ESSEX COUNTY INTERSECTIONS

ROAD SAFETY AUDIT

Newark, New Jersey

REPORT

>> December 2015

RSA facilitated by the Transportation Safety Resource Center (TSRC) at the Rutgers Center for Advanced Infrastructure and Transportation (CAIT) in partnership with the North Jersey Transportation Planning Authority (NJTPA) and Essex County, with funding provided by FHWA and NJDOT

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What is a Road Safety Audit (RSA)?

CAIT's Transportation Safety Resource Center (TSRC) offers a statewide Road Safety Audit (RSA) service at no charge to New Jersey towns and counties. Interested parties can request RSA 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 Plan4Safety tool belongs to the New Jersey Department of Transportation and is maintained by the Rutgers Transportation Safety Resource Center.

The RSA team provides a final report, including 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, Safety Program Manager, at andy.kaplan@rutgers.edu.

Disclaimer

A Road Safety Audit report provided by the Center for Advanced Infrastructure and Transportation staff does 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.

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the New Jersey Department of Transportation or the Rutgers Center for Advanced Infrastructure and Transportation. This report does not constitute a standard, specification, or regulation. This document is disseminated under the sponsorship of the Department of Transportation, University Transportation Centers Program, in the interest of information exchange. The US government assumes no liability for the contents or use thereof.

The 2015 Essex County Intersections RSA was conducted on Monday, July 27, 2015. The RSA locations were chosen by the Essex County Engineering Department in conjunction with the North Jersey Transportation Planning Authority, and reflect high-ranking intersections in the 2015 network screening lists. The four intersections studied were:

- Stuyvesant Ave. and 18th Ave.
- Bergen St. and South Orange Ave.
- Park Ave. and Clifton Ave.
- Broadway and 3rd Ave.

Each intersection is located beyond downtown Newark, in neighborhoods that are largely residential or institutional. The frequency and number of bus lines varied by intersection, as did the geometry and pavement width.

When compared to countywide data, each intersection had an overrepresentation of the following crash characteristics: "dark" lighting conditions, "pain" severity levels, and "left-turn" or "pedestrian" crash types. Other trends, such as high incidence of crashes on wet roadways or right-angle crashes, varied by intersection.

During the field visit, the team made several general observations of the intersections, including faded pavement markings, signal maintenance issues, and ADA compliance. More intersection-specific issues include geometry, lane use, and transit accommodations.

General recommendations include refreshing pavement markings, upgrading signal heads, and considering road diets to reduce speed. Intersection-specific recommendations, such as geometric reconfigurations at South Orange Avenue, varied by site.

1.1 Site Selection

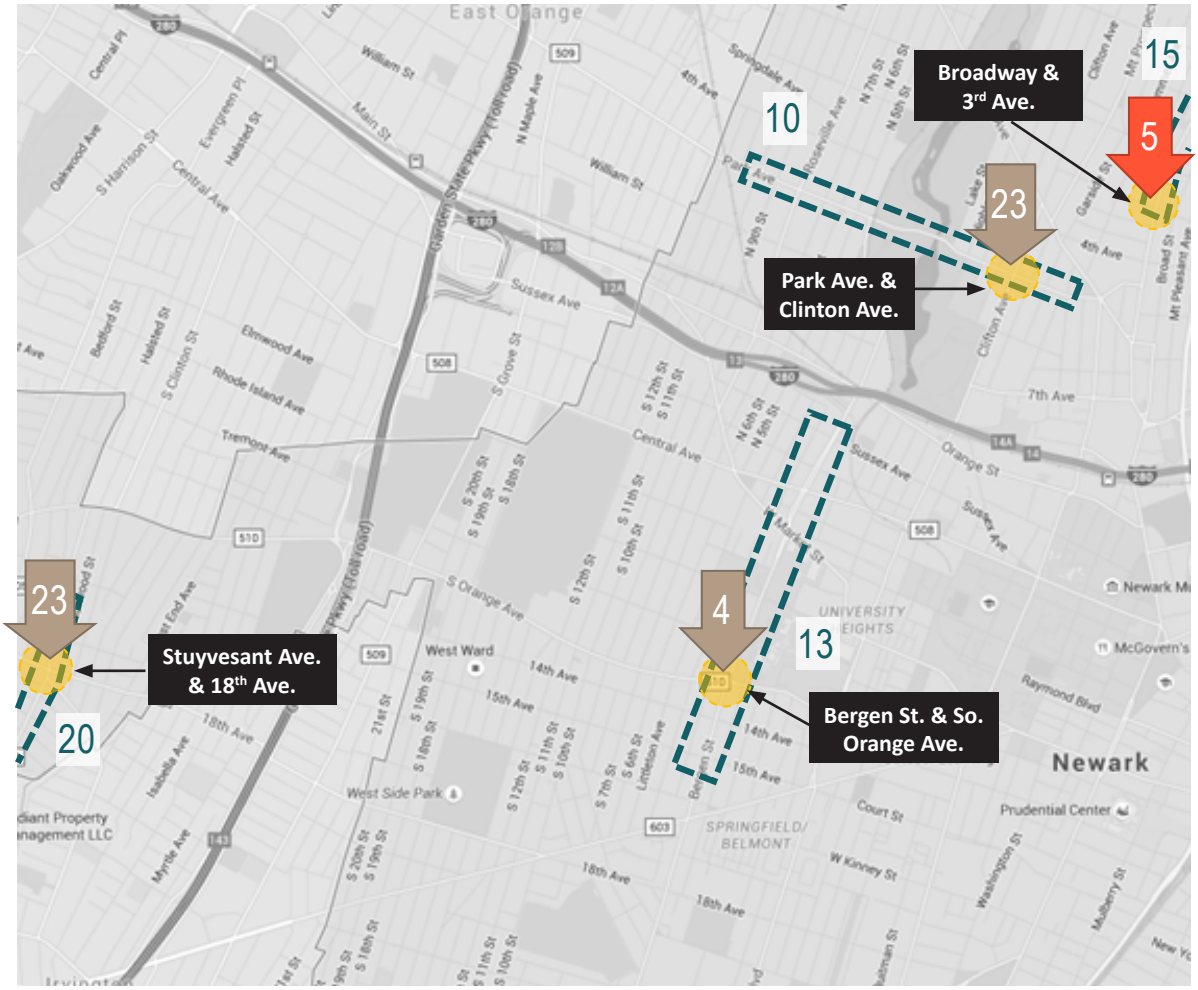


Figure 1 – Identified Priority High Crash Locations

Symbol	Safety Focus	Essex County Ranking			
		Stuyvesant Avenue & 18th Avenue	Bergen Street & South Orange Avenue	Park Avenue & Clifton Avenue	Broadway & 3rd Avenue
	Intersection Spot	23	4	23	-
	Pedestrian Spot	-	-	-	5
	Pedestrian Corridor	20	13	10	15

The 2015 Essex County RSA Intersections were chosen as a result of the 2014 network screenings, conducted in conjunction with the NJTPA and NJ DOT. Network screenings use crash reports, as identified in the Plan4Safety tool, and prioritize sites based on crash volume and severity.

Many of the higher-ranking Essex County intersections have recently undergone improvements; others have not.

The county chose the four following intersections from the list of identified sites that have not been improved in recent years:

- Stuyvesant Avenue and 18th Avenue
- Bergen Street and South Orange Avenue
- Park Avenue and Clifton Avenue
- Broadway and 3rd Avenue

Rankings for each intersection, in terms of the three identifying network screenings lists, are shown in Figure 1 above.

1.2 Traffic Volumes

Traffic volumes differ by intersection. The bi-directional traffic counts within a quarter-mile of each study intersection are listed below. For more information, see "Traffic Volumes" map in Appendix B.

Intersection	Traffic Counts
Stuyvesant Avenue and 18th Avenue	10,153 along Stuyvesant Avenue
Bergen Street and South Orange Avenue	Not available
Park Avenue and Clifton Avenue	17,351 along Park Avenue
Broadway and 3rd Avenue	Not available

Figure 2 – Traffic Volumes

1.3 Area Characteristics

The area characteristics vary by intersection.

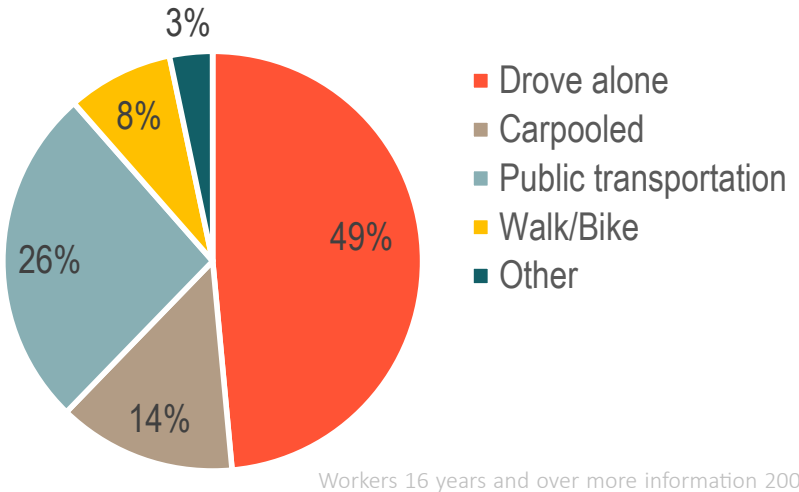
- Stuyvesant Avenue and 18th Avenue: The Stuyvesant Avenue intersection is located in the Vailsburg neighborhood, which is primarily residential, with single-family homes and duplexes. There is mixed-use and commercial space on three of the intersection's corners. The northeast corner is a vacant lot that serves as a parking lot for the fire station, which is located one block to the west.

- Bergen Street and South Orange Avenue: The South Orange Avenue intersection sits at the junction of the Fairmount, University Heights, Belmont, and West Side neighborhoods. The intersection's northeast corner marks the southern edge of the University Hospital campus, and is characterized by large hospital buildings and parking decks. On the northwest corner is a large surface parking lot for a Pathmark. A gas station sits on the southeast corner, and a smaller cluster of commercial and institutional buildings are located on the southwest intersection corner.

- Park Avenue and Clifton Avenue: The Park Avenue intersection is located in the Lower Broadway neighborhood just east of Branch Brook Park. The area around the intersection is primarily used for Archdiocese- and Basilica-related purposes. There are large parking lots located on the southwest and northwest corners. The northeast corner is vacant.

- Broadway and 3rd Avenue: The Broadway intersection is located in the Mount Pleasant neighborhood. There is mixed-use retail on the southwest and northwest corners, a post office on the southeast corner, and low/mid-rise multifamily residential on the northeast corner.

The adjacent graph conveys the commuting mode of choice for working-age individuals in Newark.



Workers 16 years and over more information 2009-2013 American Community Survey 5-Year Estimates.

Figure 3 – Commuting Data in Newark

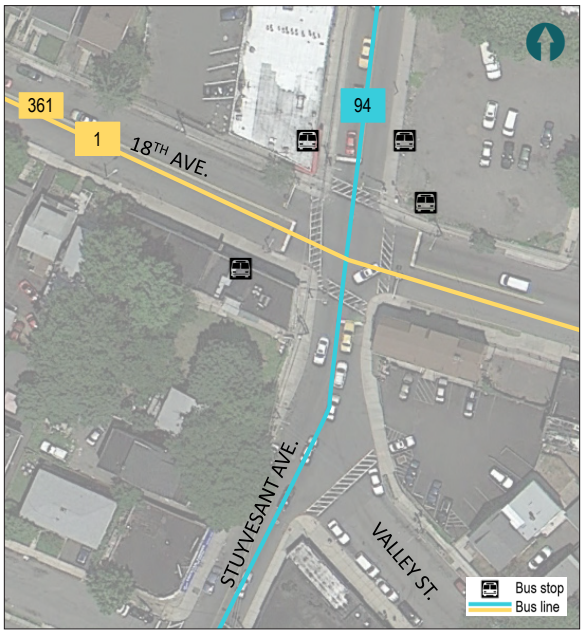


Figure 4 – Stuyvesant Avenue & 18th Avenue

Stuyvesant Avenue and 18th Avenue

- **NJ Transit #1**: Daily service to Irvington, Newark, Kearny, and Jersey City with headways of approximately 2 to 15 minutes, excluding late night services.
- **NJ Transit #94**: Daily service to Bloomfield, East Orange, Newark, Irvington, Union, Roselle Park, and Linden with headways of approximately 4 to 20 minutes, excluding late night services.
- **NJ Transit #361**: Weekday peak service to Irvington and Newark (express service) with headways of approximately 10 to 45 minutes.

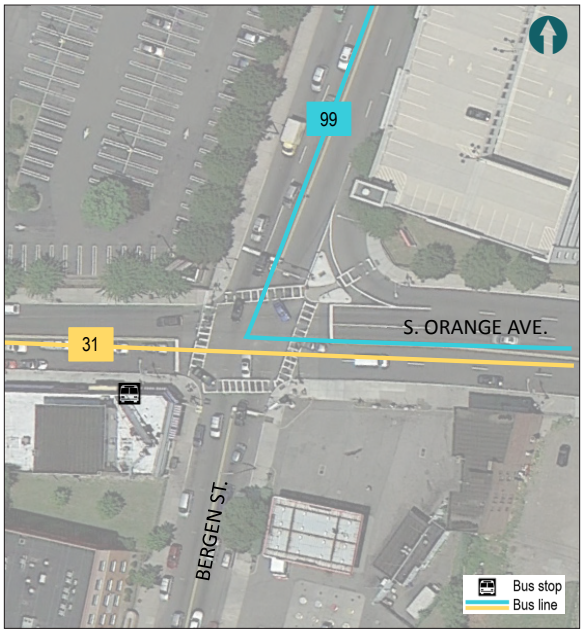


Figure 5 – Bergen Street & South Orange Avenue

Bergen Street and South Orange Avenue

- **NJ Transit #99**: Serving Newark and Hillside with headways of approximately 10 to 20 minutes, excluding late night services.
- **NJ Transit #31**: Schedule unavailable, though frequent service observed during site visit.

