ATLANTIC AVENUE
ROAD SAFETY AUDIT
Atlantic City, New Jersey
REPORT

>> December 2014

RSA performed by the Transportation Safety Resource Center (TSRC) at the Rutgers' Center for Advanced Infrastructure and Transportation (CAIT) in partnership with the South Jersey Transportation Planning Organization (SJTPO) and City of Atlantic City

>> cait.rutgers.edu/tsrc

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What is a Road Safety Audit (RSA)?

CAIT's Transportation Safety Resource Center (TSRC) and New Jersey Local Technical Assistance Program (NJ LTAP) offer a statewide Road Safety Audit (RSA) service at no charge to New Jersey towns and counties. Interested parties can request road surveys conducted by a team of engineers, planners, and law-enforcement officers to help municipalities and counties make cost-effective safety improvements.

A multidisciplinary team of professionals offers assessments on roadway issues such as pedestrian and bicycle safety, intersection analyses, rural roads, human factors, speed management, and sign visibility and retroreflectivity standards.

RSAs include data-driven considerations and analysis of crashes. To determine the best safety solutions, RSA professionals perform incisive crash data evaluations on the target area using Plan4Safety, TSRC's award-winning crash database and software.

The RSA team provides a final report that includes long- and short-term countermeasure recommendations that fit within the requestor's budget. Furthermore, RSAs pay off. According to the Federal Highway Administration (FHWA), countermeasures applied after RSAs can reduce crashes by about 60 percent.

For more information, contact Andy Kaplan, senior engineer researcher at andy.kaplan@rutgers.edu.

Disclaimer

Road Safety Audit reports provided by the Center for Advanced Infrastructure and Transportation staff do not constitute an engineering report. The agency responsible for design and construction should consult a professional engineer licensed in the state of New Jersey in preparing construction documents to implement any of the safety countermeasures in the report.

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>> 1.0 Corridor Analysis

1.1 Site Selection

The Atlantic Avenue Road Safety Audit (RSA) was conducted on April 4, 2014 as one of two RSAs the Transportation Safety Resource Center (TSRC) conducted in the South Jersey Transportation Organization (SJTPO) region. As an intersection and pedestrian focus state, TSRC conducted a regional analysis of intersection and pedestrian crashes. It was found that Atlantic City was overwhelmingly over-respected in pedestrian crashes. As such, TSRC conducted a pedestrian spot (1/10 mile) and pedestrian corridor (1 mile) network screening focused on the Atlantic City subregion.

The number one pedestrian corridor (2008–2012) in the city was Atlantic Avenue between Mississippi Avenue and Virginia Avenue. Also included within this corridor were the following high ranking pedestrian spots (2008–2012):

- #1 Atlantic Avenue between Michigan Avenue and Ohio Avenue
- #2 Atlantic Avenue between Dr. Martin Luther King Boulevard and Kentucky Avenue
- #3 Atlantic Avenue between Tennessee Avenue and South Carolina Avenue
- #4 Atlantic Avenue between New York Avenue and Tennessee Avenue

TSRC and SJTPO also consulted the NJDOT pedestrian intersection lists (2003–2005) and identified the following sites as state priorities:

- NJDOT Pedestrian Intersection Rank: # 5 (Tie) Atlantic Avenue and Ohio Avenue
- NJDOT Pedestrian Intersection Rank: # 18 (Tie) Atlantic Avenue and Kentucky Avenue

The table below summarizes this information.

Intersection	Atlantic City Pedestrian Spot Rank (2008–2012)	NJDOT Pedestrian Spot and Intersection Rank (2003–2005)
A. Atlantic Avenue and Michigan Avenue	1	(none)
B. Atlantic Avenue and Ohio Avenue	1	5
C. Atlantic Avenue and Dr. Martin Luther King Boulevard	2	(none)
D. Atlantic Avenue and Kentucky Avenue	2	18
E. Atlantic Avenue and New York Avenue	4	(none)
F. Atlantic Avenue and Tennessee Avenue	3	(none)
G. Atlantic Avenue and South Carolina Avenue	3	(none)

Figure 1

Figure 2

1.2 Traffic Volumes

Traffic counts from the NJDOT show that Atlantic Avenue has an average annual daily traffic (AADT) count of 15,062 at Dr. Martin Luther King Boulevard in 2012. This is a decrease from the 2009 counts at the same location that showed AADT being 19,595. Just southwest of the study area, between Arkansas Avenue and Christopher Columbus Boulevard on Atlantic Avenue, traffic counts similarly dropped from 16,112 in 2007 to 12,034 in 2011. Northeast of the study area, the traffic volume increased from 11,026 in 2009 to 14,189 in 2012. Volume at cross streets is significantly less, totaling to 2,563 AADT northbound on Indiana Avenue.

1.3 Transit Service

Thirty percent of Atlantic City residents commute to work by public transit. The study area is particularly transit-heavy since 11 of the city's 18 bus lines run along the corridor. Of the 225 bus stops in Atlantic City, only 11 of them are along the Atlantic Avenue study corridor. Every bus stop along the corridor except one accommodates seven to 10 different bus route lines. Bus traffic generates lots of pedestrian activity along the study corridor with people waiting at bus stops. The Atlantic City bus terminal is also within the study corridor at the intersection of Ohio Avenue and Atlantic Avenue. The terminal hosts buses traveling to and from several large east coast cities, including New York City, Baltimore, and Philadelphia. The Atlantic City Rail Terminal is located three blocks northeast of the bus terminal.

1.4 Area Characteristics and Background

Atlantic City is located in Atlantic County, New Jersey. It is well known for its resorts, casinos, and boardwalk. According to the U.S. Census Bureau's 2010–2012 American Community Survey, the city's total population is 39,543, and its working population is 14,624. In terms of commuting trends, 30 percent of Atlantic City residents commute by public transit. Another 17 percent walk to work. These percentages are significantly higher than the public transit and walking patterns throughout the rest of the state, which measure at 11 and 3 percent respectively. Another 4 percent of workers biked, motorcycled, or took a taxicab to work. Those who drive alone represent approximately 39 percent of the population. This is all summarized in figure 1.

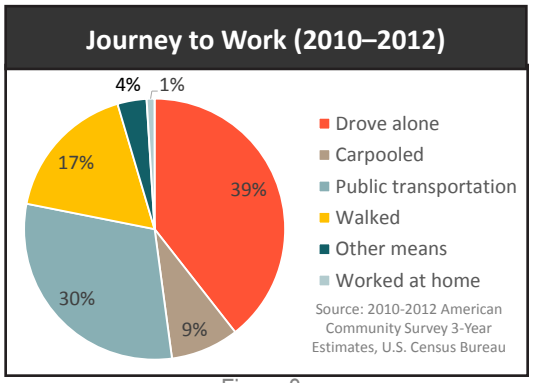


Figure 3

Intersection	Larger Establishments
Michigan Avenue	Tanger Outlet strip mall, Caesars
Ohio Avenue	Atlantic City Medical Center, Atlantic City Bus Terminal
Indiana Avenue	U.S. Post Office, large vacant lot
Kentucky Avenue	Strip mall, large parking lot
New York Avenue	AtlantiCare Healthcare Complex
Tennessee Avenue	Public Library
S. Carolina Avenue	City Center Park

Figure 4

The southwest end on the study area is bounded by several large commercial establishments, including Trump Plaza, Caesars, and the Tanger Outlets strip mall. Small- and medium-sized establishments continue northwards along Atlantic Avenue. Other notable features along the study corridor include a public library, healthcare facilities and the city's bus terminal. The locations of each are summarized in the Figure 4.

Atlantic City recently received technical assistance from the New Jersey Department of Transportation (NJ DOT). Working as a consultant for the state, Michael Baker released the Bicycle and Pedestrian Master Plan in May 2013. The plan analyzes the city's bikeability and walkability and makes recommendations on areas to improve. It also proposes a comprehensive bicycle and pedestrian network. The plan recognizes the RSA corridor along Atlantic Avenue as both a bicycle and pedestrian route and recommends a road diet that includes just one travel lane in each direction, a center turn lane, bike lanes, a 6-foot-wide fenced median, and in one of the scenarios, curb extensions. As of February 2014, the city had submitted an application to South Jersey Transportation Planning Organization (SJTPO) for $14.5 million in Highway Safety Improvement Funds (HSIP). The application is currently pending.

1.5 Intersection characteristics

The typical cross-section of Atlantic Avenue is 69-feet from curb to curb with two travel lanes in each direction. A fifth center lane allows vehicles to turn on to the side streets. Four of the cross streets within the study are one-directional on one side of Atlantic Avenue and two-directional on the other. When the cross street does not allow for left turns, the center lane frequently becomes a painted median as it approaches the intersection. Cross streets (Dr. Martin Luther King Boulevard) is bi-directional on both sides of Atlantic Avenue, and three (South Carolina Avenue, Ohio Avenue, and Indiana Avenue) are one-directional on either side of Atlantic Avenue. One intersection, Mt. Vernon Avenue, is one-directional on one side and an alley on the other. A brief description of the geometry at the studied intersections is provided below:

Figure 5

Michigan Avenue and Atlantic Avenue

- North leg. Two northbound (NB) lanes. Two southbound (SB) lanes: one left-turn-only lane and one right-turn-only lane. Left turn lane is set 25 feet from intersection. Trees, vegetation on either side of street.
- South leg. Four NB lanes: two left-turn-only lanes, one through lane (crossing Atlantic Avenue at an angle) and one through/right-turn lane. Parking garage on west side of street 100 feet south of intersection.
- East leg. Three westbound (WB) lanes: two through lanes and one through/right-turn lane. Seven foot median in center. Two eastbound (EB) lanes. Prohibited parking area marked by paint starting 15 feet from intersection and extending eastward.
- West leg. Three EB lanes: two through lanes and one left-turn only set 30 feet back from intersection. Four WB lanes.

Figure 6

Ohio Avenue and Atlantic Avenue

- North leg. Two SB lanes: one through/left-turn lane and one through/right-turn lane.
- South leg. Two SB lanes. Paint marking prohibited parking begins 15 feet south of intersection.
- East leg. Three WB lanes: two through lanes (angled and dotted guide lines through intersection) and one left-turn only lane. Painted prohibited parking area at WB curb but permitted parking (except in loading areas and bus stops) beyond as leg extends eastward.
- West leg. Three EB lanes. A painted curbside lane on the EB approach keeps it clear for emergency vehicles. The stop bar for the EB approach is 40 feet back from the intersection.

Figure 7

Indiana Avenue and Atlantic Avenue

- North leg. Two receiving NB lanes. Painted hatch-lines to prohibit corner parking but permitted after.
- South leg. Two NB lanes. A third lane farthest to the west prohibits parking, and travel and is reserved for emergency vehicles. Left lane for through-traffic only. Right lane is through/right-turn.
- East leg. Two WB lanes: one through and one through/right-turn lane. Seven-foot median in center. Two receiving eastbound (EB) lanes. Painted hatch-lines prohibit corner parking but permitted after(except in loading/bus zones).
- West leg. Two EB lanes: one left-turn only (45 feet back from intersection), two through lanes. Two receiving lanes. Painted hatch-lines to prohibit corner parking but permitted (except in loading/bus zones) after. Active driveway entrances on south curb.

Figure 8

Dr. Martin Luther King Boulevard and Atlantic Avenue

- North leg (70-foot cross-section). Two SB lanes: one right-turn only, one through and one through/left-turn. Lanes are S-shaped to line up with receiving lanes across intersection. Hatched lane near west curb. Two receiving NB lanes.
- South leg (40-foot cross-section). Two NB lanes: one through/left-turn and one through/right-turn, two receiving SB lanes.
- East leg. Three WB lanes: two through and one left-turn only (35 feet back from intersection). Painted hatch-lines to prohibit corner parking but permitted (except in loading/bus zones) after.
- West leg. Three EB lanes: one left-turn only, two through lanes. Two receiving lanes. Painted hatch-lines to prohibit corner parking but permitted (except in loading/bus zones) after. Active driveway entrances on south curb.

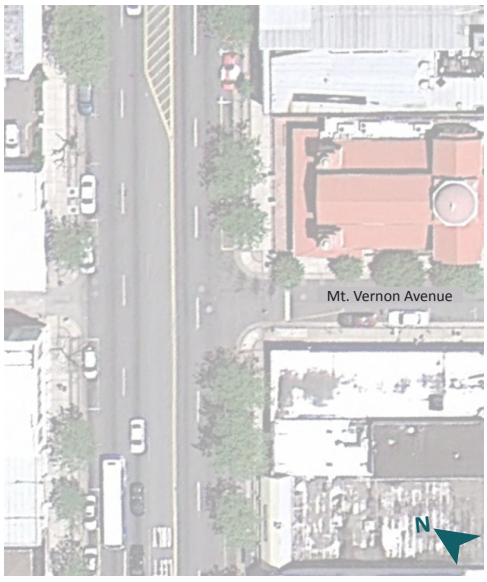


Figure 9

Mt. Vernon Avenue and Atlantic Avenue

- This intersection is unique from the other intersections in the study area in that it is an unsignalized T-intersection with unmarked crosswalks. Both the east and west approaches are two lanes wide with parallel parking (except in loading and bus zones).
- North leg. One SB lane, more in the form of an alley.
- South leg. One NB lane and one parking lane on the west side starting 45 feet back from the intersection. Left turns are only permitted from 8 p.m. to 8 a.m.

Figure 10

Kentucky Avenue and Atlantic Avenue

- North leg. Two SB lanes: one through/left-turn lane and one through/right-turn lane. Starting 100 feet back from intersection, there are three lanes SB.
- South leg. One NB lane (left/through/right) with stop bar approximately 30 feet back from intersection. Parking permitted long east curb. One receiving SB lane.
- East leg. Three WB lanes: two through lanes and one left-turn lane. Two EB lanes. Painted hatch-lines to prohibit corner parking but permitted (except in loading/bus zones) after. East of the intersection 115 feet, there is a pair of driveway entrances to access the strip mall parking lot.
- West leg. Two through EB lanes and two receiving WB lanes. Curbside parking permitted except for loading and bus zones.

Figure 11

New York Avenue and Atlantic Avenue

- North leg. Two receiving NB through-lanes with parking along west curb.
- South leg. Two NB through-lanes with the stop bar set 60 feet back from intersection. One receiving SB lane.
- East leg. Two WB through-lanes and two receiving EB lanes with hatched 12-foot painted median. Painted angle line to prohibit corner parking but permitted after (except in loading/bus zone on SE corner.)
- West leg. Two EB through-lanes and one left-turn-only lane with the stop bar set 35 feet from intersection. Two receiving WB lanes. Painted angle line to prohibit corner parking but permitted after (except in loading/bus zone on NW corner.)

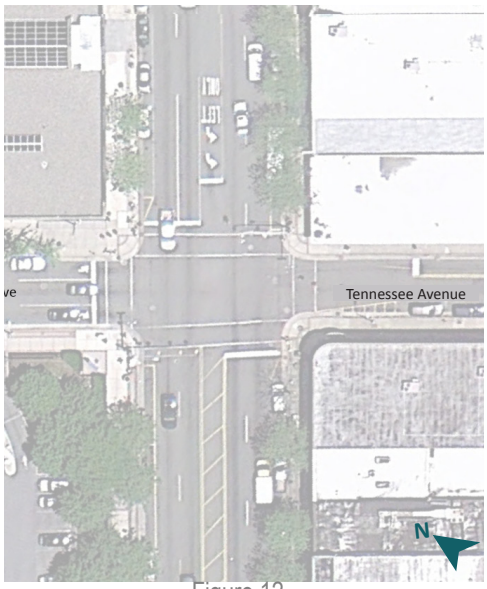


Figure 12

Tennessee Avenue and Atlantic Avenue

- North leg: Two SB through-lanes and one left-turn-only lane.
- South leg. One NB turning lane and one SB receiving lane with parking starting 25 feet from intersection along west curb. NB stop bar is set 60 feet back from the intersection.
- East leg. Two WB through-lanes and one left-turn-only lane with the stop bar set 35 feet back from the intersection. Two receiving EB lanes. Painted angle line to prohibit corner parking but permitted after (except in loading/bus zone on SE corner.)
- West leg. Two EB through-lanes and two receiving WB lanes. Painted hatch-lines to prohibit corner parking but permitted after (except in loading/bus zone on NW corner). 12-foot painted center median.

Figure 13

South Carolina Avenue and Atlantic Avenue

- North leg. Four NB receiving lanes and "T" painted parking spots along west curb. Seven-foot wide bus loading zone in east-most lane.
- South leg. Two NB lanes: one through and one left-turn-only. Painted edge line to prohibit parking on east curb within 100 feet of intersection.
- East leg. Two WB through-lanes and one left-turn-only lane with the stop bar set 35 feet back from the intersection. Painted edge line for bus loading zone along curb 125 feet east and 75 feet west of intersection. Twelve-foot-wide painted center median.
- West leg. Two EB through-lanes and one left-turn-only with stop bar set 35 feet back from intersection. Painted hatch-lines prohibit corner parking but permitted (except in loading/bus zones) after.

2.1 Chronology

From 2010 to 2012, the total number of crashes per year decreased. Some crash types decreased more than others. Pedestrian crashes decreased from 16 in 2010 to 14 in 2011, and nine in 2012. Same direction/side swipe crashes remained constant from year to year. Cyclist crashes dropped from seven in 2010 to two in 2011 but rose again to five in 2012. Same direction/rear-end crashes followed a similar pattern of 33 crashes in 2010, 19 in 2011, and 28 in 2012.

Over one-third of the crashes occurred during the summer months. The rest of the crashes were spread evenly throughout the year with the lowest crash months being March and September (see Figure 15).

Approximately 12 percent of crashes occurred each day on either Sunday, Monday, Tuesday, or Wednesday. Crashes were slightly more likely to occur Thursday to Saturday with the highest incidence being Friday, graphically shown in Figure 14.

The peak crash hours were 1 to 2 p.m., 4 to 5 p.m., and 6 to 7 p.m.

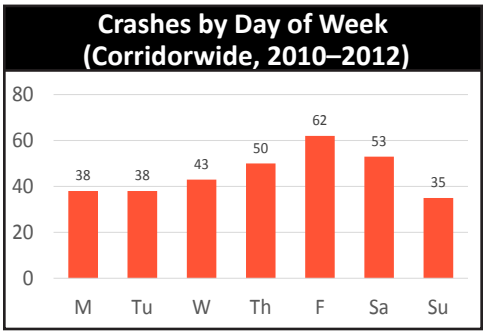


Figure 14

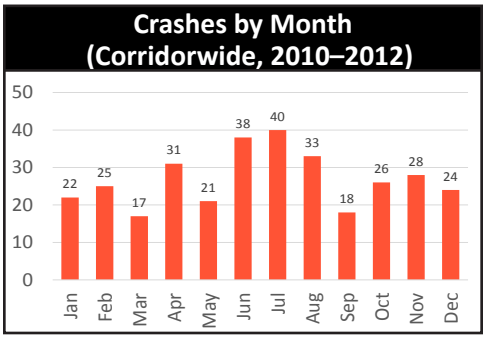
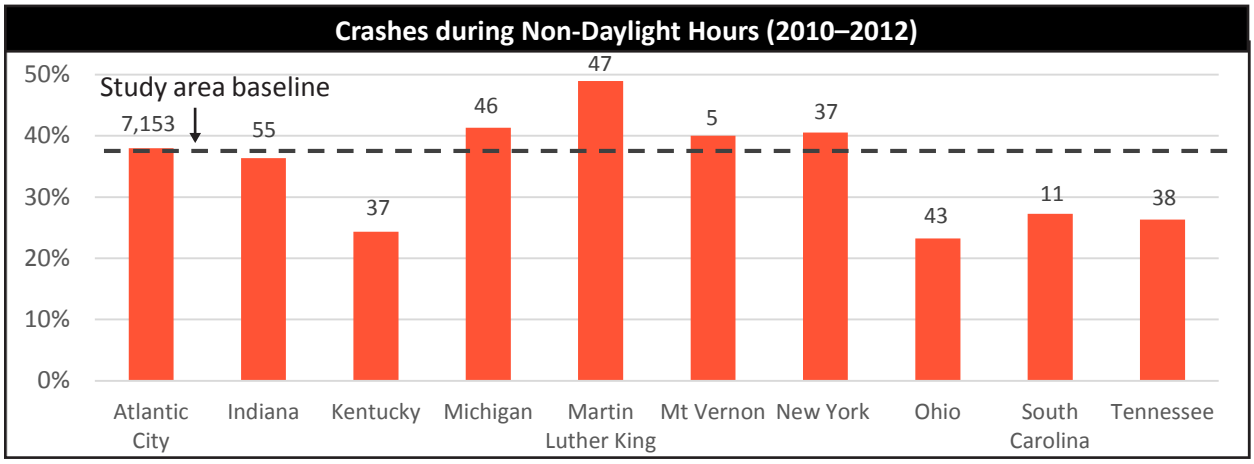


Figure 15

2.2 Surface and Light Conditions

Surface conditions for the crashes in the study area were roughly consistent with surface and lighting conditions for all crashes occurring in Atlantic City during the same study period.

During the three-year study period, 38 percent of Atlantic City's crashes occurred during non-daylight hours. In the study corridor, fewer crashes occurred during the same hours; however, it should be noted that not all areas of Atlantic City are necessarily as urban as the study corridor where there is a need for continuous street lighting. When this is taken into account and we examine crashes along all urban roadways in New Jersey, we find that 30 percent of crashes occur during non-daylight hours. This means that 8 percent more crashes are occurring in the Atlantic Avenue study area than in other urbanized areas.



Numbers above the bars give the raw number of crashes while the bars themselves show the percentage of relative crashes.

Figure 16

When comparing the different study intersections to each other, it is seen that proportionally more non-daylight crashes occur at Indiana Avenue, Michigan Avenue, Dr. Martin Luther King Boulevard, Mount Vernon Avenue, and New York Avenue, as shown in Figure 16.

2.3 Collision Type

When compared with the rest of Atlantic City, the RSA corridor experienced three times as many pedestrian crashes and two times as many cyclist crashes. It also experienced higher percentages of same direction crashes. Struck parked vehicle crash rates were exactly the same.

Crash Type	RSA	City
Same Direction - Rear-end	25%	20%
Same Direction - Side swipe	25%	21%
Right Angle	6%	10%
Struck Parked Vehicle	19%	19%
Left Turn/U-turn	1%	2%
Backing	4%	8%
Fixed Object	2%	11%
Pedestrian	12%	4%
Pedalcyclist	4%	2%
Other crash types	2%	3%
Total	100%	100%

Figure 17

2.4 Severity

Seventy percent of all crashes were property damage only. Of the remaining crashes, one quarter resulted in complaint of pain. Bicycle and pedestrian crashes were significantly more severe than other crashes in the study corridor. Both of the incapacitating injury crashes in the segment were pedestrian crashes. Additionally, two-thirds of the moderate injury and almost half of the complaint of pain crashes were categorized as either bicycle or pedestrian crashes, as shown in Figure 18. It is not surprising that bicycle and pedestrian crashes have greater severity of crashes due to the speed differential between the vehicle and cyclist or pedestrian and amount of vehicle protection.

