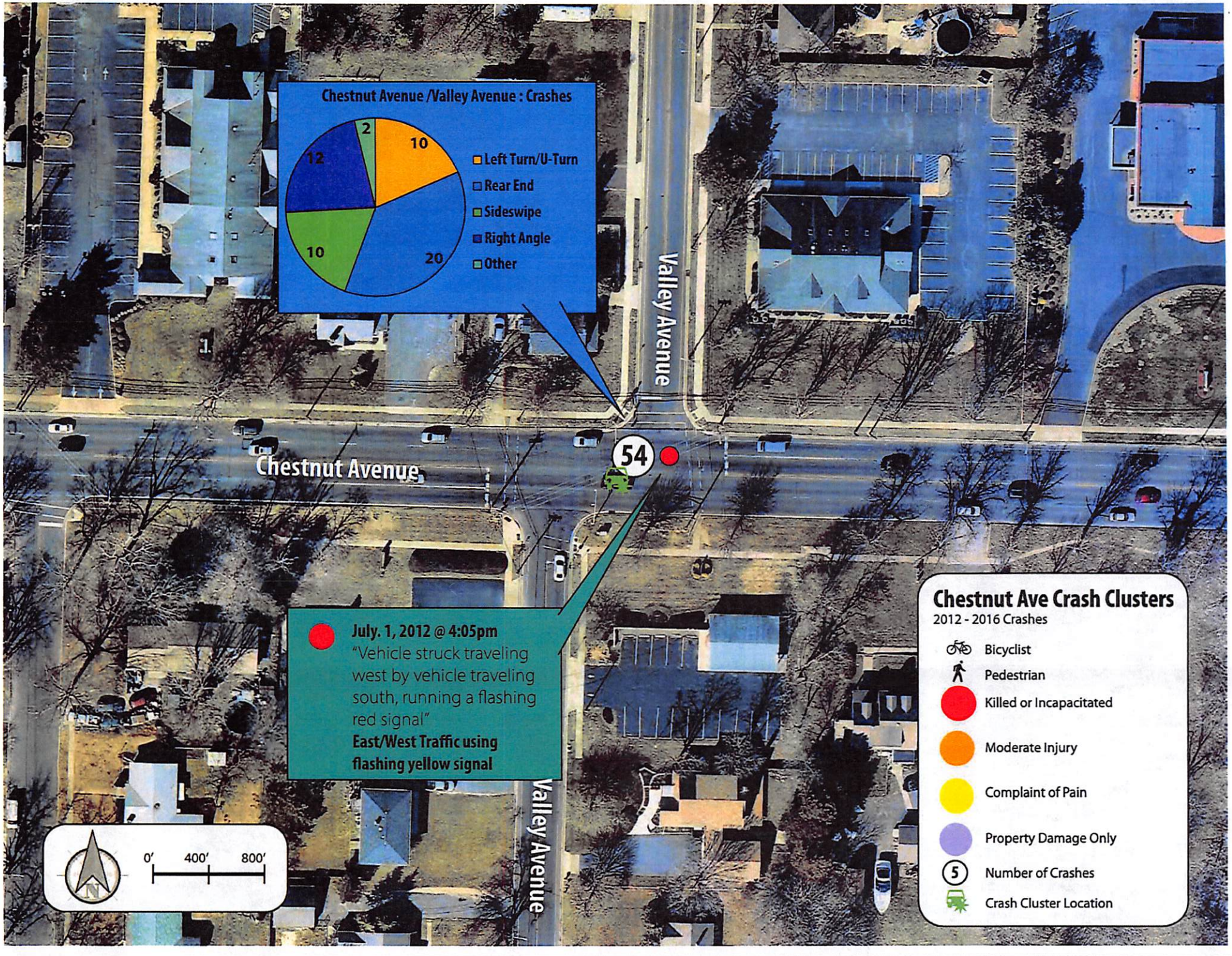

April. 8, 2012 @ 7:58pm
"Struck illegally crossing Chestnut Avenue by vehicle traveling east"
Sep. 26, 2015 @ 1:52pm
"Struck illegally crossing Chestnut Avenue by vehicle traveling east"
May. 22, 2012 @ 4:43pm
"Skateboarder struck while illegally crossing at crosswalk by truck traveling east"
Chestnut Avenue /Myrtle Street : Crashes
1
3
3
2
6
Pedestrian
Rear End
Right Angle
Fixed Object
Other
Aug. 21, 2014 @ 11:46am
"hit & run, struck outside of crosswalk by vehicle traveling west"
East Avenue
Myrtle Street
Chestnut Avenue
77
15
Chestnut Avenue /East Avenue : Crashes
11
2
2
8
32
17
14
Bicyclist
Pedestrian
Head-on
Left Turn/U-Turn
Rear End
Sideswipe
Right Angle
Fixed Object
0'
400'
800'
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

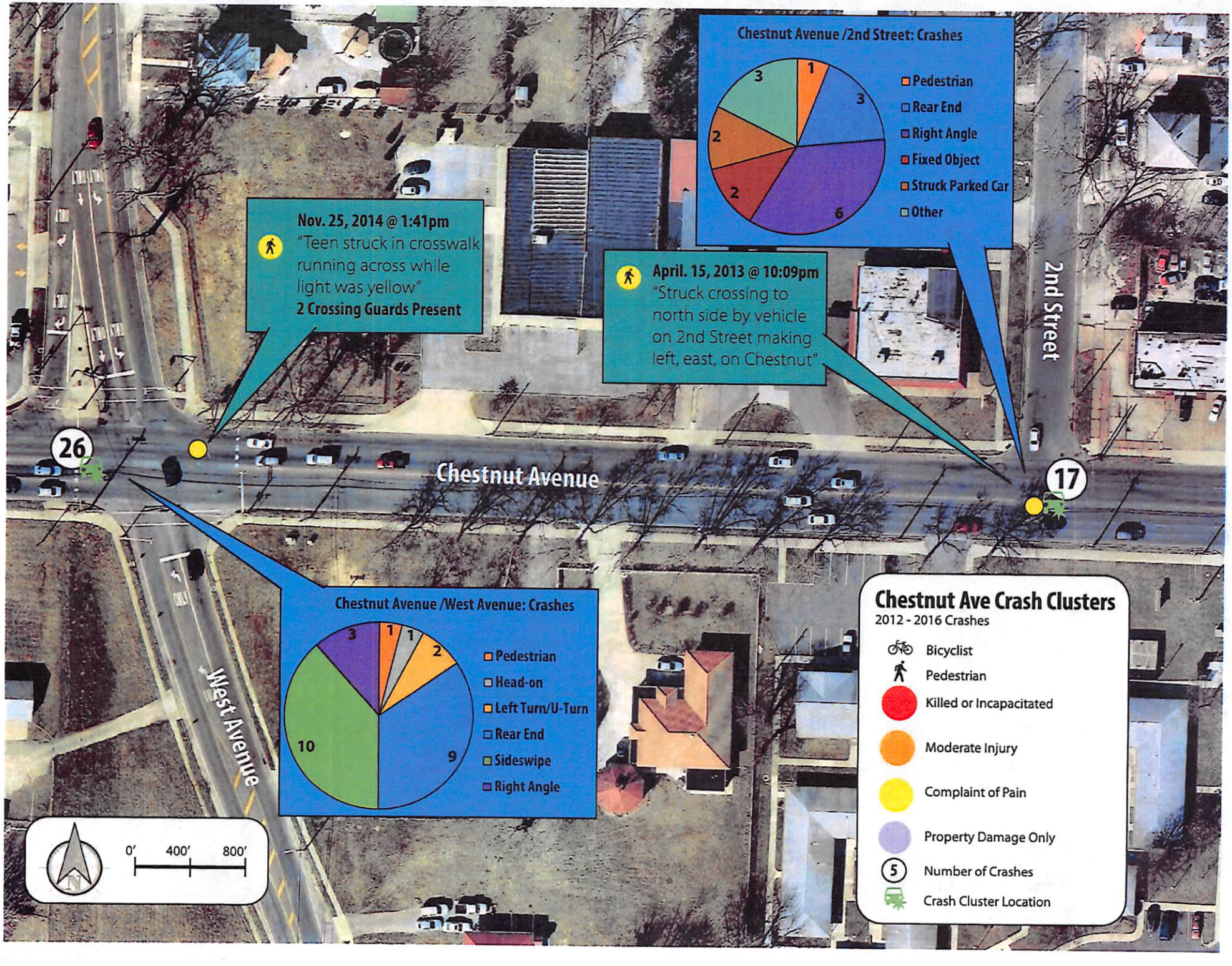

March. 9, 2013 @ 10:32pm
"hit & run", backing
West Blvd
Chestnut Avenue
33
34
East Blvd
Train
Chestnut Avenue /East Blvd : Crashes
3
2
15
12
2
Rear End
Sideswipe
Right Angle
Fixed Object
Other
Chestnut Avenue /West Blvd : Crashes
2
1
2
2
7
16
3
Pedestrian
Rear End
Sideswipe
Right Angle
Fixed Object
Backing
Other
Aug. 14, 2012 @ 9:48pm
"Struck in crosswalk, driver statement: 'blinded by oncoming northbound train'"
N
0'
400'
800'
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

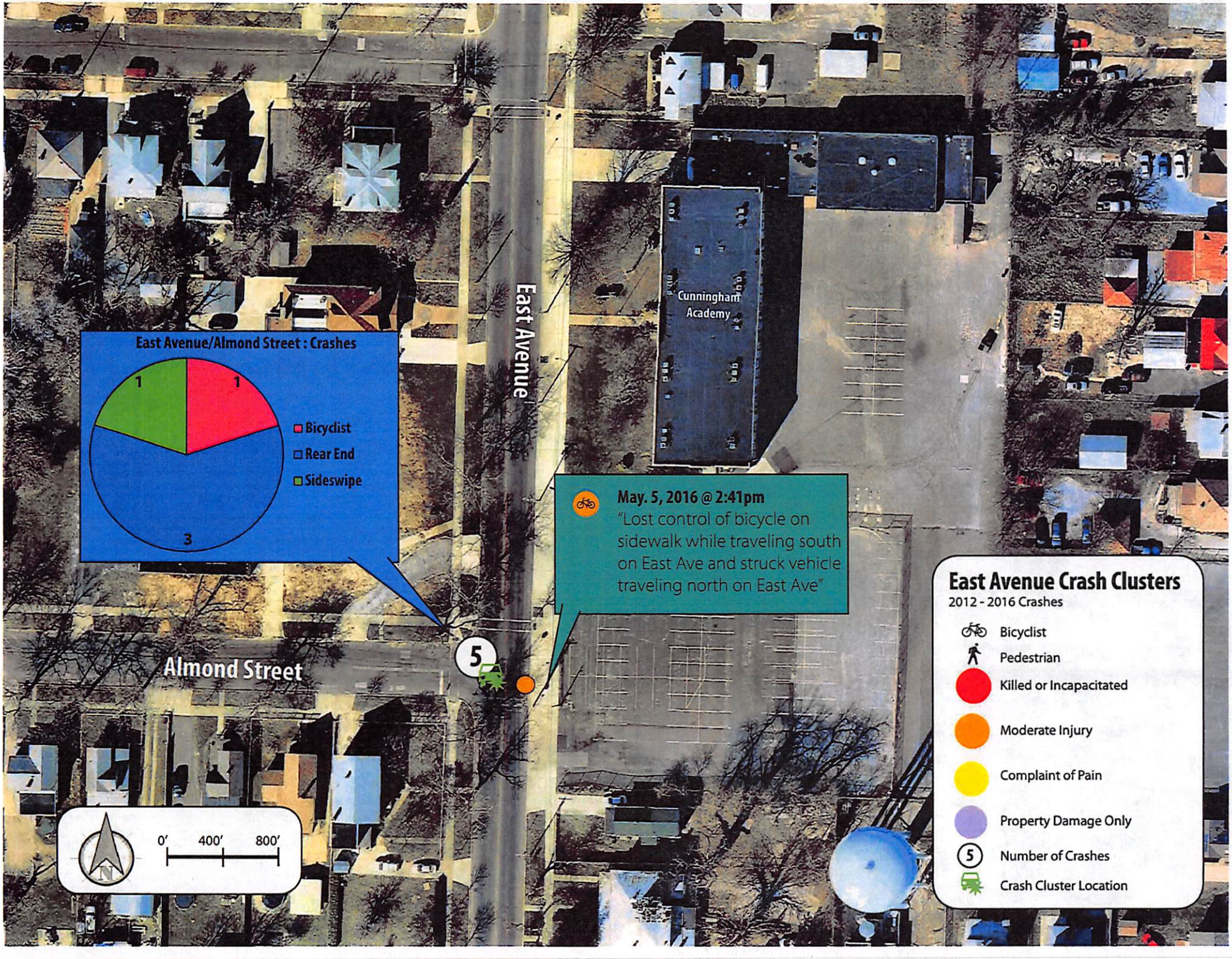

Evelyn Avenue
Chestnut Avenue
19
Dec. 25, 2013 @ 5:44pm
"J-walking, intoxicated"
Sep. 10, 2012 @ 8:30am
"Struck illegally crossing Chestnut Avenue by vehicle traveling east"
Chestnut Avenue /Evelyn Avenue : Crashes
3
1
1
2
12
Bicyclist
Pedestrian
Rear End
Right Angle
Other
0'
400'
800'
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