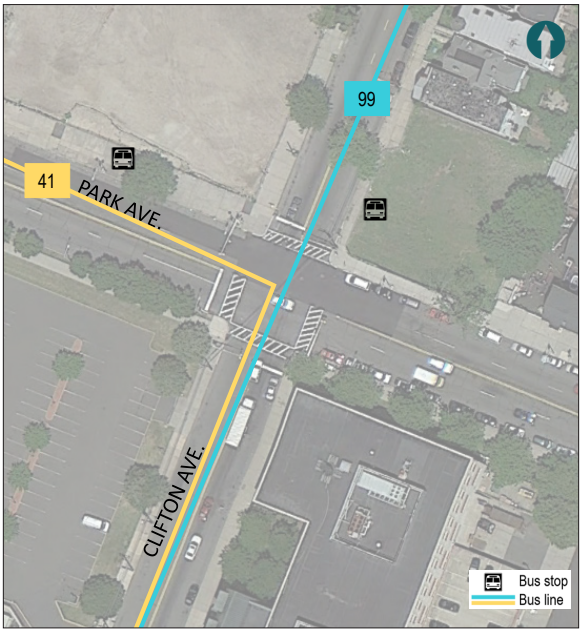


Figure 6 – Clifton Avenue & Park Avenue

Clifton Avenue and Park Avenue

- **NJ Transit #99**: Serving Newark and Hillside with headways of approximately 10 to 20 minutes, excluding late night services.
- **NJ Transit #41**: Serving Orange, East Orange, and Newark with headways of approximately 10 to 30 minutes, excluding late night service.

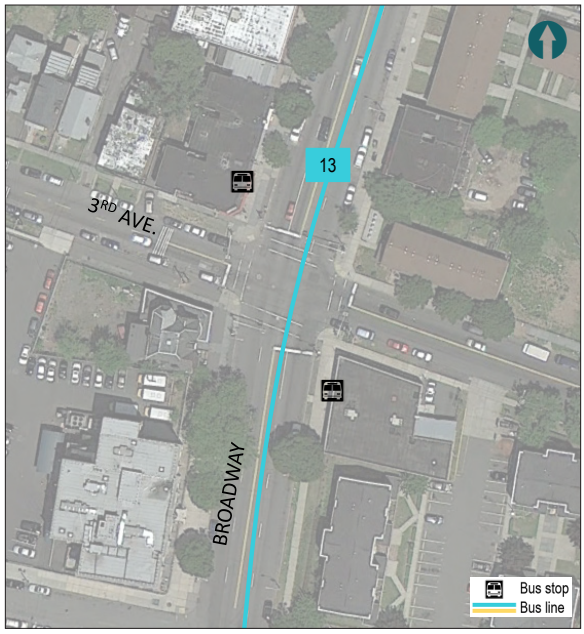


Figure 7 – Broadway & 3rd Avenue

Broadway and 3rd Avenue

- **NJ Transit #13**: Serving Newark, Irvington, Belleville, Nutley, and Clifton with headways of approximately 7 to 20 minutes, excluding late night services.

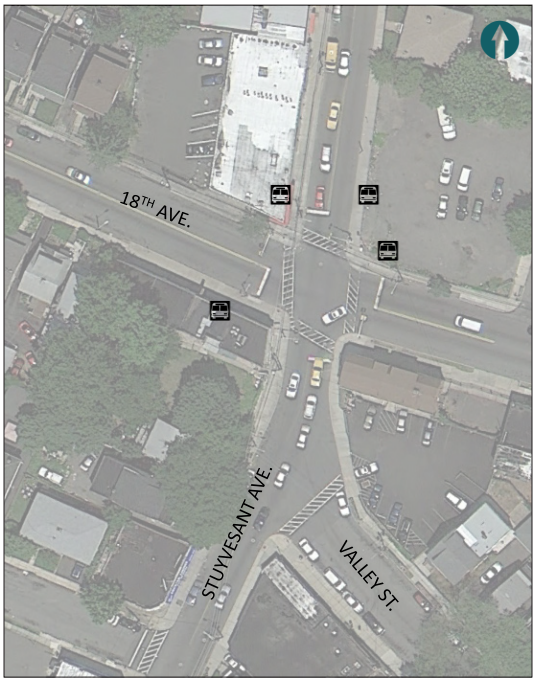


Figure 8 – Stuyvesant Avenue & 18th Avenue

Stuyvesant Avenue and 18th Avenue

- Signalized
- Slightly skewed
- Stuyvesant Avenue
  - County owned
  - Urban minor arterial
  - Pavement: 29'
  - 1 lane each direction
  - Curbside parking
- 18th Avenue
  - Municipal owned
  - Urban minor arterial
  - Pavement: 39'
  - 1 lane each direction
  - Curbside parking

Note: Valley Street intersection is 100 feet south of the 18th Avenue intersection, and the two intersections affect each other.

Figure 9 – Bergen Street & South Orange Avenue

Bergen Street and South Orange Avenue

- Signalized
- Slightly skewed
- South Orange Avenue: County owned, Urban principal arterial
  - West leg:
    - Pavement: 40'
    - 1 lane each direction
    - Curbside parking
  - East leg:
    - Pavement: 60'
    - 2 lanes in each direction + slip ramp onto Bergen St.
- Bergen Street: Municipal owned, Urban minor arterial
  - North leg:
    - Pavement: 70'
    - 2 receiving lanes after slip ramp from S. Orange Ave.
    - 1 through/right-turn lane, 1 left-turn lane (protected/permitted)
  - South leg:
    - Pavement: 40'
    - 1 lane each direction
    - Curbside parking

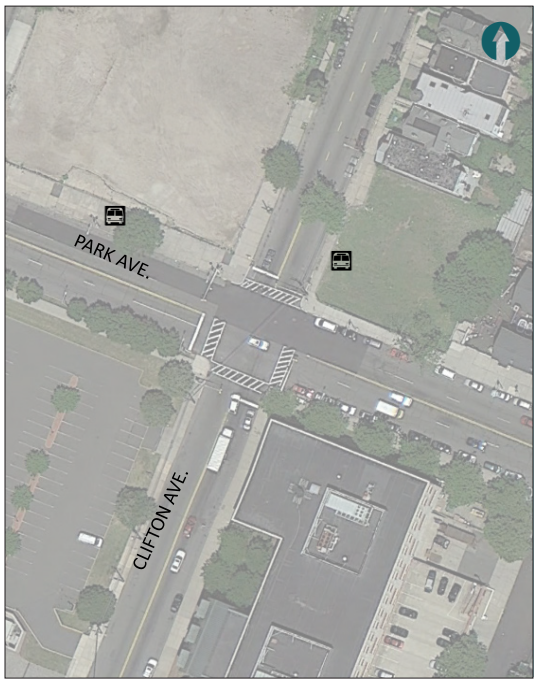


Figure 10 – Clifton Avenue & Park Avenue

Clifton Avenue and Park Avenue

- Signalized
- Park Avenue:
  - County owned
  - Urban principal arterial
  - Pavement: 50’
  - 2 lanes each direction
  - Curbside parking
  - Vertical westward incline
- Clifton Avenue:
  - Municipal owned
  - Urban minor arterial
  - Pavement: 44’
  - 1 lane each direction
  - Curbside parking

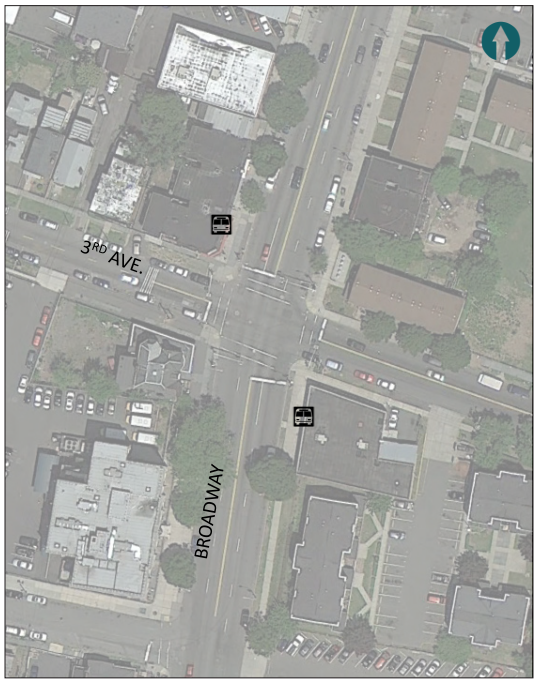


Figure 11 – Broadway & 3rd Avenue

Broadway and 3rd Avenue

- Signalized
- Broadway:
  - County owned
  - Urban minor arterial
  - Pavement: 58’
  - 2 lanes each direction
  - Curbside parking
- 3rd Avenue:
  - Municipal owned
  - Pavement: 35’
  - 1 lane each direction
  - Curbside parking

>> 2.0 Summary Statistics—All Four Intersections

2.1 Crashes by Intersection

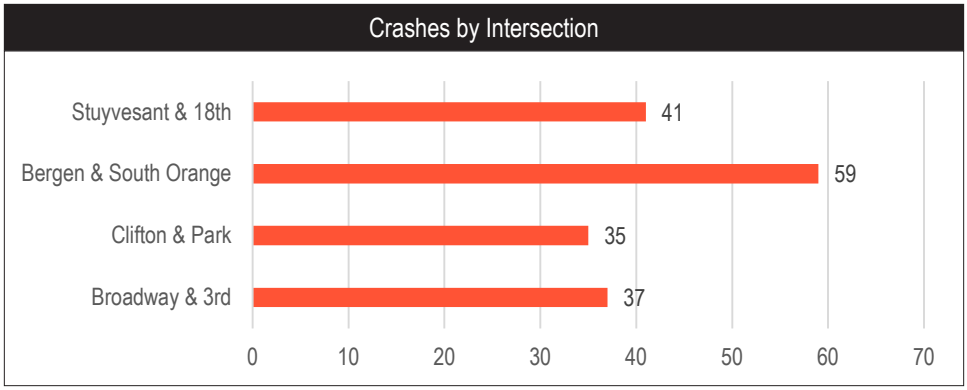


Figure 12 – Crashes by Intersection

The number of crashes varied by intersection, with the most crashes occurring at the intersection of Bergen Street and South Orange Avenue.

2.2 Crash Type

Left-turn crashes and pedestrian crashes were both overrepresented, at every intersection in the study area. The Stuyvesant Avenue intersection and the Park Avenue intersection also had notable overrepresentation of right-angle crashes. The Stuyvesant Avenue intersection had a high overrepresentation of opposite-direction head-on/angular crashes. More detailed crash type information is available in Appendix D—Table 1.

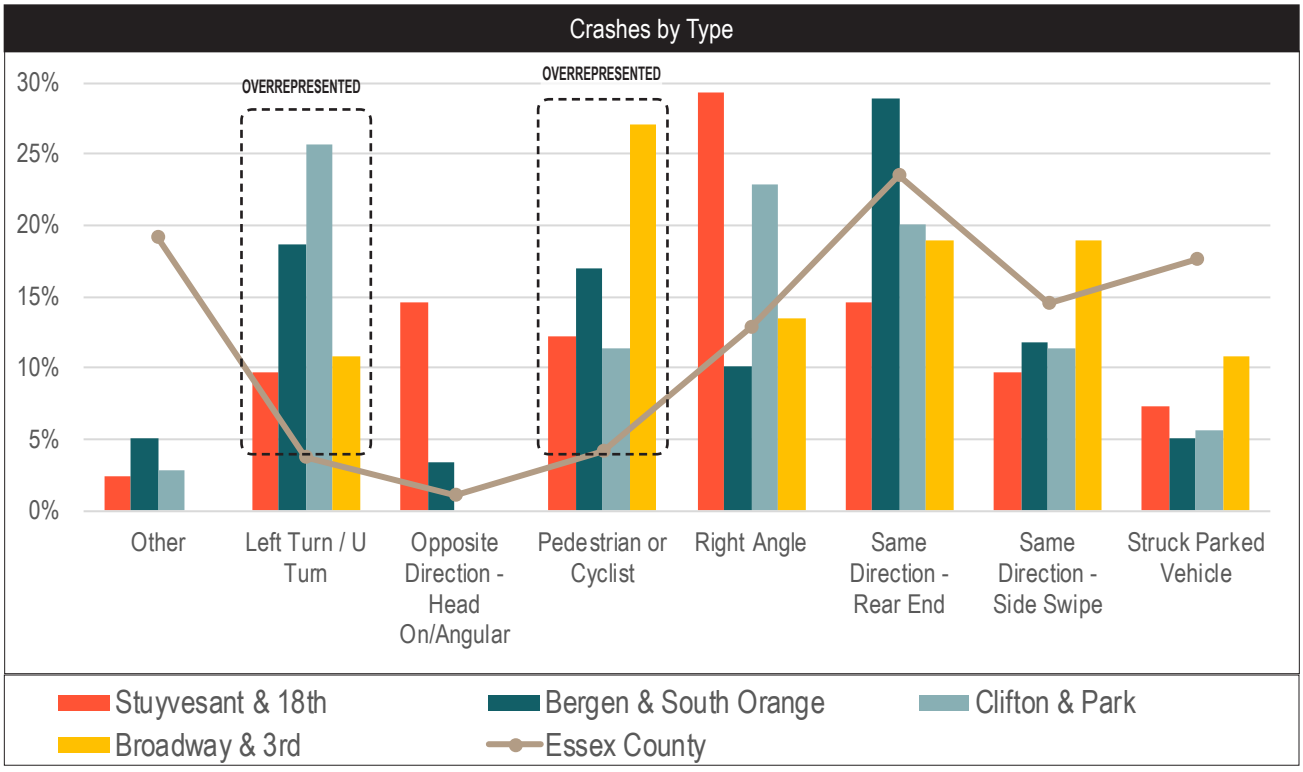


Figure 13 – Crash by Type

2.3 Crash Conditions and Severity

There are several pronounced trends in crash conditions and severity. Key findings for the three figures are summarized at the bottom of this page.