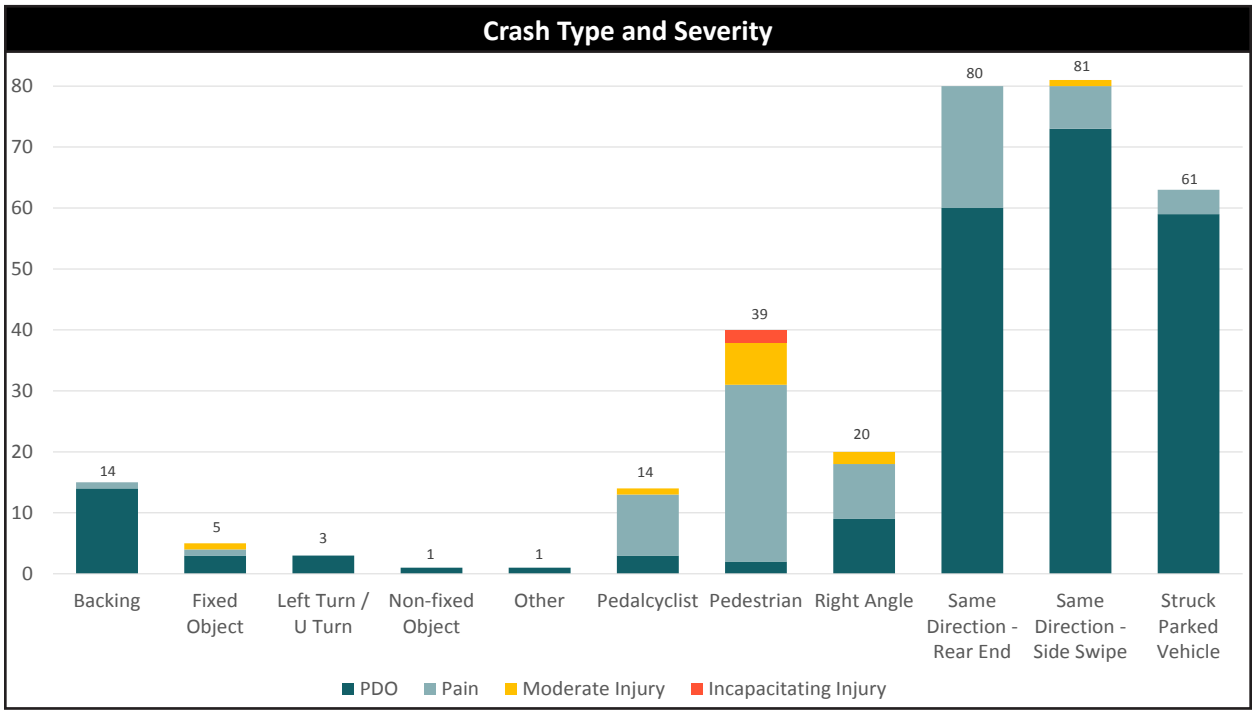
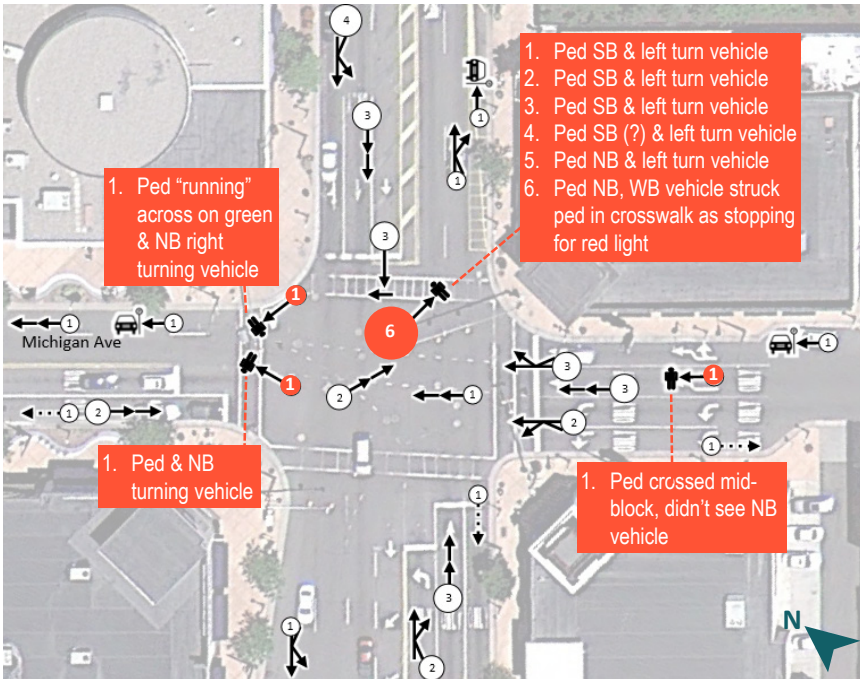


Figure 18

2.5 Crashes by Intersection

Michigan Avenue: 15.3 crashes per year (milepost 6.69)

Six pedestrian crashes occurred in the crosswalk on the east leg. Five of these crashes involved southbound left-turning vehicles. The two pedestrian crashes on the north leg also occurred in the crosswalk and involved turning vehicles. Only one crash occurred at a mid-block crossing just south of the intersection. In three other crashes, the turning vehicles were waiting for pedestrians to exit the crosswalk and the vehicle behind rear-ended the waiting vehicle.



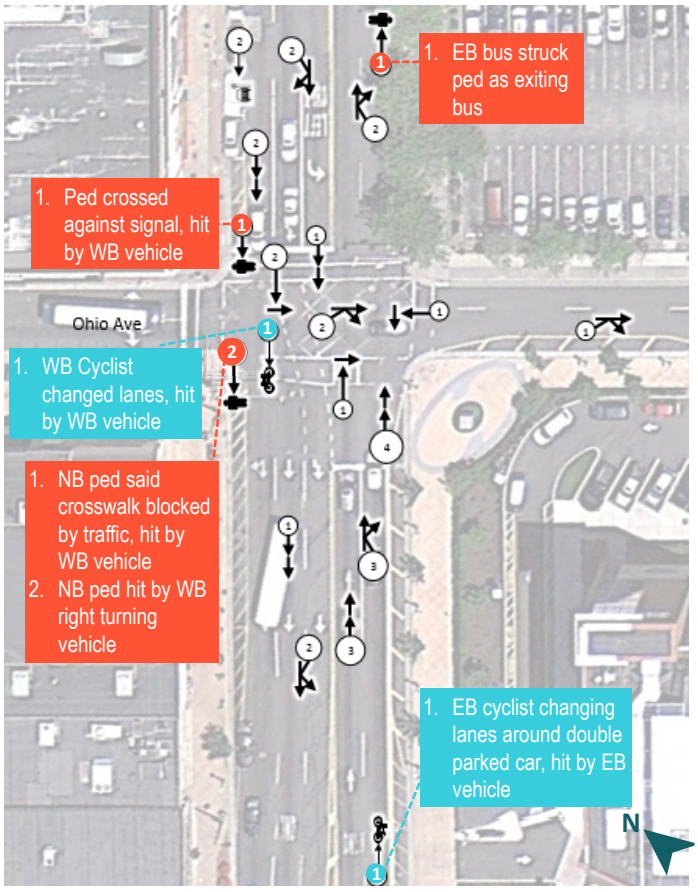
Other crash trends include: Same direction crash trends include seven on westbound Atlantic Avenue, five on eastbound Atlantic Avenue, eight northbound Michigan Avenue, two on southbound Michigan Avenue, and three in the intersection. Three right angle crashes involved WB vehicles on Atlantic Avenue and NB vehicles on Michigan Avenue.

Ohio Avenue: 14.3 crashes per year (milepost 6.77)

Pedestrian crashes at Ohio Avenue were more sporadic than at Michigan Avenue. Two pedestrian crashes occurred at the northwest corner, near the location of the bus station entrance. Another involved a pedestrian crossing against the signal on the east leg, and the final occurred while the pedestrian was exiting the bus. Two crashes, both of which occurred at the entrance of the south leg, involved a vehicle waiting for pedestrians to exit the crosswalk that was rear-ended by a vehicle behind it.

Two cyclist crashes occurred in the vicinity of the intersection, both of which occurred when the cyclist was traveling in the direction of traffic and had to change lanes.

Vehicle-to-vehicle crash trends include eight same direction crashes on eastbound approach three on the westbound lanes of the west leg. Five of the RSA area's 17 crashes bus crashes occurred at the Ohio Avenue intersection.

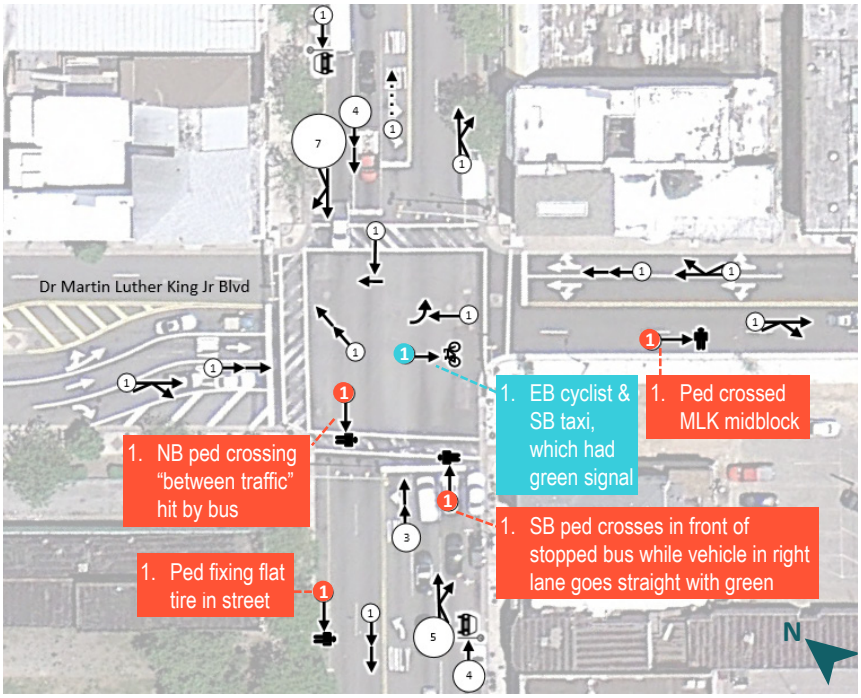


Indiana Avenue: 18.3 crashes per year (milepost 6.84)

The pedestrian crashes at the Indiana Avenue intersection were also sporadic. One crash occurred on the sidewalk where a vehicle was exiting a driveway south side of the west leg. Based on copies of the crash reports, two appeared to have occurred out of the crosswalk, two in the crosswalk when pedestrians were walking against the signal, and one shadow crash.

The intersection's only incident with a cyclist occurred on westbound Atlantic Avenue when a parked car opened the traffic-side door and struck the cyclist who in turn struck a passing car.

Other trends include 10 Struck Parked Vehicle crashes on the westbound Atlantic Avenue approach and four on the eastbound side of the same leg. Six crashes involved cars entering or exiting one of the driveways on the south side of the intersection's west leg (Atlantic Avenue). In terms of same-direction crashes, eight occurred on the westbound Atlantic Avenue approach, four in the westbound lanes after the intersection, and five on the eastbound approach. Six bus-involved crashes occurred at the Indiana Avenue intersection, five of which were the result of a parked car that opened its door into traffic.



Dr. Martin Luther King Boulevard: 15.7 crashes per year (milepost 6.92)

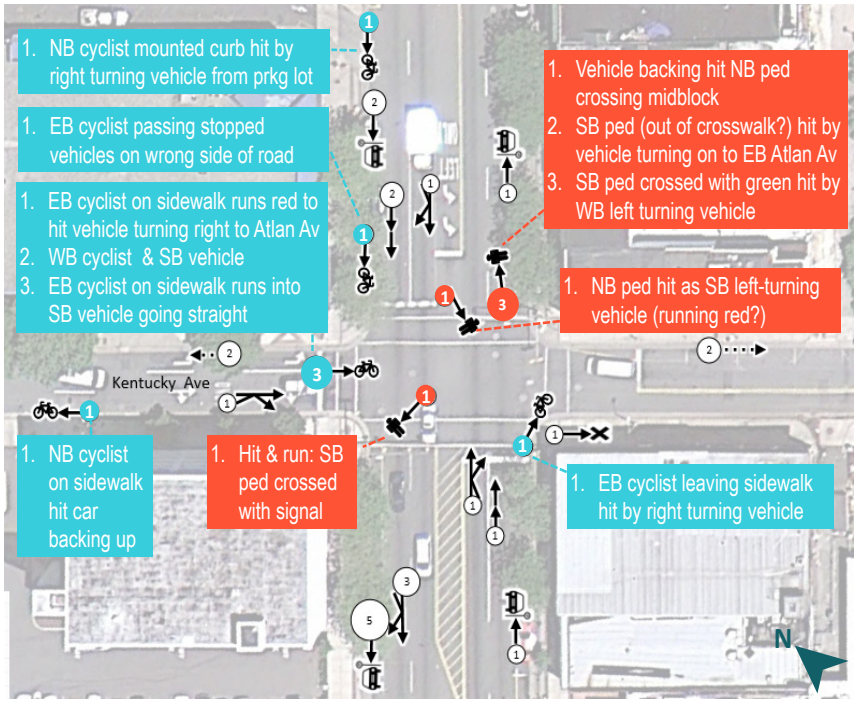
The pedestrian crashes did not appear to have a consistent pattern. Two pedestrian crashes occurred in the crosswalk of the intersection's west leg: one where the pedestrian was crossing against the signal between traffic and was struck by a bus, and one shadow crash. The three remaining pedestrian crashes occurred mid-block, one in which the pedestrian was fixing a flat tire, one south of the intersection, and one east of the intersection.

Other crash trends include 12 same-direction crashes on the westbound approach, and eight on the eastbound approach—none of which resulted in more than property damage only). There was also a clustering of four Struck Parked Vehicle crashes on the south side of the western leg.

Mt. Vernon Avenue: 1.7 crashes per year (milepost 6.96)

No crash pattern occurred at the Mt. Vernon Avenue intersection. The pedestrian crash occurred just to the east of the intersection.

Kentucky Avenue: 12.3 crashes per year (milepost 7.00)

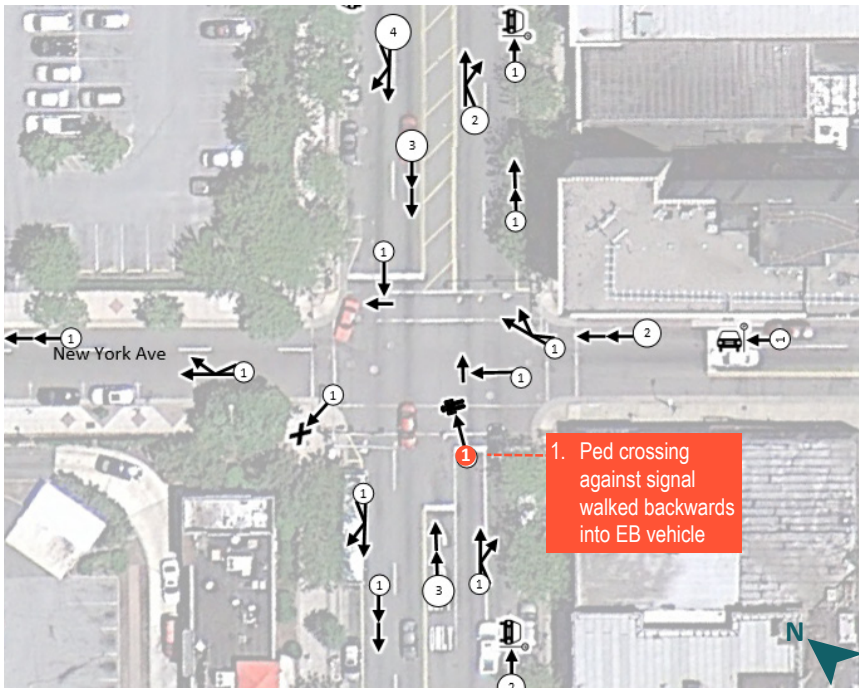


The Kentucky Avenue intersection accounted for over 20 percent of the study area's bicycle or pedestrian crashes. One crash on the east leg was clearly outside of the intersection. Two crashes on that same leg were in the crosswalk and involved vehicles turning left onto Atlantic Avenue. In a fourth crash on the east leg, the pedestrian action is unclear. The only pedestrian crash on the west leg involved a pedestrian crossing against the signal.

Four of the bicycle crashes involved the cyclist exiting from the sidewalk or traveling in the wrong direction while crossing Kentucky Avenue. The crash on the north leg occurred as a result of a vehicle colliding with a bicycle on the sidewalk. In one crash east of the intersection, the cyclist was traveling in the opposite direction of stopped traffic and side-swiped a bus. The other bicycle crash occurred when a vehicle exiting from the drive on the north side of the road collided with a cyclist who was attempting to move his bike onto the sidewalk from the roadway.

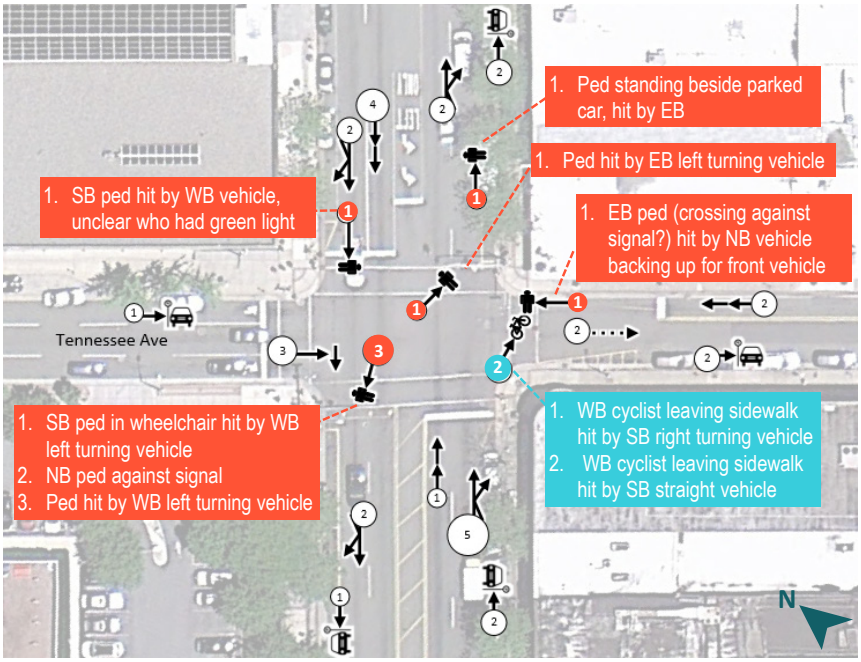
Other crash patterns include two Backing crashes south and two north of the intersection. There were five Same-Direction crashes on the westbound west leg, three on the westbound east leg, and two on the eastbound west leg.

New York Avenue: 12.3 crashes per year (milepost 7.07)



Very few crash patterns occur at the New York Avenue intersection. Only one pedestrian crash occurred, four Same-Direction crashes on the eastbound approach and seven Same-Direction crashes on the westbound approach.

Five crashes involved buses, of which three crashes were Sideswipes.

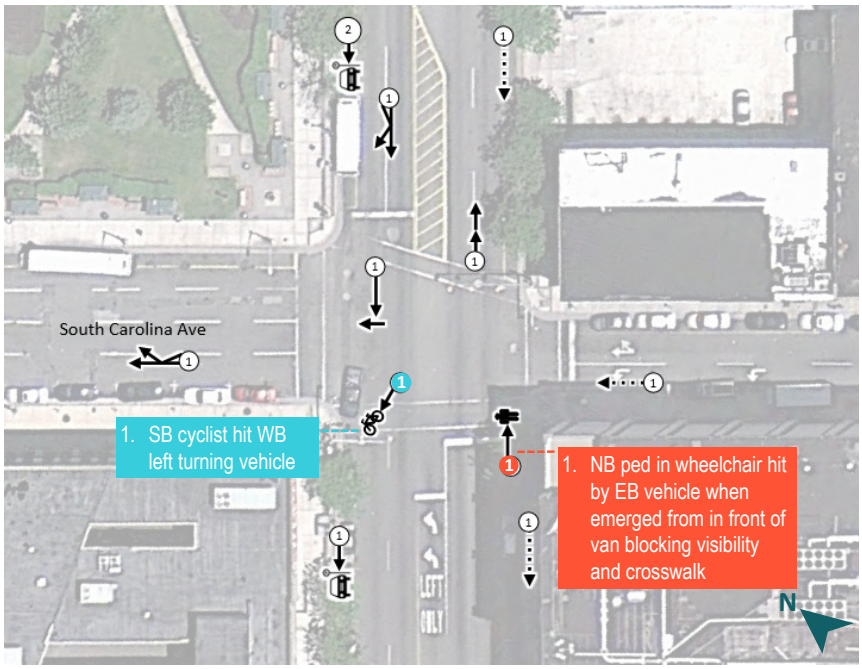


Tennessee Avenue: 12.7 crashes per year (milepost 7.15)

Three pedestrians where struck in the westbound lanes of the west leg, two of which were traveling in accordance with the green light. One of the pedestrians was also in a wheelchair. One pedestrian was struck mid-block on the east leg, one was struck while crossing the east leg against the signal, and one was hit in the crosswalk by a backing vehicle.

The two bicycle crashes involved the cyclist traveling westbound on the sidewalk and upon exiting the sidewalk, colliding with southbound vehicles entering the south leg.

Other crash trends include: six Same-Direction crashes on the eastbound approach, six on the westbound approach and three Right Angle crashes from vehicles traveling southbound on Tennessee Avenue and colliding with westbound vehicles on Atlantic Avenue.



South Carolina Avenue: 3.7 crashes per year (milepost 7.23)

Very few crash patterns exist at the South Carolina Avenue intersection.

The pedestrian crash involved a pedestrian in a wheelchair, unable to complete southbound crossing, who was struck by a shadow vehicle.

The bicycle crash involved a cyclist crossing south on the west leg in the crosswalk who was struck by a northbound left-turning vehicle.

Issue #	Identified Issues	Corridor	Michigan Avenue	Ohio Avenue	Indian a Avenue	MLK Boulevard	Mt. Vernon Avenue	Kentucky Avenue	New York Avenue	Tennessee Avenue	South Carolina
	Bus operations block moving lanes										
1	Heavy bus traffic contributes to heavier and more hectic traffic operations.	✔									✔
2	Buses making stops along the corridor were frequently observed to block travel lanes.	✔									
3	Cars were noted to park in bus loading area.	✔									
	Lane lines and direction is not always very clearly defined										
4	Lane line extensions westbound are faded		✔								
5	Opposing one-way, two-way pairs of minor street		✔	✔	✔			✔	✔	✔	✔
6	Zig-zag problem due to offset intersection						✔				
7	Odd pavement markings along southbound MLK, particularly with right-turn lane					✔					
	Deficiency in roadway maintenance										
8	Lack of intersection lighting.	✔	✔					✔			✔
9	Pavement condition, including potholes and uneven surfaces.	✔									
10	Minor street STOP sign blocked by foliage						✔				
11	Faded crosswalks make it difficult to identify designated pedestrian crossing areas	✔									
	Roadway does not adequately facilitate cyclist needs										
12	Significant number of bicyclist crashes, especially at certain intersections	✔						✔			
13	Lack of bicycle facilities such as lanes, signage or pavement markings	✔									
	Impeded roadway viability										
14	Design of driveway entrance/exits suggests right-in/right-out				✔			✔			
15	Sight visibility problem for vehicles exiting driveways				✔		✔				
16	Vehicles observed to be unloading of goods and people at non-designated areas, possibly contributing to shadow crashes	✔									
17	STOP-bars are set far back.							✔			
	Signal phasing not compliant with traffic needs										
18	Local officials noted traffic to be especially problematic during big events	✔	✔								
19	Southbound traffic receives very limited amount of green time		✔								
20	Split phasing present, pedestrian phase cannot go during all red clearance interval		✔								
21	Pedestrian walk time is not congruent with 3.5fps walking speed	✔				✔					
22	All-red clearance is too short along Tennessee Avenue									✔	
45	Pedestrian signal not aligned with through phasing so pedestrians don't get as much crossing time as they could.								✔		
	Inappropriate roadway user behavior										
23	Posted 30mph, but vehicles seemed to be traveling much faster	✔									
24	Jaywalking very predominant	✔									
25	Bicyclists traveling on sidewalk cause problems when they exit the sidewalk at intersections.	✔						✔			

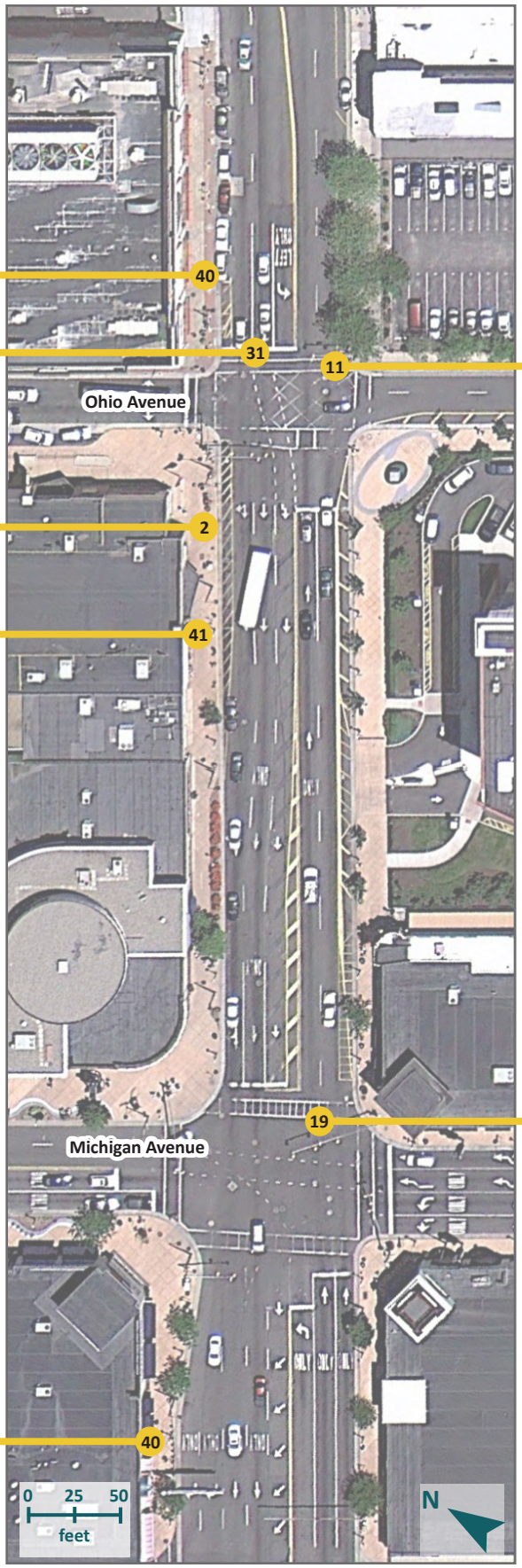
Issue #	Identified Issues	Corridor	Michigan Avenue	Ohio Avenue	Indian a Avenue	MLK Boulevard	Mt. Vernon Avenue	Kentucky Avenue	New York Avenue	Tennessee Avenue	South Carolina
26	Bicyclists were seen to travel unlawfully against traffic.	✔									
27	Lots of double parking, loading/unloading observed.	✔			✔						
28	Illegal parking in loading areas	✔								✔	
29	Parking at intersection, inhibiting sight distance	✔									✔
30	Lots of double parking along South Carolina, Avenue perhaps opportunity to reduce travel lanes (city considering "campus" type improvements)	✔									✔
	Signal equipment is often antiquated or poorly placed.										
31	Far side signal heads but no nearside, back to back signal placement		✔	✔	✔			✔			
32	Missing visors on signal heads, corridorwide	✔									
33	8-inch signal head along minor street	✔									
34	Location of signal heads		✔								
	Roadway does not adequately facilitate pedestrians needs or volume										
35	Number of pedestrians necessitate wider crosswalks	✔	✔								
36	Physical disability observed widely along corridor, supports need for ADA compliance investigation	✔									
37	Tripping hazards in sidewalk	✔						✔			
38	Curb cuts do not exist or do not align with crosswalk						✔				
39	Long crossings on minor streets that expose pedestrians to heavy traffic	✔									✔
44	Inconsistent pedestrian indication for automatic recall vs. push button activation.					✔					
	Lack of proper signage										
40	Unclear mast arm signage to indicate lane shift ahead, remnants of older configurations			✔						✔	
41	Atlantic City Expressway signage lacking		✔	✔							
42	Street name signs were inconsistently placed and designed throughout the corridor	✔									
43	Lacking signage for one-way	✔									✔

Unclear mast arm signage to indicate lane shift ahead, remnants of old configurations may confuse drivers.