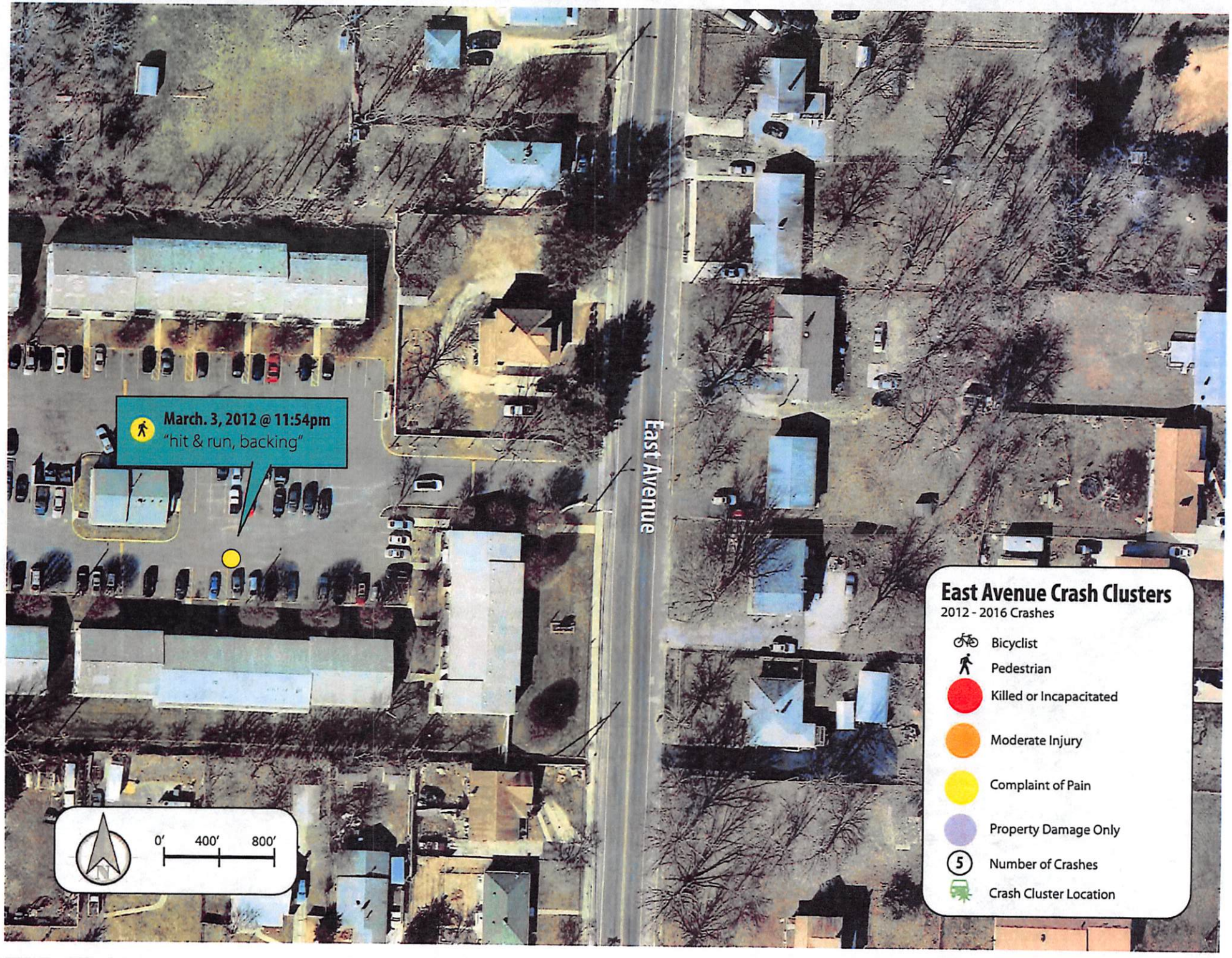

Veterans Memorial Middle School
Aug. 20, 2012 @ 2:55pm
"Vehicle making left onto Main Road struck vehicle speeding through intersection with yellow light
Feb. 15, 2012 @ 8:21am
"Student darted out in front of oncoming traffic to cross over to CVS"
Chestnut Avenue /Main Road : Crashes
Pedestrian
Left Turn/U-Turn
Rear End
Sideswipe
Right Angle
Fixed Object
Encroachment
Other
1
4
2
2
5
11
25
11
Chestnut Avenue
13
61
Chestnut Avenue : Crashes
Rear End
Right Angle
Fixed Object
Backing
Struck Parked Car
3
2
1
2
5
CVS
Main Road
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location
N
0'
400'
800'

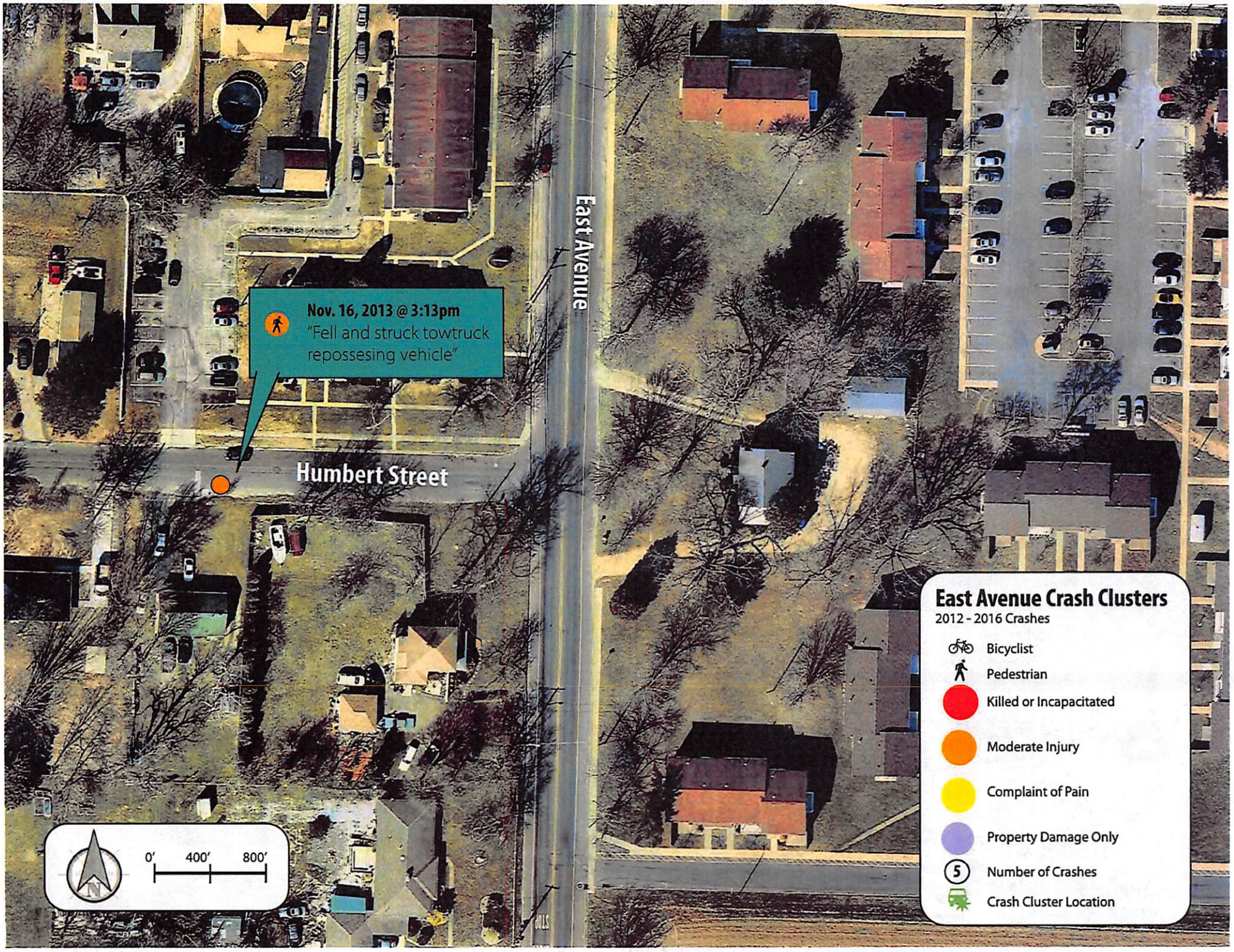

Chestnut Avenue /State Street: Crashes
3
6
14
9
Left Turn/U-Turn
Rear End
Right Angle
Other
March. 9, 2016 @ 7:04am
"hit & run", bicyclist was traveling east with traffic and was hit from behind"
State Street
Howard Street
32
Chestnut Avenue
10
Chestnut Avenue / Howard Street : Crashes
2
1
3
2
2
Bicyclist
Rear End
Sideswipe
Right Angle
Other
Nursing Home
0'
400'
800'
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

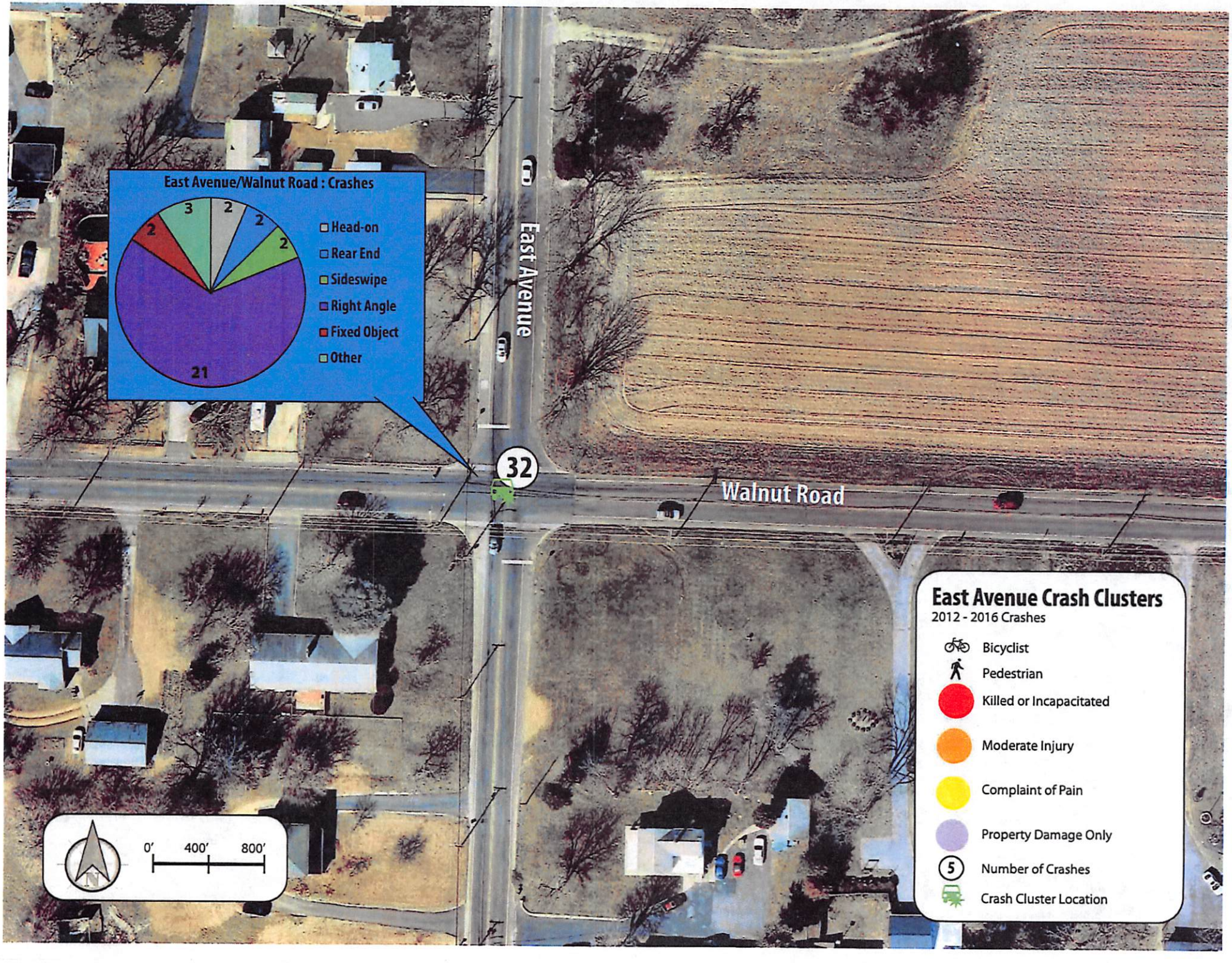

Chestnut Avenue /Valley Avenue : Crashes
2
10
12
10
20
Left Turn/U-Turn
Rear End
Sideswipe
Right Angle
Other
Valley Avenue
Chestnut Avenue
54
July. 1, 2012 @ 4:05pm
"Vehicle struck traveling west by vehicle traveling south, running a flashing red signal"
East/West Traffic using flashing yellow signal
Valley Avenue
0'
400'
800'
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