Summary of Findings

Surface Condition (Figure 12; Appendix D—Table 3)

- Every intersection except Clifton Avenue and Park Avenue has an overrepresentation of crashes occurring on wet roadway conditions.

Light Condition (Figure 13; Appendix D—Table 7)

- Every intersection has an overrepresentation of crashes occurring during non-daylight conditions.

Severity (Figure 14; Appendix D—Table 2)

- Every intersection has an overrepresentation of injury crashes. More specifically, there is an overrepresentation of "Complaint of Pain" crashes, the lowest injury level.

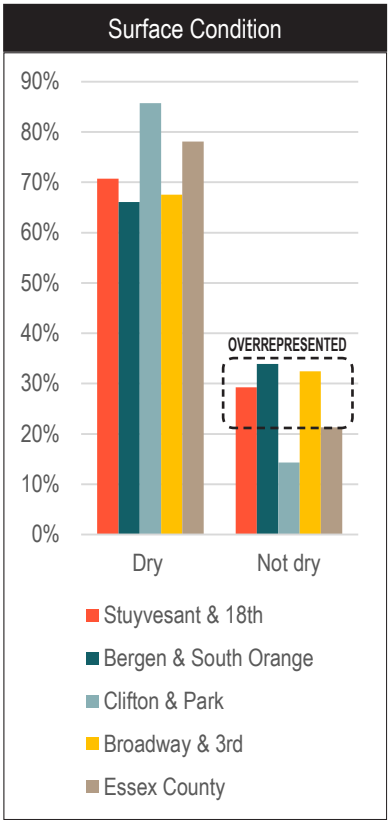


Figure 14 – Surface Condition

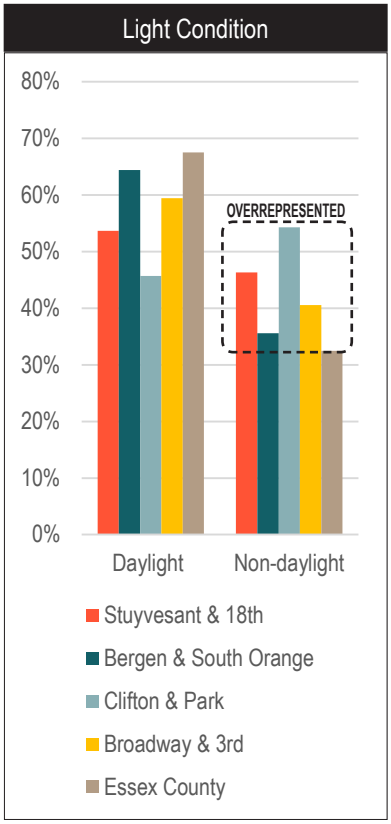


Figure 15 – Light Condition

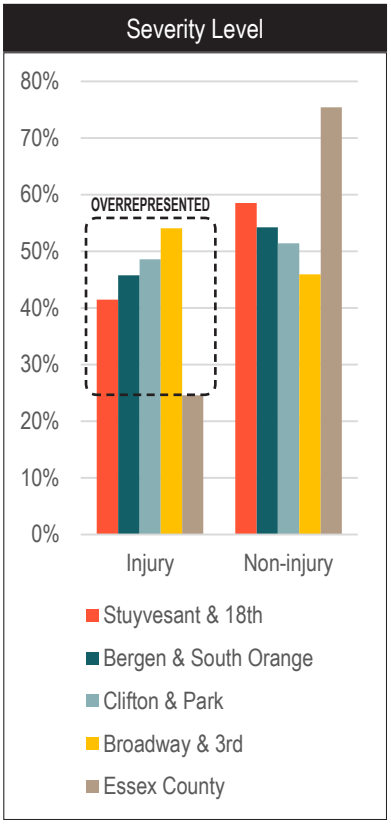


Figure 16 – Severity

2.4 Temporal Crash Characteristics

There was little consistency in temporal crash characteristics, from intersection to intersection. This may be partially attributed to not having enough data to draw conclusions on an intersection-by-intersection basis. But a few intersections had notable overrepresentations, as set forth below. Figures 17-20, Week, Year, Month and Time) are summarized below.

Summary of Findings

Day of Week (Figure 17; Appendix D – Table 8)

- Stuyvesant Avenue & 18th Avenue: Sunday, Wednesday and Saturday
- Bergen Street and South Orange Avenue: Friday
- Clifton Avenue and Park Avenue: Monday, Friday
- Broadway and 3rd Avenue: Saturday

Year (Figure 18; Appendix D – Table 4)

- Stuyvesant Avenue & 18th Avenue: 2012
- Bergen Street and South Orange Avenue: 2011
- Clifton Avenue and Park Avenue: 2013

Time of Day (Figure 19; Appendix D – Table 8)

- Stuyvesant Avenue & 18th Avenue: Early morning (12 a.m. to 4 a.m.); 2 p.m. to 3 p.m. 7 p.m. to 8 p.m.
- Bergen Street and South Orange Avenue: 11 a.m. to 12 p.m.; 8 p.m to 9 p.m.; 11 p.m. to 1 a.m.
- Clifton Avenue and Park Avenue: 3 a.m. to 4 a.m.; Evening/Night (6 p.m. to 7 p.m.; 8 p.m. to 12 a.m.)
- Broadway and 3rd Avenue: Afternoon (3 p.m. to 5 p.m.); Evening (8 p.m. to 9 p.m.; 10 p.m. to 11 p.m.)

Month (Figure 20; Appendix D – Table 5)

- Stuyvesant Avenue & 18th Avenue: February, April, July, November
- Bergen Street and South Orange Avenue: February to March, September to October
- Clifton Avenue and Park Avenue: January; April to July; September
- Broadway and 3rd Avenue: February to May; November to December

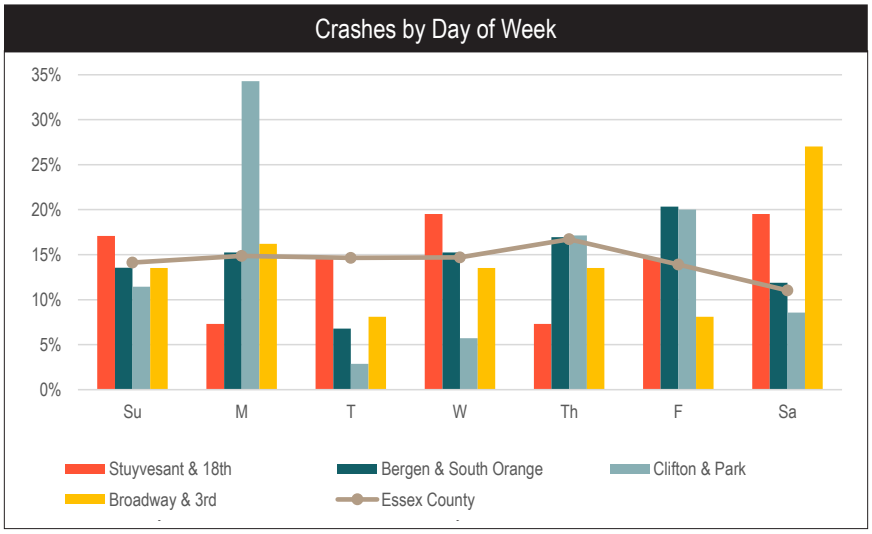


Figure 17 – Day of Week

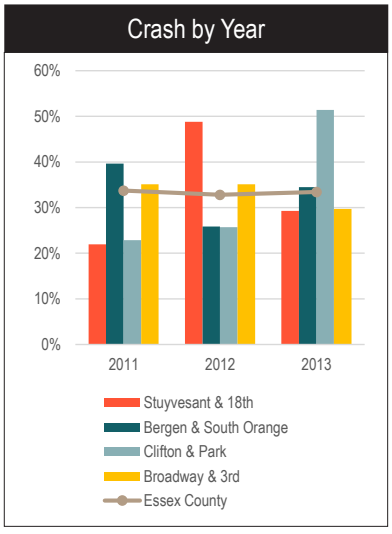


Figure 18 – Year

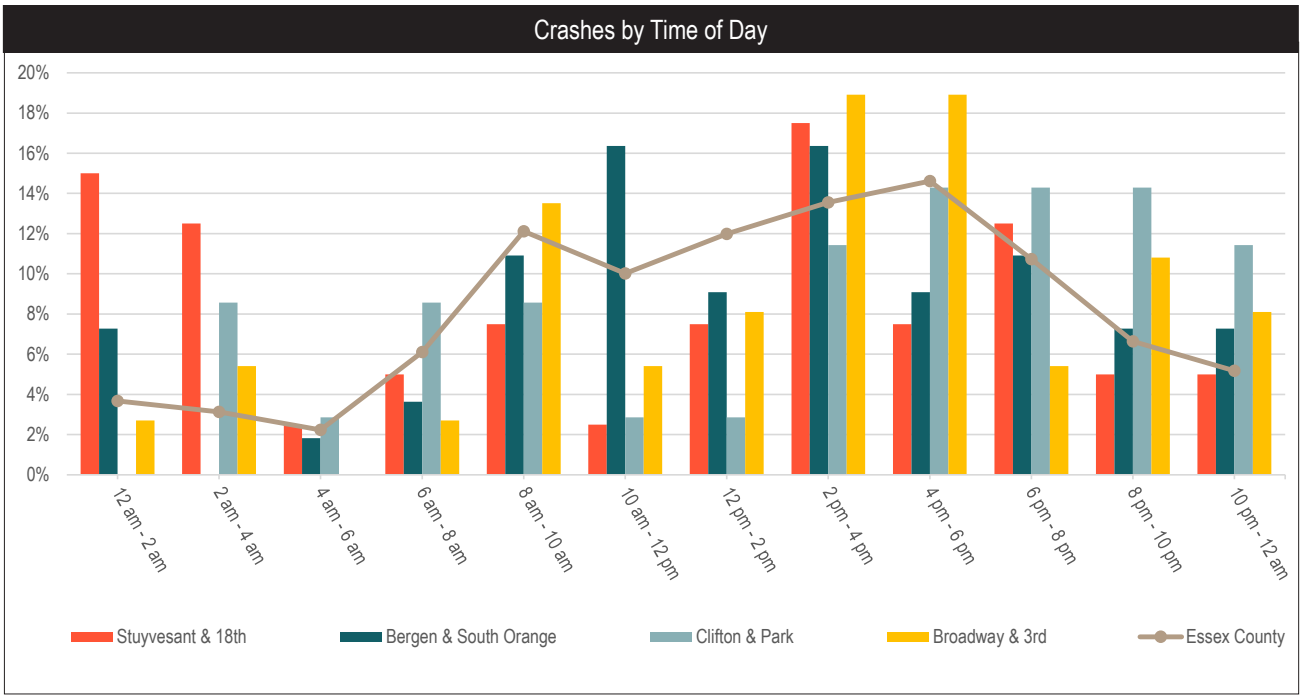


Figure 19 – Time of Day

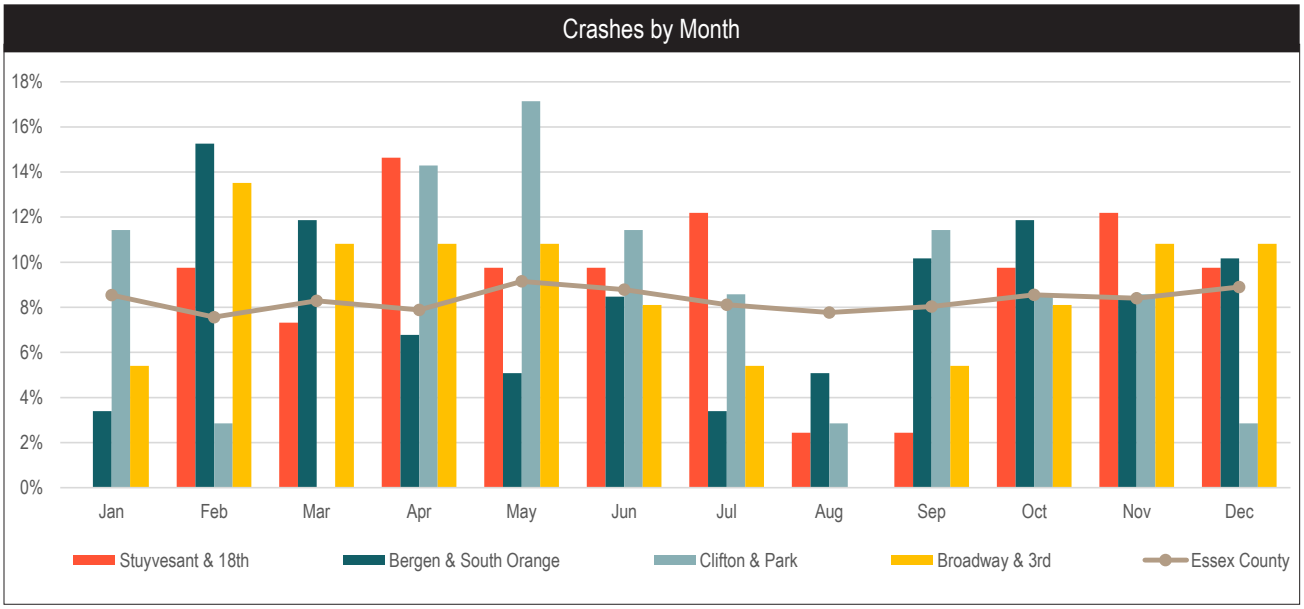


Figure 20 – Month

The following tables compare the countywide crash data to each of the individual intersections for the three-year study period. Specifically, the tables show notable crash characteristic overrepresentations (i.e., greater than 2%) for each individual intersection when compared to the county.