No near side signal heads on EB and WB approaches on Atlantic Ave

Buses making stops along the corridor were frequently observed to block parts of travel lanes, especially at places like the bus terminal at Ohio Avenue where several buses may stop at the same time.

Lacking signage for upcoming expressway



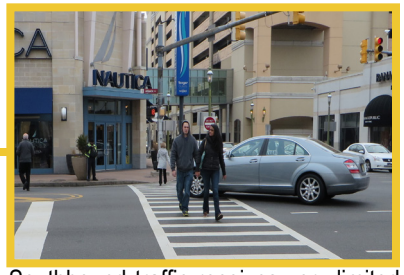
Faded and inconsistent crosswalk markings make it difficult to identify designated pedestrian crossing areas.

35 Lots of pedestrians at crosswalk during regular hours

18 During events, even more pedestrians and vehicles further complicate traffic operations

8 Local traffic operation delegates commented that there is insufficient intersection lighting at Michigan Avenue, where 40 percent of crashes occurred in the dark hours. Additionally, all three right angle crashes (NB on Michigan Avenue colliding with WB vehicles) occurred in the dark hours.

The only indication for the upcoming expressway is here; indications are lacking east of Michigan Avenue.

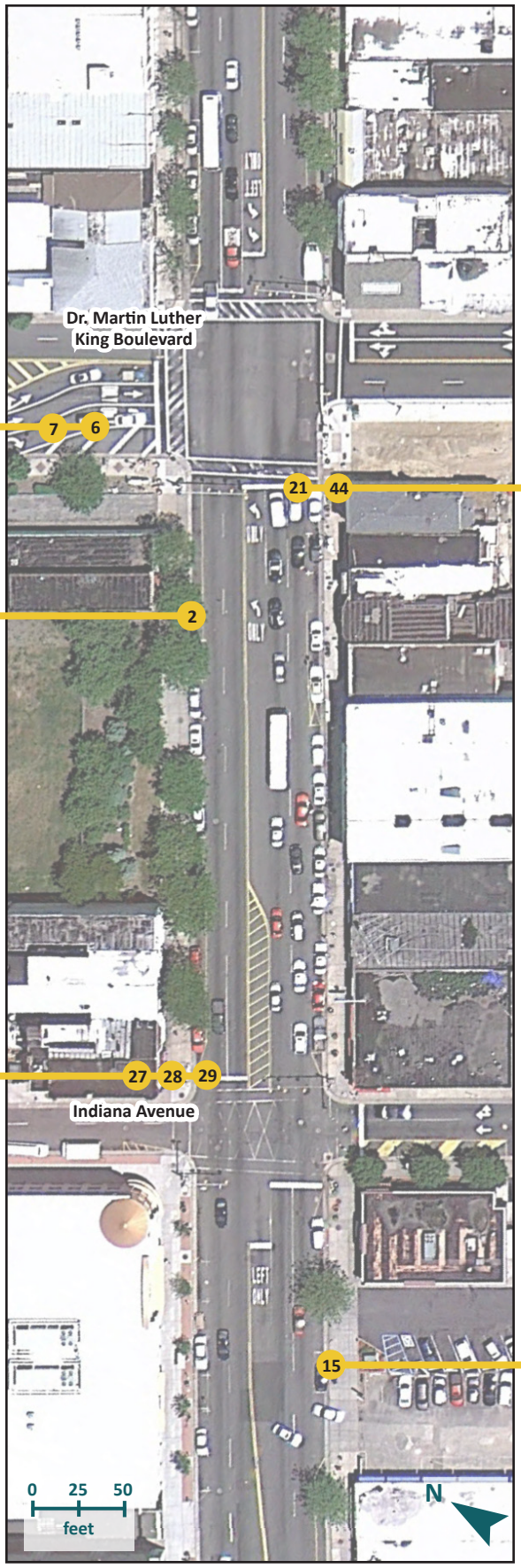


Southbound traffic receives very limited green light time. Six pedestrian crashes, one of which was incapacitating, occurred a this location and involved SB left-turning vehicles.

Odd pavement markings along SB Dr. Martin Luther King Boulevard, particularly with right-turn lane. Some vehicles were also observed parked in the hatched, right-most area.

Another very active bus stop where it was observed that the bus stuck into the travel lane.

Many vehicles along Atlantic Avenue were observed to be parking in loading zones (like above), parking at intersections, or double-parked. This problem was particularly noted at the NE corner of Indiana Avenue in front of Gem Liquor. Crash reports showed 10 Struck Parked Vehicle crashes at this location.

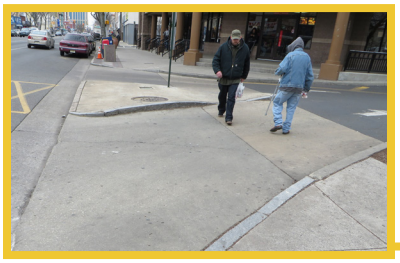


Pedestrian push button to cross Atlantic Avenue, inconsistent with corridor and crossing time may be too short.

Three of the five Right Angle crashes at Indiana Avenue involved vehicles turning out of the parking lots here. Sight visibility may be an issue. Another vehicle also hit a pedestrian at this location as it was exiting the driveway.

36 Observed many pedestrians in need of ADA-compliant facilities.

Missing visors on signal heads at New York Avenue.

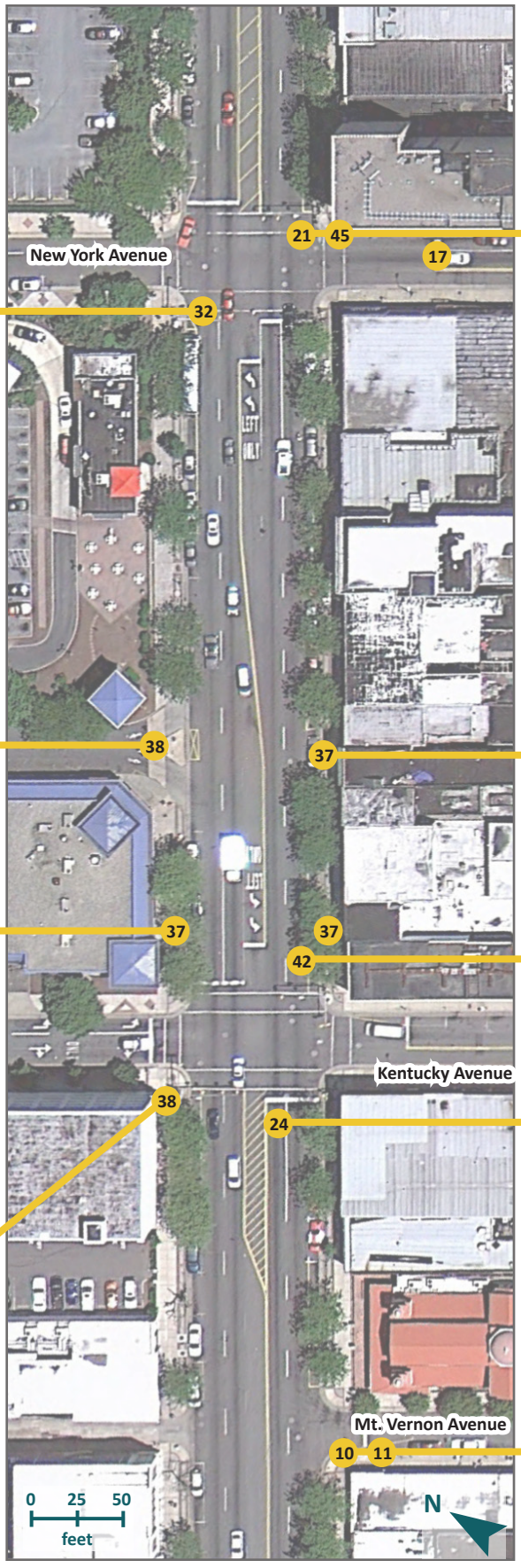


Misaligned curb, crosswalk marking at strip mall entrance.

Old foundation is a sidewalk tripping hazard.

11 25 24 Six of the 14 cyclist crashes occurred at the Kentucky Avenue intersection as cyclists were crossing the faded crosswalk at Kentucky Avenue. In three of the crashes, the cyclist was exiting the sidewalk.

Curb cuts are either non-existent or do not properly align with crosswalk at NW corner of Kentucky Avenue.



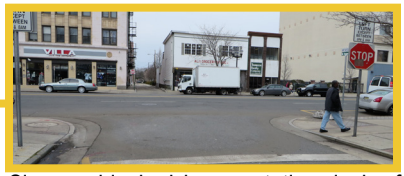
17 STOP bar is so far back it may be difficult to see oncoming traffic, pedestrians, or cyclists.

Pedestrian signal not aligned with through phasing so pedestrians don't get as much crossing time as they could.

Old foundation is a sidewalk tripping hazard. Another shallow hole is located on the SW corner of Kentucky Avenue.

Street signs seemed small and were inconsistently sized/located throughout the corridor.

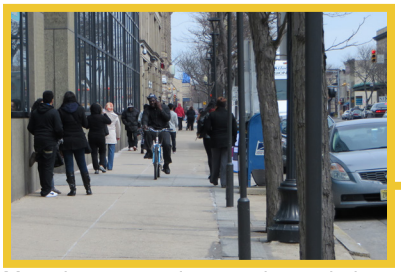
Jaywalking and crossing against the signal were frequently observed along the entire corridor.



Signage blocked by vegetation; lack of marked crosswalk on cross-street.

Heavy bus traffic contributes to heavier and more hectic traffic operations.

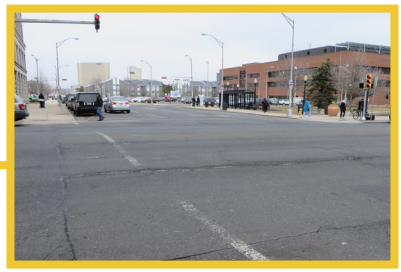
Antiquated 8-inch signal heads are on located along many of the minor street approaches.



Many human services are located along Atlantic Avenue between Tennessee Avenue and South Carolina Avenue, such as the public library. RSA team members commented that vehicles drop off passengers to utilize these services and double park or park illegally to do so.

Three pedestrian crashes occurred here in the crosswalk, two of which involved left-turning vehicles when pedestrians had the right of way. Crosswalks were very faded.

43 The South Carolina Avenue intersection does not have signage indicating it is a one-way street.



Cyclists traveling along sidewalks at higher-than-walking speed may not be seen by left-turning vehicles.

22 All-red clearance seemed too short along Tennessee Avenue. This may have been a factor in the multiple right-angle crashes that occurred with southbound and west bound vehicles.

Rec. #	Michigan Avenue	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref #
A-1	Lengthen the green signal timing for southbound turning vehicles to adequately allow for left-turn movements and add an all-red clearance phase.	High	Short	$	Atlantic City	19, 20
A-2	Re-install westward lane line extensions.	Medium/ Low	Short	$	Atlantic City	20
A-3	Consider adding directional signage to properly lead motorists to the approaching Atlantic City Expressway.	Low	Short	$	Atlantic City	41
	Ohio Avenue					
A-6	Add signage to indicate lane shift ahead.	Medium/ Low	Short	$	Atlantic City	40
A-7	Fully remove old signage.	Medium/ Low	Medium	$	Atlantic City	40
A-8	Add directional signs to properly lead motorists to the approaching Atlantic City Expressway.	Medium/ Low	Short/ Medium	$/ $$	Atlantic City	41
	Indiana Avenue					
A-10	Restrict driveway entrance on the south side of Atlantic Avenue between Indiana and Ohio avenues to be right-in/right-out.	Medium	Medium	$	Atlantic City and property owner	15
	Dr. Martin Luther King Boulevard					
A-11	Recall all pedestrian crossings to make consistent with the rest of the corridor.	Medium	Medium /Long	$	Atlantic City	44
A-12	Investigate pedestrian crossing time for north and west legs since it seemed too short.	Medium	Medium /Long	$	Atlantic City	21
A-13	Reposition hatched bulb-out so right-turn lane is curbside, shifting the painted island over one lane to the east.	Medium/ Low	Medium	$$	Atlantic City	7
A-14	OR remove hatched bulb-out to have one dedicated left-turn lane, two through lanes, and one right turn-only lane.	Low	Short	$	Atlantic City	7
A-15	Lane line extensions to be considered to help guide traffic through the intersection.	Low	Short	$	Atlantic City	6
	Mt. Vernon Avenue					
A-16	Consider adding signage to prohibit left turns at all times.	Medium	Short	$	Atlantic City	15
A-17	Trim vegetation to make the STOP sign more visible.	Medium	Short	$	Atlantic City	10
A-18	Add a marked crosswalk across Mt. Vernon Avenue.	Medium/ High	Short	$	Atlantic City	38
Ref. #	Kentucky Avenue	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref #
A-19	Investigate feasibility of adding curb cuts on either side of Atlantic Avenue's west leg.	Medium/ High	Medium /Long	$$	Atlantic City	38
A-20	Properly align existing curb cut with Kentucky Avenue crosswalk on northwest corner of intersection.	Medium/ High	Medium	$/ $$	Atlantic City	38
A-21	Investigate feasibility of aligning curb cuts at entrance to strip mall driveway and add a painted, high visibility crosswalk.	Medium/ Low	Medium	$$	Atlantic City and property owner	38

A-29	Consider converting south leg into a one-way southbound street.	Medium/ High	Long	$$$	Atlantic City	5
	New York Avenue					
A-22	Add missing visors to signal heads.	Medium	Short	$	Atlantic City	32
A-30	Consider converting south leg as a one-way northbound street.	Medium/ High	Long	$$$	Atlantic City	5
	Tennessee Avenue					
A-23	Update southbound approach to an appropriately marked left, through and right lane configuration.	Medium	Short	$	Atlantic City	40
A-31	Consider converting south leg as a one-way southbound street.	Medium/ High	Long	$$$	Atlantic City	5
A-24	Extend the timing of the all-red phase to allow more time for vehicles to completely clear the intersection, considering the long distance of the stop line at the northbound approach of Tennessee Avenue to edge line of Atlantic Avenue.	Medium/ High	Short	$	Atlantic City	22
	South Carolina Avenue					
A-25	Considering prohibiting westbound right-turn on red due to conflict with pedestrians. Consider prohibiting a no-turn-on-red from the southbound approach of South Carolina Avenue, if warranted by sheer number of pedestrians in conflict with the turn.	Medium/ High	Short	$	Atlantic City	39
A-26	Potentially install a lead-pedestrian interval to clear before vehicles gets green since there will be no issue with a yellow trap.	Medium/ High	Short	$	Atlantic City	39
A-27	Replace green ball eastbound along Atlantic Avenue with a straight-through arrow.	Medium/ Low	Medium	$$	Atlantic City	43
A-28	Consider adding larger bulb-outs on the north leg since there doesn't appear to be a need for four through lanes. Doing so may also allow for the installation of back-angled parking (see Road Diet Alternative 1).	High	Medium /Long	$$/ $$$	Atlantic City	39, 29

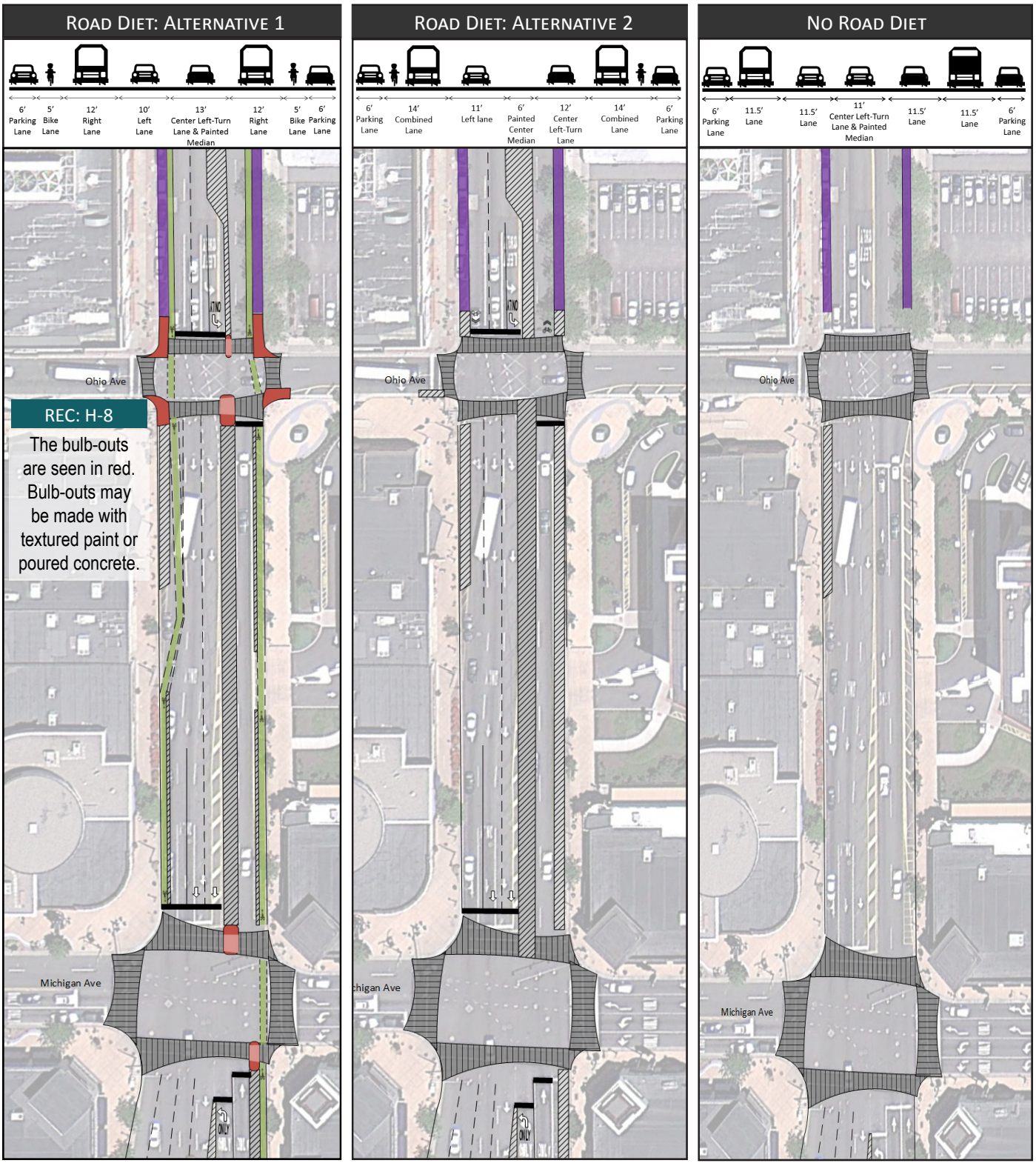
Ref. #	Corridorwide	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref #
B	Signals and Phasing					
B-1	Align pedestrian walk times with vehicle signals so pedestrians receive as much crossing time as possible.	High	Short	$	Atlantic City	21, 44
B-2	Install countdown pedestrian heads in all signalized intersections.	Medium	Short	$$	Atlantic City	44
B-3	Signal upgrade to have at least one 12-inch signal head for each receiving traffic lane.	Medium	Short	$$	Atlantic City	33
B-4	Install supplemental near-left 12-inch signal heads where appropriate.	Medium	Short	$$	Atlantic City	32, 33
B-5	Upgrade 8-inch signal heads to 12-inch signal heads.	Medium	Short	$$	Atlantic City	33
C	Roadway Geometry					
C-1	Consider bulb-outs at corner of each intersection where appropriate, which will shorten crossing distance for pedestrians, increase sight distance at corners and improve compliance with parking restrictions.	High	Long	$$/ $$$	Atlantic City	39, 29
C-2	Conduct a traffic volume study to examine if any vehicle lanes may be removed. Fewer lanes will discourage and prevent vehicles passing each other and create room to install infrastructure that more adequately addresses the transportation needs of vulnerable users like cyclists and pedestrians.	High	Long	$$$	Atlantic City	12, 13, 39, 2, 26, 30, 25, 23
C-3	Install flexible bollards to enforce parking restrictions (removable and can be run over).	Medium/ High	Short	$	Atlantic City	39, 29
D	Signage					
D-1	Better locate existing one-way signage and add supplemental one-way signage at each intersection.	Medium/ High	Short	$	Atlantic City	43
D-2	Consider installing retro-reflective backplates on traffic signals.	Medium	Short	$	Atlantic City	
D-3	Install larger street name signs that are consistent throughout the corridor. Consider placing all signs on the mast arm near the signal heads for higher visibility.	Medium/ Low	Medium	$$	Atlantic City	42
D-4	Consider painting pavement markings to alert drivers to upcoming one-way streets.	Medium/ Low	Short	$/ $$	Atlantic City	43
E	Maintenance					
E-1	Conduct a lighting study to assess whether more intersection lighting is needed, specifically at the following intersections where comparatively more non-daylight crashes occur: Indiana, Michigan, Mt. Vernon, and New York avenues, and Dr. Martin Luther King Boulevard.	Medium/ High	Short	$	Atlantic City	8
E-2	Repair potholes along Atlantic Avenue.	Medium	Short	$$	Atlantic City	9
E-3	Remove sidewalk obstructions, especially those noted at Kentucky Avenue.	Low	Short	$	Atlantic City	37
F	Traffic Operations					
F-1	Coordinate with owners of entertainment venues to develop a traffic management plan for events that increase volume along Atlantic Avenue.	Medium/ High	Medium /Long	$$	Atlantic City	18, 1
G	Bus Operations					
G-1	Paint bus loading zone at stops that will fully accommodate the length and width of the bus. The proposed removal of an eastbound lane may provide enough space to accommodate the zone.	Medium	Medium	$$	Atlantic City	2, 3
G-2	Reduce number of bus stops to be at every other block.	Medium	Medium	$$	Atlantic City	2, 3

Ref. #	Corridorwide	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref #
G-2	Provide a 4-foot cut into sidewalk to provide bus lane/stop.	Medium	Medium	$$$	Atlantic City	2
H	Pedestrian Safety Improvement					
H-1	Consider an ergonomic crosswalk consistent with pedestrian walking patterns	Medium	Short	$	Atlantic City	24
H-2	Atlantic Avenue should accommodate but not encourage pedestrian mid-block crossings, potentially with a pedestrian refuge island.	High	Medium /Long	$$/ $$$	Atlantic City	24, 36
H-3	Re-initiate an enforcement/education campaign for cyclists and pedestrians alike to remind all roadway users of appropriate roadway behavior (no jaywalking, no speeding, no parking at intersections, no double parking, no parking at loading zones, etc.)	Medium/ High	Short	$/ $$	Atlantic City	24, 36, 23, 25
H-4	Consider an enforcement/education campaign in partnership with NJ Transit.	Medium/ High	Long	$$	Atlantic City	24, 23
H-5	Consider the installation of center island fencing. Conversely, balance the RSA team's concern that such an installation might also 1) encourage pedestrians to walk along fence in the lane of traffic and 2) prevent emergency vehicles from utilizing the center lane.	Medium/ High	Long	$$$	Atlantic City	24, 23
H-6	Widen crosswalks, particularly at Michigan Avenue.	Low	Short	$	Atlantic City	35
H-7	Design intersection crossings with refuge islands to encourage pedestrians to cross there instead of at mid-block crossings. Consider the use of mountable refuge islands to allow for emergency vehicles to still utilize the center lane.	High	Medium /Long	$$/ $$$	Atlantic City	23, 24,
H-8	Minimize exposure to pedestrian-vehicle conflict by shortening crossing distance with bulb-outs at intersections.	High	Medium /Long	$$/ $$$	Atlantic City	39, 29, 24
H-9	Install uniform, high-visibility crosswalks (or ladder-type crosswalks) on Atlantic Avenue, the intersecting streets, and mid-block crossings along the entire corridor.	Medium/ High	Short	$	Atlantic City	36
H-10	Consider installing an exclusive pedestrian phase at high-volume pedestrian intersections like Michigan Avenue or South Carolina Avenue. Potentially install accompanying diagonal crosswalks.	Medium/ High	Short	$	Atlantic City	35
I	Bicyclist Safety Improvement					
I-1	Consider installing high-visibility bike lanes with along Atlantic Avenue.	Medium/ High	Medium /Long	$$	Atlantic City	12, 25, 26
I-2	Consider adding buffers to the bike lanes where possible.	High	Medium /Long	$	Atlantic City	12, 25, 26
I-3	In areas where the road is too narrow to accommodate bike lanes, consider painting sharrows to alert drivers to cyclist presence.	Low	Short	$	Atlantic City	12
J	Address Illegal Parking					
J-1	Paint in designated parking areas with either a continuous white strip or "T" or "L" markings.	Low	Short	$	Atlantic City	27, 29
J-2	Fully hatch corners and loading zones to clarify that there is no parking in these areas.	Low/ Medium	Short	$	Atlantic City	29
J-3	Use orange plastic bollards at the corners to obstruct cars from parking there.	Low/ Medium	Short	$	Atlantic City	29