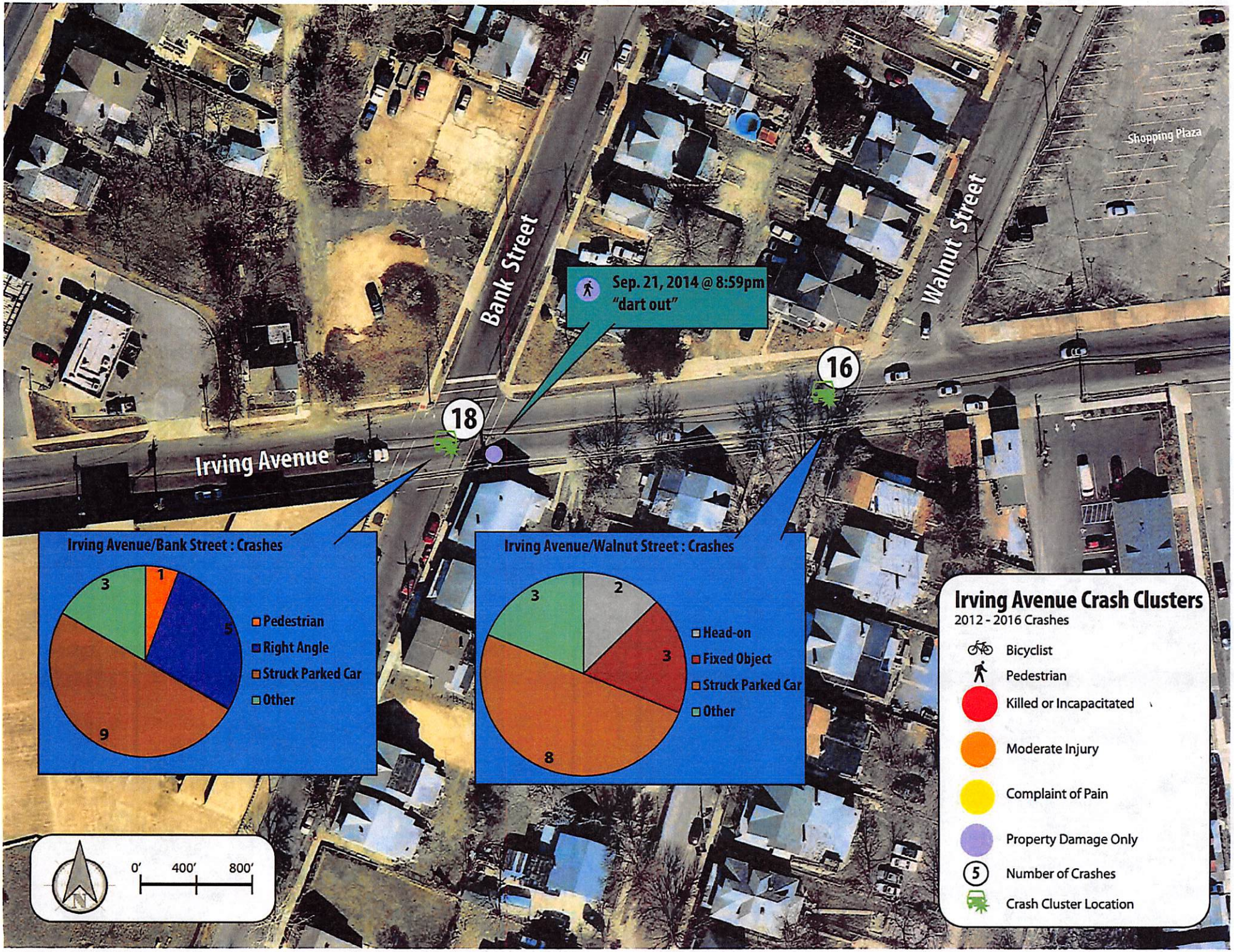

Chestnut Avenue /2nd Street: Crashes
Pedestrian
Rear End
Right Angle
Fixed Object
Struck Parked Car
Other
3
1
3
2
2
6
Nov. 25, 2014 @ 1:41pm
"Teen struck in crosswalk running across while light was yellow"
2 Crossing Guards Present
April. 15, 2013 @ 10:09pm
"Struck crossing to north side by vehicle on 2nd Street making left, east, on Chestnut"
2nd Street
Chestnut Avenue
26
17
West Avenue
ONLY
Chestnut Avenue /West Avenue: Crashes
Pedestrian
Head-on
Left Turn/U-Turn
Rear End
Sideswipe
Right Angle
3
1
1
2
10
9
0'
400'
800'
Chestnut Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

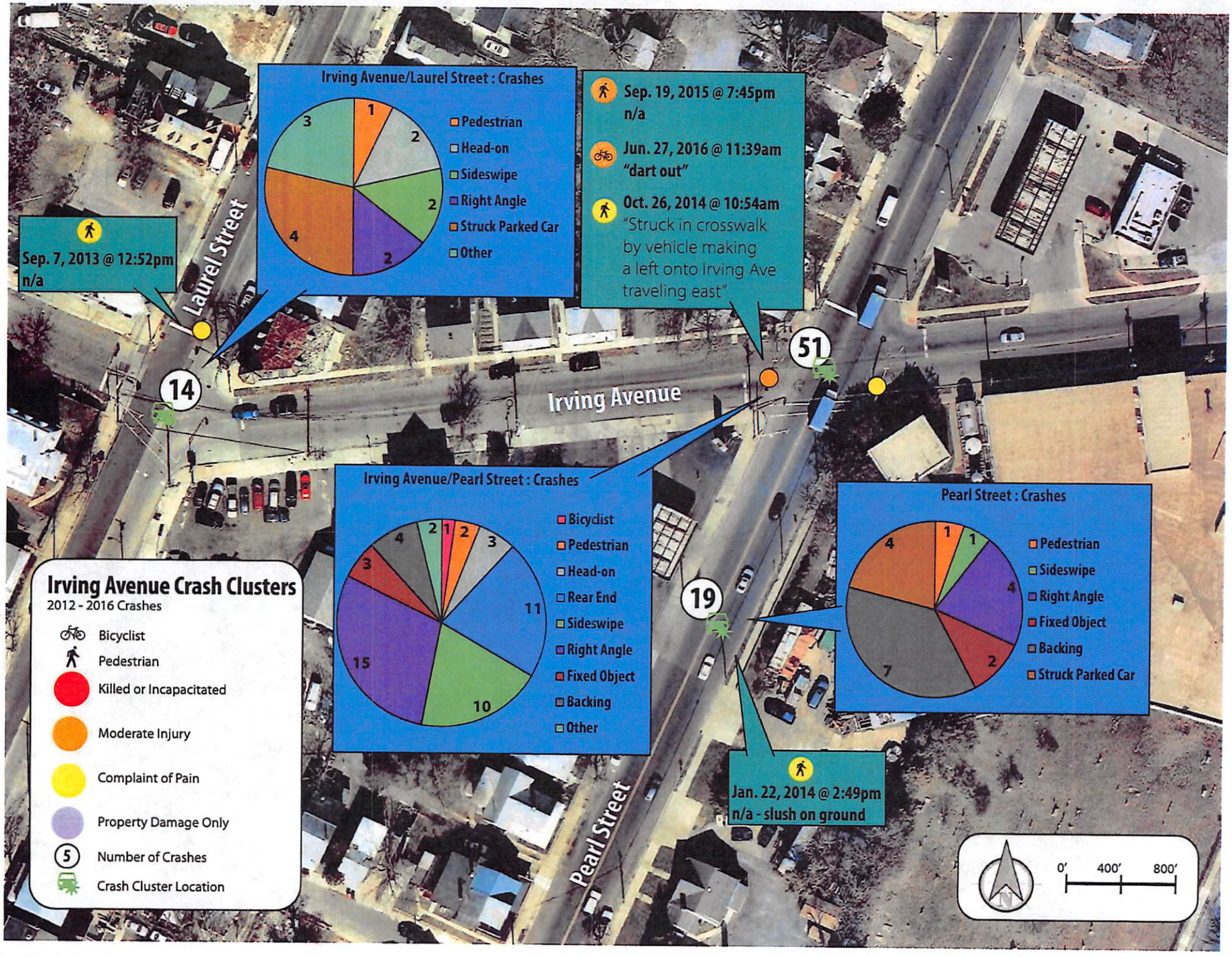

East Avenue/Almond Street : Crashes
1
1
3
Bicyclist
Rear End
Sideswipe
East Avenue
Cunningham Academy
May. 5, 2016 @ 2:41pm
"Lost control of bicycle on sidewalk while traveling south on East Ave and struck vehicle traveling north on East Ave"
Almond Street
5
0'
400'
800'
East Avenue Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

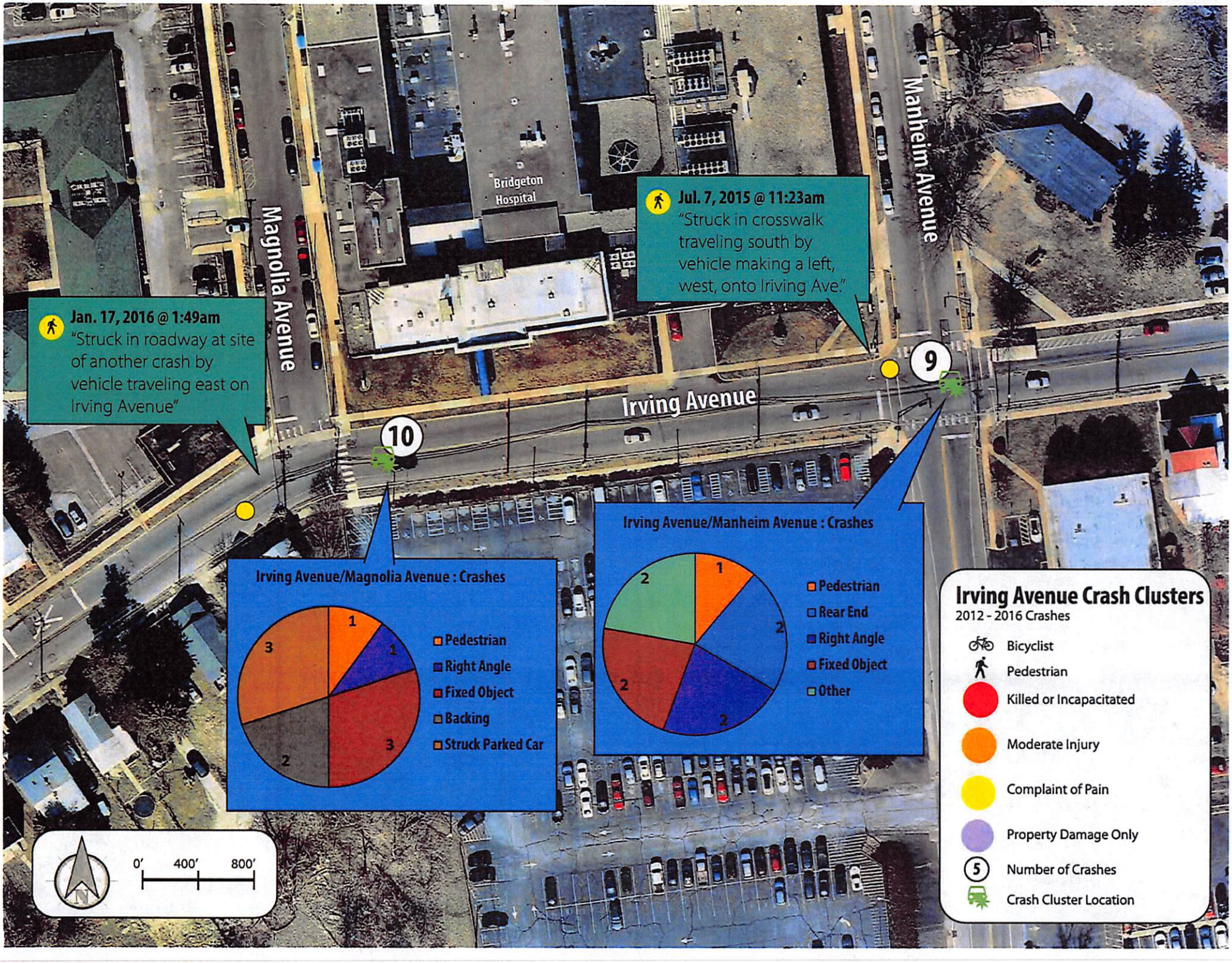

March. 3, 2012 @ 11:54pm
"hit & run, backing"
East Avenue
0'
400'
800'
East Avenue Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