3.1 Stuyvesant Avenue and 18th Avenue

Number of crashes: 41

Crash Type			
Type	Intersection	County	Difference
Right Angle	29%	13%	16%
Left Turn / U Turn	10%	4%	6%
Pedestrian	12%	4%	8%
Opposite Direction - Head On/ Angular	15%	1%	14%

Severity			
Type	Intersection	County	Difference
Pain	39%	21%	18%

Roadway Condition			
Condition	Intersection	County	Difference
Not Dry	29%	21%	8%

Light Condition			
Condition	Intersection	County	Difference
Non-daylight	46%	32%	14%

Crash Year			
Year	Intersection	County	Difference
2012	49%	33%	16%

Crash Time			
Time	Intersection	County	Difference
12am - 2am	15%	4%	11%
2am - 4am	13%	3%	10%
2pm - 4pm	18%	14%	4%

Crash Month			
Month	Intersection	County	Difference
Apr	15%	8%	7%
Jul	12%	8%	4%
Nov	12%	8%	4%

Day of Week			
Day	Intersection	County	Difference
Wednesday	20%	15%	5%
Saturday	20%	14%	6%
Sunday	17%	11%	6%

3.2 Bergen Street and South Orange Avenue

Number of crashes: 58

Crash Type			
Type	Intersection	County	Difference
Same Direction - Rear End	29%	23%	4%
Left Turn / U Turn	19%	4%	15%
Ped/Cyclist	17%	4%	13%

Severity			
Type	Intersection	County	Difference
Pain	43%	21%	22%

Roadway Condition			
Condition	Intersection	County	Difference
Not Dry	35%	21%	14%

Light Condition			
Condition	Intersection	County	Difference
Non-daylight	36%	33%	3%

Crash Year			
Year	Intersection	County	Difference
2012	40%	34%	6%

Crash Time			
Time	Intersection	County	Difference
12am - 2am	7%	4%	3%
10am -12pm	16%	10%	6%

Crash Month			
Month	Intersection	County	Difference
Feb	16%	8%	8%
Mar	12%	8%	4%
Oct	12%	9%	3%

Day of Week			
Day	Intersection	County	Difference
Friday	21%	17%	4%
Sunday	14%	11%	3%

3.3 Clifton Avenue and Park Avenue

Number of crashes: 35

Crash Type			
Type	Intersection	County	Difference
Right Angle	23%	13%	10%
Left Turn / U Turn	26%	4%	22%
Ped/Cyclist	11%	4%	7%

Severity			
Type	Intersection	County	Difference
Pain	49%	21%	28%

Roadway Condition			
Condition	Intersection	County	Difference
Dry	86%	78%	8%

Light Condition			
Condition	Intersection	County	Difference
Non-daylight	54%	33%	21%

Crash Year			
Year	Intersection	County	Difference
2013	51%	33%	18%

Crash Time			
Time	Intersection	County	Difference
2am - 4am	9%	3%	6%
8pm - 10pm	14%	7%	7%
10pm -12am	11%	5%	6%

Crash Month			
Month	Intersection	County	Difference
Apr	14%	8%	6%
May	17%	9%	8%
Sep	11%	8%	3%

Day of Week			
Day	Intersection	County	Difference
Monday	34%	14%	20%
Friday	20%	17%	3%

3.4 Broadway and 3rd Avenue

Number of crashes: 37

Crash Type			
Type	Intersection	County	Difference
Same Direction - Side Swipe	19%	15%	4%
Left Turn / U Turn	11%	4%	7%
Ped/Cyclist	27%	4%	23%

Severity			
Type	Intersection	County	Difference
Pain	54%	21%	33%

Roadway Condition			
Condition	Intersection	County	Difference
Not Dry	32%	21%	11%

Light Condition			
Condition	Intersection	County	Difference
Non-daylight	41%	33%	8%

Crash Year

* no significant differences

Crash Time			
Time	Intersection	County	Difference
2pm - 4pm	19%	14%	5%
4pm - 6pm	19%	15%	4%
8pm - 10pm	11%	7%	4%
10pm -12am	8%	5%	3%

Crash Month			
Month	Intersection	County	Difference
Feb	14%	8%	6%
Mar	11%	8%	3%
Apr	11%	8%	3%

Day of Week			
Day	Intersection	County	Difference
Saturday	27%	14%	13%

Ref #	INTERSECTION ISSUES
	4.1 Stuyvesant Avenue and 18th Avenue
	Roadway Operations & Geometry
1	Parked cars on Stuyvesant caused drivers to cross over the yellow line, encroaching into the opposing lane.
2	Drivers exhibit aggressive driving and turning behavior; possibly producing the high number of head-on/angular crashes.
3	There is a hill to the west of the intersection.
4	Emergency services do not have signal prioritization.
5	Roadway seems to have unnecessary depressed curbs.
6	Roadway lanes are too wide, especially on 18th Street.
7	The turning radii appear to be too small.
	Traffic Signal
8	The mix of horizontal and vertical signal heads lacks consistency.
9	Signal heads are antiquated and too small.
10	The southbound-facing signal on the northwest corner is broken.
11	Overhead utility wires affect visibility by blocking the signal.
	Maintenance
12	Pavement markings are faded and not clearly visible.
13	Lighting may be inadequate, especially on the northwest corner
14	There is an abandoned phone booth base on the northeast corner of the intersection.
15	Control box wires are exposed.
	Pedestrian / Bicyclist Behavior & Facilities
16	Pedestrian facilities are not ADA compliant.
17	The intersection lacks pedestrian signal heads.
18	There are many pedestrians using the bus or waiting at bus stop.
	Bus Facilities & Operations
19	Bus stop signage is blocked by foliage.
20	Bus stop facilities seem inadequate for the high volume of passengers.
21	The bus stop north of the intersection blocks the travel lane.

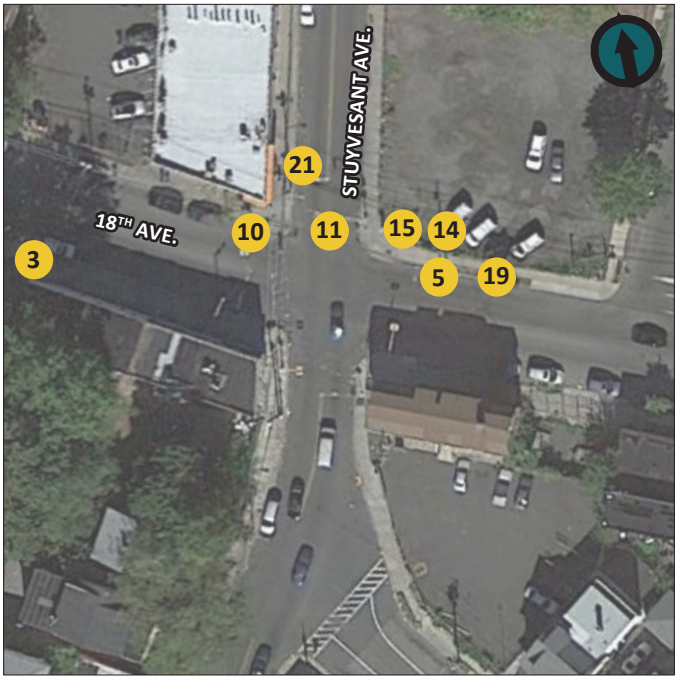
Ref #	INTERSECTION ISSUES
	4.2 Bergen Street and South Orange Avenue
	Roadway Operations & Geometry
22	Roadway merge along South Orange Avenue is insufficiently demarcated.
23	Drivers treat eastbound approach as two lanes though it is delineated as one wide lane.
24	There are eastbound/westbound left-turn conflicts on South Orange Avenue.
25	The gas station driveway is very close to the intersection and affects operations.
	Driver Behavior
26	Vehicles park in the eastbound travel lane of the intersection's eastern leg.
27	Vehicles ignore the pedestrian crosswalk in the slip ramp, merging into northbound traffic with excessive speed.
28	Left-turning drivers from both southbound and eastbound approaches are speeding, to try and "make the light" before cross traffic starts, not paying sufficient attention to pedestrians.
29	Southbound vehicles have limited right turn visibility due to the fence.
	Traffic Signal
30	There are more signal heads than travel lanes, which makes lane delineation more confusing.
31	The signal-head orientation is inconsistent, both in horizontal/vertical alignment and three-heads vs four-heads.
	Maintenance & Misc.
32	Pavement markings are faded and not clearly visible.
33	Lighting is inadequate (especially the pedestrian lighting).
34	Sign clutter makes a confusing driving environment.
35	Signal pole on pedestrian island has been struck by vehicles.
36	Drainage system drains into pedestrian walkway, across island onto slip ramp.
	Pedestrian / Bicyclist Behavior & Facilities
37	Pedestrian facilities are not ADA compliant.
38	The pedestrian signal head on the northeast island is not operational.
39	Pedestrian-level lighting is lacking.
40	Pedestrians cross South Orange Avenue mid-block near the slip ramp.
41	There are no bicycle accommodations.
	Bus Facilities & Operations
42	Bus stops are too close to the intersection, in an unmarked area that drivers use as a merge.
43	Bus stop facilities seem inadequate for the high volume of passengers.

Ref #	INTERSECTION ISSUES
	4.3 Clifton Avenue and Park Avenue
	Roadway Operations & Geometry
44	There is a vertical curve on the westbound leg of Park Avenue which could hinder visibility and encourage speeding.
45	Clifton Avenue experiences a high volume of traffic connecting to I-280.
46	The left-turn negative offset on Park Avenue creates a shadow effect, diminishing visibility.
47	Wide curbside lanes (~18 feet) on north leg may encourage speeding.
48	There is a high number of right angle crashes on northbound Clifton Avenue.
	Pedestrian/Bicyclist Behavior & Facilities
49	Crosswalks across Park Avenue are too long, overexposing pedestrians to vehicles.
50	Pedestrian facilities are not ADA compliant.
51	There are many pedestrians, due to the church at the intersection and nearby schools.
52	Pedestrian push buttons are incorrectly located and oriented.
53	There are no accommodations for bicyclists.
54	The pedestrian walk signals are on recall and the push buttons cause pedestrian confusion.
55	Foliage is blocking the pedestrian head on southeast corner.
	Traffic Signals
56	Signal heads on Clifton Avenue are antiquated and too small.
	Maintenance
57	Drainage grates on northwest corner are full.

Ref #	INTERSECTION ISSUES
	4.4 Broadway and 3rd Avenue
	Roadway Operations & Geometry
58	The tight turning radii at all quadrants force larger vehicles to make right turns from the leftmost lane.
59	There are more lanes on Broadway than signal heads.
60	There is no clear lane delineation.
61	Drivers park too close to the intersection.
	Pedestrian/Bicyclist Behavior & Facilities
62	Pedestrian were observed to ignore crossing signals, and cross against signal or out of crosswalk.
63	Pedestrian countdown timers are not operational.
64	Crosswalks are not high visibility.
65	Pedestrian facilities are not ADA compliant, and lack truncated domes. Additionally there are no curb cuts on the northeast corner.
66	Crosswalks across Broadway are too long, overexposing pedestrians to vehicles.
	Bus Facilities & Operations
67	Bus stops provide no amenities to waiting passengers.
68	Bus stops are insufficiently demarcated.
	Maintenance
69	Drainage grates are full of sediment on northeast corner.
70	Pavement markings are faded.

5.1 Stuyvesant Avenue and 18th Avenue

Unclear lane delineation and extra width of the single lane in each direction along 18th Avenue leads motorists to treat it as two lanes.



Unnecessary depressed curbs.

Faded crosswalks; Lack of truncated domes; No pedestrian signal heads.

Faded crosswalks and centerline; No bus shelter or benches.