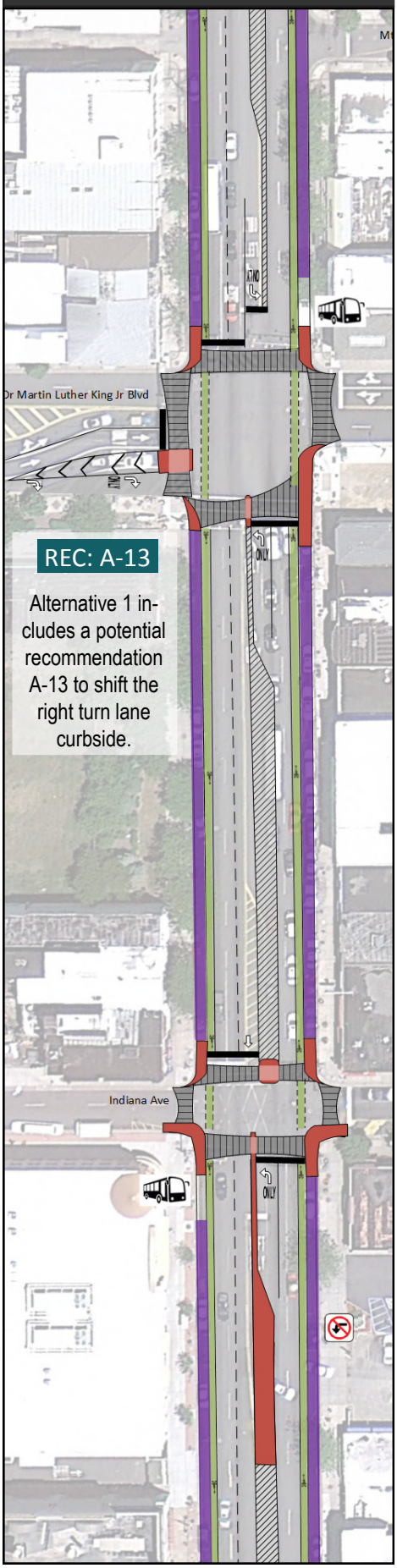
>> Appendix A - Recommendation Graphics

The width between the curbs along the studied stretch of Atlantic Avenue is approximately 69 feet. This allows for various roadway configurations that may more appropriately meet the safety needs of the current roadway users. The following two road diet alternatives visualize some of the potential corridorwide design concepts, particularly the road diet in recommendation C-2.

Both Alternatives 1 and 2 suggest removing a lane of travel in one direction to accommodate a designated bike lane (alternative 1) or a shared lane (alternative 2). Based on the 2012 traffic counts, there are 1,310 fewer vehicles traveling northbound so one of the northbound lanes was removed. A more in-depth traffic analysis should be conducted to see where updated traffic counts may give guidance on which lane to remove. The third column to the right shows a configuration with the current pavement widths with no bicycle facilities or no pedestrian enhancements apart from the ergonomic crosswalks.



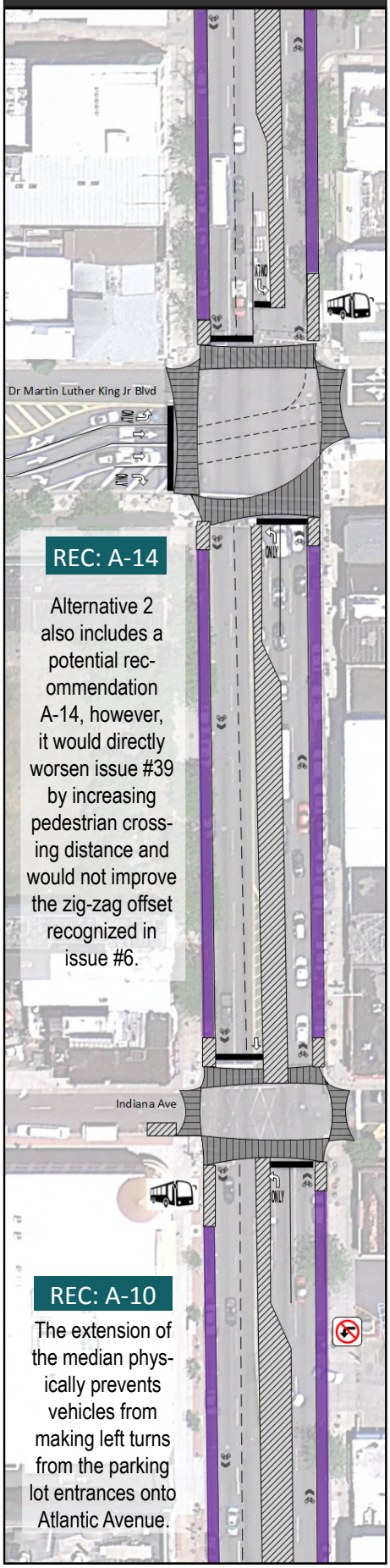
Road Diet: Alternative 1



REC: A-13

Alternative 1 includes a potential recommendation A-13 to shift the right turn lane curbside.

Road Diet: Alternative 2



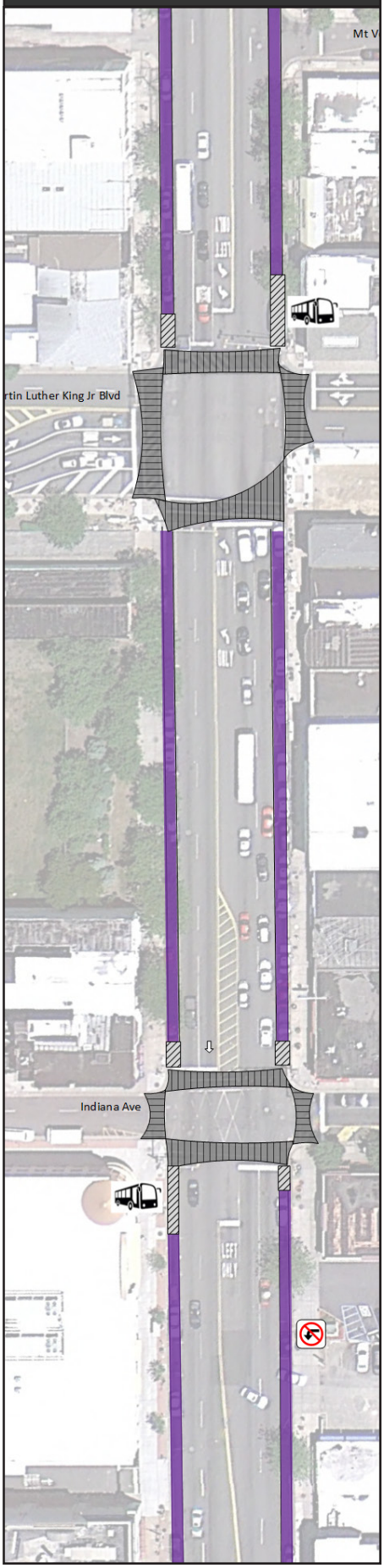
REC: A-14

Alternative 2 also includes a potential recommendation A-14, however, it would directly worsen issue #39 by increasing pedestrian crossing distance and would not improve the zig-zag offset recognized in issue #6.

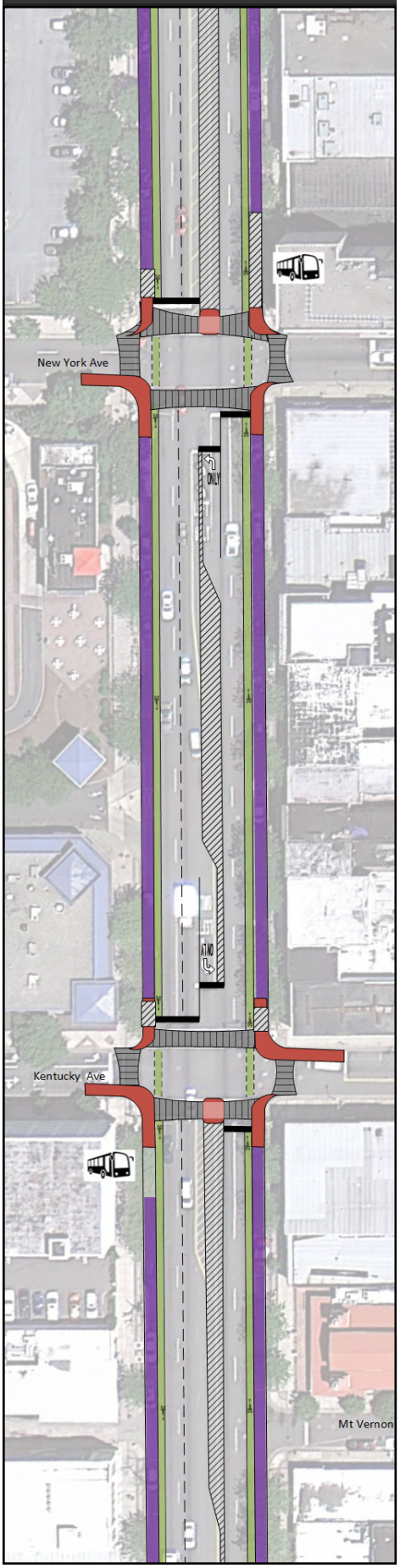
REC: A-10

The extension of the median physically prevents vehicles from making left turns from the parking lot entrances onto Atlantic Avenue.

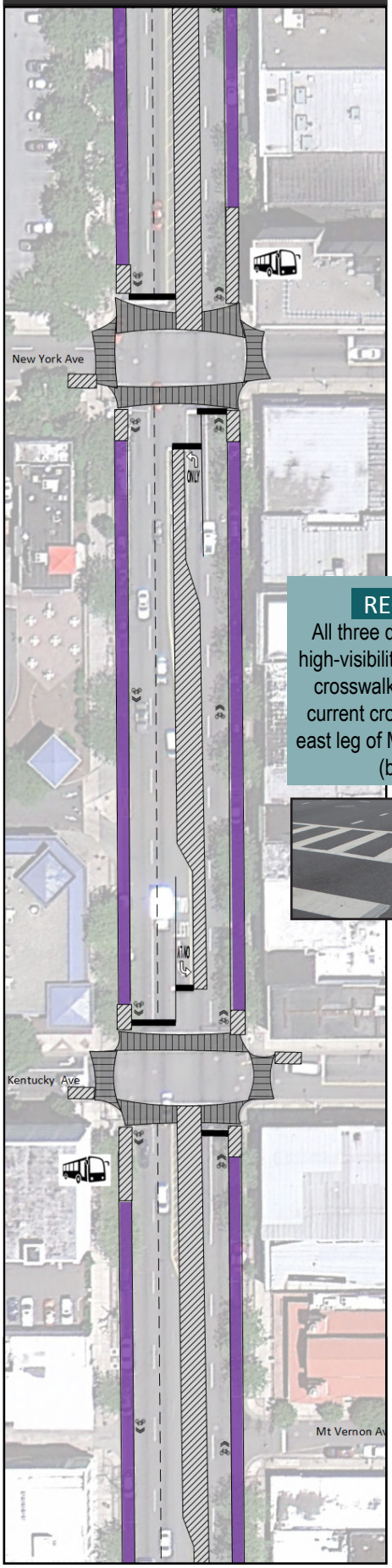
No Road Diet



Road Diet: Alternative 1



Road Diet: Alternative 2

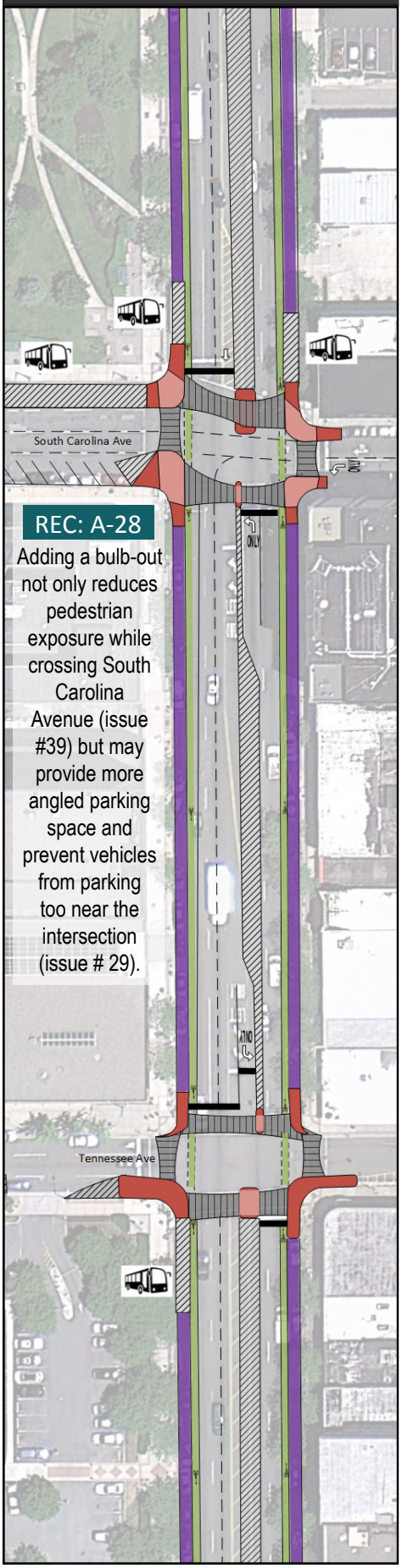


REC: H-9

All three designs feature high-visibility, retroreflective crosswalks, such as the current crosswalks on the east leg of Michigan Avenue (below).

No Road Diet

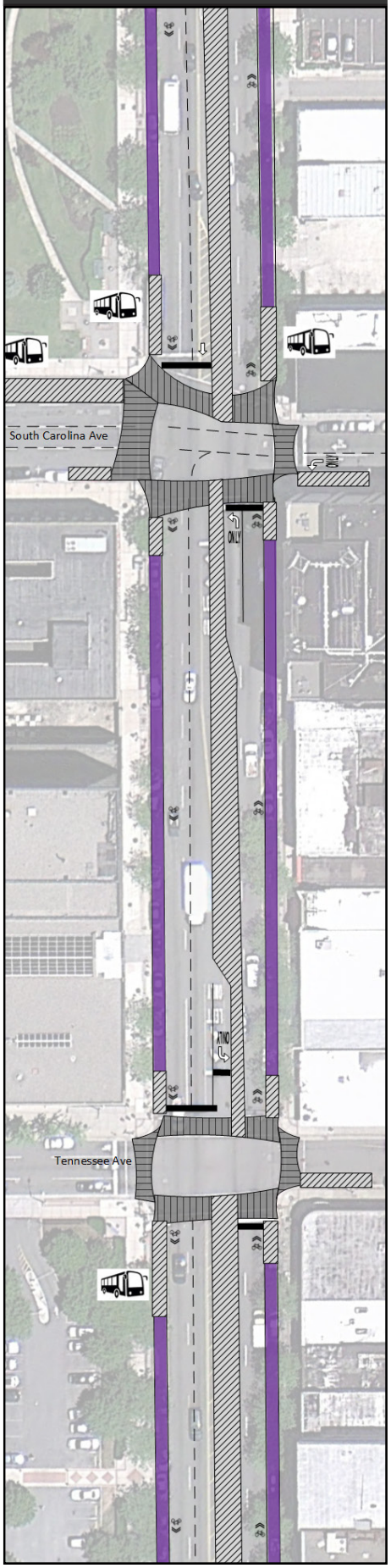
Road Diet: Alternative 1



REC: A-28

Adding a bulb-out not only reduces pedestrian exposure while crossing South Carolina Avenue (issue #39) but may provide more angled parking space and prevent vehicles from parking too near the intersection (issue # 29).

Road Diet: Alternative 2



No Road Diet

Road diets are a FHWA proven safety countermeasure that may improve speed limit compliance, reduce incidence of rear ends and sideswipes, and provide space for enhanced bicycle and pedestrian facilities. The FHWA notes that good candidates for road diets are those that experience 20,000 Average Daily Traffic (ADT) or less. Atlantic Avenue had an AADT of 15,062 in 2012 (6,876 NB and 8,186 SB).

One of the RSA team's recommendation was to conduct a road diet. The Atlantic City Bicycle and Pedestrian Plan also recommends a road diet. Some members of the RSA team expressed that the plan's proposed road diet (removing two lanes to make Atlantic Avenue one lane each way) would increase congestion. While a full road diet study should be conducted to see whether this is a valid concern or not, alternative road diets may also be explored; without a road diet, it may be difficult to address the area's noted safety issues for bicyclists and pedestrians. Removing the northbound lane of traffic, for example, should provide enough space for the currently non-existent bicycle accommodations and allow for enhanced pedestrian accommodations like refuge islands and bulb-outs.

Pedestrian refuge islands are recognized by the FHWA as a proven safety countermeasure, reducing pedestrian crashes by 46 percent and motor vehicle crashes by up to 39 percent. They act as a visual barrier to slow traffic and help to alert drivers to the presence of a crosswalk. They may also provide a refuge for pedestrians who are not able to cross the entire length of the intersection in one movement.

A commonly expressed concern with refuge islands is that they will impede emergency vehicles from full use of the center lane. One way to circumvent this concern is to consider the use of a mountable curb such as the one above in Princeton, New Jersey.

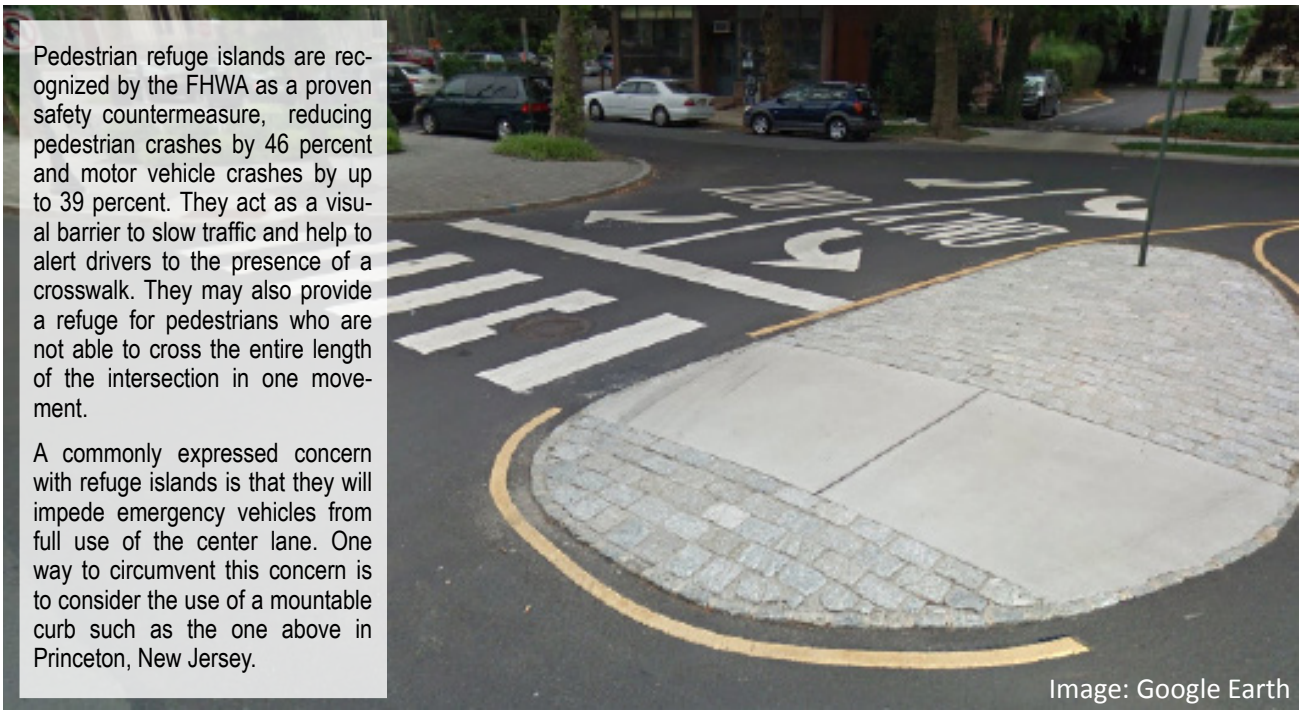


Image: Google Earth

Image: Alex Goldmark, Transportation Nation

ABOVE: Mountable median in Princeton, New Jersey

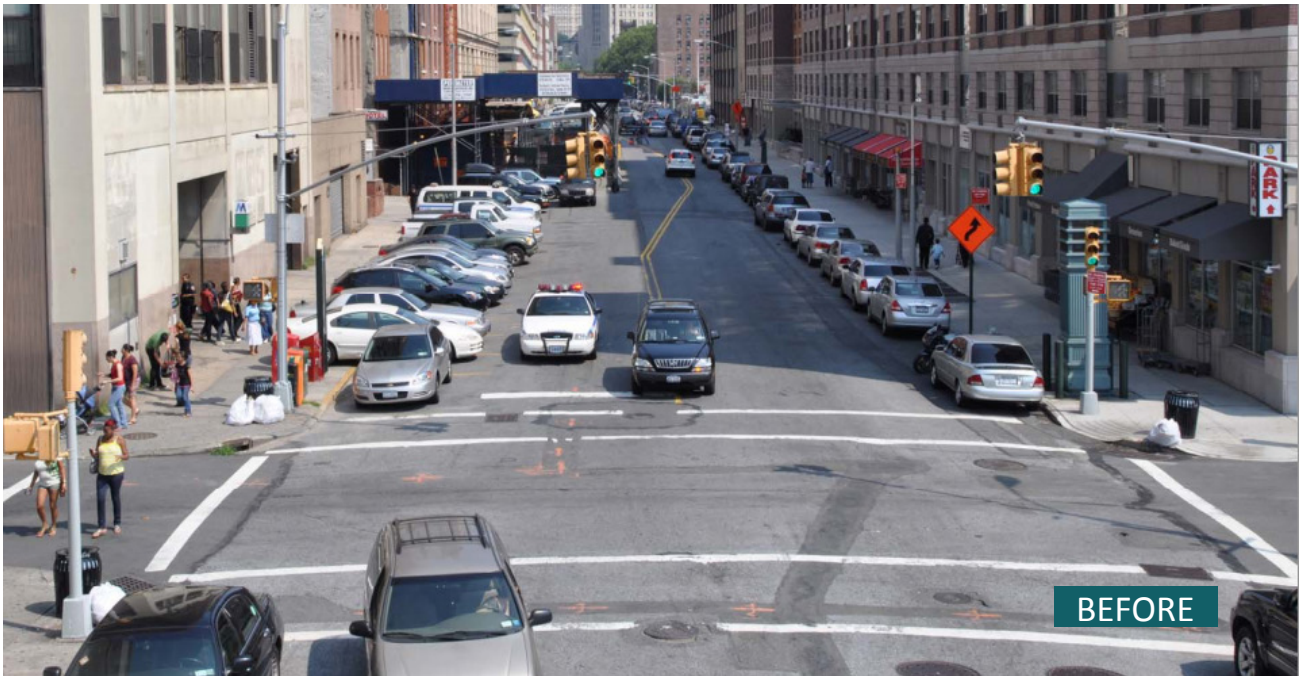
MIDDLE: Hoboken's use of plastic bollards prevent vehicles from parking at the intersection

LEFT: A green, textured buffered bike lane in Newark, New Jersey alongside a metered parking lane

BOTTOM: Skipped lines indicate that the bike lane extends through the intersection

Image: Andrew Besold on Walk Bike Jersey Blog

Image: SamKa, Glocally Newark



Painted bulb-outs or curb extensions are a quick, inexpensive way to provide safer pedestrian accommodations. They may also be augmented with landscaping elements like planters, benches, bike racks, or garbage receptacles. Notice that the image above also features ergonomic crosswalks that reflect pedestrian desire lines, high visibility crosswalks, and a parking area that does not interject onto sidewalk space.