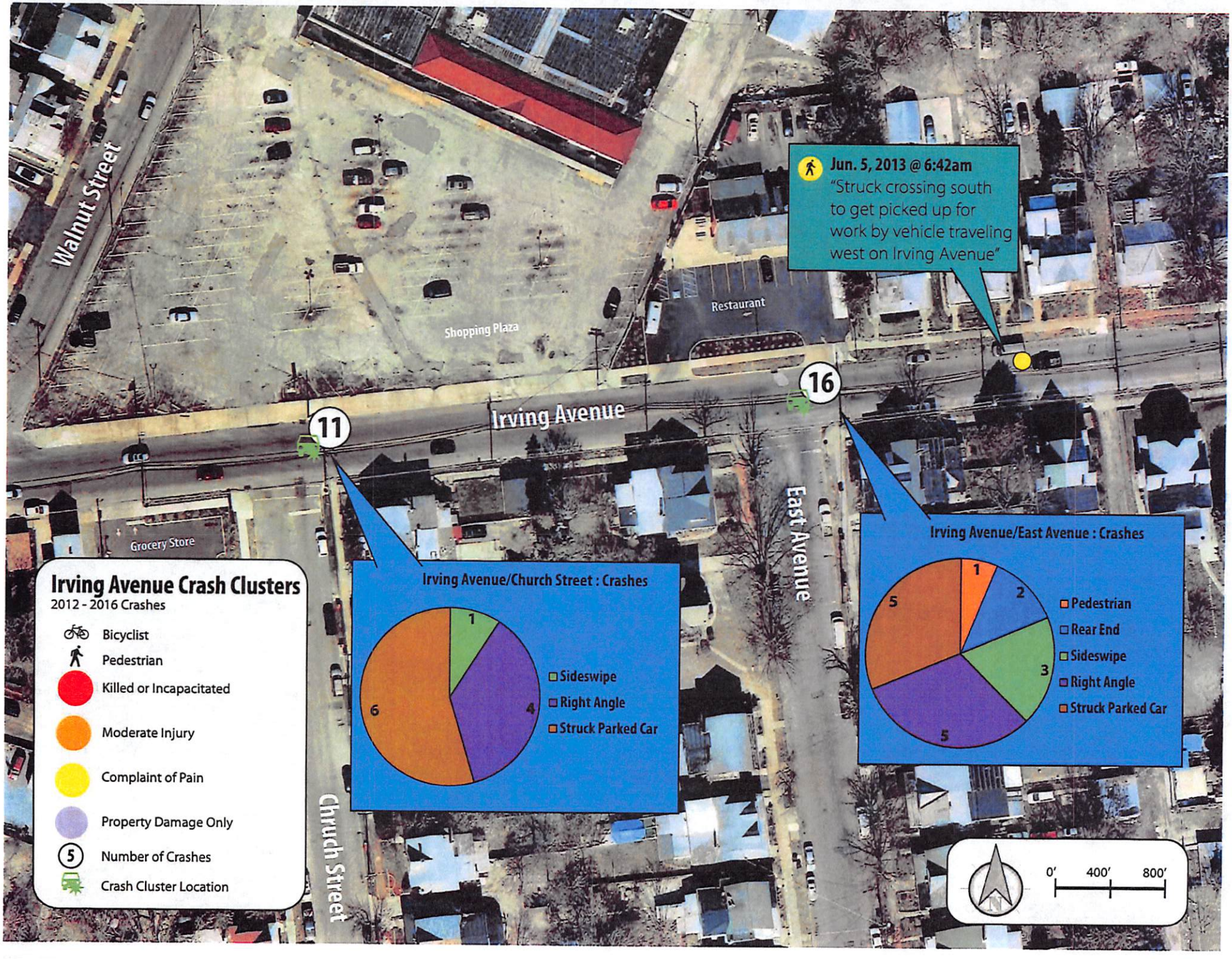

East Avenue
Humbert Street
Nov. 16, 2013 @ 3:13pm
"Fell and struck towtruck repossesing vehicle"
0'
400'
800'
East Avenue Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

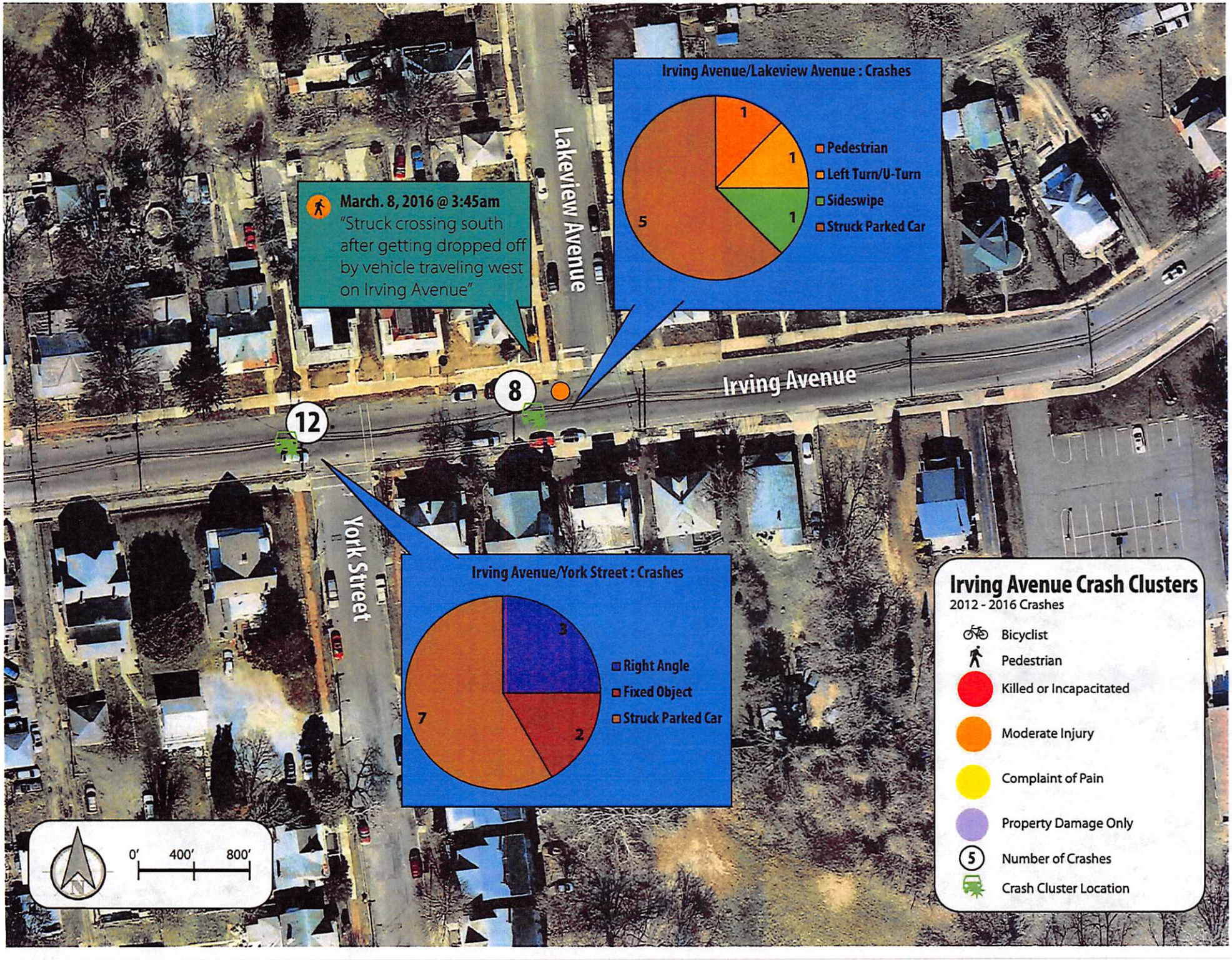

East Avenue/Walnut Road : Crashes
3
2
2
2
2
21
Head-on
Rear End
Sideswipe
Right Angle
Fixed Object
Other
East Avenue
32
Walnut Road
0'
400'
800'
East Avenue Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location


Bank Street
Walnut Street
Shopping Plaza
Irving Avenue
Sep. 21, 2014 @ 8:59pm
"dart out"
18
16
Irving Avenue/Bank Street : Crashes
1
3
5
9
Pedestrian
Right Angle
Struck Parked Car
Other
Irving Avenue/Walnut Street : Crashes
2
3
3
8
Head-on
Fixed Object
Struck Parked Car
Other
Irving Avenue Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location
N
0'
400'
800'

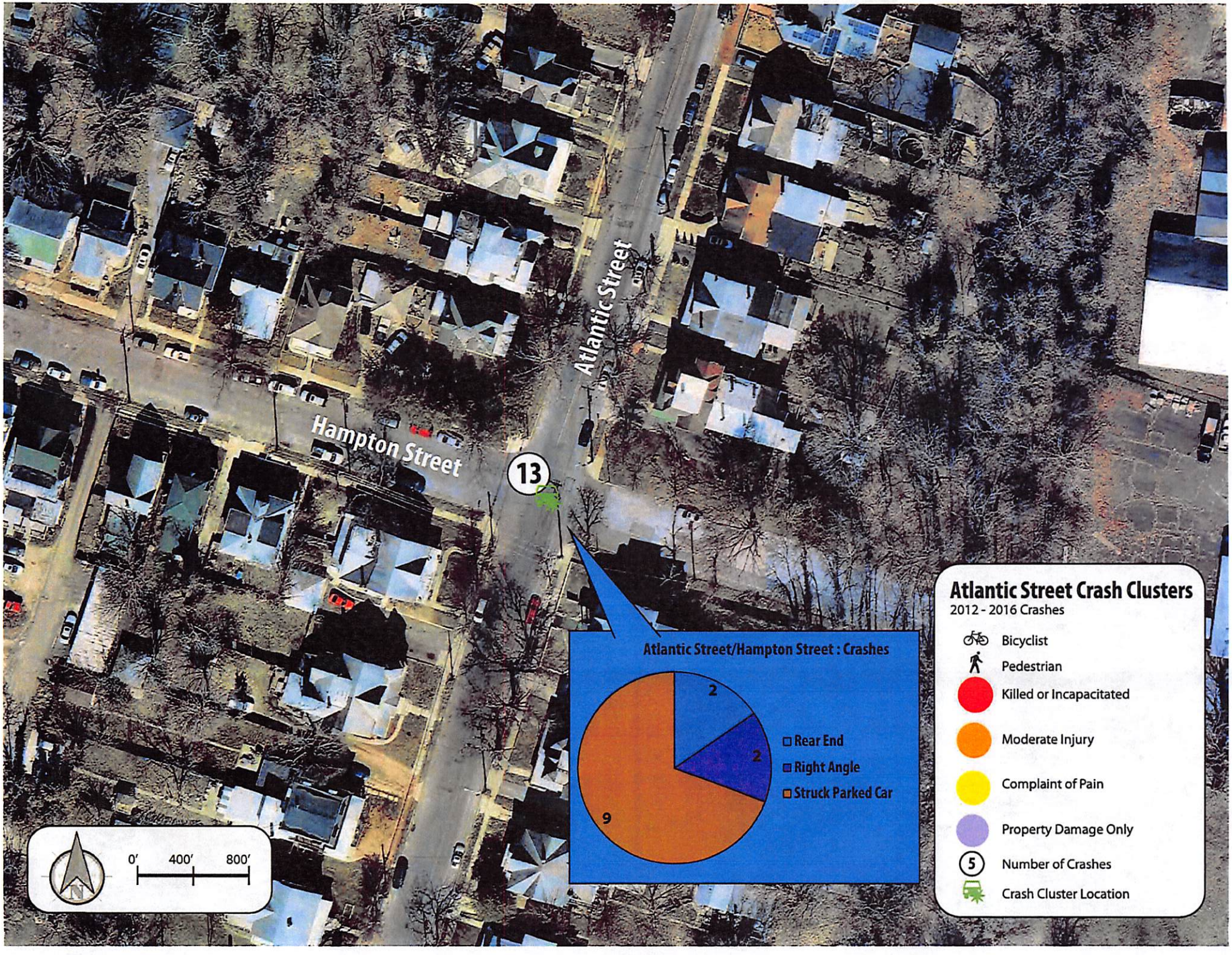

Irving Avenue/Laurel Street : Crashes
1
2
2
2
4
3
Pedestrian
Head-on
Sideswipe
Right Angle
Struck Parked Car
Other
Sep. 19, 2015 @ 7:45pm
n/a
Jun. 27, 2016 @ 11:39am
"dart out"
Oct. 26, 2014 @ 10:54am
"Struck in crosswalk by vehicle making a left onto Irving Ave traveling east"
Sep. 7, 2013 @ 12:52pm
n/a
Laurel Street
14
51
Irving Avenue
Irving Avenue/Pearl Street : Crashes
11
10
15
3
4
2
1
2
3
Bicyclist
Pedestrian
Head-on
Rear End
Sideswipe
Right Angle
Fixed Object
Backing
Other
Pearl Street : Crashes
4
1
1
4
2
7
Pedestrian
Sideswipe
Right Angle
Fixed Object
Backing
Struck Parked Car
19
Jan. 22, 2014 @ 2:49pm
n/a - slush on ground
Pearl Street
Irving Avenue Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location
0'
400'
800'