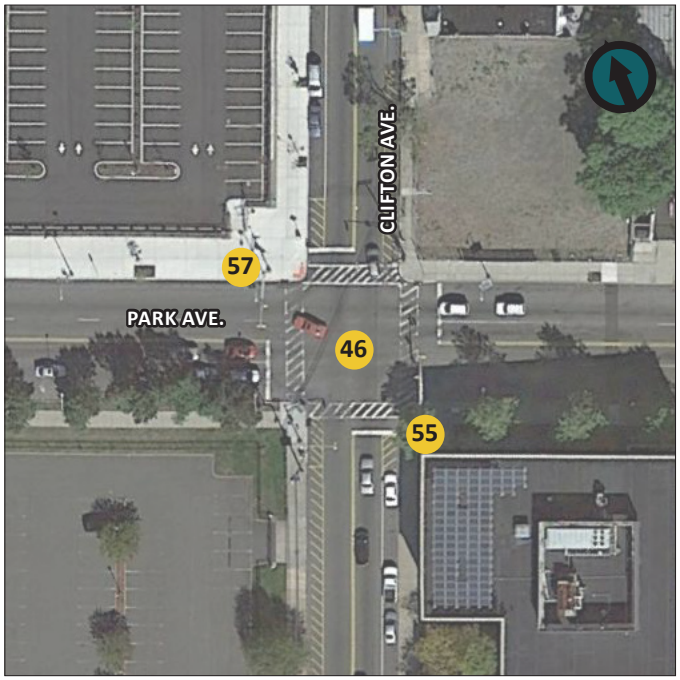
Wide slip ramp allows vehicles to access Bergen Street at high speeds. Motorists were observed not yielding to pedestrians. There is no advance warning sign of pedestrians on the slip ramp, and the sight triangle on approach is limited by fencing.

Wide receiving lane with the 2 signal heads may confuse drivers as to how many receiving lanes exist.

Wide receiving and bus lane is a confusing merge point for motorists. Lack of bus shelters or benches, despite high ridership.

Multiple vehicles were parked in the eastbound travel lane.

Vertical curve may limit motorist visibility; long crosswalks across Park Avenue; negative offset on Park Avenue.

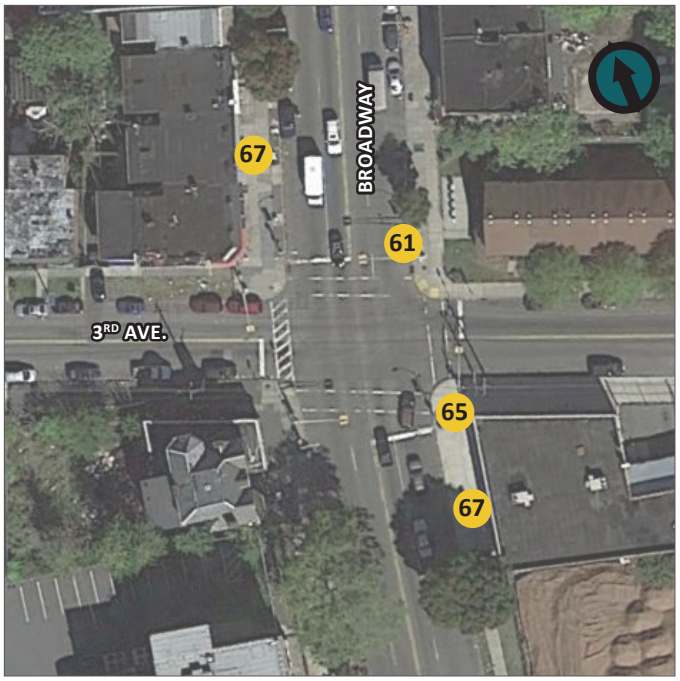


Wide outer lanes (~18') may contribute to increased speeds, especially as the curbside parking spaces seem underutilized; lack of bus shelters or benches.

Foliage blocks pedestrian signal head.

Lack of cyclist facilities.

Missing curb cut on northeast corner and missing truncated domes on all corners.



Drainage grate full of debris and is also not bicycle safe.

Faded pavement markings; crosswalks not high visibility.

Motorists park too close to intersection, inhibiting sight distance.

Rec. #	RECOMMENDATIONS LIST	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
	6.1 Stuyvesant Avenue and 18th Avenue					
	Roadway Operations & Geometry					
1	Paint edgelines to visually narrow the travel lane on 18th Avenue.	Medium	Short	$	Essex Co.	6
2	Consider relocating the stop bar to Valley Street, and increase the left-turn radius from westbound 18th Avenue (in conjunction with #3).	Medium	Med. / Long	$$	Essex Co.	7
3	Consider relocating the signal to Valley Street to better control traffic.	Medium	Medium	$$	Essex Co.	2
4	Install rumble strips on the 18th Avenue vertical curve.	Medium	Medium	$$	Newark	3
	Traffic Signal					
5	Full signal upgrade on all signal heads to include 12-inch heads and backplates with retroreflective borders. Uniform, vertical signal heads are better, if possible.	Med. / High	Medium	$$	Essex Co.	8, 9, 10
6	Install pedestrian-countdown signal heads.	Medium	Short	$$	Essex Co.	17
7	Ensure that overhead utility wires do not block signal heads.	Low / Med.	Short	$	Essex Co.	11
8	Consider installing a near-right pedestal for northbound Stuyvesant Avenue (as part of the full signal upgrade).	Medium	Short	$$	Essex Co.	9
9	Consider installing a signal preemption system for emergency vehicles.	Medium	Long	$$$	Essex Co.	4
	Maintenance					
10	Repaint faded pavement markings.	High	Medium	$$	Essex Co.	12
11	Trim overgrown foliage and perform other necessary maintenance.	Low	Short	$	Essex Co.	14, 15, 19
	Pedestrian/Bicyclist Behavior & Facilities					
(7)	Install pedestrian countdown signal heads.					
12	Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks	Medium	Medium	$$	Essex Co.	5, 16
13	Implement a Street Smart campaign.	Medium	Short	$ / $$	Newark	2, 18
	Bus Facilities & Operations					
14	Relocate bus stops, or install pull-offs, to ensure bus does not block travel lane.	High	Long	$$	Newark	21
15	Consider widening the sidewalk and installing bus shelters and benches.	Medium	Long	$$$	Newark	18, 20
	Visibility					
16	Professional staff should conduct a formal engineering review of existing lighting conditions to evaluate where both vehicle-level and pedestrian-level lighting can be enhanced.	Medium	Short	$$	Essex Co.	13

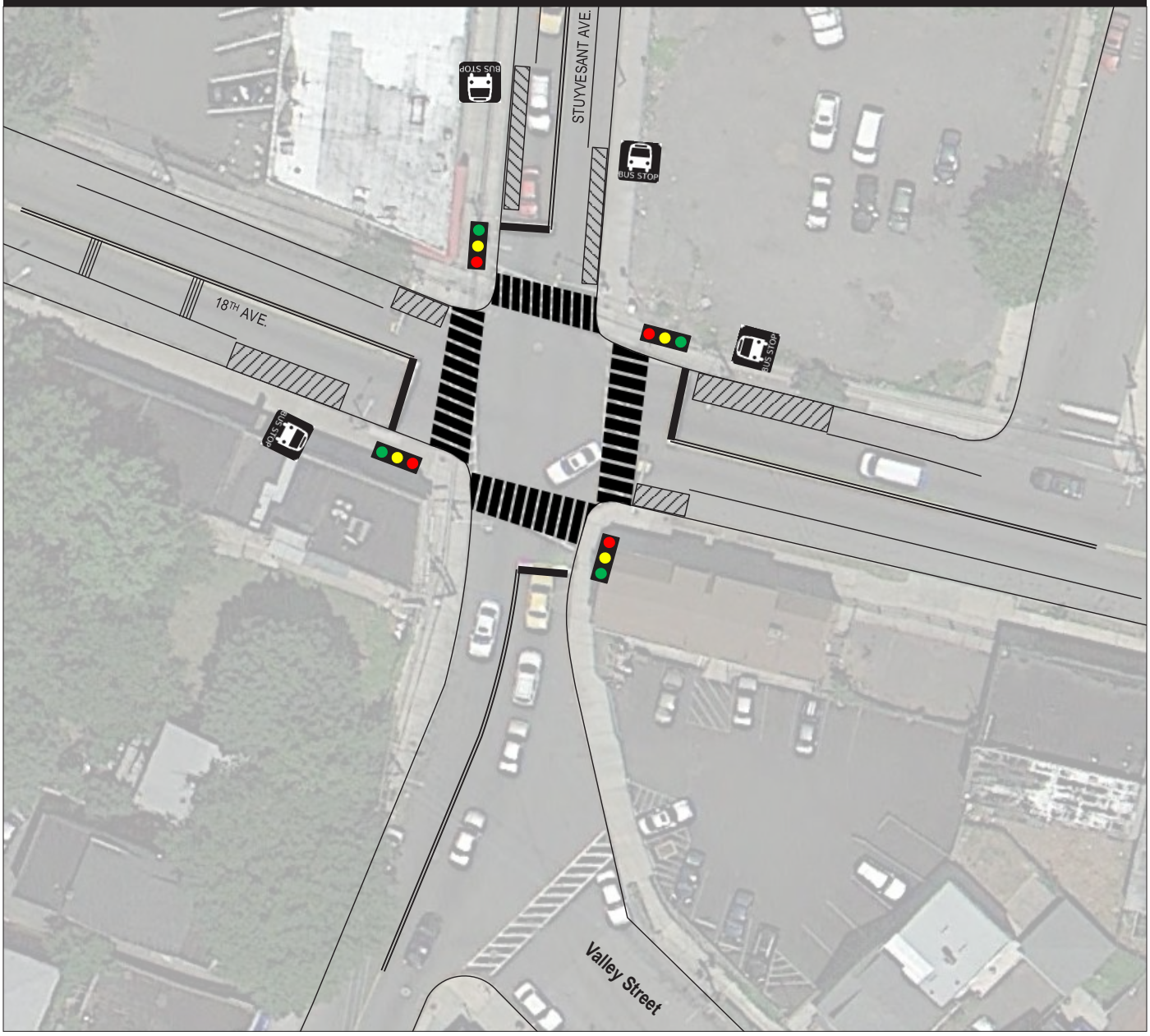
Rec. #	RECOMMENDATIONS LIST	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
	6.2 Bergen Street and South Orange Avenue					
	Roadway Operations & Geometry					
1	Consider implementing a roadway diet on the eastbound approach.	Medium	Long	$$	Essex Co.	26, 25
2	Revise the northeast corner: a. Consider removing the island, eliminating the slip ramp and squaring the intersection; or b. Alternatively, the radius could be tightened on the northeast corner, without removing the island.	Medium	Long	$$$	Essex Co.	30, 34, 35
3	Evaluate the warrant for implementing No-Turn-on-Red on the northwest corner	Medium	Medium	$$	Essex Co.	29
4	Consider the installation of head-to-head left-turn lanes on Bergen Street.	Med/High	Medium	$$	Essex Co.	28
5	Consider head-to-head left-turn alignment on South Orange Avenue.	High	Long	$$	Essex Co.	24
6	Conduct a formal speed study to evaluate lowering the speed limit to 25 mph.	Medium	Short	$$	Essex Co.	27, 28
7	Add lane striping to delineate the travel lanes.	Medium	Short	$	Essex Co.	23
8	Modify access to gas station.	Medium	Medium	$$	Essex Co.	25
9	Consider installing a “No Turn on Red” sign to reduce pedestrian-vehicle conflicts from the southbound approach.	High	Short	$	Essex Co.	32
10	Coordinate with law enforcement to minimize parking in the travel lanes.	Medium	Short	$	Essex Co.	29
	Traffic Signal					
11	Consider the installation of a full traffic signal upgrade.	Medium	Medium	$$	Essex Co.	27, 28
12	Consider a Lead Pedestrian Interval across South Orange Avenue on eastern leg.	High	Medium	$$	Essex Co.	28
13	Ensure that there is a properly oriented signal head for each lane.	Medium	Medium	$$	Essex Co.	30
	Maintenance & Misc.					
14	Repaint faded pavement markings.	Medium	Short	$	Essex Co.	32
15	Professional staff should conduct a formal engineering review of existing lighting conditions to evaluate where both vehicle-level and pedestrian-level lighting can be enhanced.	Medium	Short	$$	Essex Co.	33
16	Professional engineering staff should conduct a thorough evaluation of existing and required signage to decrease sign clutter.	Medium	Short	$$	Essex Co.	34
17	Investigate drainage issues and perform other necessary maintenance.	Low	Short	$	Essex Co.	36
18	Upgrade all signals to have 12-inch heads and backplates with retroreflective borders.	Med. / High	Medium	$$	Essex Co.	31
19	Extend curb lines through sidewalk.	Medium	Short	$$	Essex Co.	32
	Pedestrian / Bicyclist Behavior & Facilities					
20	Install center median refuge on eastern leg.	Medium	Medium	$$	Essex Co.	40
21	Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks.	Medium	Medium	$$	Essex Co.	37
22	Give pedestrians maximum possible walk time on the west leg.	High	Medium	$$	Essex Co.	40