Images: NYC DOT

>> Appendix B - RSA Team

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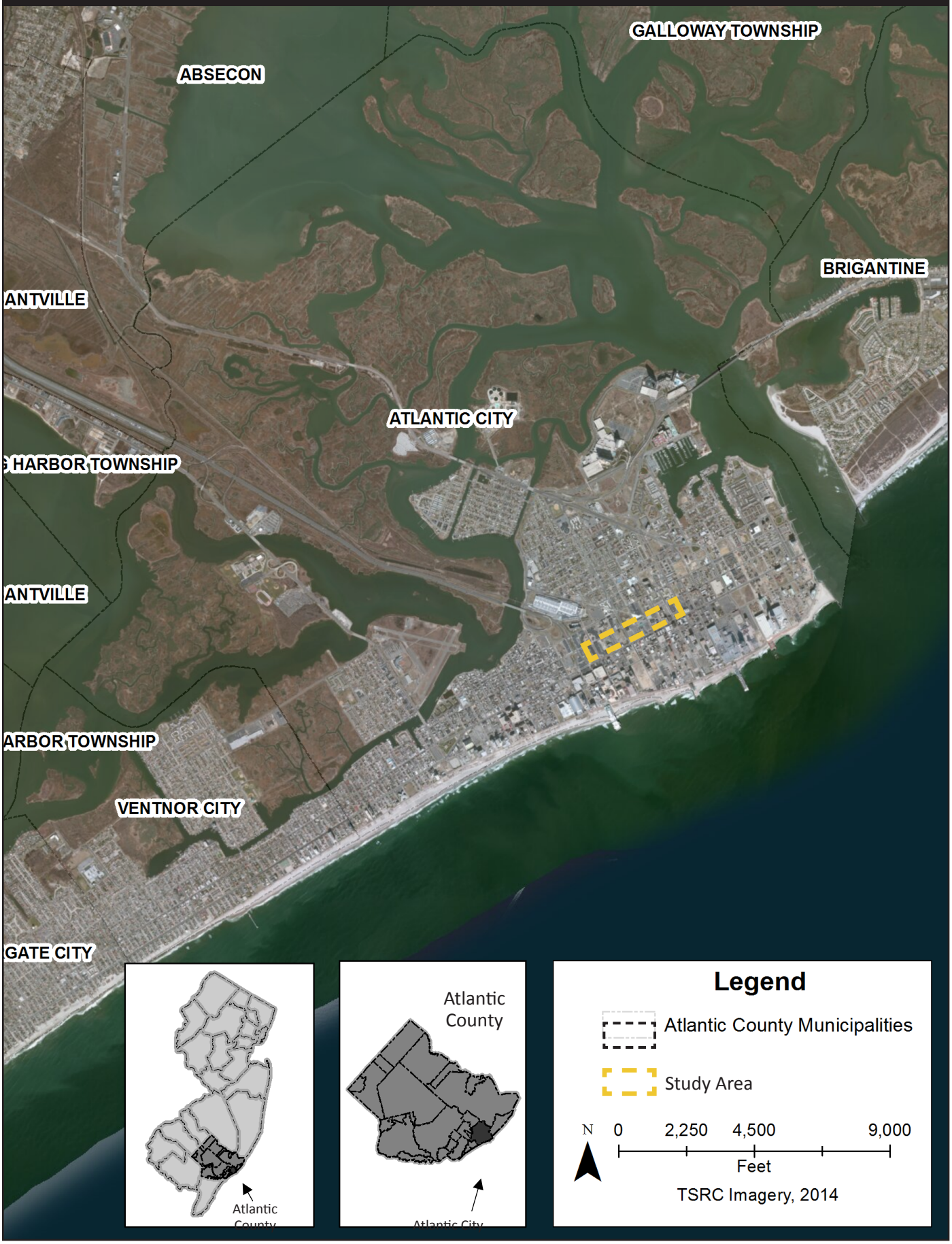
Vijesh Darji	NJDOT - Local Aid	Vijesh.Darji@dot.state.nj.us
Jennifer Marandino, P.E.	South Jersey Transportation Planning Organization	jmarandino@sjtpo.org
Andrew Tracy	South Jersey Transportation Planning Organization	atracy@sjtpo.org
Bob Clarke	South Jersey Transportation Safety Alliance	achockey@comcast.net
Aimee Jefferson	Transportation Safety Resource Center, CAIT, Rutgers	aimee.jefferson@rutgers.edu
Andy Kaplan	Transportation Safety Resource Center, CAIT, Rutgers	andy.kaplan@rutgers.edu
Sally Karasov	Transportation Safety Resource Center, CAIT, Rutgers	sally.karasov@rutgers.edu
Jim Rutala	Consultant to Atlantic City	jmrutala@comcast.net

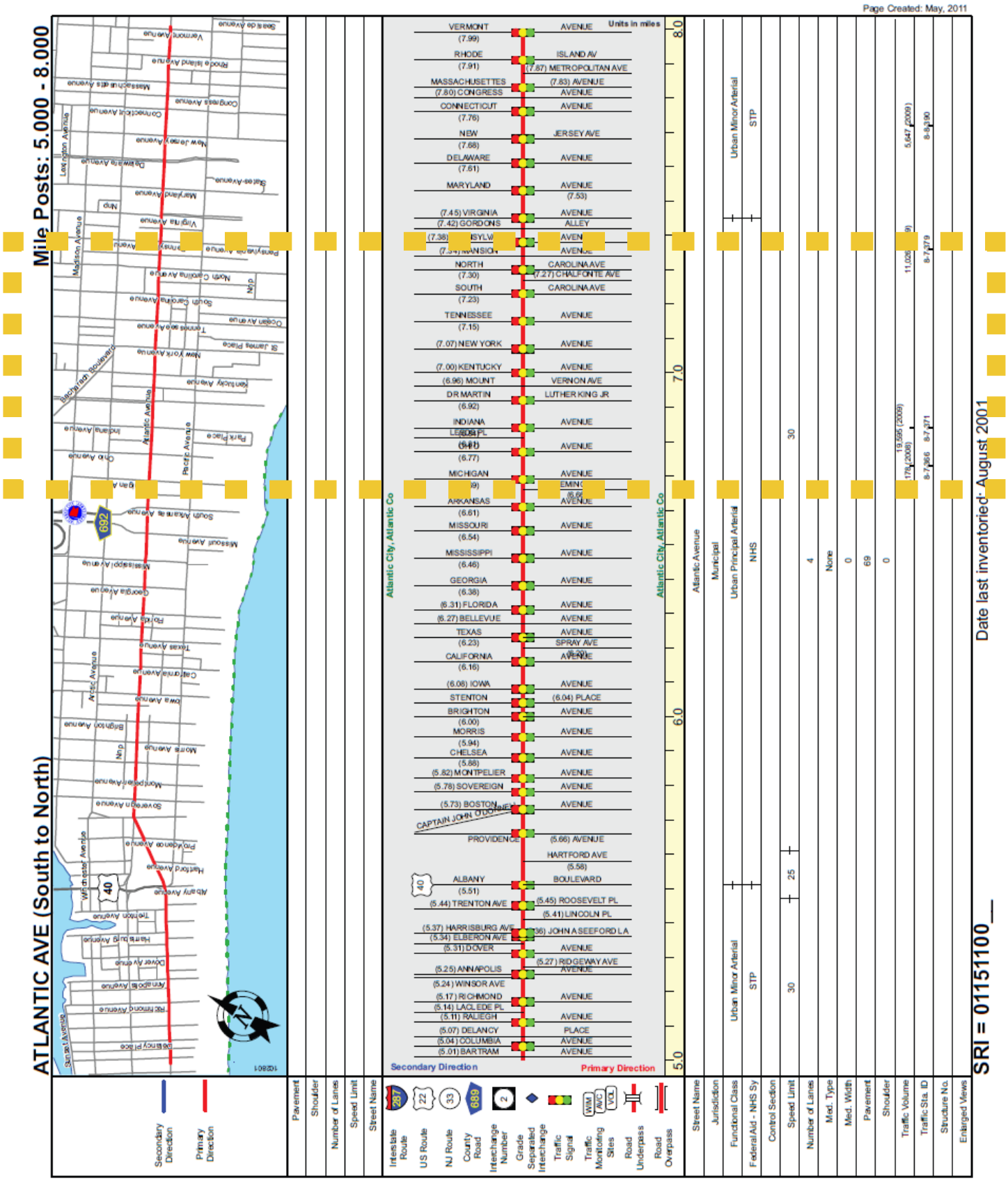
>> Appendix C - Area Maps

Study Area

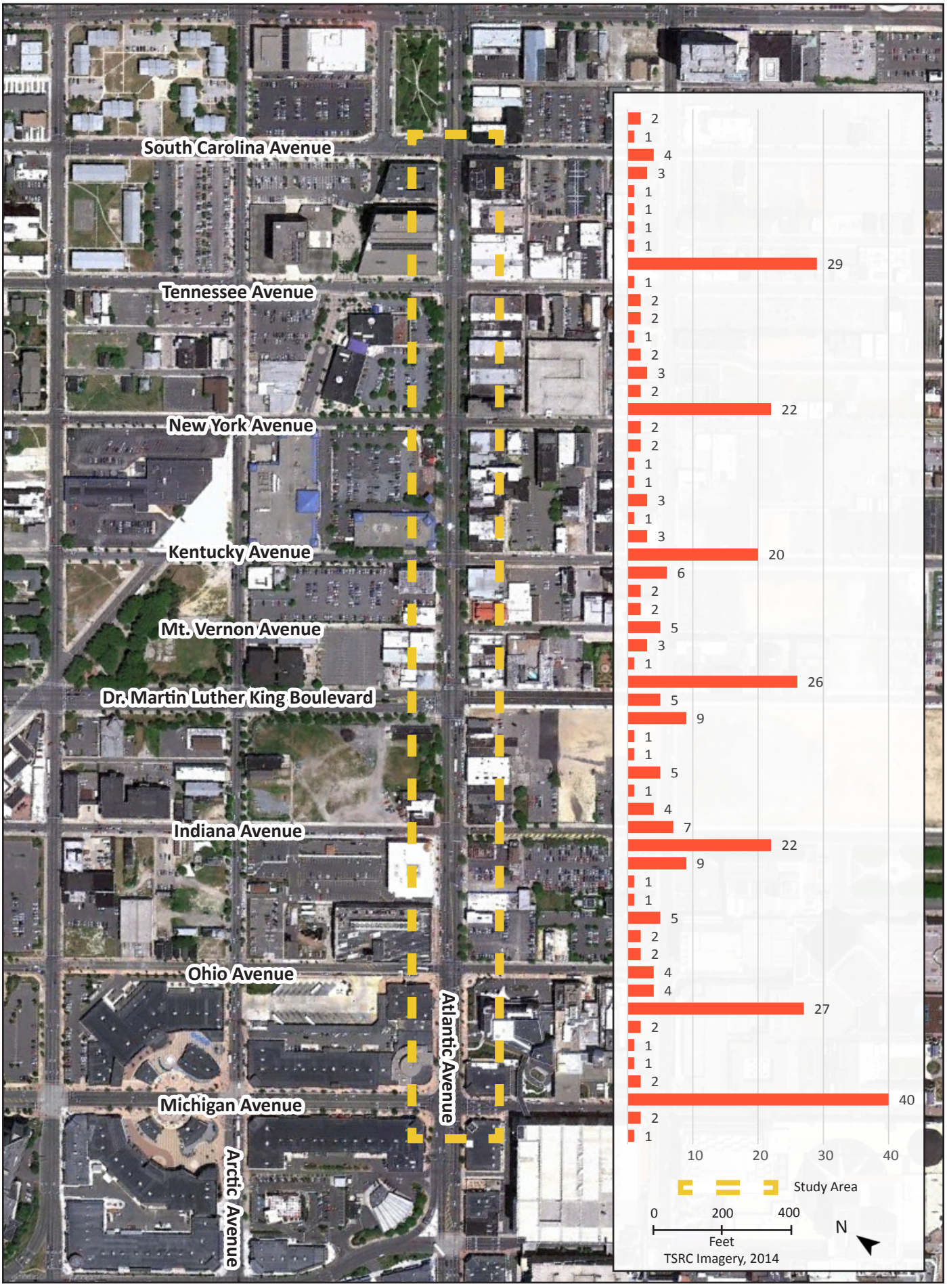

GALLOWAY TOWNSHIP
ABSECON
BRIGANTINE
ANTVILLE
ATLANTIC CITY
HARBOR TOWNSHIP
ANTVILLE
ARBOR TOWNSHIP
VENTNOR CITY
GATE CITY
Atlantic County
Atlantic City
Legend
Atlantic County Municipalities
Study Area
N
0
2,250
4,500
9,000
Feet
TSRC Imagery, 2014

Area Transit

Traffic Volumes


Page Created: May, 2011
ATLANTIC AVE (South to North)
Mile Posts: 5.000 - 8.000
Units in miles
Date last inventoried: August 2001
SRI = 01151100__
Secondary Direction
Primary Direction
Atlantic City, Atlantic Co
Atlantic Avenue
Municipal
Urban Minor Arterial
Urban Principal Arterial
STP
NHS
None
Pavement
Shoulder
Number of Lanes
Speed Limit
Street Name
Interstate Route
US Route
NJ Route
County Road
Interchange Number
Grade Separated Interchange
Traffic Signal
Traffic Monitoring Sites
Road Underpass
Road Overpass
Jurisdiction
Functional Class
Federal Aid - NHS Sy
Control Section
Med. Type
Med. Width
Traffic Volume
Traffic Sta. ID
Structure No.
Enlarged Views

>> Appendix D - Crash Data


South Carolina Avenue
Tennessee Avenue
New York Avenue
Kentucky Avenue
Mt. Vernon Avenue
Dr. Martin Luther King Boulevard
Indiana Avenue
Ohio Avenue
Michigan Avenue
Atlantic Avenue
Arctic Avenue
2
1
4
3
1
1
1
1
29
1
2
2
1
2
3
2
22
2
2
1
1
3
1
3
20
6
2
2
5
3
1
26
5
9
1
1
5
1
4
7
22
9
1
1
5
2
2
4
4
27
2
1
1
2
40
2
1
10
20
30
40
Study Area
0
200
400
Feet
TSRC Imagery, 2014
N

Crash Summary - RSA Corridor (2010–2012)

Crash Type	#
Same Direction - Rear End	80
Same Direction - Side Swipe	81
Right Angle	20
Opposite Direction - Head On/Angular	-
Opposite Direction - Side Swipe	-
Struck Parked Vehicle	61
Left Turn/U-turn	3
Backing	14
Encroachment	-
Overturned	-
Fixed Object	5
Animal	-
Pedestrian	39
Pedalcyclist	14
Non-fixed Object	1
Railcar - Vehicle	-
Other	1
Total	319

Month	#
January	22
February	24
March	17
April	30
May	21
June	38
July	39
August	33
September	18
October	26
November	27
December	24
Total	319

Severity	#
Property Damage Only	225
Pain	80
Moderate Injury	12
Incapacitating Injury	2
Fatal	-
Total	319

Day	#
Monday	38
Tuesday	38
Wednesday	43
Thursday	50
Friday	62
Saturday	53
Sunday	35
Total	319

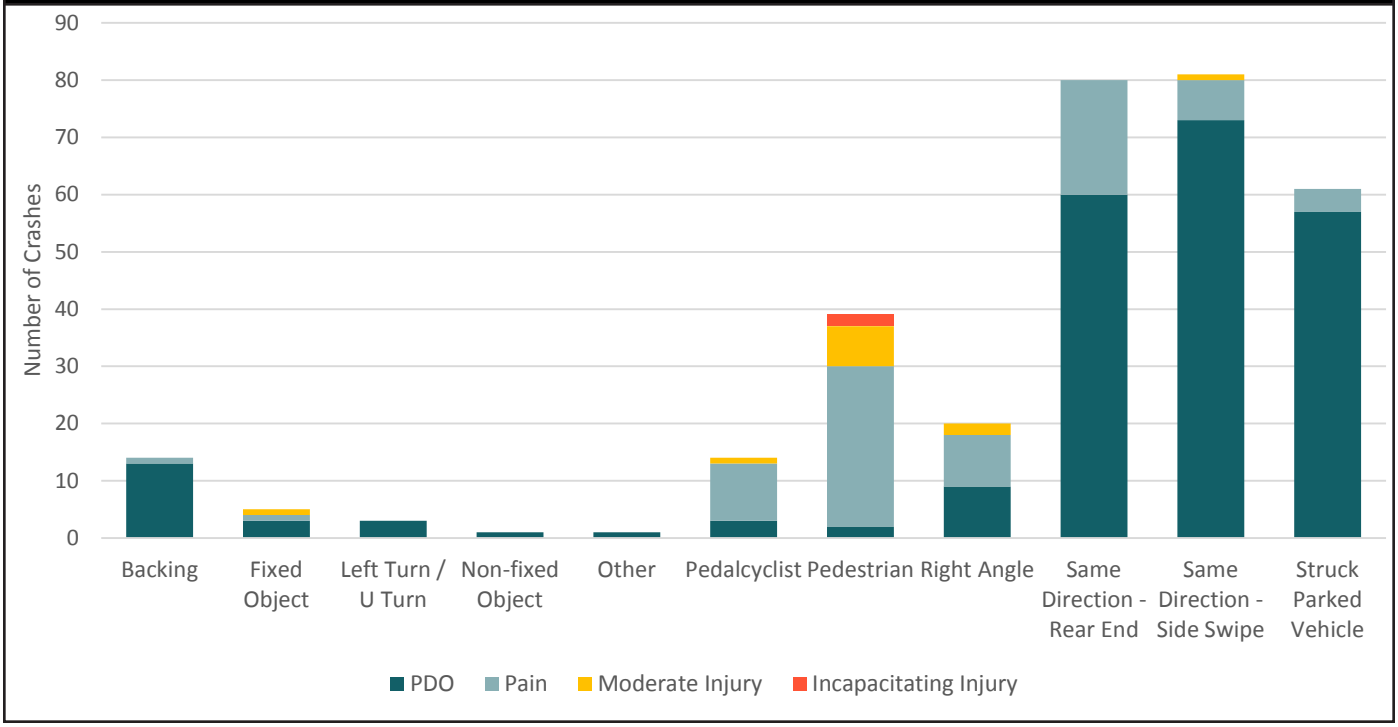
Surface Condition	#
Dry	268
Wet	44
Snowy	3
Icy	1
Slush	3
Water - Standing/Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	319

Light Condition	#
Daylight	208
Dawn	2
Dusk	17
Dark - No Street Lights	2
Dark - Street Lights On/Continuous	87
Dark - Street Lights On/Spot	2
Total	318

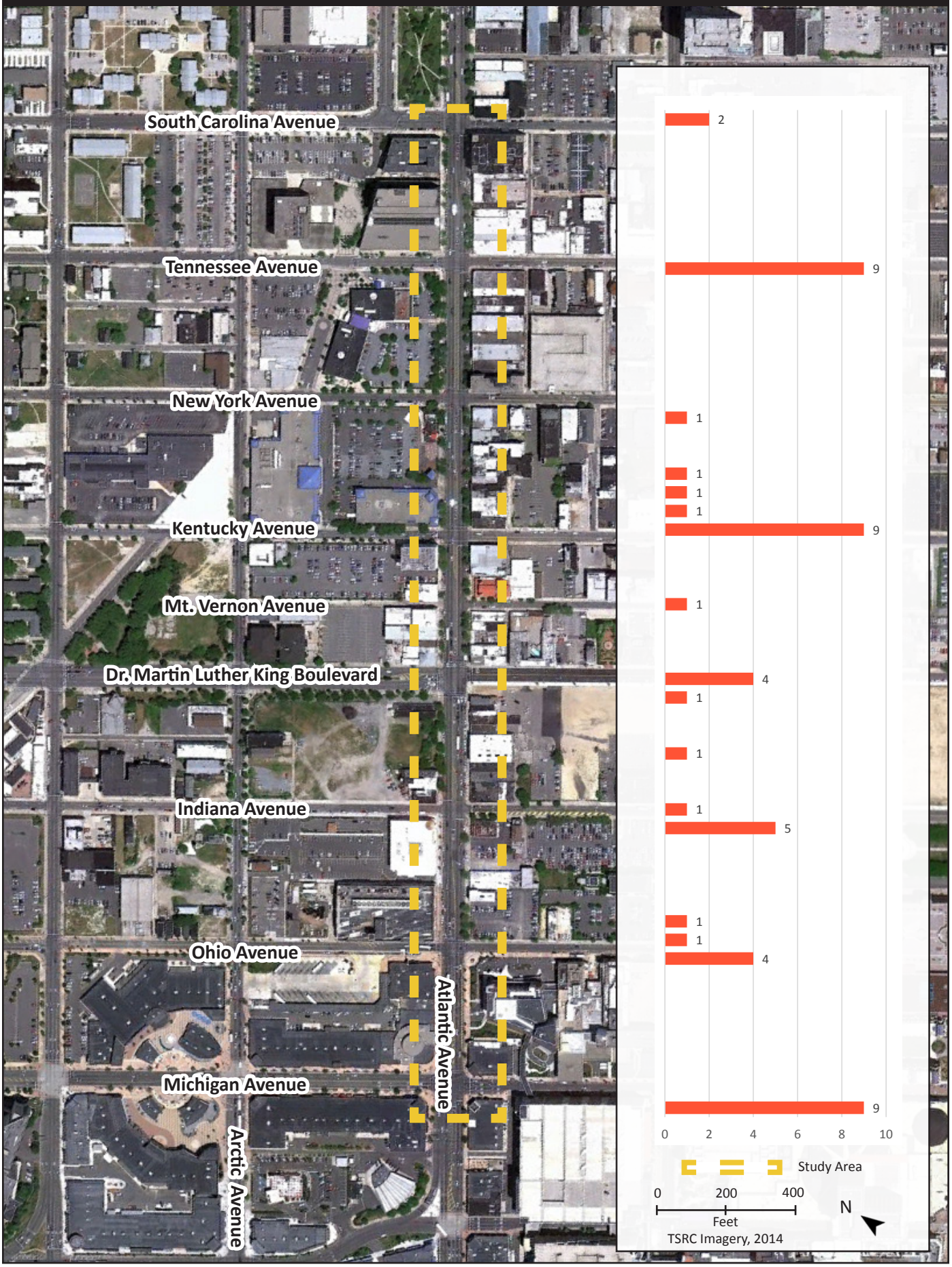
Intersection	#
At intersection	102
Not at intersection	217
Total	319

Crash Year	#
2010	125
2011	100
2012	94
Total	319

Crash Type and Severity



Bike/Pedestrian Crash focus



Bicycle/Pedestrian Crash Focus - RSA Corridor (2010–2012)

Crash Type	#
Pedestrian	39
Pedalcyclist	14
Total	53

Month	#
January	4
February	4
March	3
April	5
May	3
June	5
July	6
August	9
September	4
October	5
November	3
December	2
Total	53

Day	#
Monday	8
Tuesday	5
Wednesday	8
Thursday	7
Friday	7
Saturday	8
Sunday	10
Total	53

Light Condition	#
Daylight	32
Dawn	-
Dusk	3
Dark - No Street Lights	-
Dark - Street Lights On/Continuous	17
Dark - Street Lights On/Spot	-
Total	52

Intersection	#
Indiana Avenue	7
Kentucky Avenue	12
Michigan Avenue	9
Dr. Martin Luther King Boulevard	6
Mt. Vernon Avenue	1
New York Avenue	1
Ohio Avenue	6
South Carolina Avenue	2
Tennessee Avenue	9
Total	53