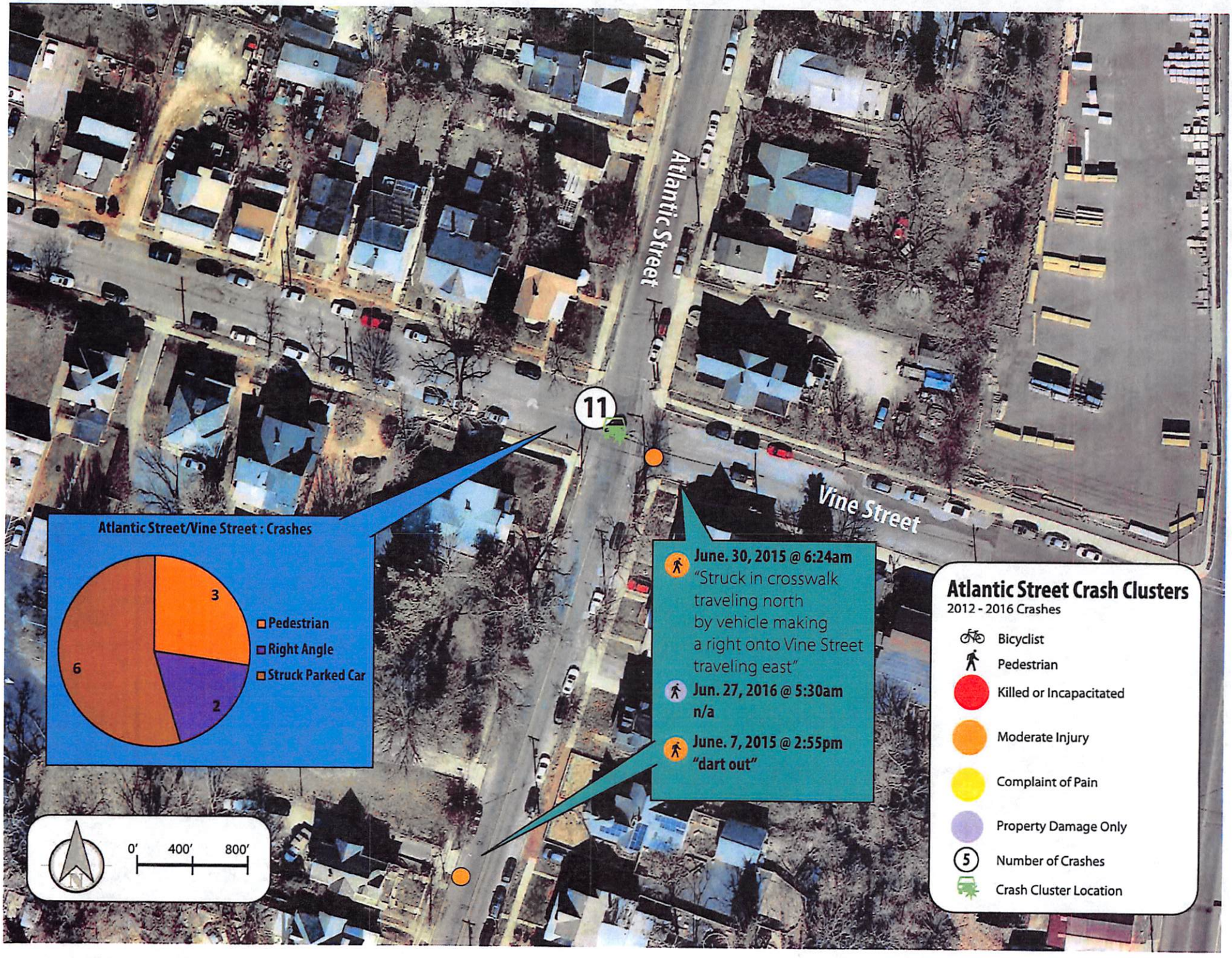

Bridgeton Hospital
Magnolia Avenue
Manheim Avenue
Irving Avenue
10
9
Jan. 17, 2016 @ 1:49am
"Struck in roadway at site of another crash by vehicle traveling east on Irving Avenue"
Jul. 7, 2015 @ 11:23am
"Struck in crosswalk traveling south by vehicle making a left, west, onto Iriving Ave."
Irving Avenue/Magnolia Avenue : Crashes
1
1
3
3
2
Pedestrian
Right Angle
Fixed Object
Backing
Struck Parked Car
Irving Avenue/Manheim Avenue : Crashes
1
2
2
2
2
Pedestrian
Rear End
Right Angle
Fixed Object
Other
Irving Avenue Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location
N
0'
400'
800'

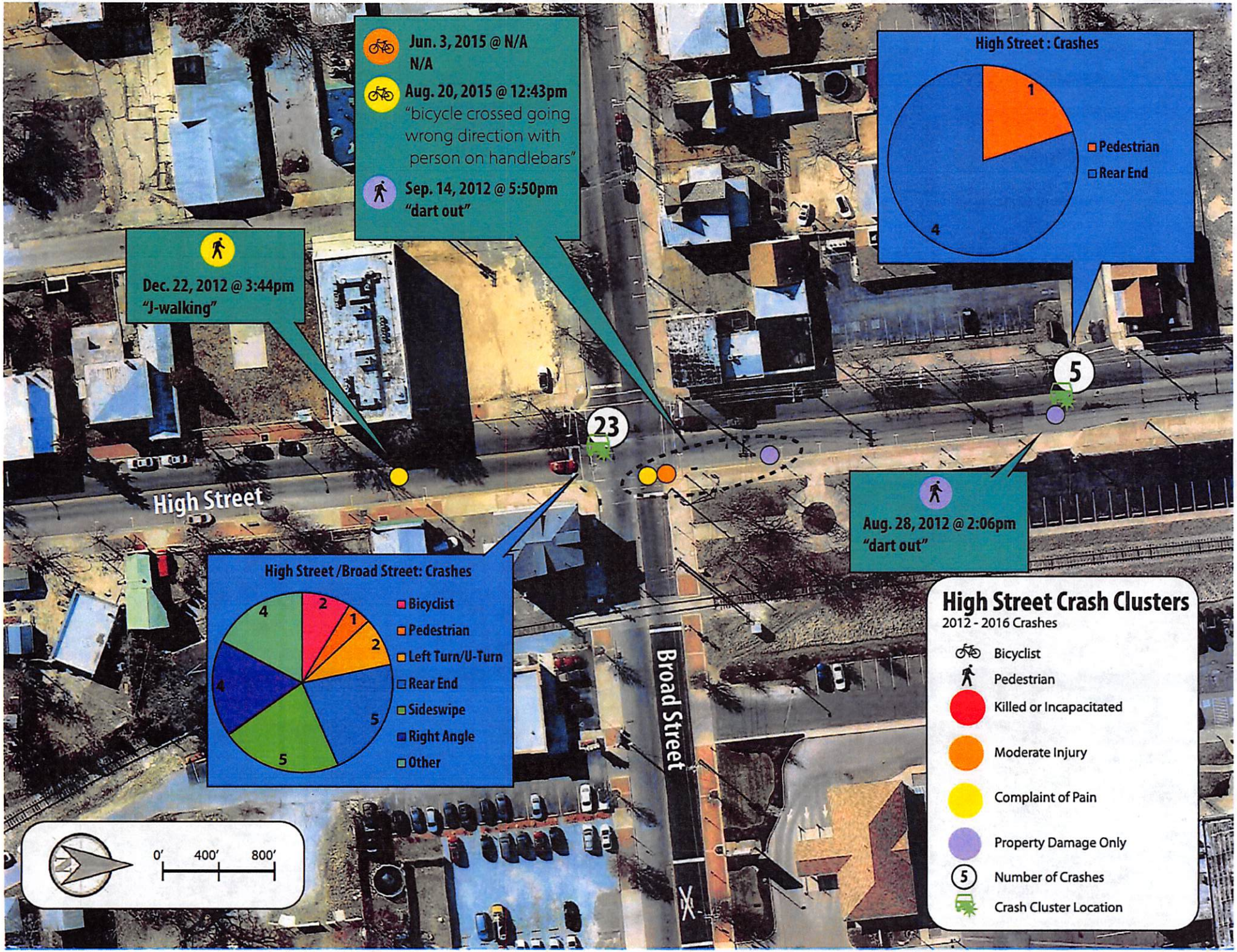

Walnut Street
Shopping Plaza
Restaurant
Irving Avenue
11
16
East Avenue
Church Street
Grocery Store
Jun. 5, 2013 @ 6:42am
"Struck crossing south to get picked up for work by vehicle traveling west on Irving Avenue"
Irving Avenue Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5 Number of Crashes
Crash Cluster Location
Irving Avenue/Church Street : Crashes
1
4
6
Sideswipe
Right Angle
Struck Parked Car
Irving Avenue/East Avenue : Crashes
1
2
5
3
5
Pedestrian
Rear End
Sideswipe
Right Angle
Struck Parked Car
0'
400'
800'

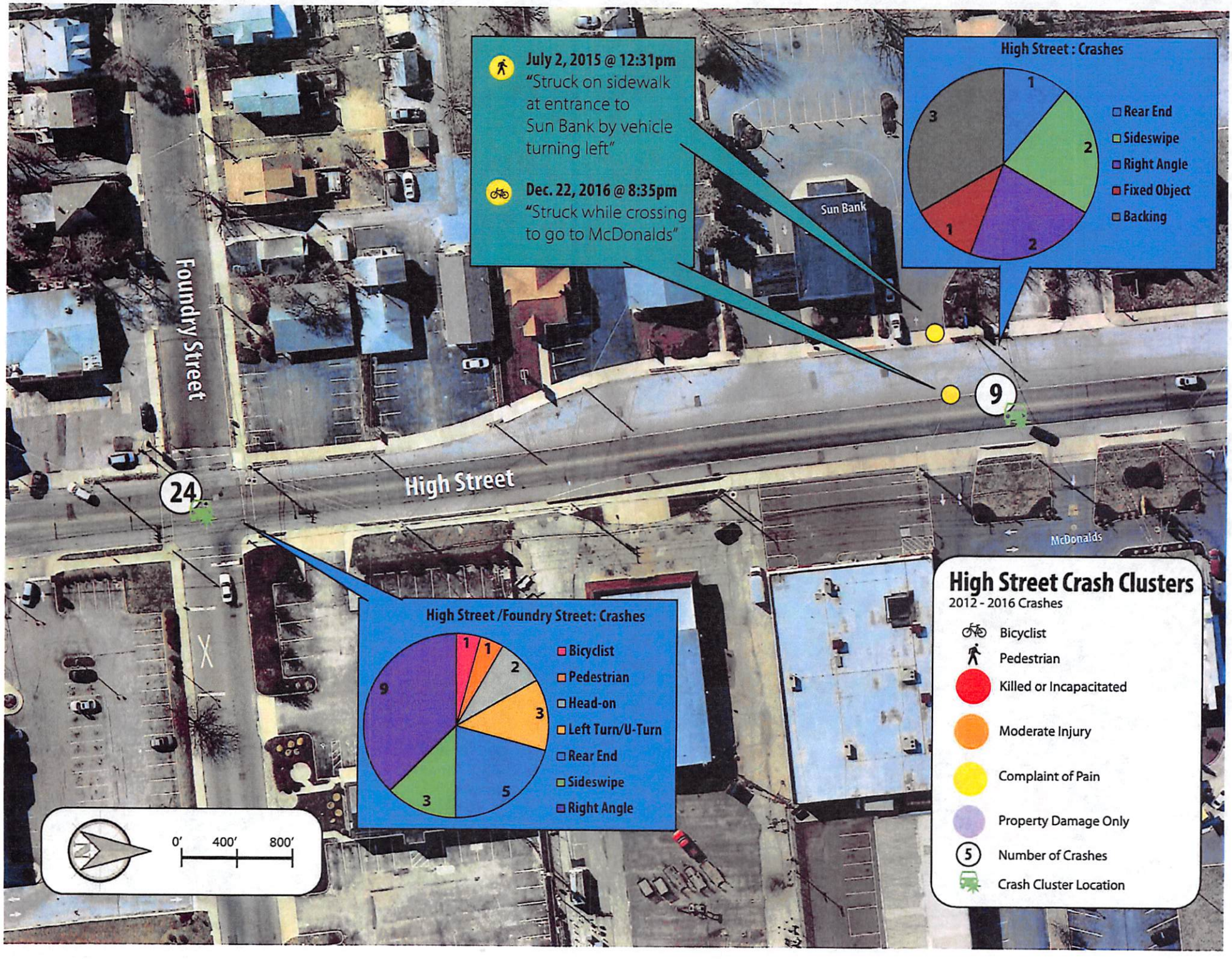

Irving Avenue/Lakeview Avenue : Crashes
1
1
1
5
Pedestrian
Left Turn/U-Turn
Sideswipe
Struck Parked Car
March. 8, 2016 @ 3:45am
"Struck crossing south after getting dropped off by vehicle traveling west on Irving Avenue"
Lakeview Avenue
Irving Avenue
8
12
York Street
Irving Avenue/York Street : Crashes
3
7
2
Right Angle
Fixed Object
Struck Parked Car
0'
400'
800'
Irving Avenue Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