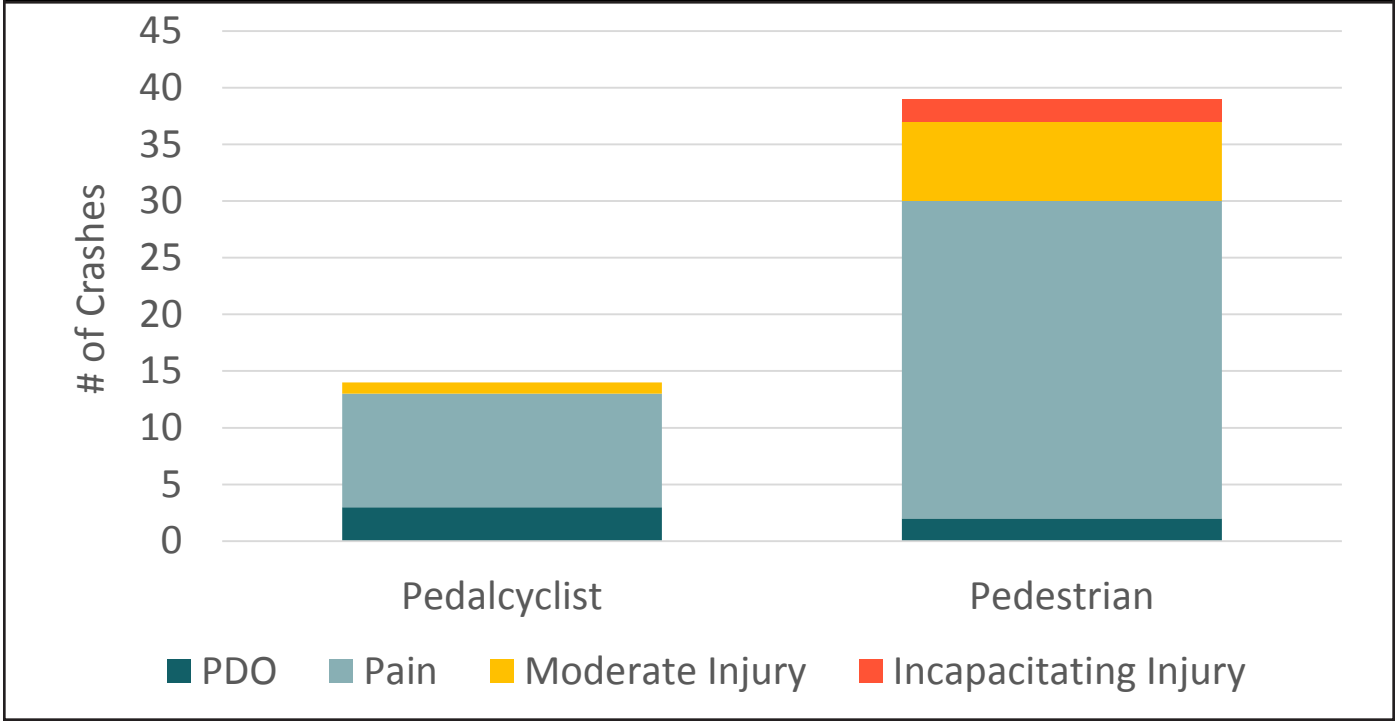
Severity	#
Property Damage Only	5
Pain	38
Moderate Injury	8
Incapacitating Injury	2
Fatal	-
Total	**53**

Surface Condition	#
Dry	49
Wet	3
Snowy	1
Icy	-
Slush	-
Water - Standing/Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	53

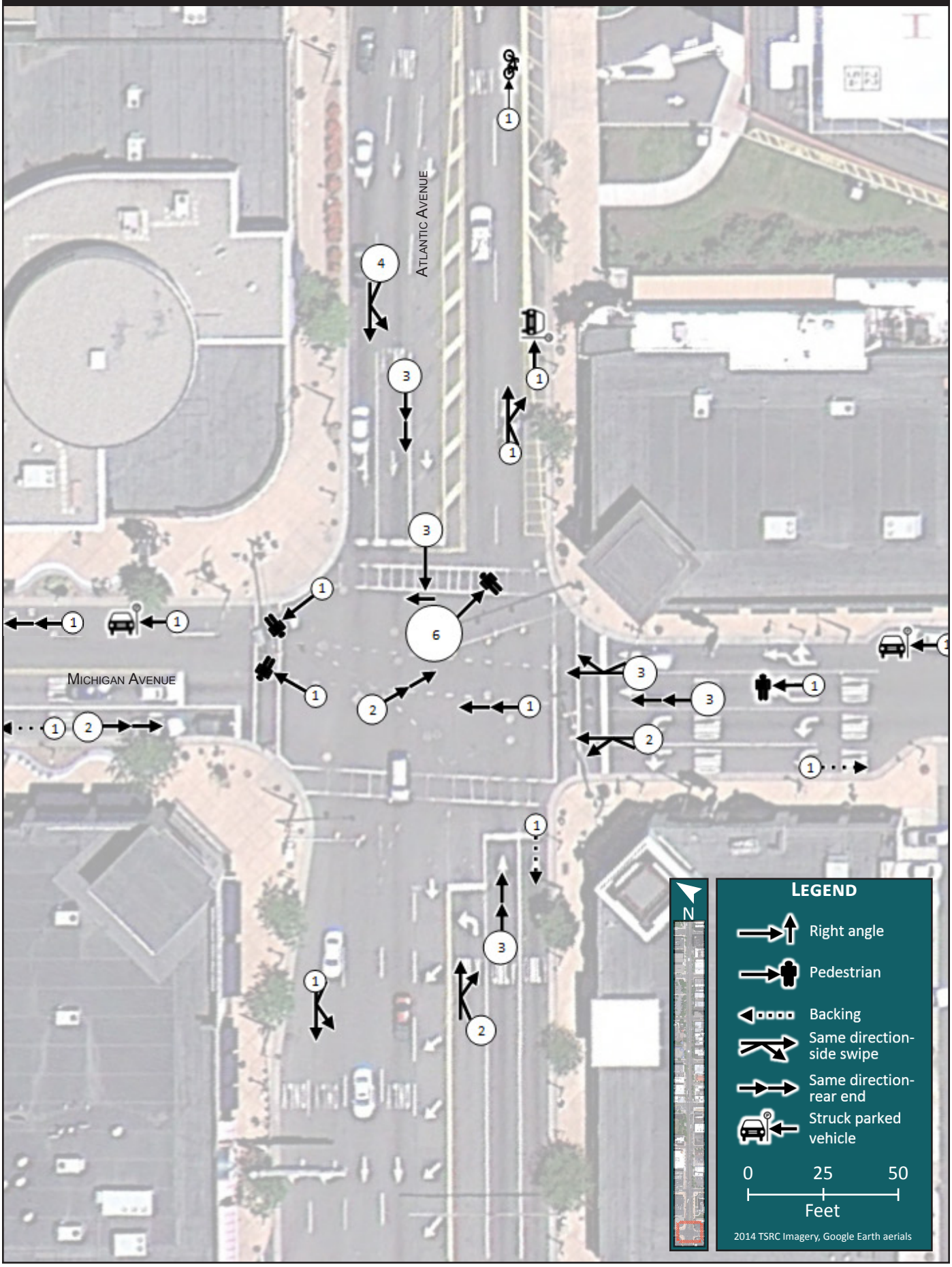
Intersection	#
At intersection	27
Not at intersection	26
Total	53

Crash Year	#
2010	23
2011	16
2012	14
Total	53

Crash Type and Severity



Michigan Avenue



Michigan Avenue - Crash Summary (2010–2012)

Crash Type	#
Same Direction - Rear End	15
Same Direction - Side Swipe	13
Right Angle	3
Opposite Direction - Head On/Angular	-
Opposite Direction - Side Swipe	-
Struck Parked Vehicle	2
Left Turn/U-turn	0
Backing	2
Encroachment	-
Overturned	-
Fixed Object	1
Animal	-
Pedestrian	9
Pedalcyclist	-
Non-fixed Object	-
Railcar - Vehicle	-
Other	1
Total	46

Month	#
January	3
February	2
March	1
April	4
May	4
June	4
July	3
August	7
September	4
October	4
November	7
December	3
Total	46

Severity	#
Property Damage Only	30
Pain	14
Moderate Injury	1
Incapacitating Injury	1
Fatal	-
Total	46

Day	#
Monday	5
Tuesday	8
Wednesday	4
Thursday	6
Friday	9
Saturday	7
Sunday	7
Total	46

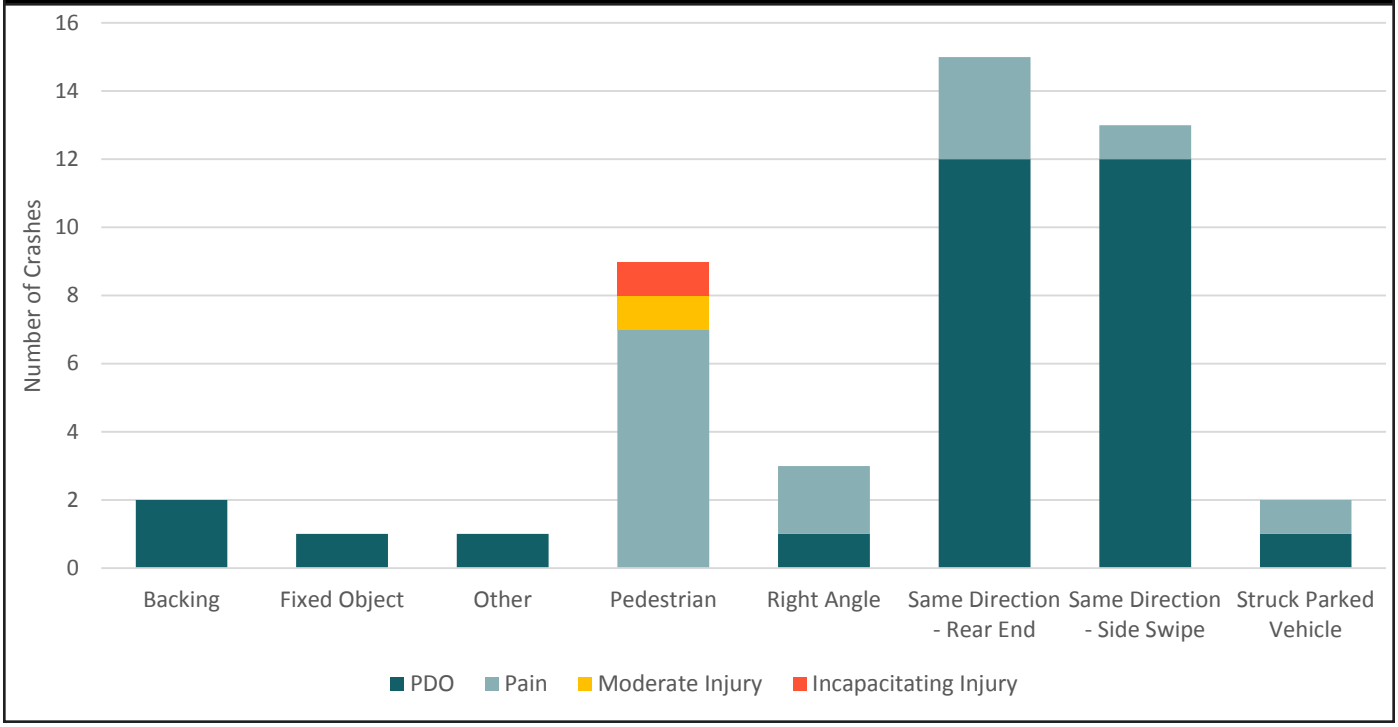
Surface Condition	#
Dry	39
Wet	6
Snowy	1
Icy	-
Slush	-
Water - Standing/Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	46

Light Condition	#
Daylight	27
Dawn	-
Dusk	-
Dark - No Street Lights	-
Dark - Street Lights On/Continuous	18
Dark - Street Lights On/Spot	-
Total	45

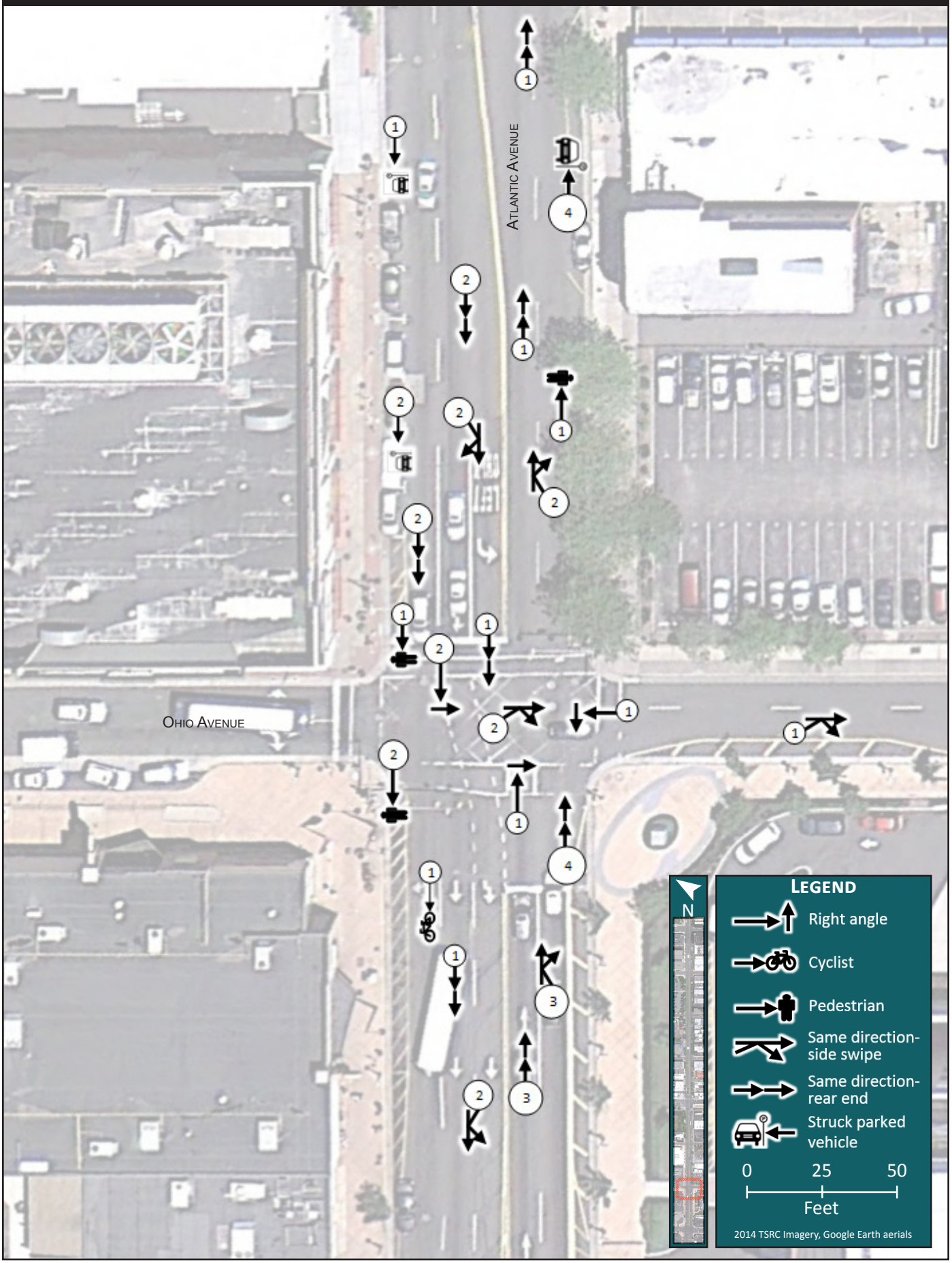
Intersection	#
At intersection	21
Not at intersection	25
Total	46

Crash Year	#
2010	24
2011	11
2012	11
Total	46

Crash Type and Severity



Ohio Avenue


Atlantic Avenue
Ohio Avenue
N
Legend
Right angle
Cyclist
Pedestrian
Same direction-side swipe
Same direction-rear end
Struck parked vehicle
0
25
50
Feet
2014 TSRC Imagery, Google Earth aerials

Ohio Avenue - Crash Summary (2010–2012)

Crash Type	#
Same Direction - Rear End	18
Same Direction - Side Swipe	11
Right Angle	4
Opposite Direction - Head On/Angular	-
Opposite Direction - Side Swipe	-
Struck Parked Vehicle	4
Left Turn/U-turn	-
Backing	-
Encroachment	-
Overturned	-
Fixed Object	-
Animal	-
Pedestrian	4
Pedalcyclist	2
Non-fixed Object	-
Railcar - Vehicle	-
Other	-
Total	43

Month	#
January	2
February	4
March	3
April	2
May	4
June	4
July	3
August	5
September	2
October	6
November	3
December	5
Total	43

Severity	#
Property Damage Only	29
Pain	13
Moderate Injury	1
Incapacitating Injury	-
Fatal	-
Total	43

Day	#
Monday	3
Tuesday	2
Wednesday	8
Thursday	6
Friday	11
Saturday	6
Sunday	7
Total	43

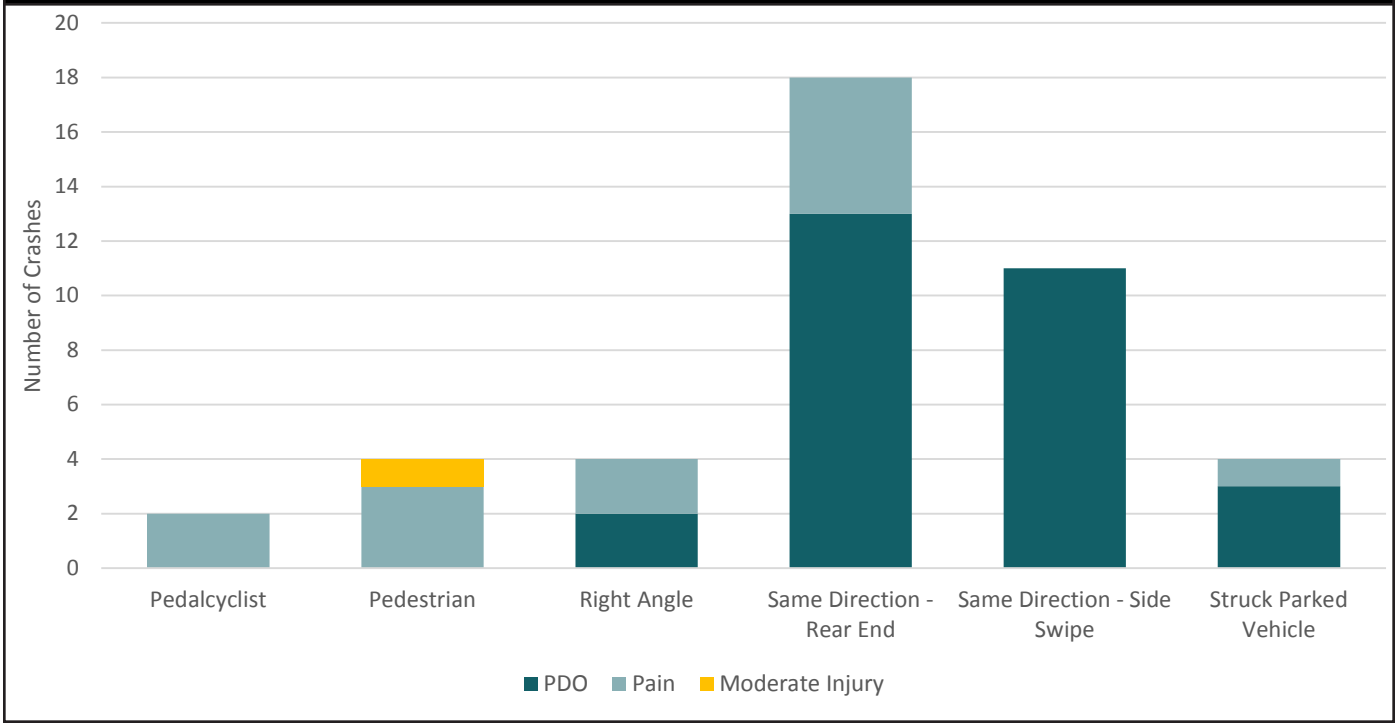
Surface Condition	#
Dry	35
Wet	8
Snowy	-
Icy	-
Slush	-
Water - Standing/Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	43

Light Condition	#
Daylight	33
Dawn	-
Dusk	2
Dark - No Street Lights	-
Dark - Street Lights On/Continuous	8
Dark - Street Lights On/Spot	-
Total	43

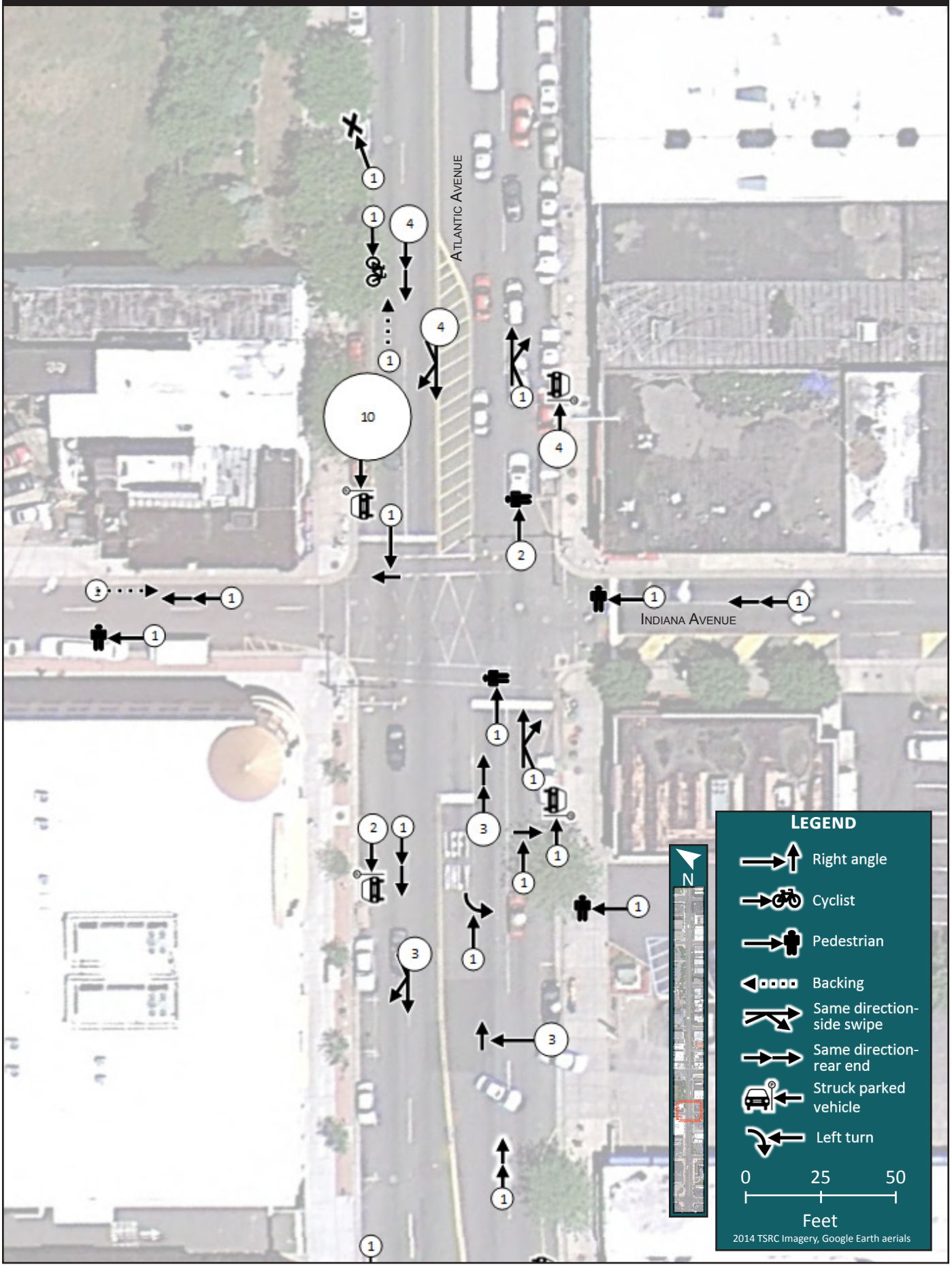
Intersection	#
At intersection	20
Not at intersection	23
Total	43

Crash Year	#
2010	18
2011	16
2012	9
Total	43

Crash Type and Severity



Indiana Avenue



Indiana Avenue - Crash Summary (2010–2012)

Crash Type	#
Same Direction - Rear End	10
Same Direction - Side Swipe	11
Right Angle	5
Opposite Direction - Head On/Angular	-
Opposite Direction - Side Swipe	-
Struck Parked Vehicle	18
Left Turn/U-turn	1
Backing	2
Encroachment	-
Overturned	-
Fixed Object	1
Animal	-
Pedestrian	6
Pedalcyclist	1
Non-fixed Object	-
Railcar - Vehicle	-
Other	-
Total	55

Month	#
January	7
February	5
March	3
April	9
May	2
June	2
July	6
August	4
September	4
October	5
November	4
December	4
Total	55

Severity	#
Property Damage Only	41
Pain	11
Moderate Injury	3
Incapacitating Injury	-
Fatal	-
Total	55

Day	#
Monday	5
Tuesday	8
Wednesday	6
Thursday	10
Friday	9
Saturday	9
Sunday	8
Total	55