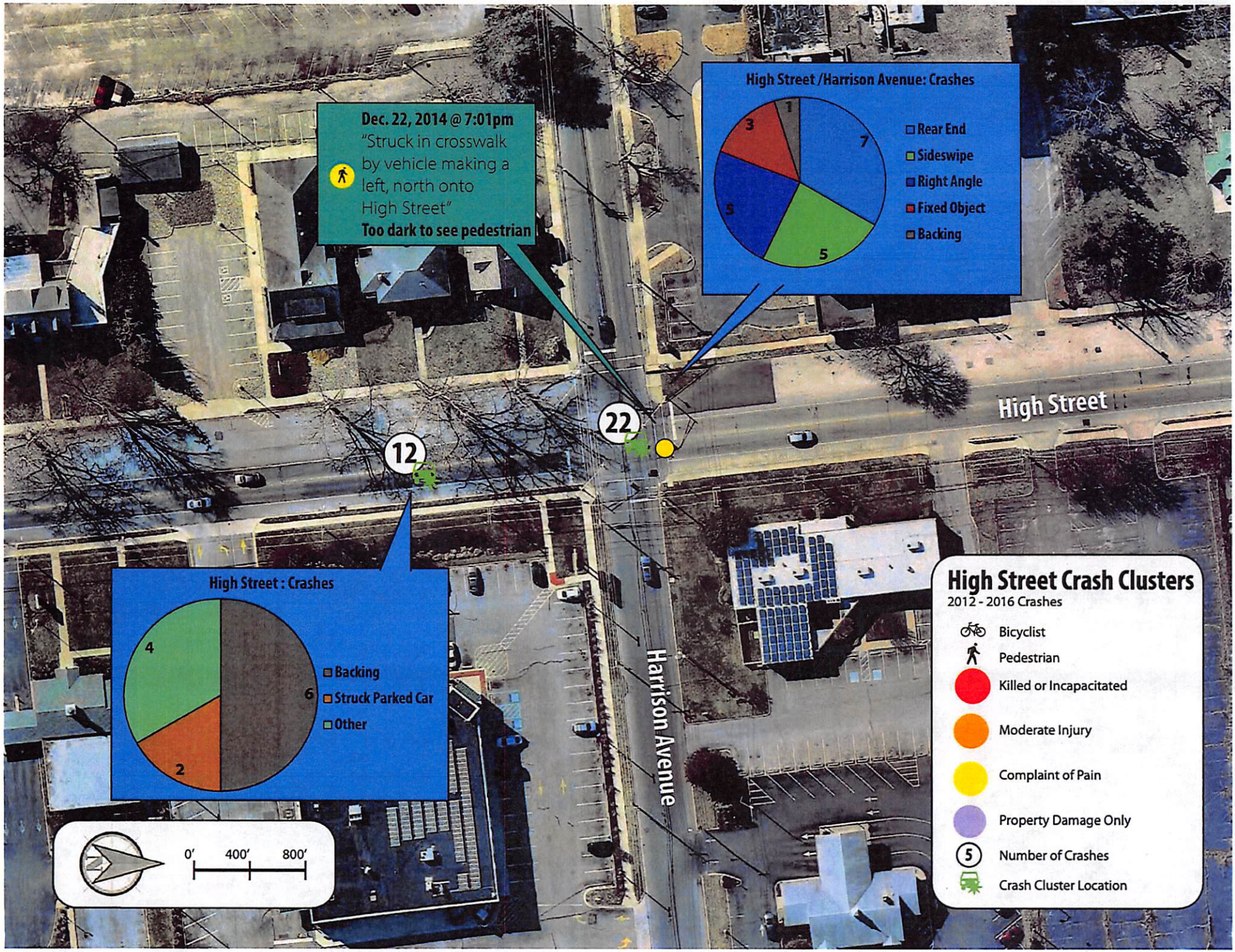

Cottage Avenue
Atlantic Street
Belmont Avenue
7
8
Atlantic Street/Cottage Avenue : Crashes
1
1
5
Pedestrian
Fixed Object
Struck Parked Car
Dec. 15, 2015 @ 10:06pm
"Struck by vehicle from behind then assaulted"
Atlantic Street/Belmont Avenue : Crashes
1
2
5
Pedestrian
Right Angle
Struck Parked Car
Nov. 4, 2012 @ 10:11pm
"dart out"
Atlantic Street Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5 Number of Crashes
Crash Cluster Location
N
0'
400'
800'

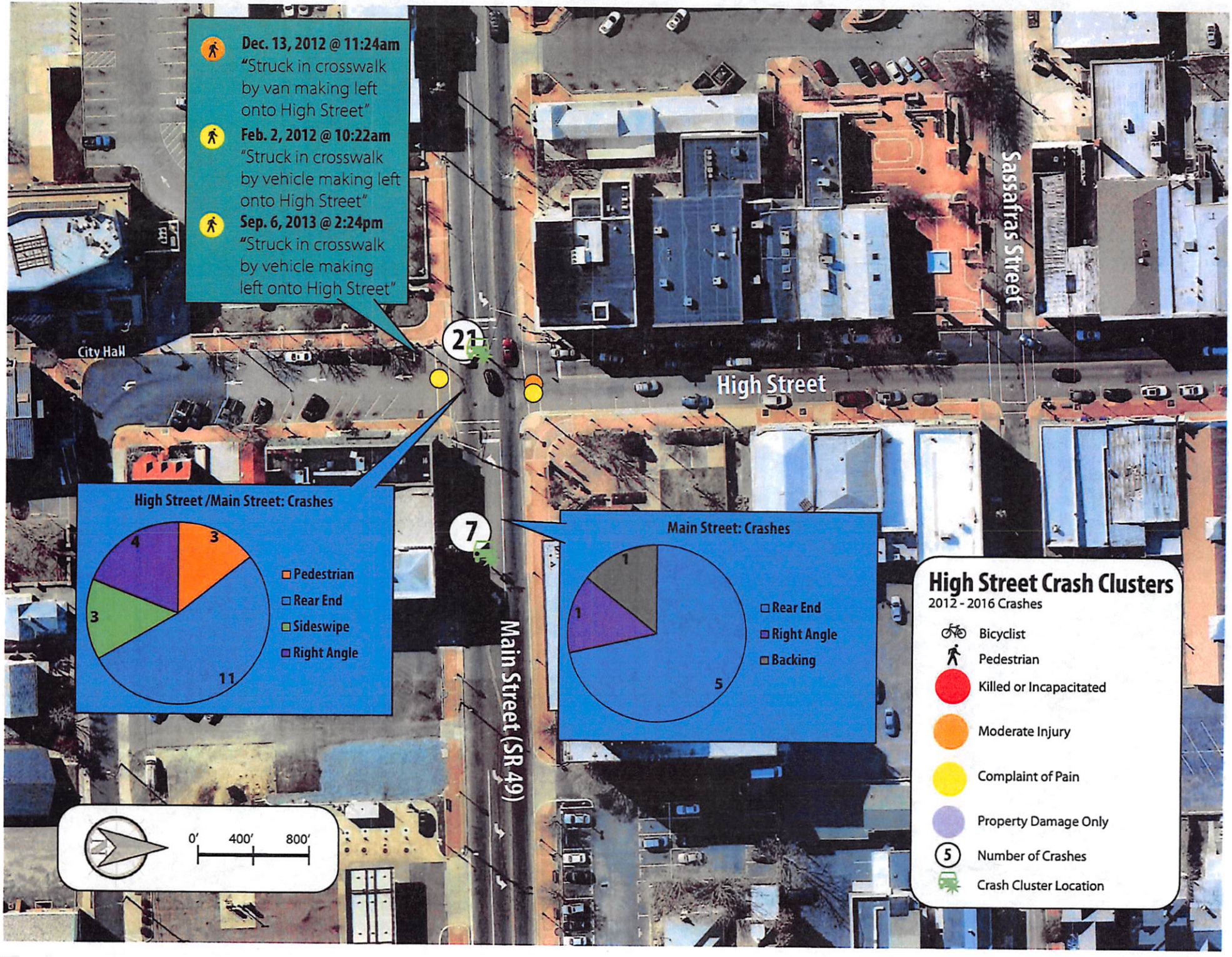

Atlantic Street
Hampton Street
13
Atlantic Street/Hampton Street : Crashes
2
2
9
Rear End
Right Angle
Struck Parked Car
Atlantic Street Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location
0'
400'
800'

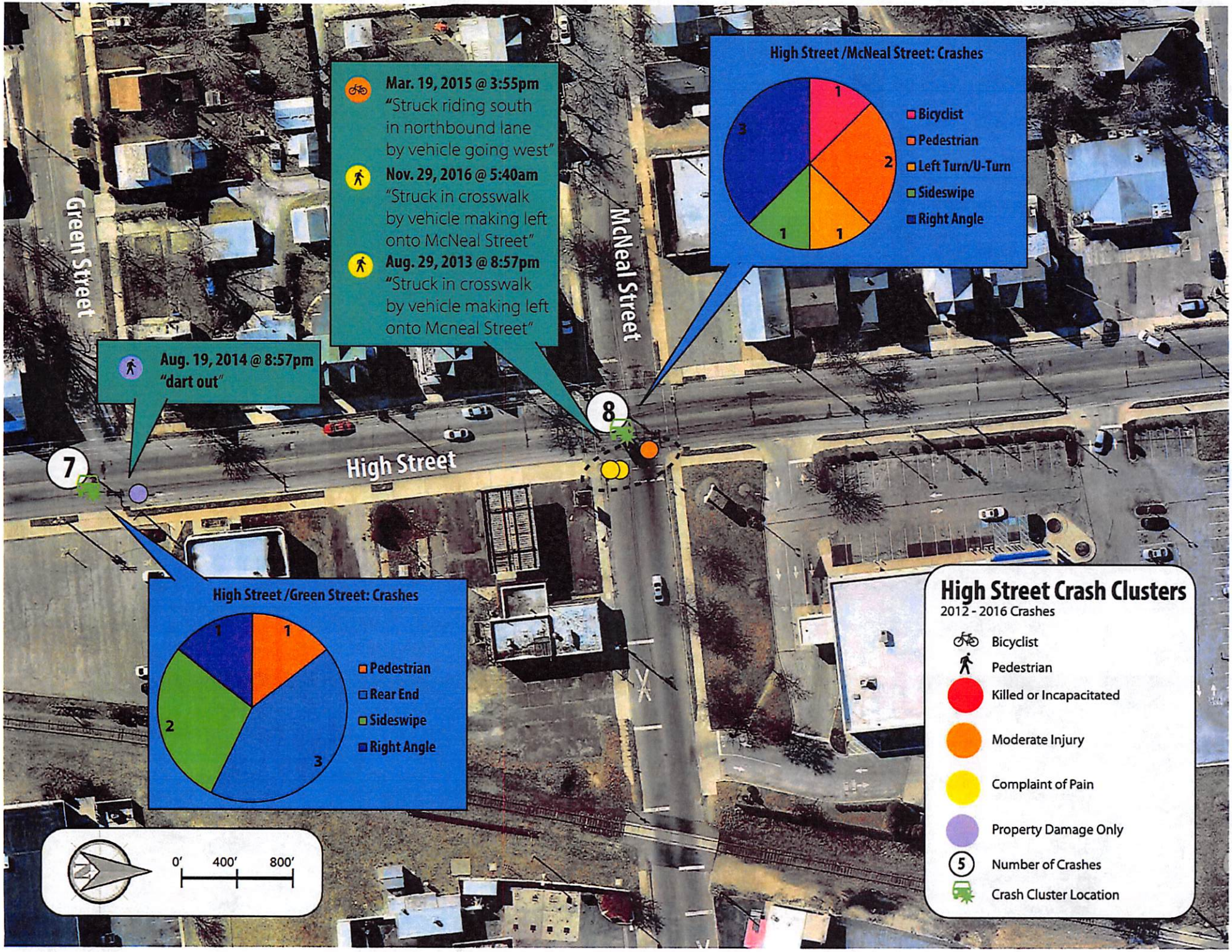

Atlantic Street
Vine Street
11
Atlantic Street/Vine Street : Crashes
3
6
2
Pedestrian
Right Angle
Struck Parked Car
June. 30, 2015 @ 6:24am
"Struck in crosswalk traveling north by vehicle making a right onto Vine Street traveling east"
Jun. 27, 2016 @ 5:30am
n/a
June. 7, 2015 @ 2:55pm
"dart out"
Atlantic Street Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location
N
0'
400'
800'

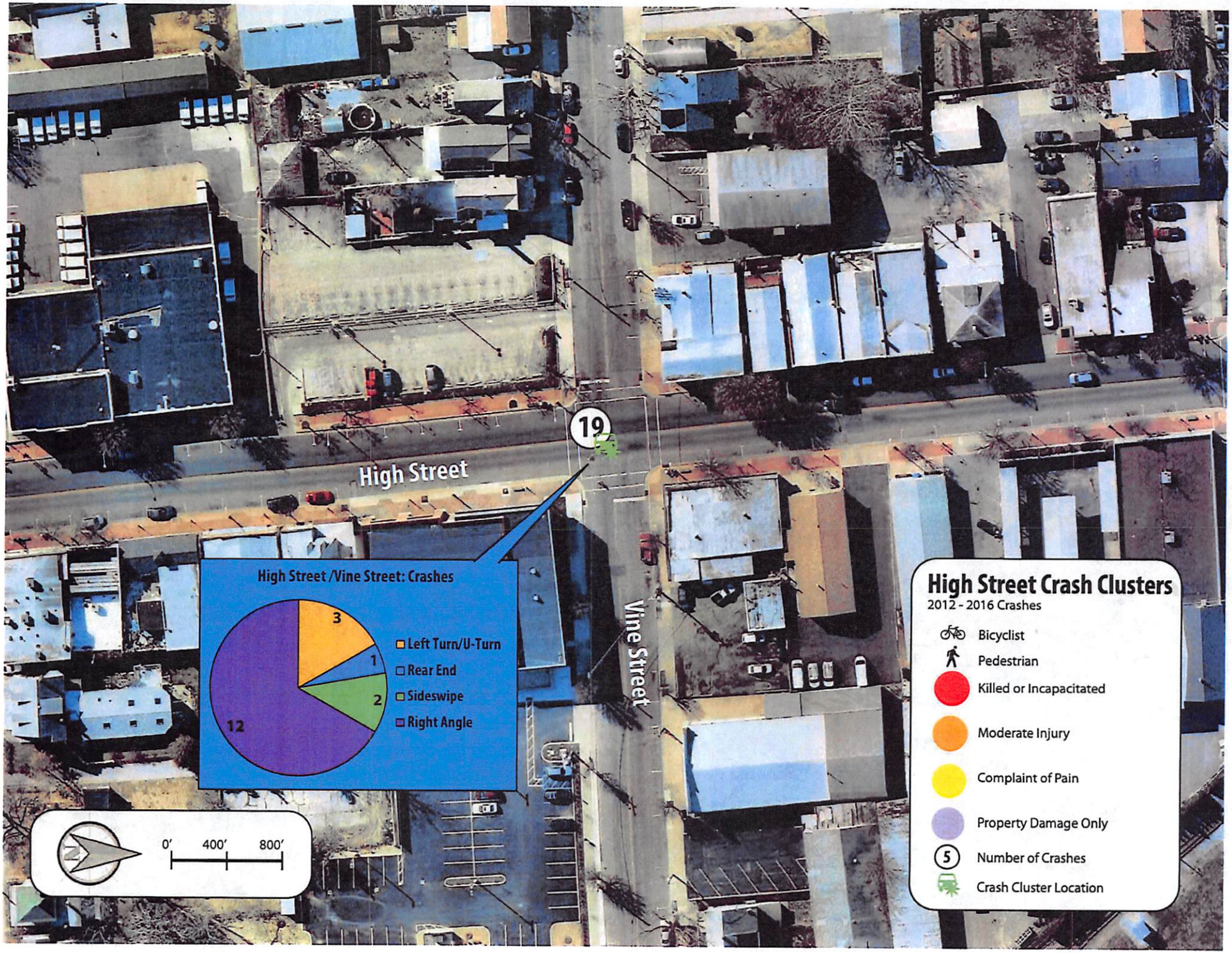

Jun. 3, 2015 @ N/A
N/A
Aug. 20, 2015 @ 12:43pm
"bicycle crossed going wrong direction with person on handlebars"
Sep. 14, 2012 @ 5:50pm
"dart out"
Dec. 22, 2012 @ 3:44pm
"J-walking"
High Street : Crashes
1
4
Pedestrian
Rear End
5
23
High Street
Aug. 28, 2012 @ 2:06pm
"dart out"
High Street /Broad Street: Crashes
2
1
2
5
5
4
4
Bicyclist
Pedestrian
Left Turn/U-Turn
Rear End
Sideswipe
Right Angle
Other
Broad Street
0'
400'
800'
High Street Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

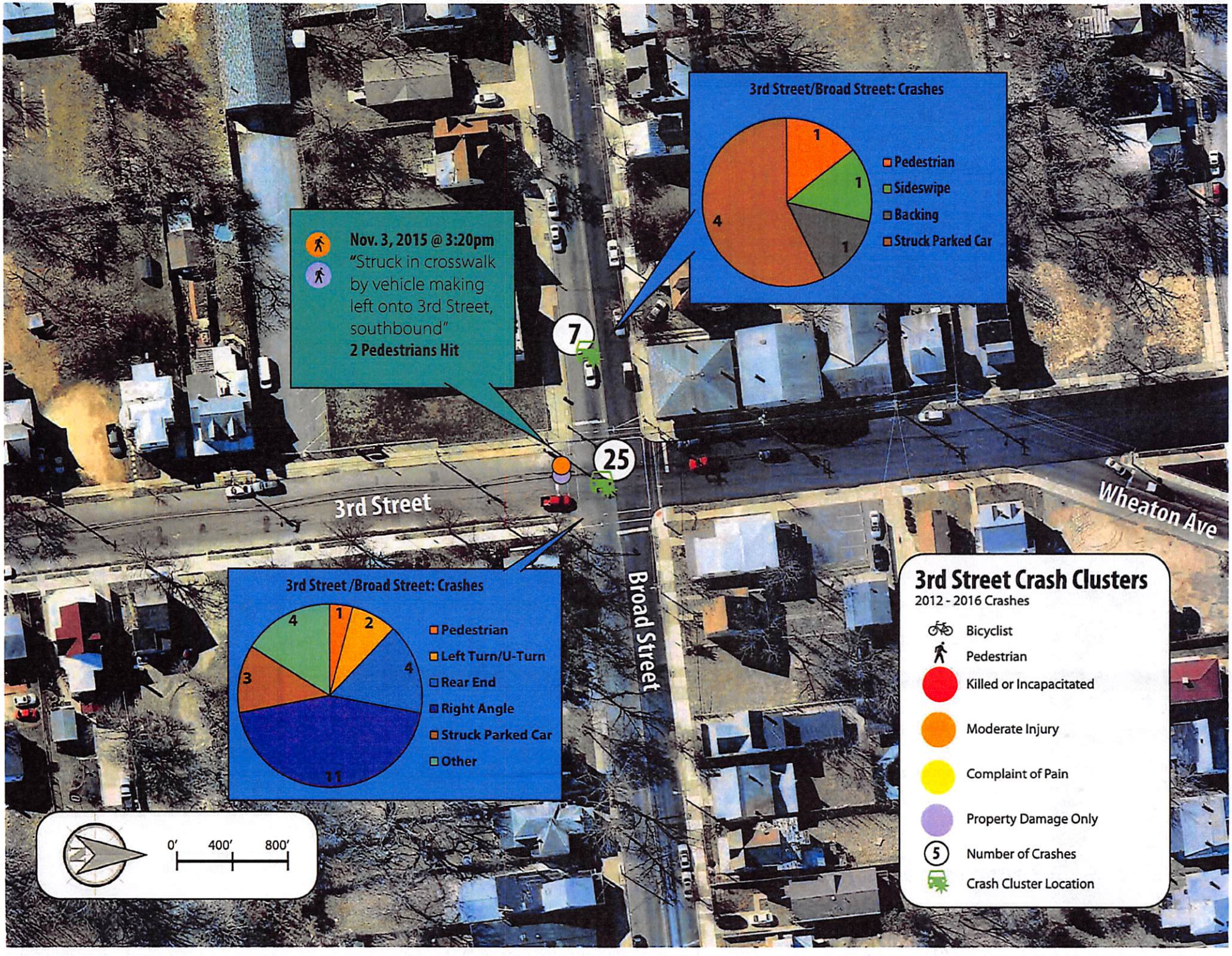

July 2, 2015 @ 12:31pm
"Struck on sidewalk at entrance to Sun Bank by vehicle turning left"
Dec. 22, 2016 @ 8:35pm
"Struck while crossing to go to McDonalds"
High Street : Crashes
1
2
2
1
3
Rear End
Sideswipe
Right Angle
Fixed Object
Backing
Sun Bank
Foundry Street
High Street
9
24
McDonalds
High Street /Foundry Street: Crashes
1
1
2
3
5
3
9
Bicyclist
Pedestrian
Head-on
Left Turn/U-Turn
Rear End
Sideswipe
Right Angle
0'
400'
800'
High Street Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

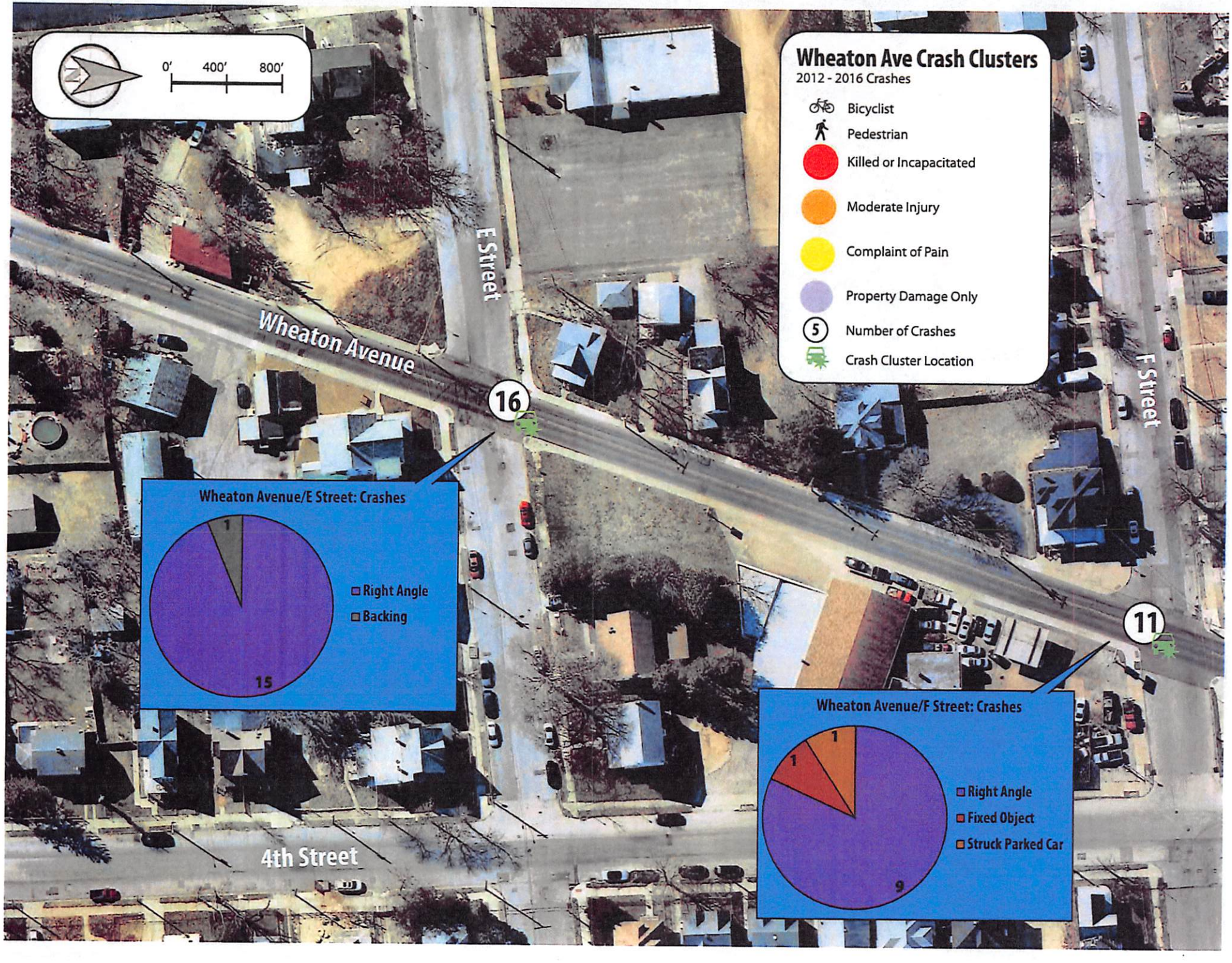

Dec. 22, 2014 @ 7:01pm
"Struck in crosswalk by vehicle making a left, north onto High Street"
Too dark to see pedestrian
High Street /Harrison Avenue: Crashes
Rear End
Sideswipe
Right Angle
Fixed Object
Backing
7
1
3
5
5
High Street : Crashes
Backing
Struck Parked Car
Other
4
6
2
12
22
High Street
Harrison Avenue
0'
400'
800'
High Street Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