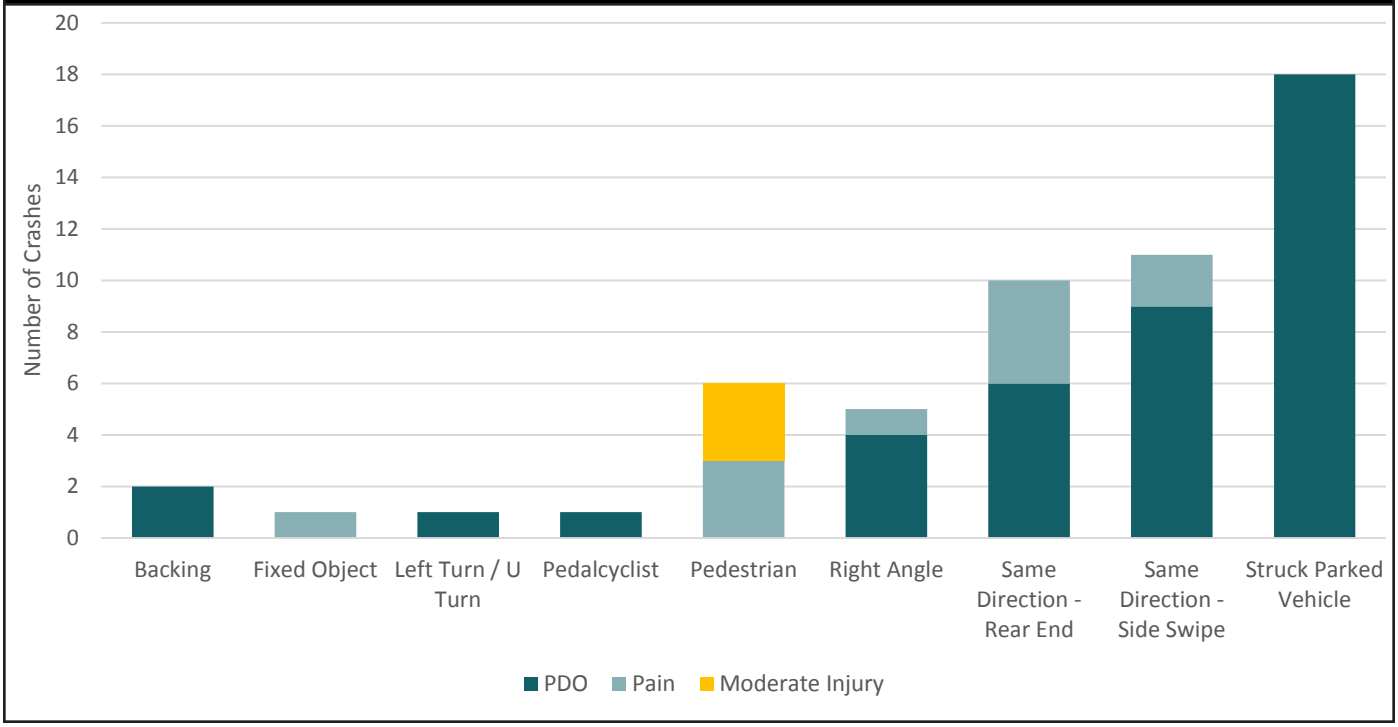
Surface Condition	#
Dry	44
Wet	10
Snowy	-
Icy	-
Slush	1
Water - Standing/Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	55

Light Condition	#
Daylight	35
Dawn	-
Dusk	2
Dark - No Street Lights	-
Dark - Street Lights On/Continuous	18
Dark - Street Lights On/Spot	-
Total	55

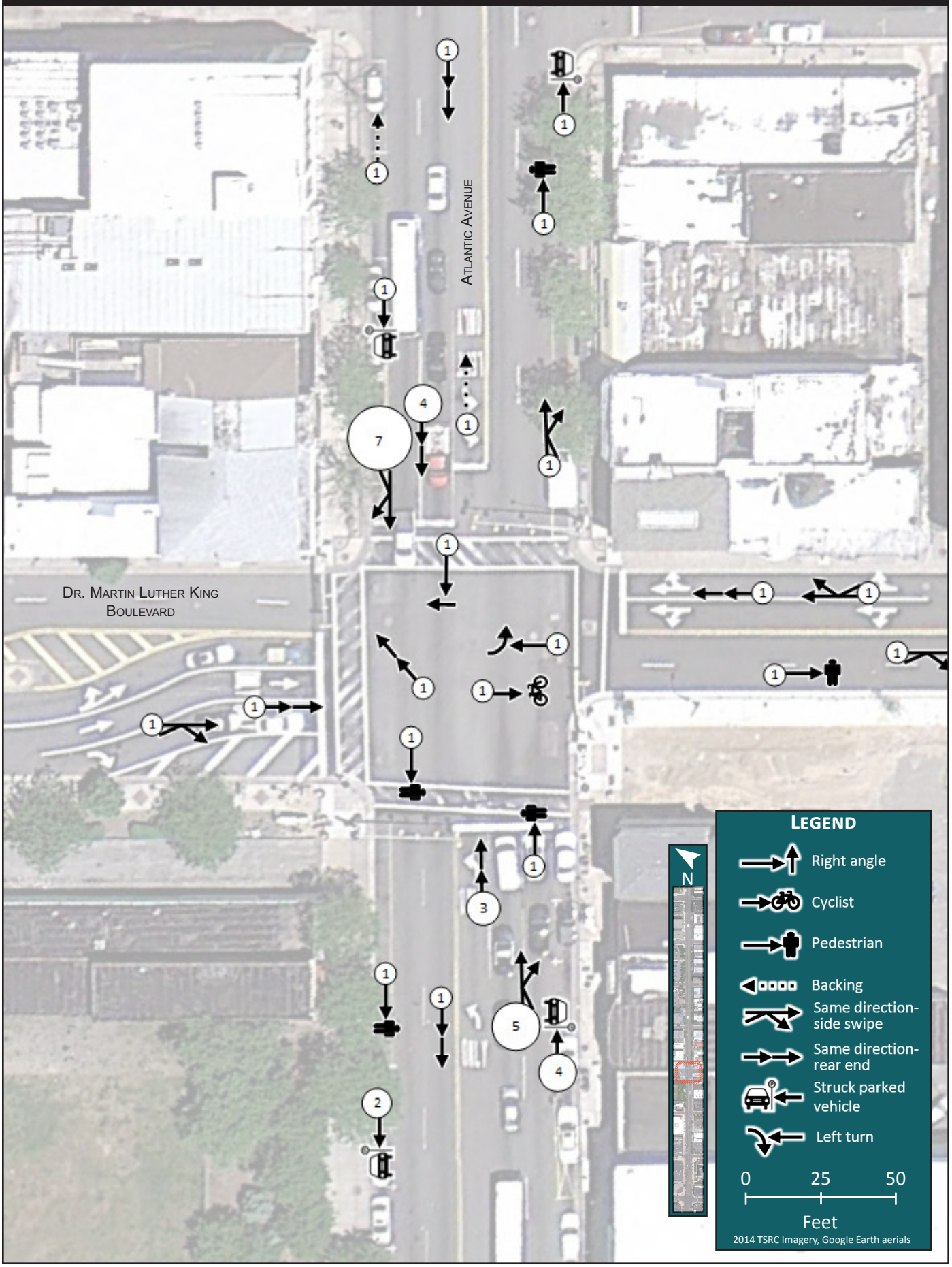
Intersection	#
At intersection	9
Not at intersection	46
Total	55

Crash Year	#
2010	24
2011	14
2012	17
Total	55

Crash Type and Severity



Dr. Martin Luther King Boulevard



Dr. Martin Luther King Boulevard - Crash Summary (2010–2012)

Crash Type	#
Same Direction - Rear End	13
Same Direction - Side Swipe	15
Right Angle	1
Opposite Direction - Head On/Angular	-
Opposite Direction - Side Swipe	-
Struck Parked Vehicle	9
Left Turn/U-turn	2
Backing	1
Encroachment	-
Overturned	-
Fixed Object	-
Animal	-
Pedestrian	5
Pedalcyclist	1
Non-fixed Object	-
Railcar - Vehicle	-
Other	-
Total	47

Month	#
January	4
February	6
March	-
April	6
May	3
June	6
July	7
August	4
September	2
October	2
November	4
December	3
Total	47

Severity	#
Property Damage Only	39
Pain	8
Moderate Injury	-
Incapacitating Injury	-
Fatal	-
Total	47

Day	#
Monday	11
Tuesday	2
Wednesday	3
Thursday	7
Friday	8
Saturday	9
Sunday	7
Total	47

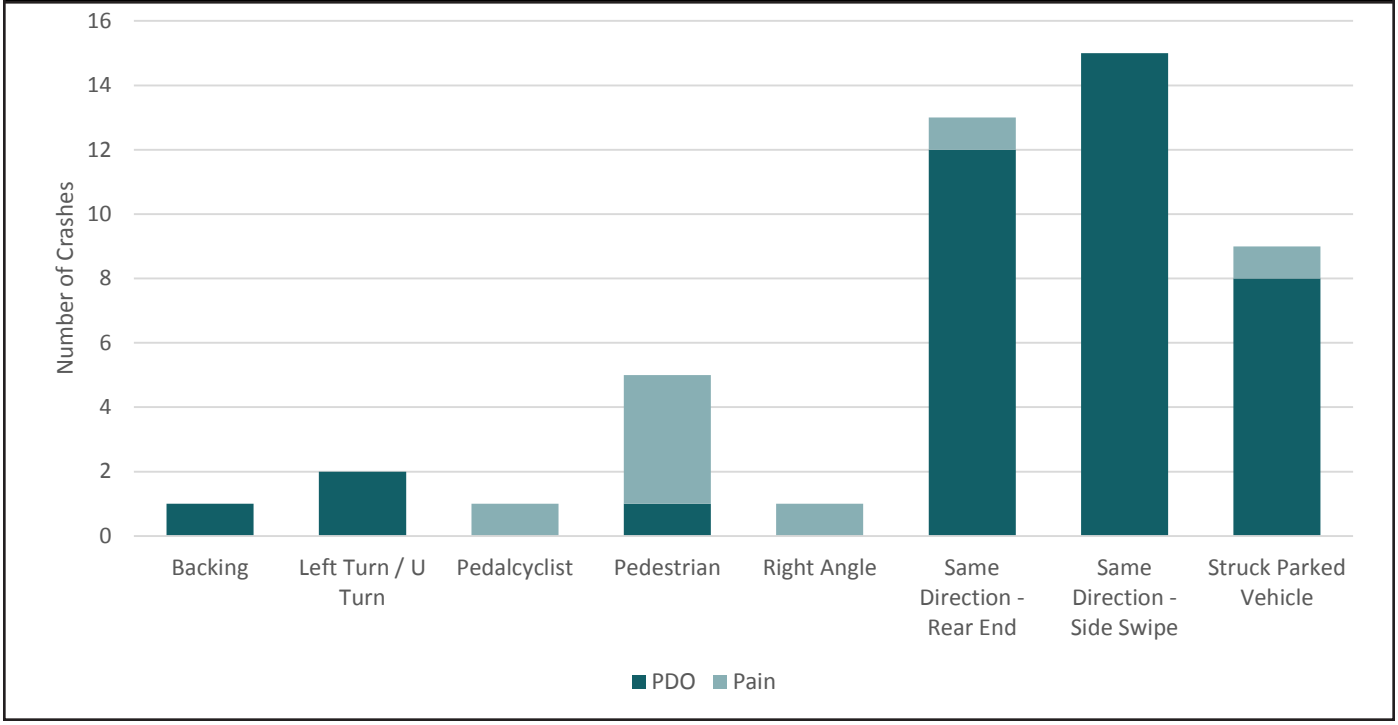
Surface Condition	#
Dry	39
Wet	5
Snowy	1
Icy	-
Slush	2
Water - Standing/Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	47

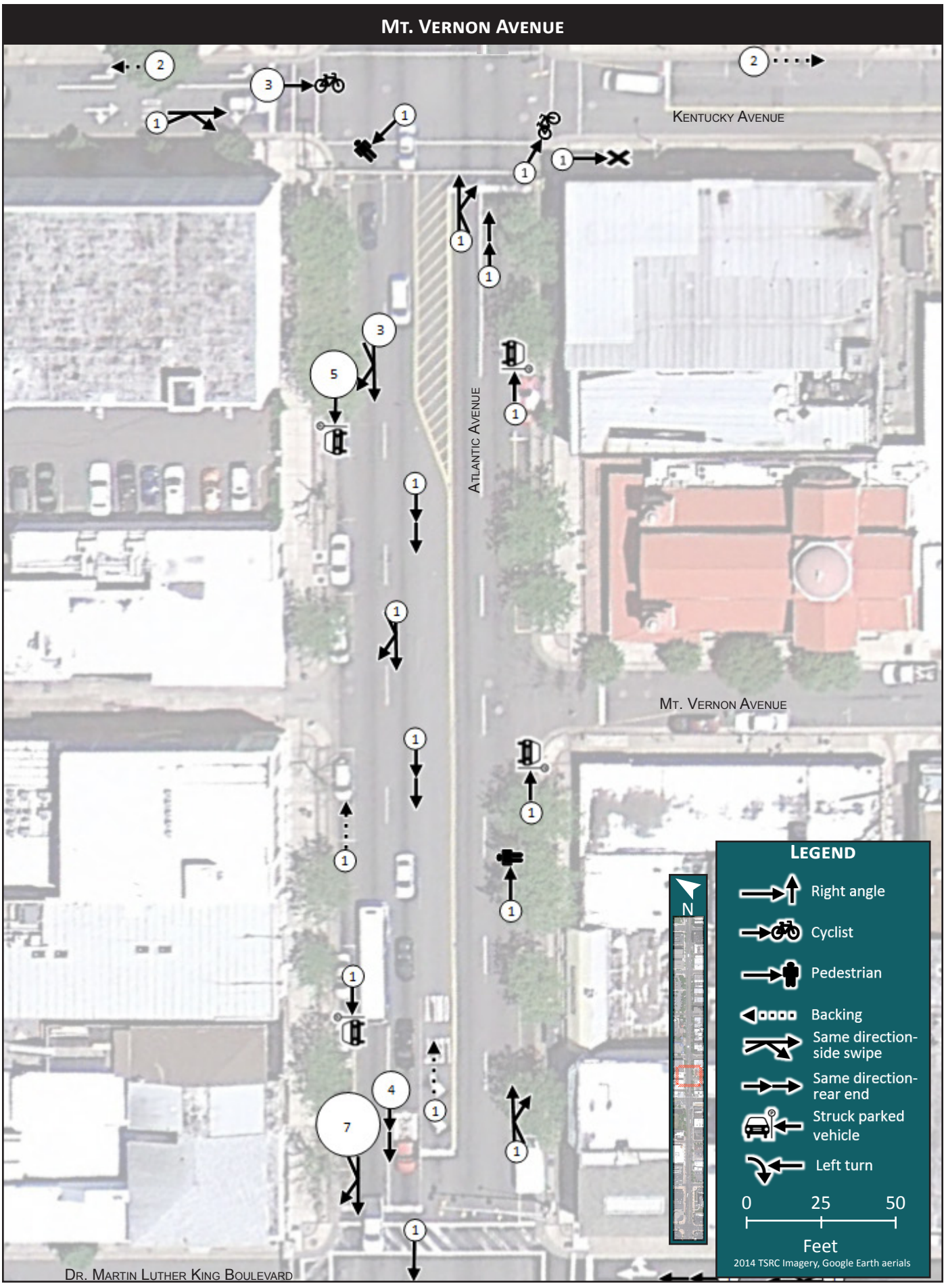
Light Condition	#
Daylight	24
Dawn	-
Dusk	5
Dark - No Street Lights	-
Dark - Street Lights On/Continuous	18
Dark - Street Lights On/Spot	-
Total	47

Intersection	#
At intersection	14
Not at intersection	33
Total	47

Crash Year	#
2010	14
2011	17
2012	16
Total	47

Crash Type and Severity




Mt. Vernon Avenue
Kentucky Avenue
Atlantic Avenue
Mt. Vernon Avenue
Dr. Martin Luther King Boulevard
N
Legend
Right angle
Cyclist
Pedestrian
Backing
Same direction-side swipe
Same direction-rear end
Struck parked vehicle
Left turn
0
25
50
Feet
2014 TSRC Imagery, Google Earth aerials

Mt. Vernon Avenue - Crash Summary (2010–2012)

Crash Type	#
Same Direction - Rear End	1
Same Direction - Side Swipe	1
Right Angle	-
Opposite Direction - Head On/Angular	-
Opposite Direction - Side Swipe	-
Struck Parked Vehicle	1
Left Turn/U-turn	-
Backing	1
Encroachment	-
Overturned	-
Fixed Object	-
Animal	-
Pedestrian	1
Pedalcyclist	-
Non-fixed Object	-
Railcar - Vehicle	-
Other	-
Total	5

Month	#
January	-
February	1
March	1
April	-
May	-
June	-
July	-
August	1
September	-
October	-
November	-
December	2
Total	5

Severity	#
Property Damage Only	4
Pain	-
Moderate Injury	1
Incapacitating Injury	-
Fatal	-
Total	5

Day	#
Monday	-
Tuesday	-
Wednesday	2
Thursday	2
Friday	1
Saturday	-
Sunday	-
Total	5

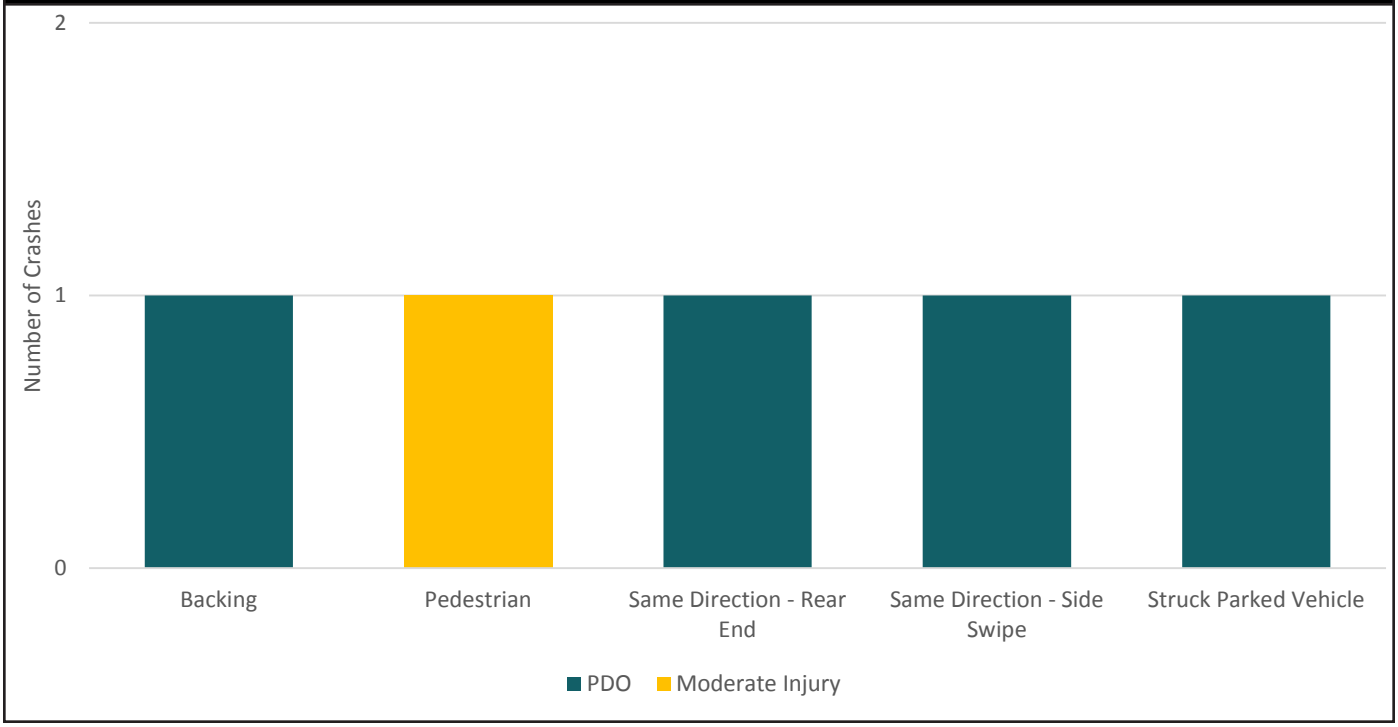
Surface Condition	#
Dry	4
Wet	1
Snowy	-
Icy	-
Slush	-
Water - Standing/Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	5

Light Condition	#
Daylight	3
Dawn	-
Dusk	-
Dark - No Street Lights	-
Dark - Street Lights On/Continuous	2
Dark - Street Lights On/Spot	-
Total	5

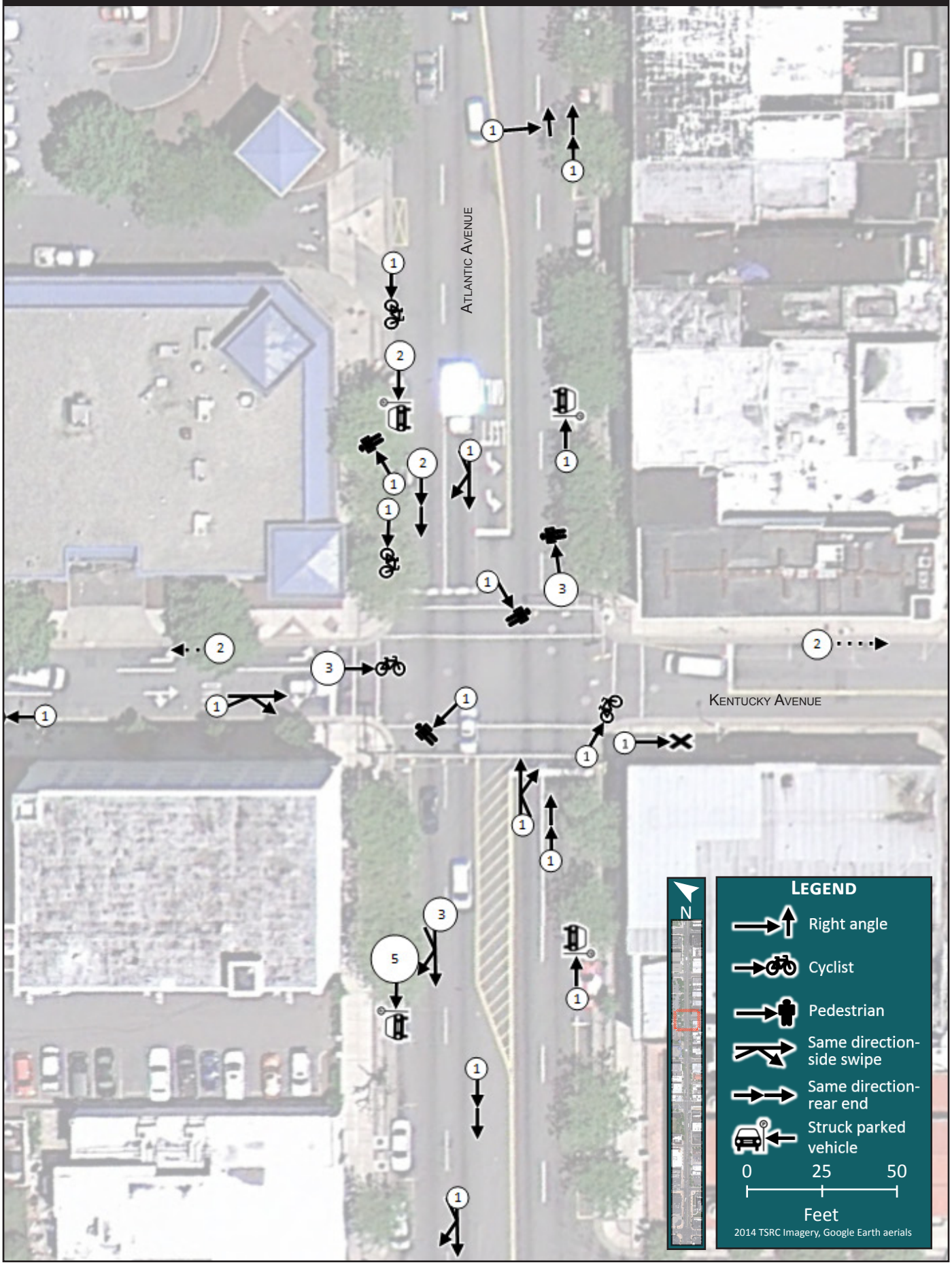
Intersection	#
At intersection	2
Not at intersection	3
Total	5

Crash Year	#
2010	-
2011	3
2012	2
Total	5

Crash Type and Severity



Kentucky Avenue



Kentucky Avenue - Crash Summary (2010–2012)

Crash Type	#
Same Direction - Rear End	5
Same Direction - Side Swipe	7
Right Angle	-
Opposite Direction - Head On/Angular	-
Opposite Direction - Side Swipe	-
Struck Parked Vehicle	9
Left Turn/U-turn	-
Backing	3
Encroachment	-
Overturned	-
Fixed Object	1
Animal	-
Pedestrian	5
Pedalcyclist	7
Non-fixed Object	0
Railcar - Vehicle	-
Other	-
Total	37

Month	#
January	2
February	1
March	1
April	2
May	3
June	8
July	5
August	5
September	1
October	5
November	2
December	2
Total	37

Severity	#
Property Damage Only	25
Pain	11
Moderate Injury	1
Incapacitating Injury	-
Fatal	-
Total	37

Day	#
Monday	3
Tuesday	6
Wednesday	6
Thursday	6
Friday	6
Saturday	8
Sunday	2
Total	37