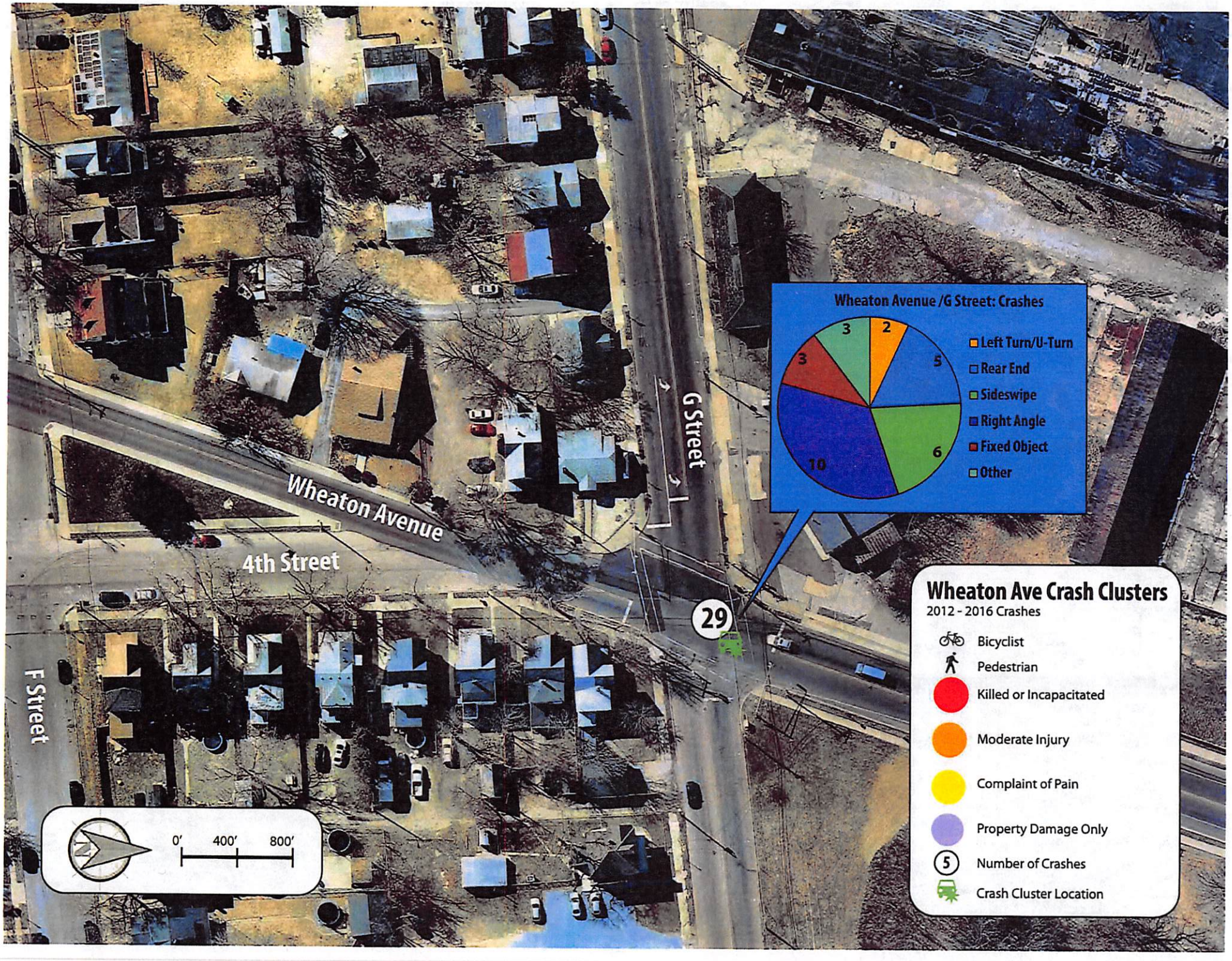

Dec. 13, 2012 @ 11:24am
"Struck in crosswalk by van making left onto High Street"
Feb. 2, 2012 @ 10:22am
"Struck in crosswalk by vehicle making left onto High Street"
Sep. 6, 2013 @ 2:24pm
"Struck in crosswalk by vehicle making left onto High Street"
City Hall
21
High Street
Sassafras Street
7
Main Street (SR 49)
High Street /Main Street: Crashes
4
3
3
11
Pedestrian
Rear End
Sideswipe
Right Angle
Main Street: Crashes
1
1
5
Rear End
Right Angle
Backing
0'
400'
800'
High Street Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

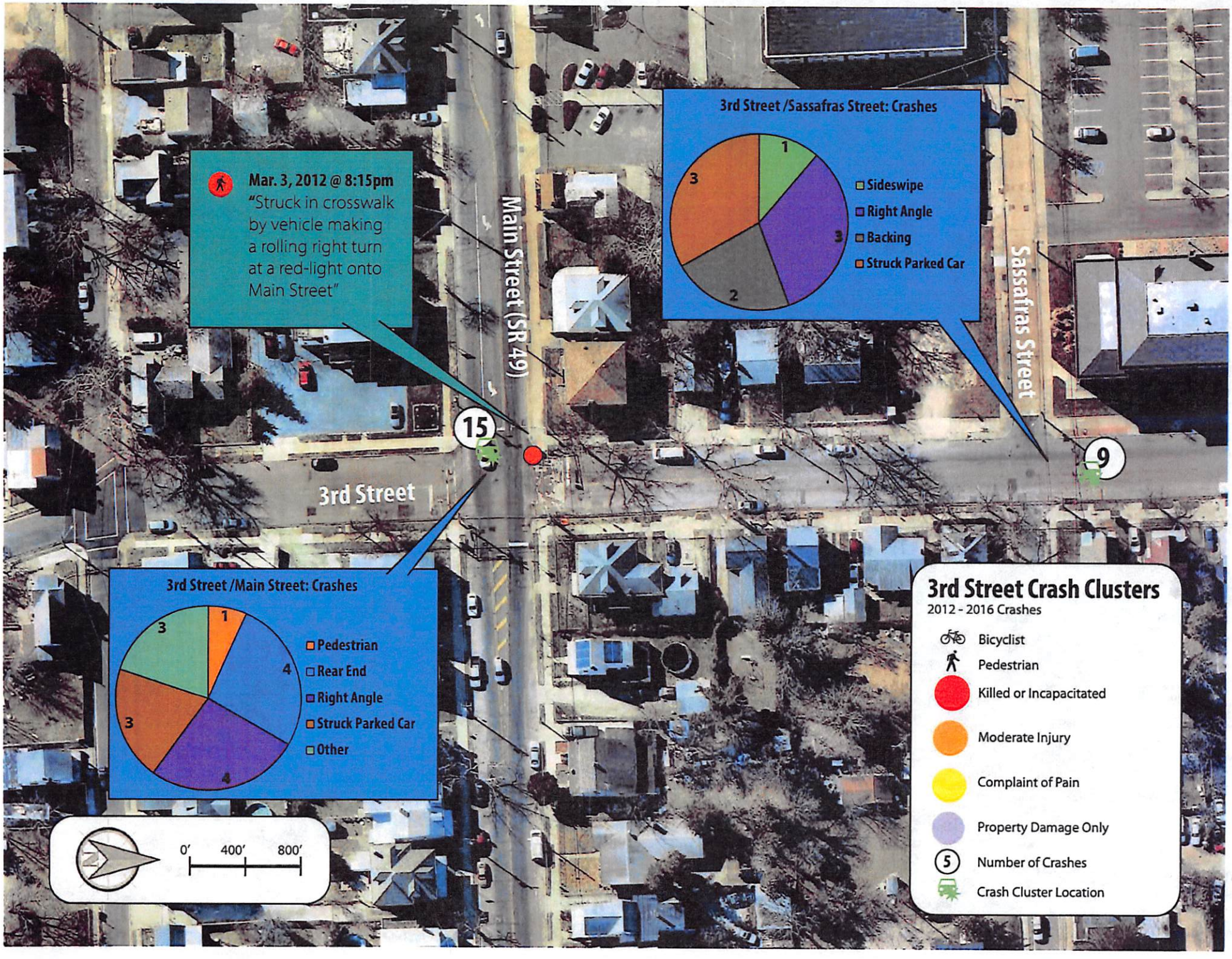

Green Street
McNeal Street
High Street
Mar. 19, 2015 @ 3:55pm
"Struck riding south in northbound lane by vehicle going west"
Nov. 29, 2016 @ 5:40am
"Struck in crosswalk by vehicle making left onto McNeal Street"
Aug. 29, 2013 @ 8:57pm
"Struck in crosswalk by vehicle making left onto Mcneal Street"
Aug. 19, 2014 @ 8:57pm
"dart out"
7
8
High Street /McNeal Street: Crashes
1
2
1
1
3
Bicyclist
Pedestrian
Left Turn/U-Turn
Sideswipe
Right Angle
High Street /Green Street: Crashes
1
1
2
3
Pedestrian
Rear End
Sideswipe
Right Angle
0'
400'
800'
High Street Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

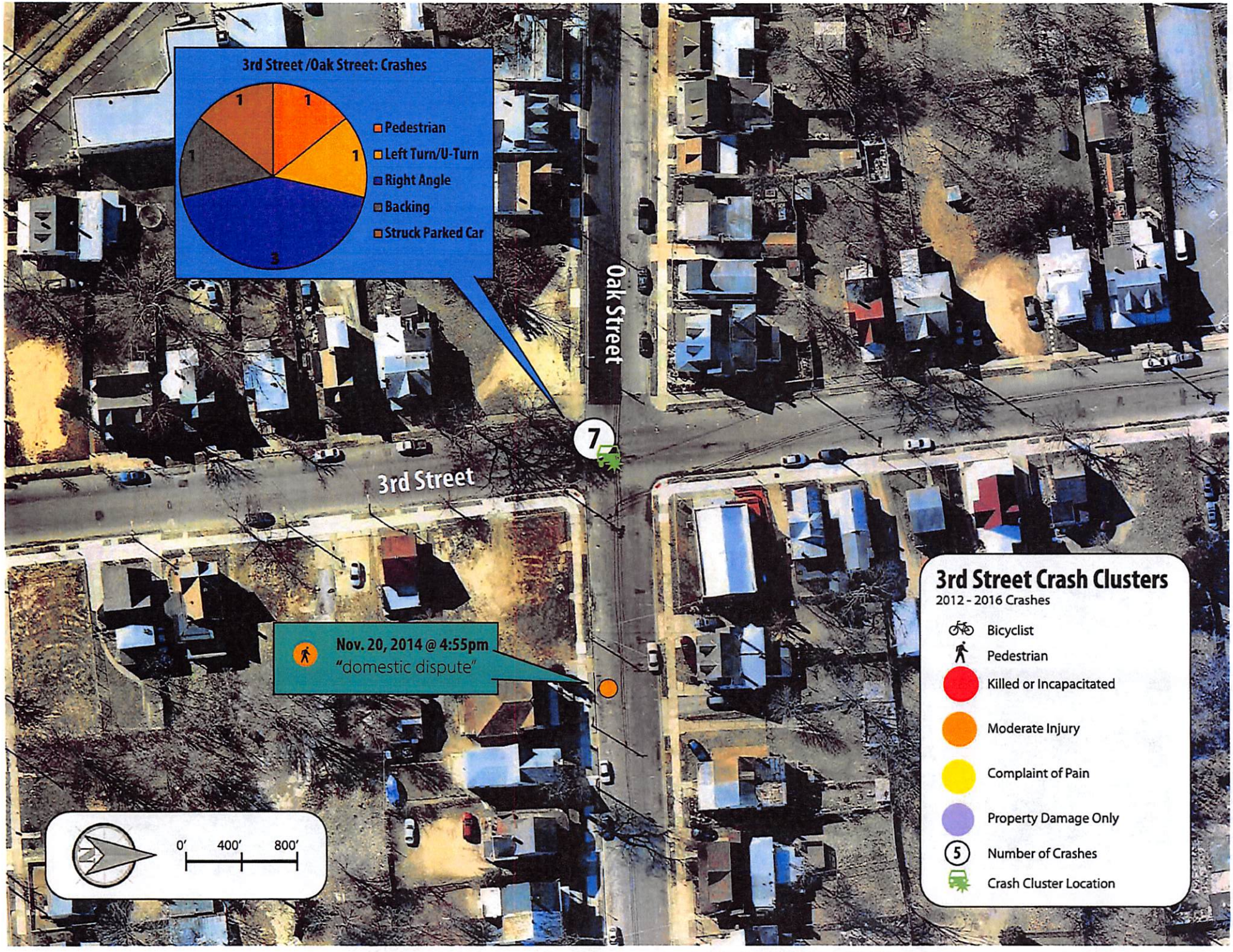

19
High Street
Vine Street
High Street /Vine Street: Crashes
3
1
2
12
Left Turn/U-Turn
Rear End
Sideswipe
Right Angle
0'
400'
800'
High Street Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location


3rd Street/Broad Street: Crashes
1
1
4
1
Pedestrian
Sideswipe
Backing
Struck Parked Car
Nov. 3, 2015 @ 3:20pm
"Struck in crosswalk by vehicle making left onto 3rd Street, southbound"
2 Pedestrians Hit
7
25
3rd Street
Broad Street
Wheaton Ave
3rd Street /Broad Street: Crashes
4
1
2
4
3
11
Pedestrian
Left Turn/U-Turn
Rear End
Right Angle
Struck Parked Car
Other
N
0′
400′
800′
3rd Street Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location


0'
400'
800'
Wheaton Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5 Number of Crashes
Crash Cluster Location
Wheaton Avenue
E Street
F Street
4th Street
16
11
Wheaton Avenue/E Street: Crashes
1
15
Right Angle
Backing
Wheaton Avenue/F Street: Crashes
1
1
9
Right Angle
Fixed Object
Struck Parked Car


Wheaton Avenue /G Street: Crashes
2
5
6
10
3
3
Left Turn/U-Turn
Rear End
Sideswipe
Right Angle
Fixed Object
Other
Wheaton Avenue
4th Street
G Street
F Street
29
0'
400'
800'
Wheaton Ave Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location


Mar. 3, 2012 @ 8:15pm
"Struck in crosswalk by vehicle making a rolling right turn at a red-light onto Main Street"
3rd Street /Sassafras Street: Crashes
1
3
3
2
Sideswipe
Right Angle
Backing
Struck Parked Car
Main Street (SR 49)
Sassafras Street
3rd Street
15
9
3rd Street /Main Street: Crashes
1
3
4
3
4
Pedestrian
Rear End
Right Angle
Struck Parked Car
Other
N
0'
400'
800'
3rd Street Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location


3rd Street /Oak Street: Crashes
1
1
1
1
3
Pedestrian
Left Turn/U-Turn
Right Angle
Backing
Struck Parked Car
Oak Street
7
3rd Street
Nov. 20, 2014 @ 4:55pm
"domestic dispute"
0'
400'
800'
3rd Street Crash Clusters
2012 - 2016 Crashes
Bicyclist
Pedestrian
Killed or Incapacitated
Moderate Injury
Complaint of Pain
Property Damage Only
5
Number of Crashes
Crash Cluster Location

Appendix D

Roadway Owner Response