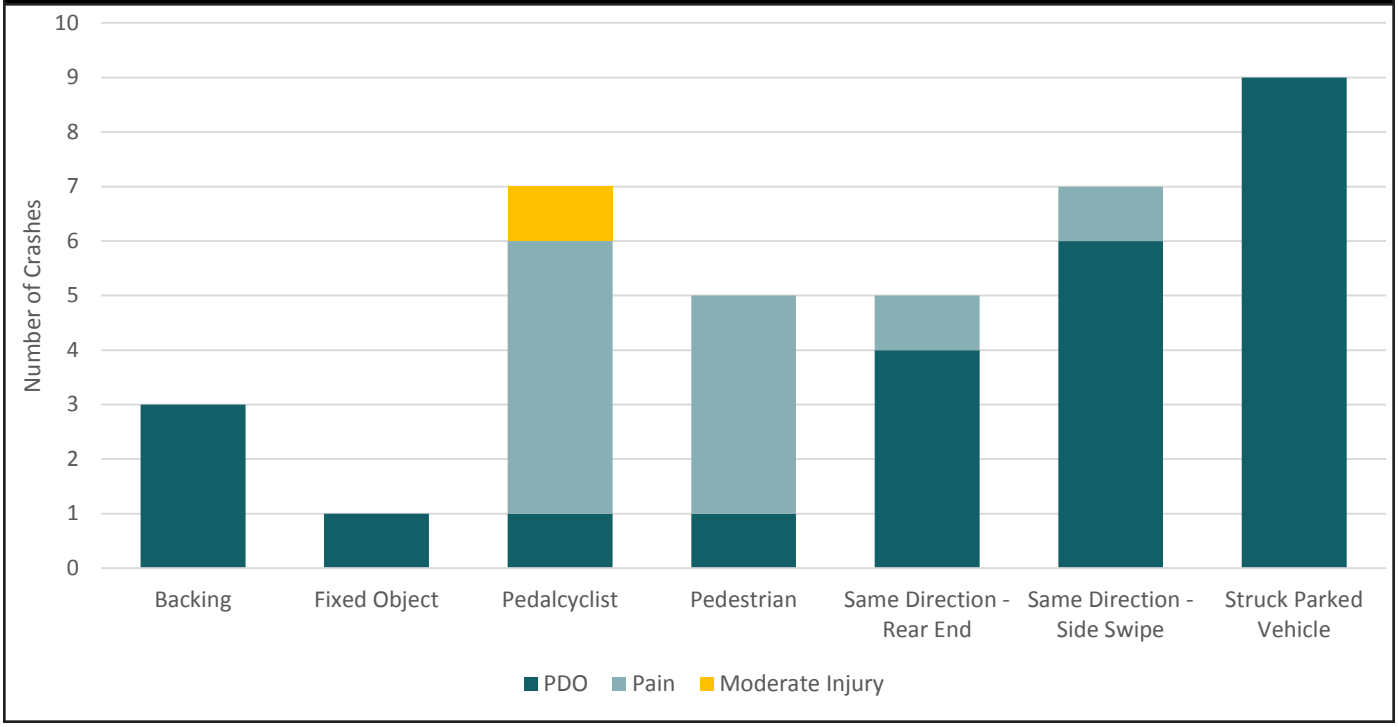
Surface Condition	#
Dry	34
Wet	3
Snowy	-
Icy	-
Slush	-
Water - Standing/Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	37

Light Condition	#
Daylight	28
Dawn	-
Dusk	2
Dark - No Street Lights	1
Dark - Street Lights On/Continuous	6
Dark - Street Lights On/Spot	-
Total	37

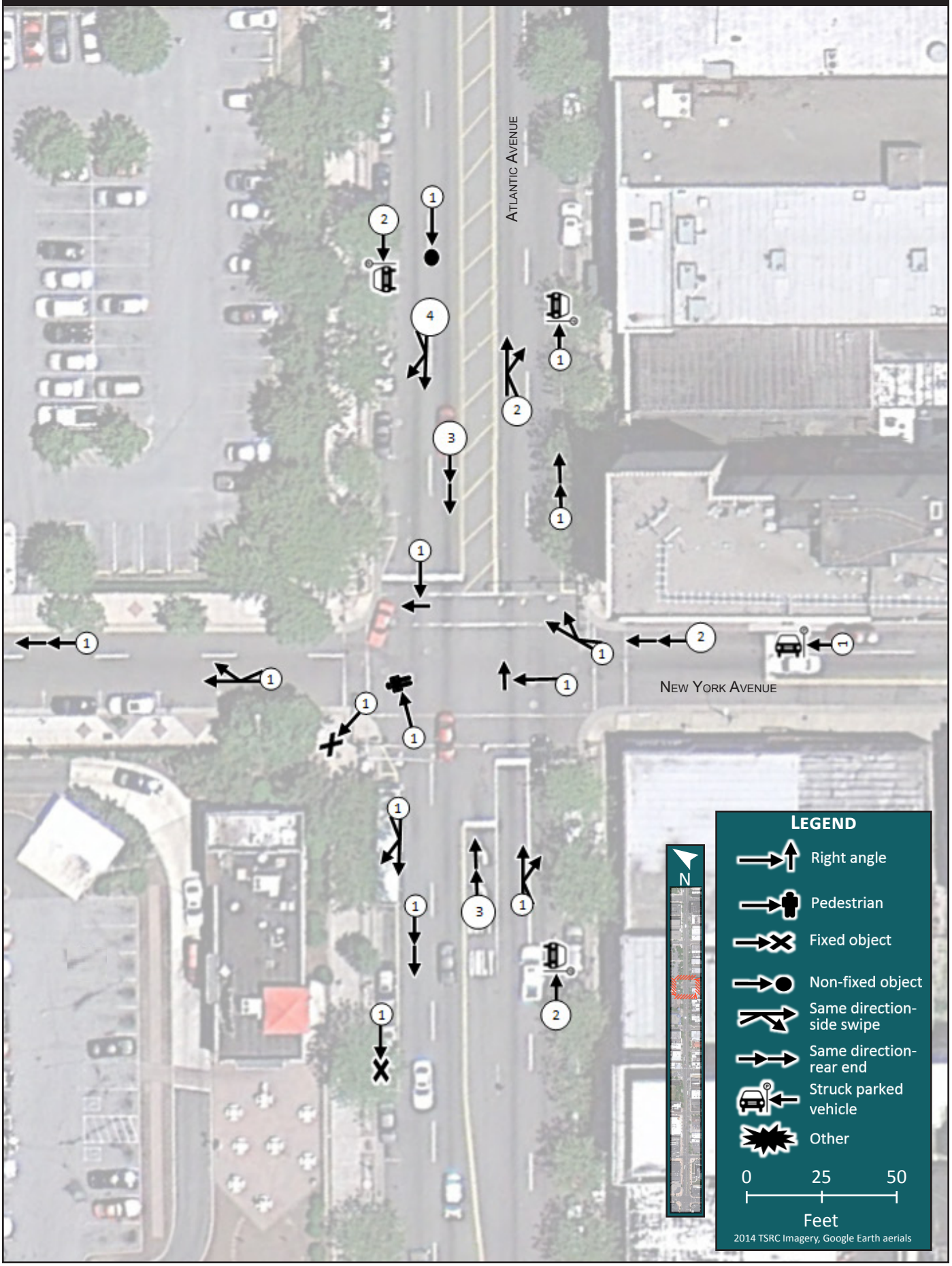
Intersection	#
At intersection	7
Not at intersection	30
Total	37

Crash Year	#
2010	9
2011	14
2012	14
Total	37

Crash Type and Severity



New York Avenue



New York Avenue - Crash Summary (2010–2012)

Crash Type	#
Same Direction - Rear End	12
Same Direction - Side Swipe	11
Right Angle	3
Opposite Direction - Head On/Angular	-
Opposite Direction - Side Swipe	-
Struck Parked Vehicle	7
Left Turn/U-turn	-
Backing	-
Encroachment	-
Overturned	-
Fixed Object	2
Animal	-
Pedestrian	1
Pedalcyclist	-
Non-fixed Object	1
Railcar - Vehicle	-
Other	-
Total	37

Month	#
January	2
February	2
March	3
April	3
May	1
June	8
July	6
August	3
September	1
October	1
November	4
December	3
Total	37

Severity	#
Property Damage Only	28
Pain	6
Moderate Injury	3
Incapacitating Injury	-
Fatal	-
Total	37

Day	#
Monday	3
Tuesday	4
Wednesday	9
Thursday	7
Friday	7
Saturday	6
Sunday	1
Total	37

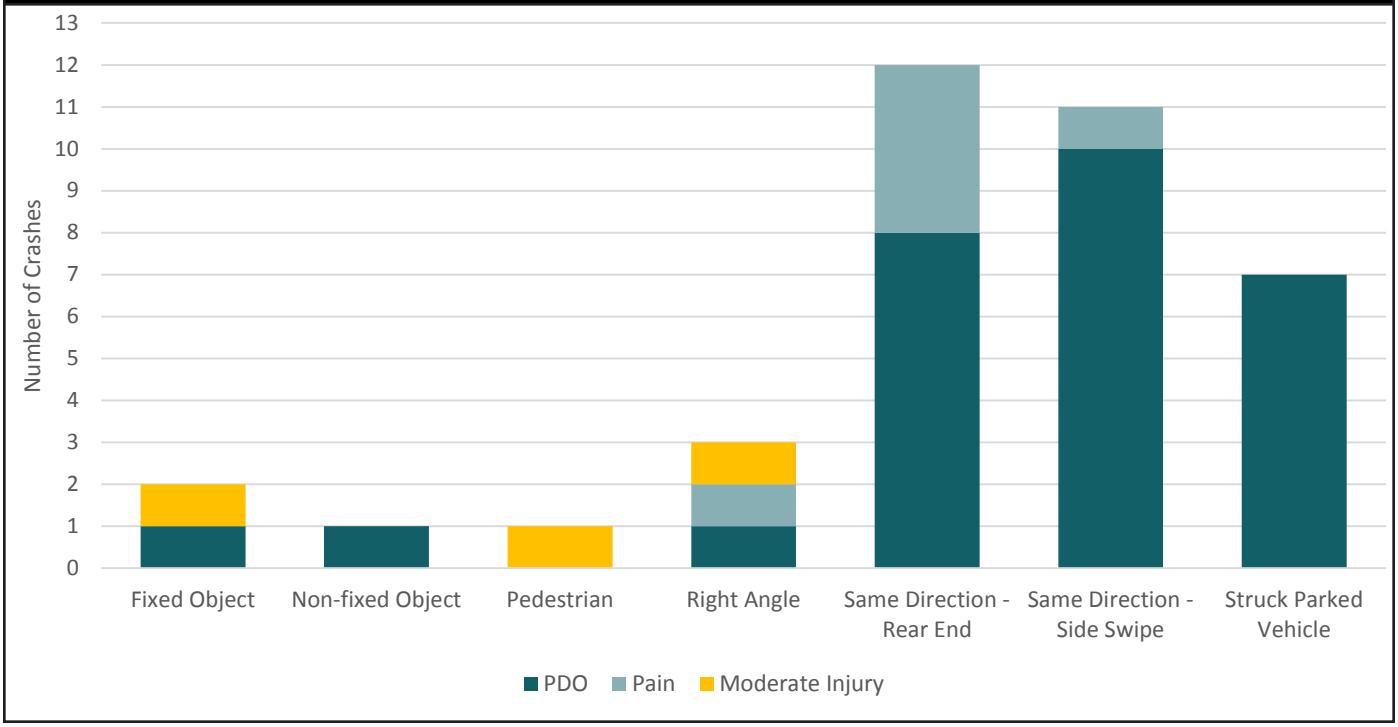
Surface Condition	#
Dry	33
Wet	3
Snowy	1
Icy	-
Slush	-
Water - Standing/Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	37

Light Condition	#
Daylight	22
Dawn	1
Dusk	3
Dark - No Street Lights	1
Dark - Street Lights On/Continuous	10
Dark - Street Lights On/Spot	-
Total	37

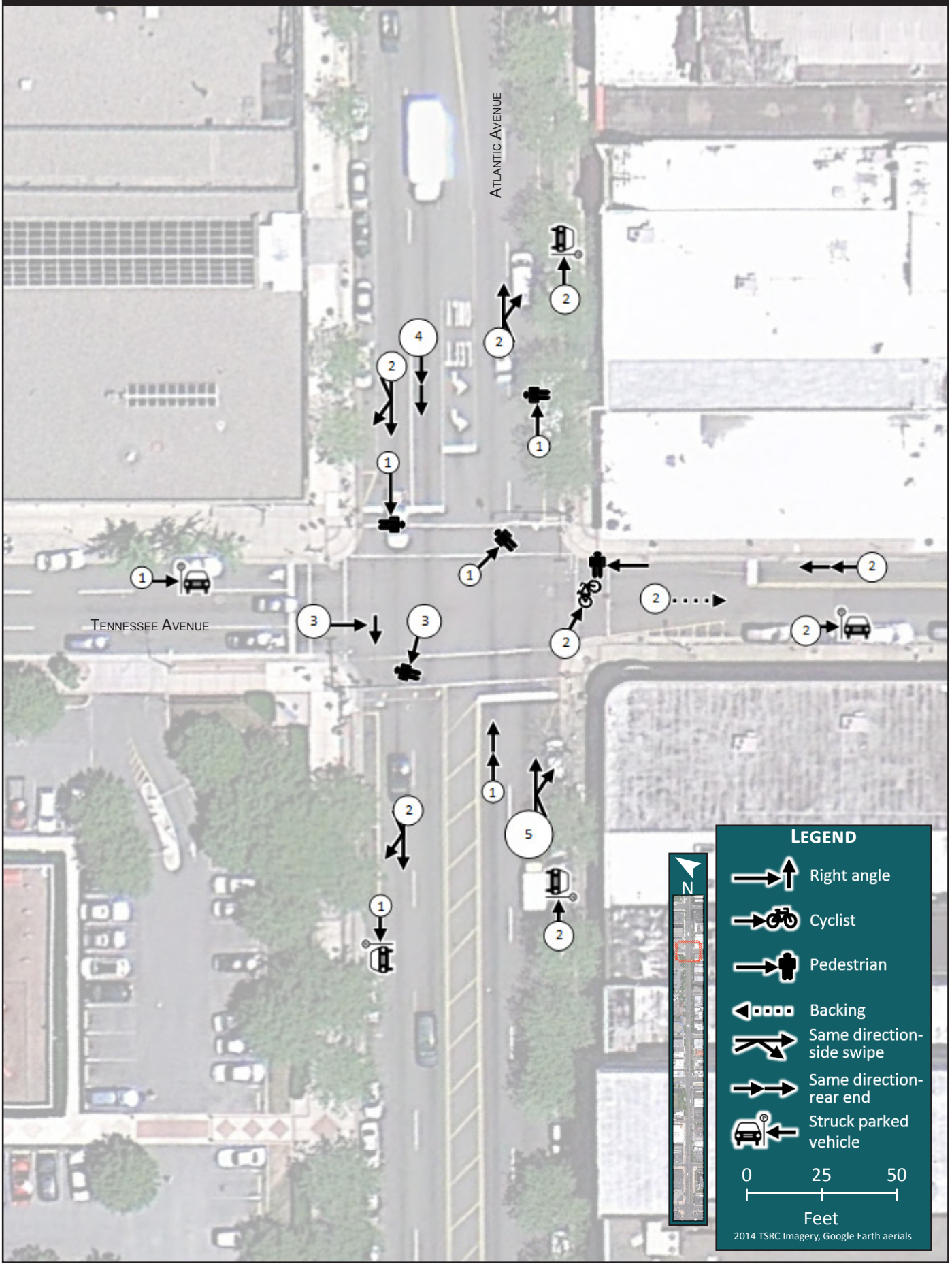
Intersection	#
At intersection	12
Not at intersection	25
Total	37

Crash Year	#
2010	15
2011	9
2012	13
Total	37

Crash Type and Severity



Tennessee Avenue



Tennessee Avenue - Crash Summary (2010–2012)

Crash Type	#
Same Direction - Rear End	6
Same Direction - Side Swipe	10
Right Angle	3
Opposite Direction - Head On/Angular	-
Opposite Direction - Side Swipe	-
Struck Parked Vehicle	8
Left Turn/U-turn	-
Backing	2
Encroachment	-
Overturned	-
Fixed Object	-
Animal	-
Pedestrian	7
Pedalcyclist	2
Non-fixed Object	-
Railcar - Vehicle	-
Other	-
Total	38

Month	#
January	2
February	2
March	3
April	3
May	3
June	6
July	5
August	3
September	4
October	2
November	3
December	2
Total	38

Severity	#
Property Damage Only	23
Pain	13
Moderate Injury	1
Incapacitating Injury	1
Fatal	-
Total	38

Day	#
Monday	6
Tuesday	7
Wednesday	5
Thursday	5
Friday	7
Saturday	6
Sunday	2
Total	38

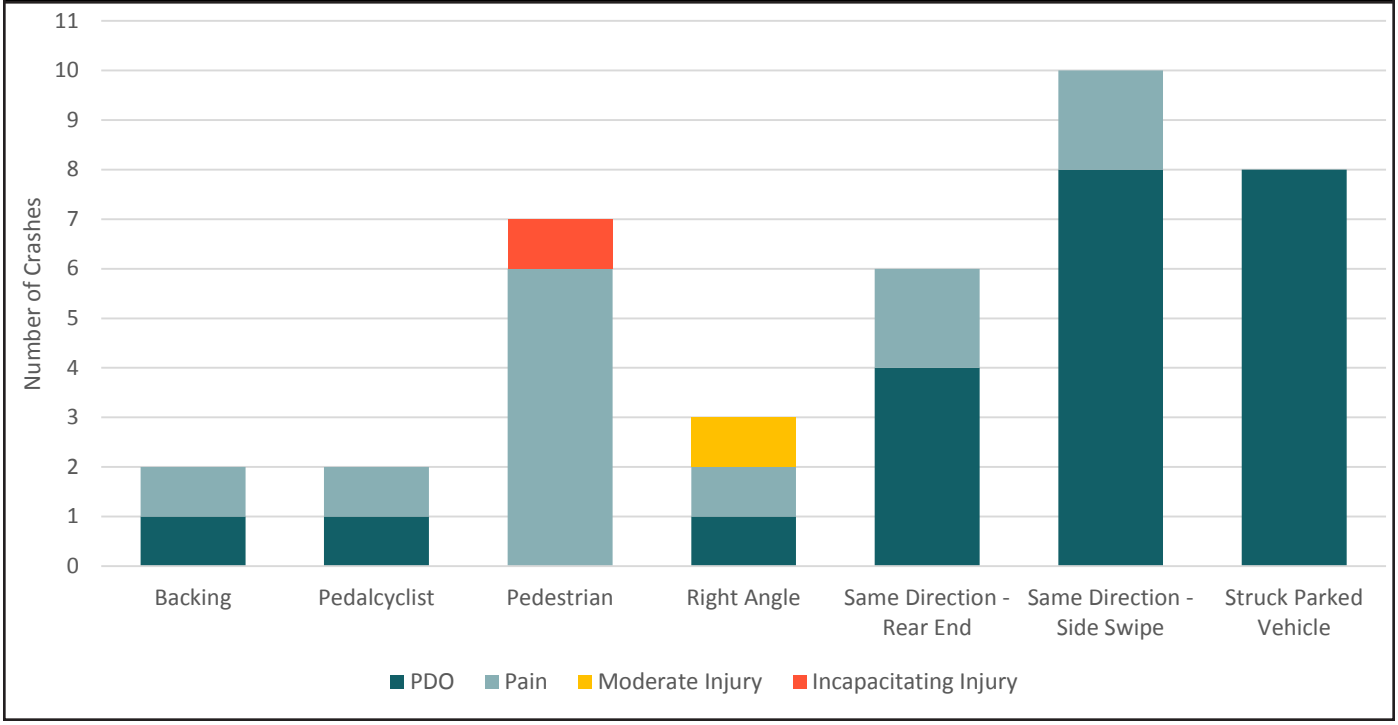
Surface Condition	#
Dry	31
Wet	6
Snowy	-
Icy	1
Slush	-
Water - Standing/Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	38

Light Condition	#
Daylight	28
Dawn	-
Dusk	3
Dark - No Street Lights	-
Dark - Street Lights On/Continuous	5
Dark - Street Lights On/Spot	2
Total	38

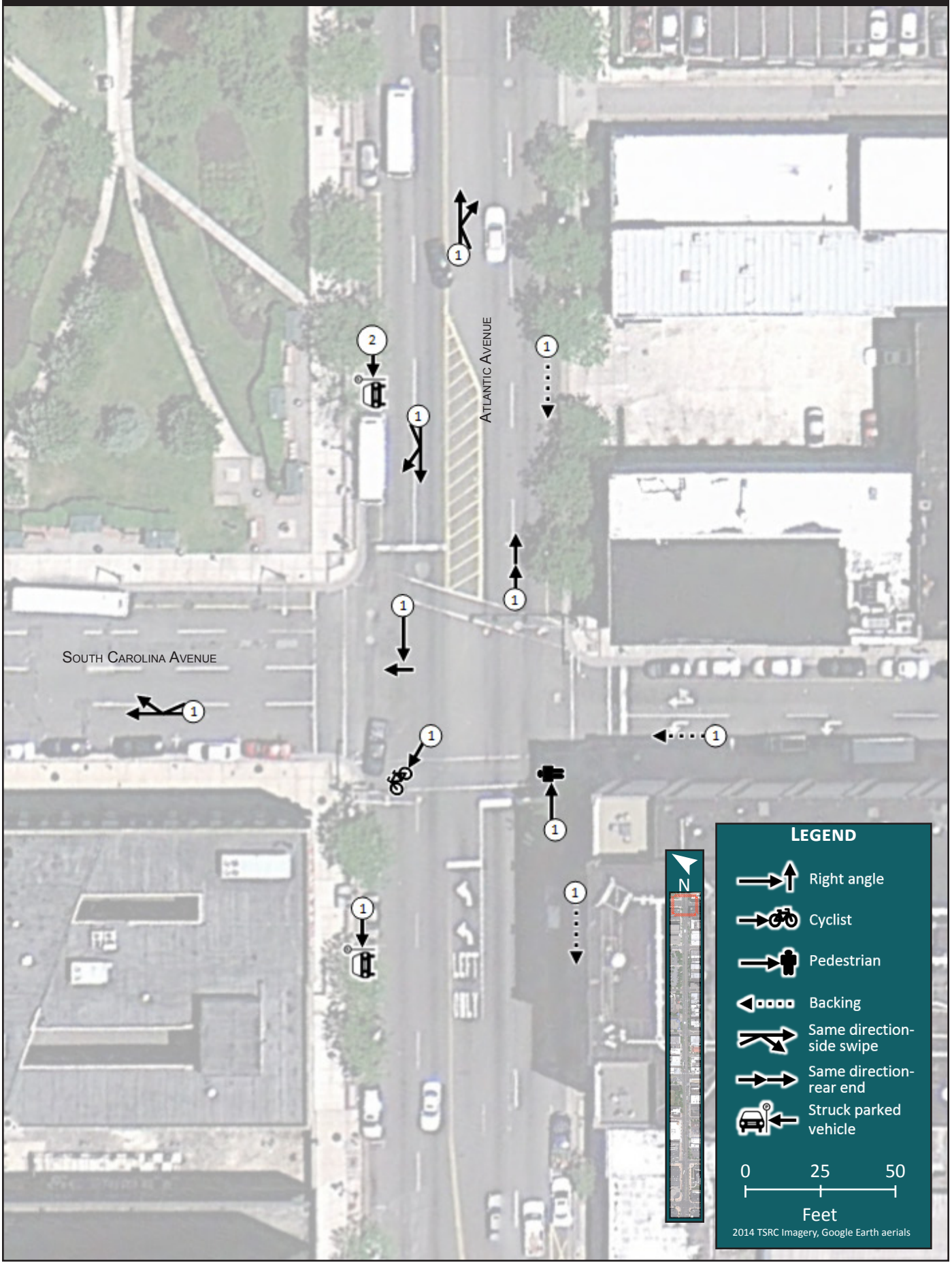
Intersection	#
At intersection	14
Not at intersection	24
Total	38

Crash Year	#
2010	16
2011	12
2012	10
Total	38

Crash Type and Severity



South Carolina Avenue



South Carolina Avenue - Crash Summary (2010–2012)

Crash Type	#
Same Direction - Rear End	-
Same Direction - Side Swipe	2
Right Angle	1
Opposite Direction - Head On/Angular	-
Opposite Direction - Side Swipe	-
Struck Parked Vehicle	3
Left Turn/U-turn	-
Backing	3
Encroachment	-
Overturned	-
Fixed Object	-
Animal	-
Pedestrian	1
Pedalcyclist	1
Non-fixed Object	-
Railcar - Vehicle	-
Other	-
Total	11

Month	#
January	-
February	1
March	2
April	1
May	1
June	-
July	4
August	1
September	-
October	1
November	-
December	-
Total	11

Severity	#
Property Damage Only	6
Pain	4
Moderate Injury	1
Incapacitating Injury	-
Fatal	-
Total	11

Day	#
Monday	2
Tuesday	1
Wednesday	-
Thursday	1
Friday	4
Saturday	2
Sunday	1
Total	11

Surface Condition	#
Dry	9
Wet	2
Snowy	-
Icy	-
Slush	-
Water - Standing/Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	11

Light Condition	#
Daylight	8
Dawn	1
Dusk	-
Dark - No Street Lights	-
Dark - Street Lights On/Continuous	2
Dark - Street Lights On/Spot	-
Total	11

Intersection	#
At intersection	3
Not at intersection	8
Total	11

Crash Year	#
2010	5
2011	4
2012	2
Total	11

Crash Type and Severity