Rec. #	RECOMMENDATIONS LIST	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
23	Consider installing a bike box to coincide with incoming Bergen Street improvements.	Medium	Medium	$$	Essex Co.	41
24	Install bicycle-safe inlet grates.	Medium	Short	$	Essex Co.	41
25	Install bicycle sharrows on the southern approach of Bergen.	Medium	Short	$	Essex Co.	41
26	Implement a Street Smart campaign.	Medium	Short	$ / $$	Newark	40
	Bus Facilities & Operations					
27	Clearly delineate bus stops with hatching pavement marking.	Medium	Medium	$$	Newark	42
28	Install bus shelters and other amenities for waiting passengers.	Low	Medium	$$	Newark	43
29	Relocate the eastbound bus stop to the far side of the intersection (east leg) [if driveway modifications are made - see #8]	Med/High	Medium	$$	NJ Transit & Newark	42
30	Relocate westbound bus stop further west to minimize merge conflicts.	High	Long	$$	Newark	42

Rec. #	RECOMMENDATIONS LIST	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
	6.3 Clifton Avenue and Park Avenue					
	Roadway Operations & Geometry					
1	Consider head-to-head left turns on Park Avenue.	High	Long	$$	Essex Co.	46
2	Conduct a road diet study to possibly narrow or reduce lanes on Park Avenue.	Medium	Short	$$	Essex Co.	45
3	Install rumble strips on the westbound leg of the Park Avenue hill.	Medium	Medium	$$	Essex Co.	44
4	Conduct a traffic study analyzing the turning movements.	Medium	Medium	$	Essex Co.	46
	Pedestrian/Bicyclist Behavior & Facilities					
5	Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks	Medium	Medium	$$	Essex Co.	50
6	Consider the installation of pedestrian bulb-outs to shorten crosswalks.	Medium	Med. / Long	$$ / $$$	Essex Co.	49
7	Either remove or reorient pedestrian push buttons.	Low	Short	$	Essex Co.	52
8	Implement a Street Smart campaign.	Medium	Short	$ / $$	Newark	51
	Traffic Signal					
9	Upgrade all signals to have 12-inch heads and install backplates with retroreflective borders.	Med. / High	Medium	$$	Essex Co.	56
	Maintenance					
10	Perform necessary drainage maintenance and trim overgrown foliage.	Low / Med.	Short	$	Essex Co.	55, 57

Rec. #	RECOMMENDATIONS LIST	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
	6.4 Broadway and 3rd Avenue					
	Roadway Operations & Geometry					
1	Consider installing "No Turn on Red" signage for all approaches.	High	Short	$	Essex Co.	58
2	Ensure that there is a signal head for each lane.	Medium	Medium	$$	Essex Co.	59
3	Conduct a road diet study on Broadway.	Medium	Medium	$$	Essex Co.	60
4	Coordinate with law enforcement to minimize illegal parking in the intersection.	Medium	Short	$	Essex Co.	61
5	Paint edge lines to delineate the travel lane.	Medium	Short	$	Essex Co.	60
	Pedestrian/Bicyclist Behavior & Facilities					
6	Install high-visibility crosswalks.	Medium	Medium	$$	Essex Co.	64
7	Implement a Street Smart campaign.	Medium	Short	$ / $$	Newark	62
8	Ensure that all countdown timers are operational.	Medium	Medium	$$	Essex Co.	63
9	Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks.	Medium	Medium	$$	Essex Co.	65
10	Consider pedestrian bulb-outs to shorten crosswalks.	Medium	Med. / Long	$$ / $$$	Essex Co.	66
11	Consider installing a refuge island on Broadway.	Medium	Medium	$$	Essex Co.	66
	Bus Facilities & Operations					
12	Install bus shelters and other amenities for waiting passengers.	Low	Medium	$$	Newark	67
13	Hatch bus stops.	Medium	Medium	$$	Essex Co.	68
	Maintenance and Other					
14	Perform necessary drainage maintenance and trim overgrown foliage.	Low / Med.	Short	$	Essex Co.	69
15	Replace inlet grates with bicycle-safe inlet grates.	Medium	Short	$$	Essex Co.	69

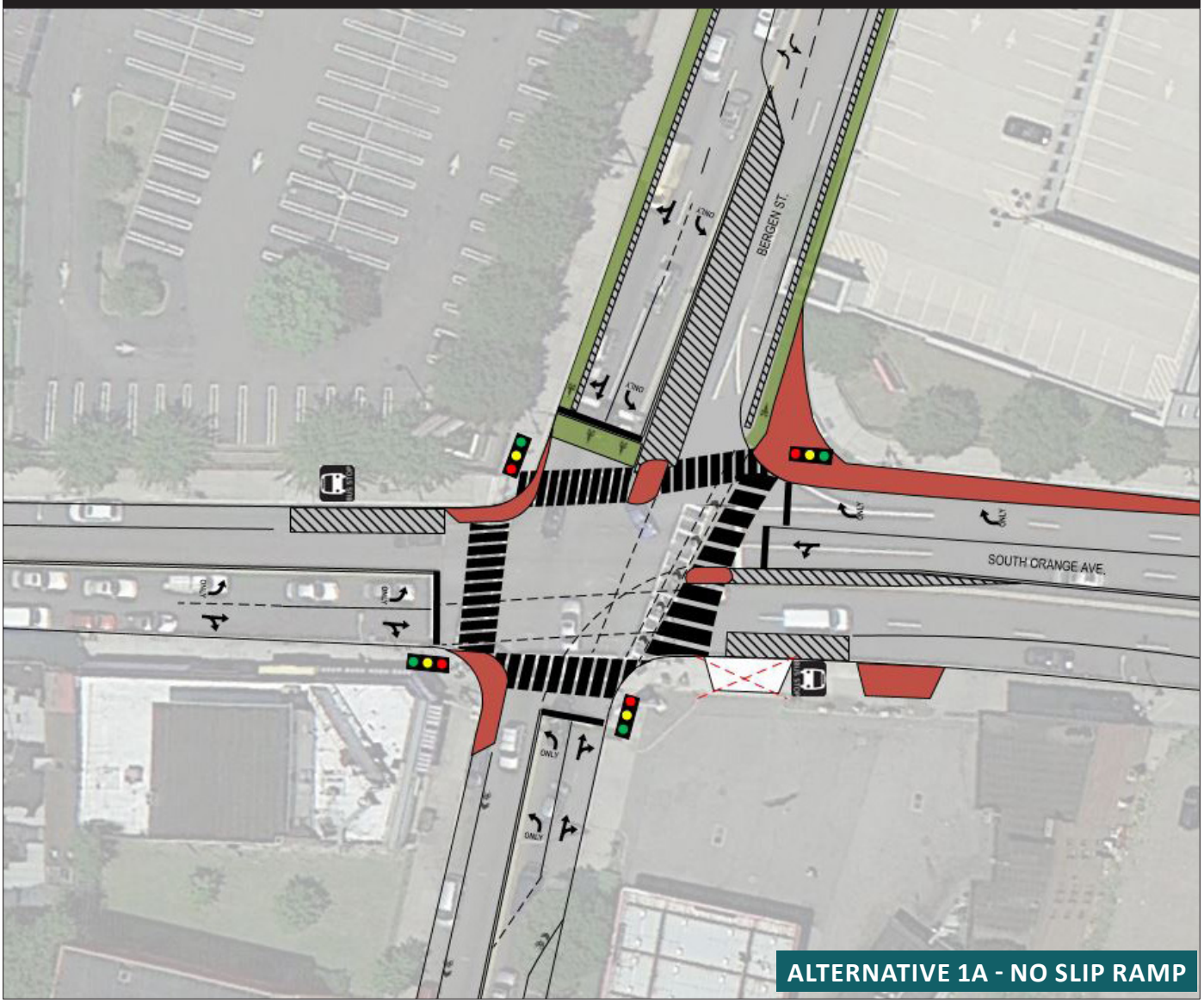
7.1 Stuyvesant Avenue and 18th Avenue



Visualized recommendations:

- Hatched bus areas
- High-visibility crosswalks
- Full signal upgrade
- Rumble Strips

7.2 South Orange Avenue and Bergen Street



ALTERNATIVE 1A - NO SLIP RAMP

Alternatives 1A and 1B:

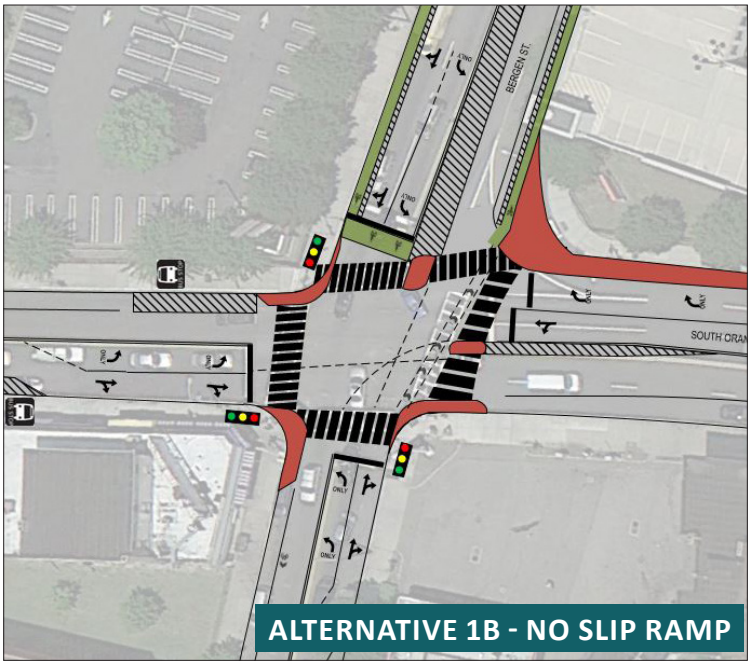
- High-visibility crosswalks
- Bike boxes
- Lane delineation
- Painted parking edgeline
- Bulb-outs where appropriate
- Pedestrian refuge islands on east and north legs
- Dedicated left-turn lanes on west leg and south leg
- Merge prior to intersection
- More positive offset along South Orange Avenue
- Hatched bus stop area

Alternative 1A:

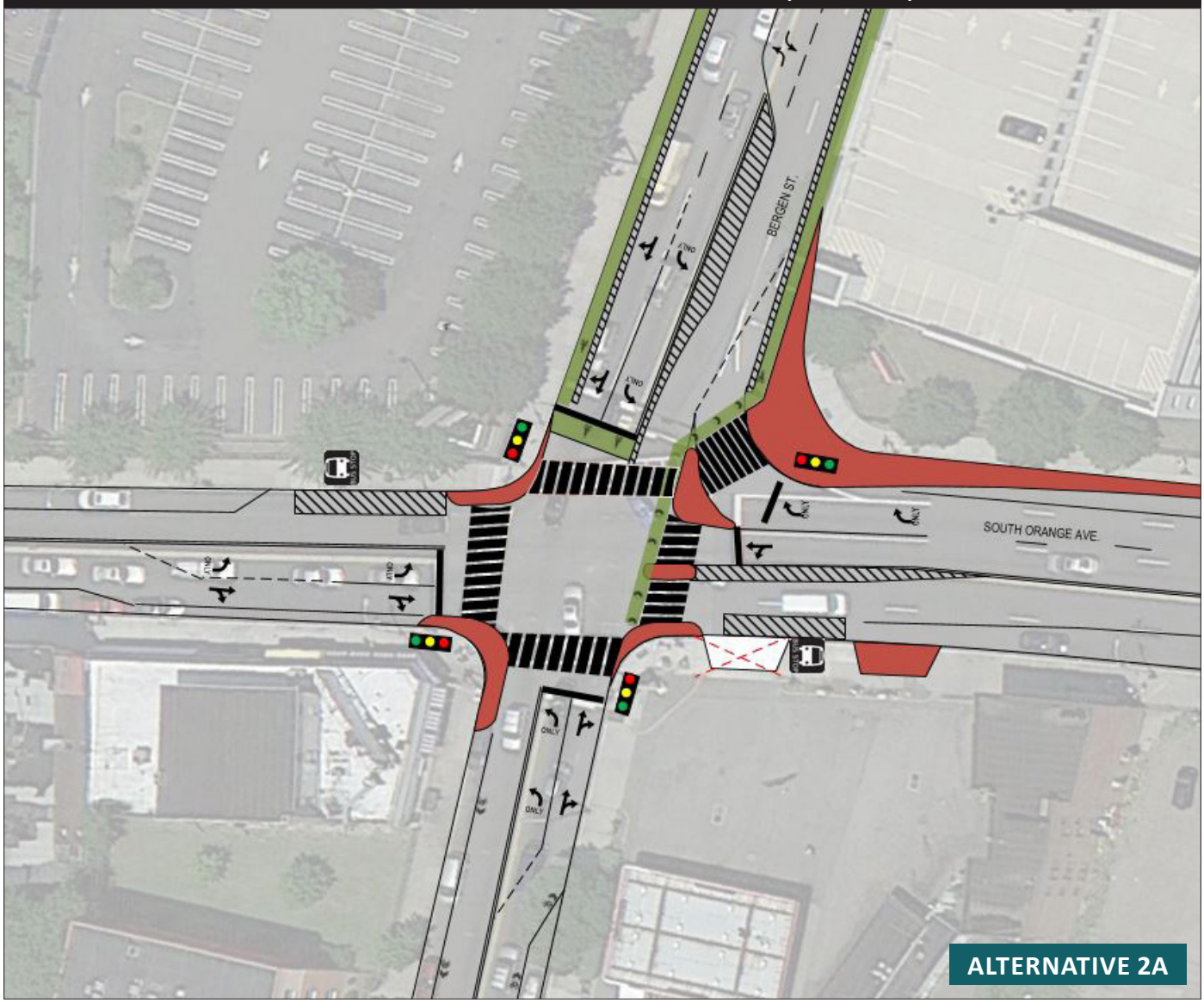
- Bus stop moved to far side

Alternative 1B:

- Keep bus on near side



ALTERNATIVE 1B - NO SLIP RAMP



Alternatives 2A and 2B:

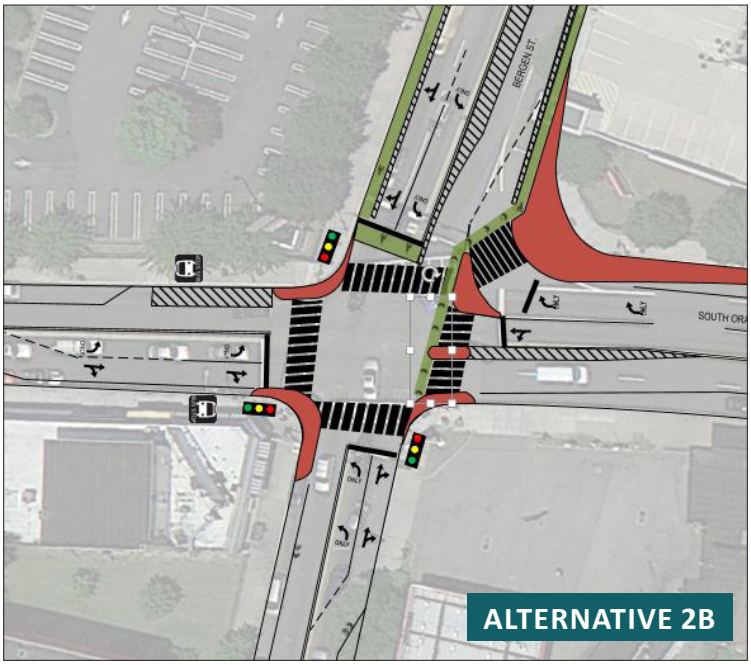
- High-visibility crosswalks
- Bike boxes
- Lane delineation
- Painted parking edgeline
- Bulb-outs where appropriate
- Pedestrian refuge island on east leg
- Dedicated left-turn lane on west and south legs
- Merge prior to intersection
- Signalize slip ramp
- More positive offset along South Orange Ave.
- Hatched bus stop area

Alternative 2A:

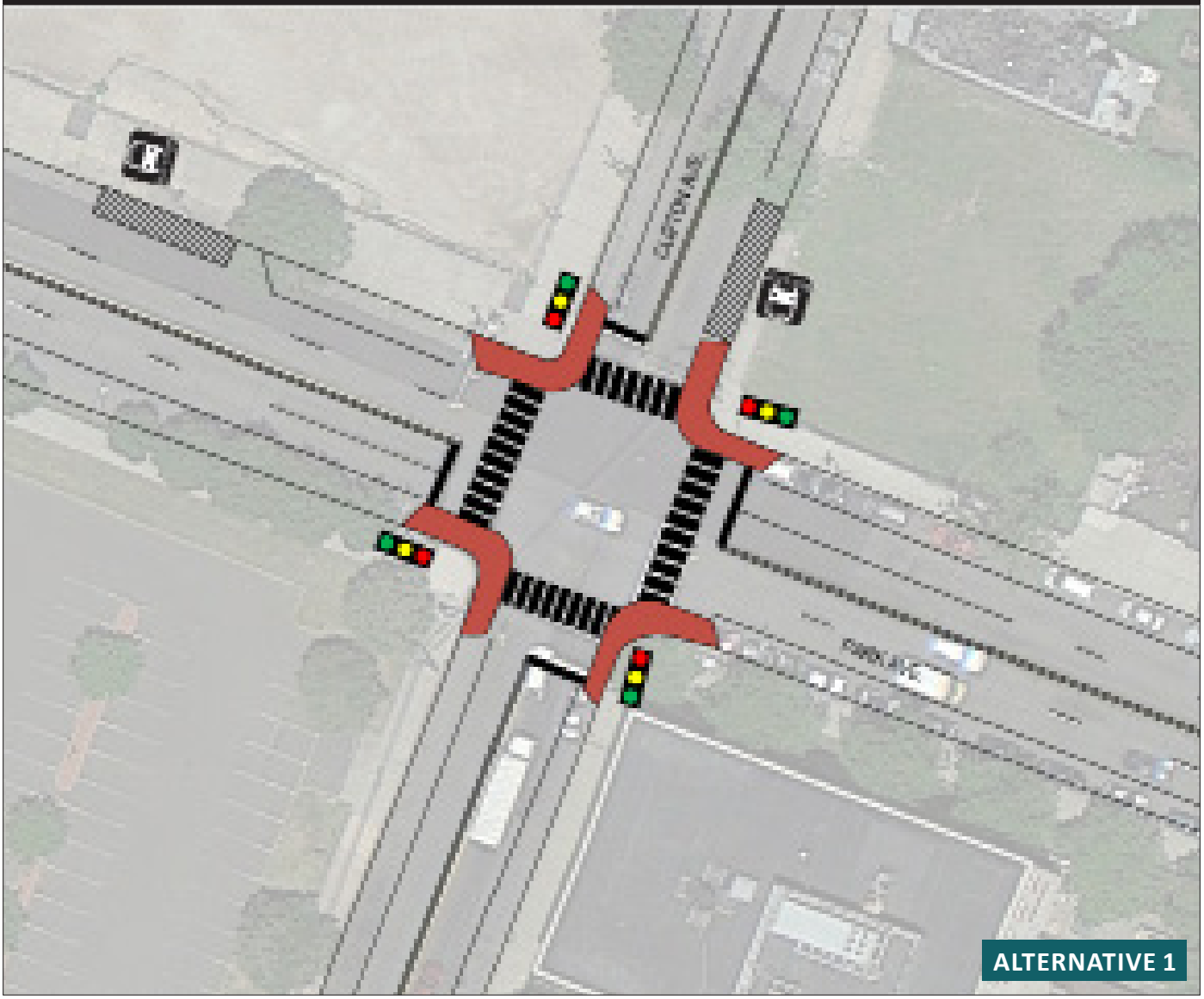
- Bus stop moved to far side

Alternative 2B:

- Keep bus on near side



7.3 Park Avenue and Clifton Avenue

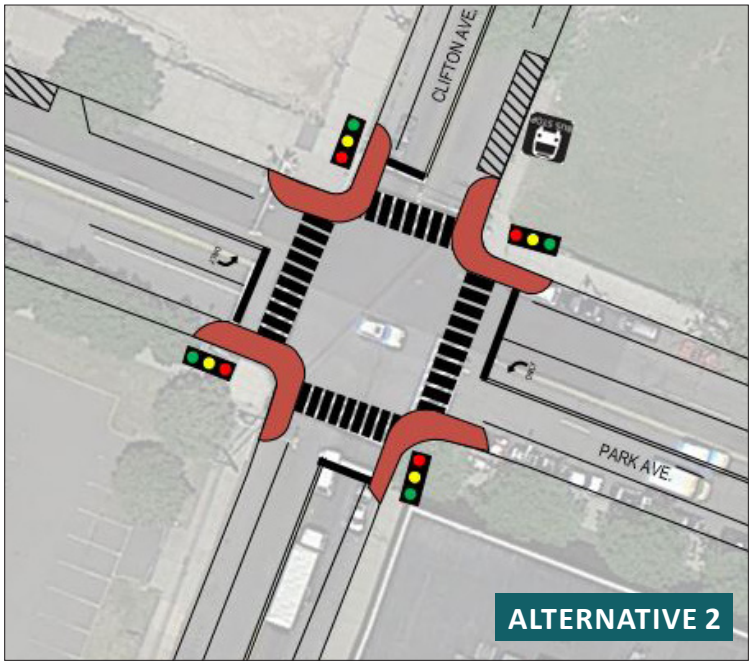


Alternatives 1 and 2:

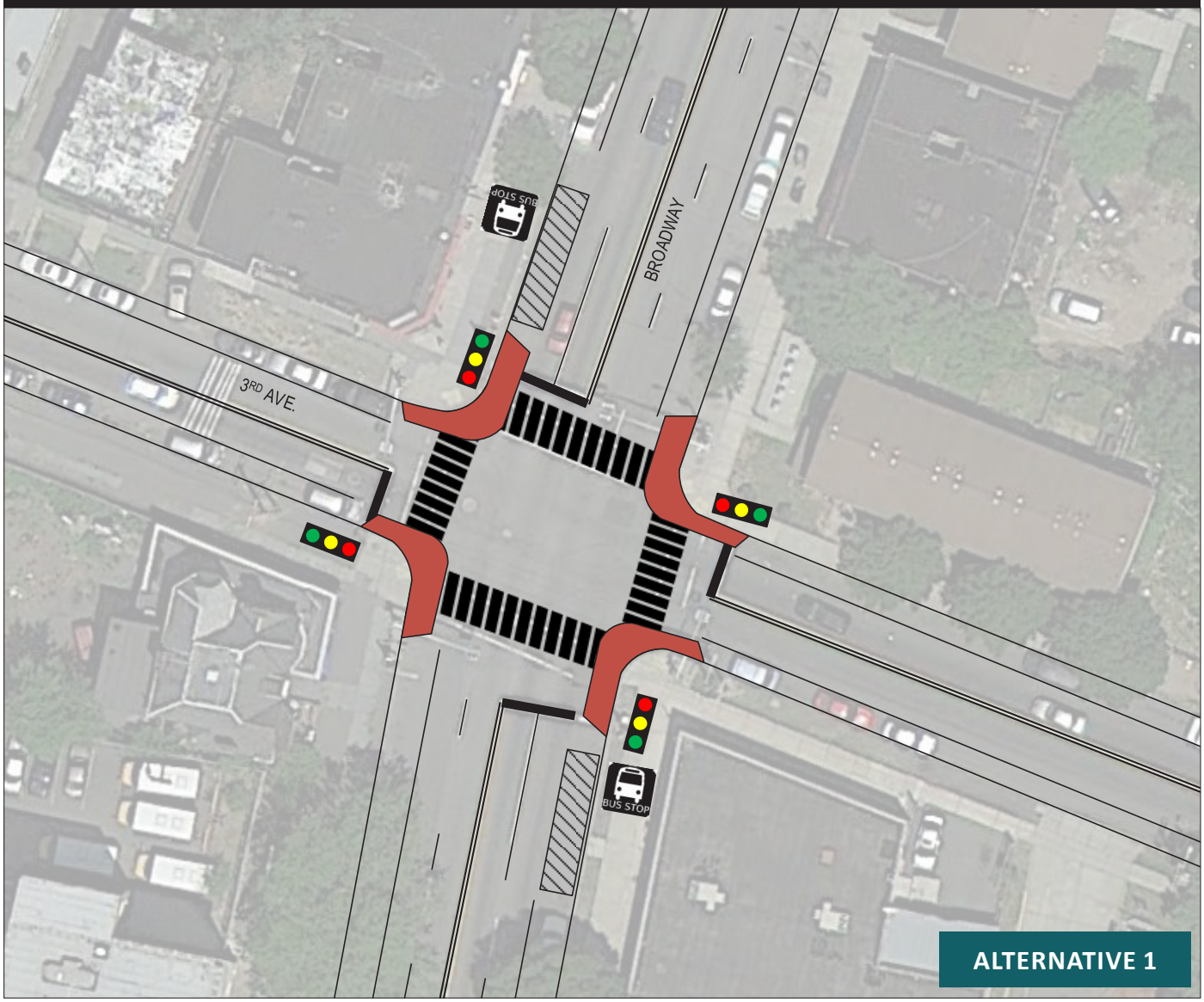
- Hatched bus areas
- High-visibility crosswalks
- Painted edgelines for parking
- Bulb-outs where appropriate

Alternative 2:

- Road Diet on Park Avenue



7.4 Broadway and 3rd Avenue



ALTERNATIVE 1

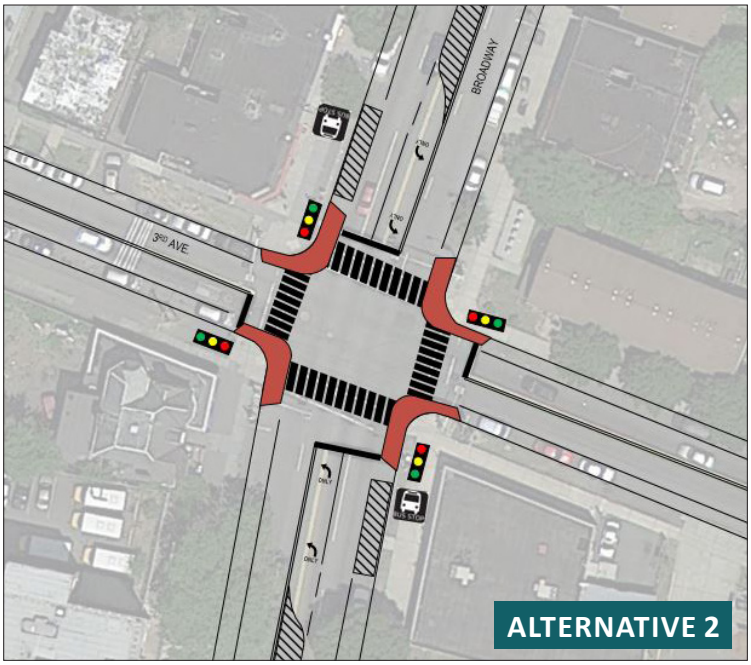
Visualized recommendations:

Alternatives 1 and 2:

- Hatched bus areas
- High-visibility crosswalks
- Painted edgelines for parking
- Bulb-outs where appropriate

Alternative 2:

- Road Diet on Broadway



ALTERNATIVE 2

>> Appendix A—RSA Team

Name	Representing	E-mail
Jack M. Nata	City of Newark—Engineering	nataj@ci.newark.nj.us
Jordan Kocak	City of Newark—Engineering	kocakj@ci.newark.nj.us
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Juan Feijoo	City of Newark—Engineering	juanf@ci.newark.nj.us
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Asif Mahmood	Essex County—Engineering	amahmood@essexcountynj.org
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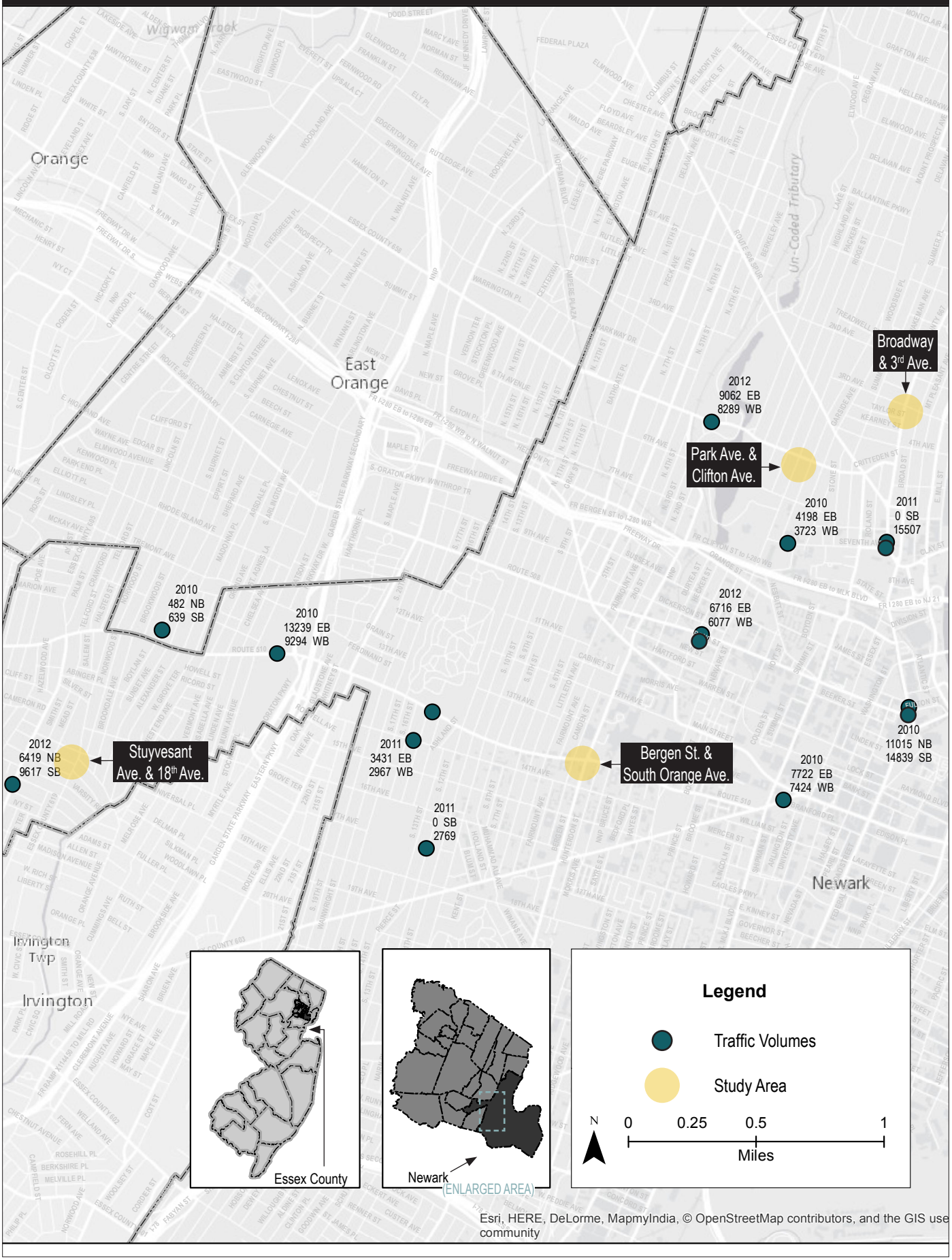
Sally Karasov	Center for Advanced Infrastructure & Transportation (Rutgers)	sally.karasov@rutgers.edu
Aimee Jefferson	Center for Advanced Infrastructure & Transportation (Rutgers)	aimee.jefferson@rutgers.edu

Study Area

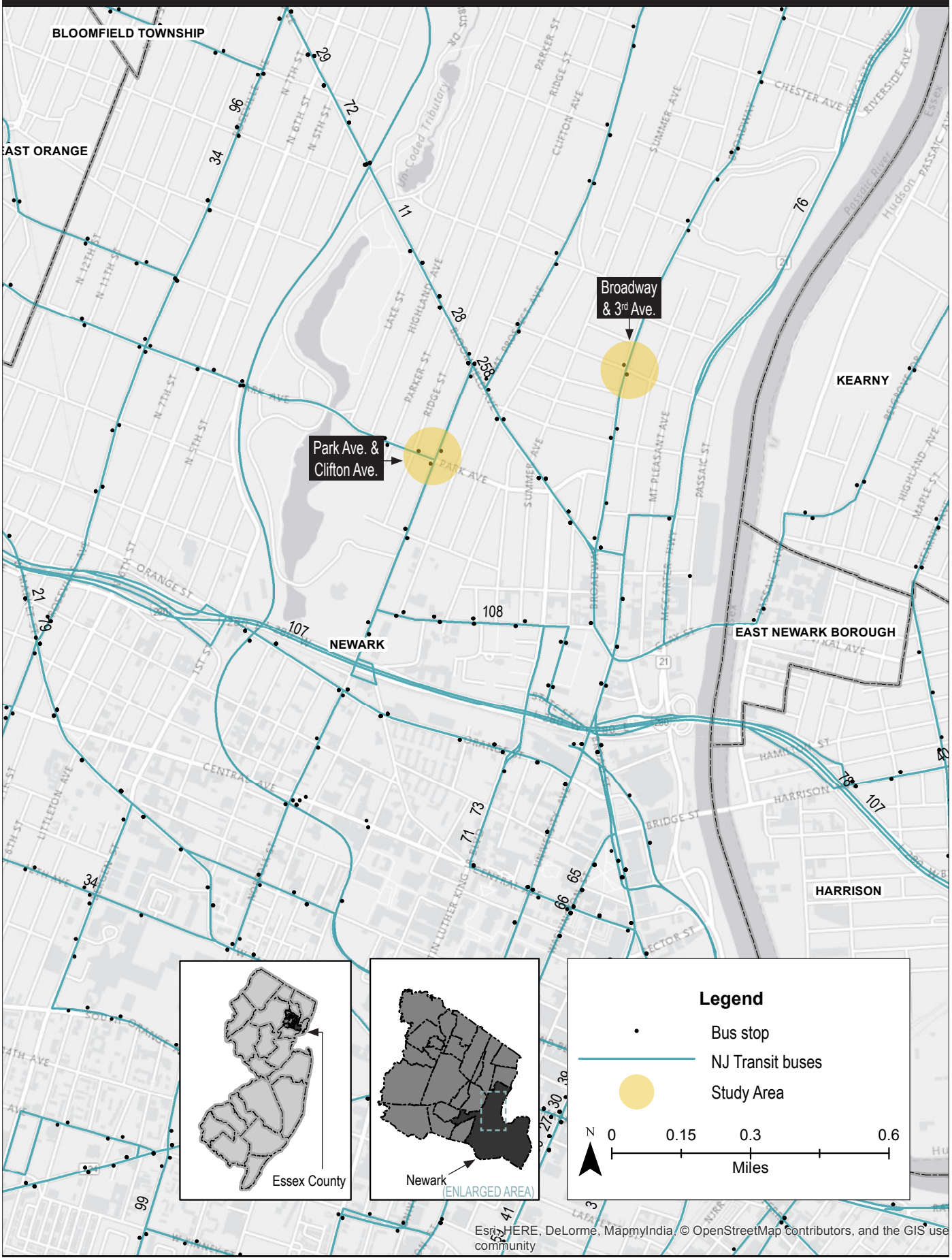

Broadway & 3rd Ave.
Park Ave. & Clifton Ave.
Stuyvesant Ave. & 18th Ave.
Bergen St. & South Orange Ave.
East Orange
Orange
Newark
Springfield Ave
RT-124 Springfield Ave
I-280 E
I-280 W
Garden State Pky
Oraton Pky
Eastern Pky
Western Pky
Essex County
Newark
(ENLARGED AREA)
Legend
Study Area
N
0
0.25
0.5
1
Miles
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Traffic Volumes



Area Transit—Stuyvesant Ave. and 18th Ave.; Bergen St. and South Orange Ave.

Area Transit—Clifton Ave. and Park Ave.; Broadway and 3rd Ave.



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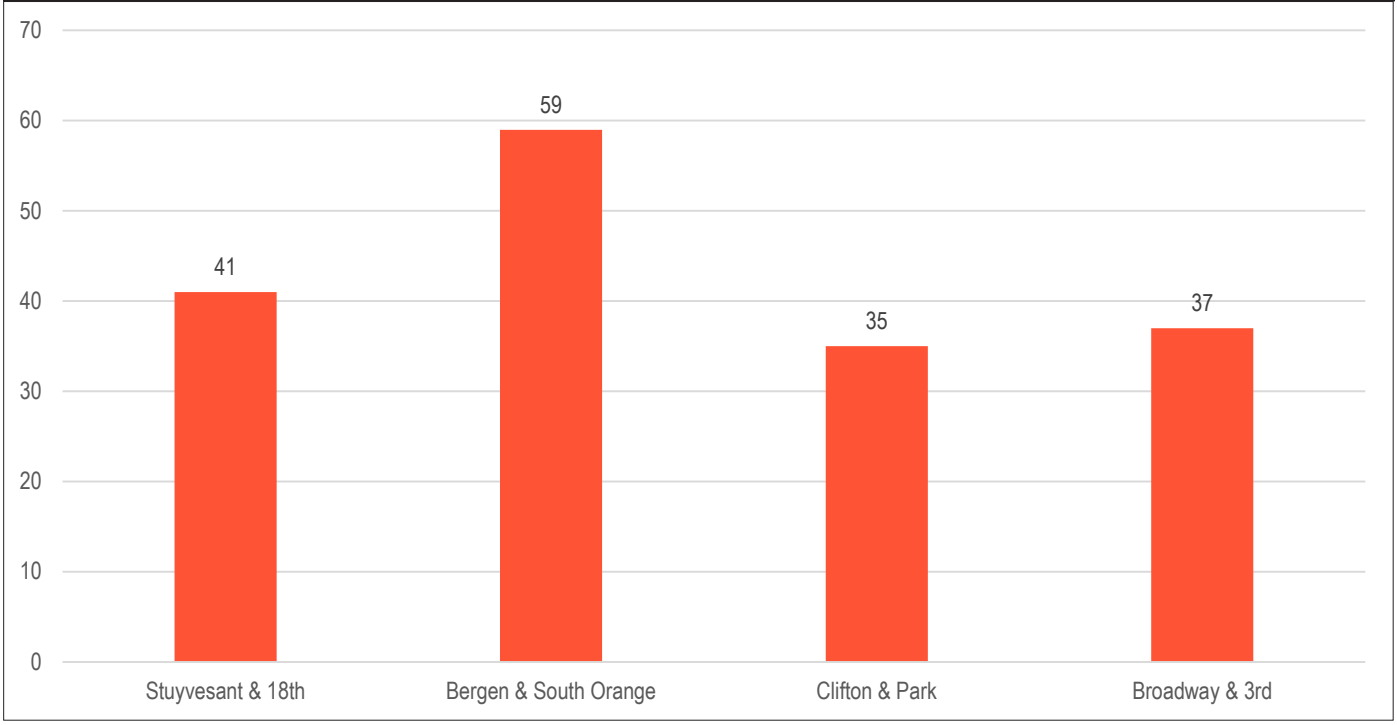
Crash Count by Intersection



RSA Intersections—Crash Summary (2011–2013)

Crash Type	#
Same Direction – Rear End	37
Same Direction – Side Swipe	22
Right Angle	31
Opposite Direction – Head On/ Angular	8
Opposite Direction – Side Swipe	1
Struck Parked Vehicle	12
Left Tum / U-Tum	28
Backing	2
Encroachment	-
Overturned	-
Fixed Object	2
Animal	-
Pedestrian	28
Pedalcyclist	1
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
Total	172

Month	#
January	8
February	19
March	14
April	19
May	17
June	16
July	12
August	5
September	13
October	17
November	17
December	15
Total	172

Severity	#
Property Damage Only (PDO)	91
Pain	78
Moderate Injury	2
Incapacitating Injury	1
Fatal	-
Total	172

Crash Year	#
2010	53
2011	57
2012	61
Total	171

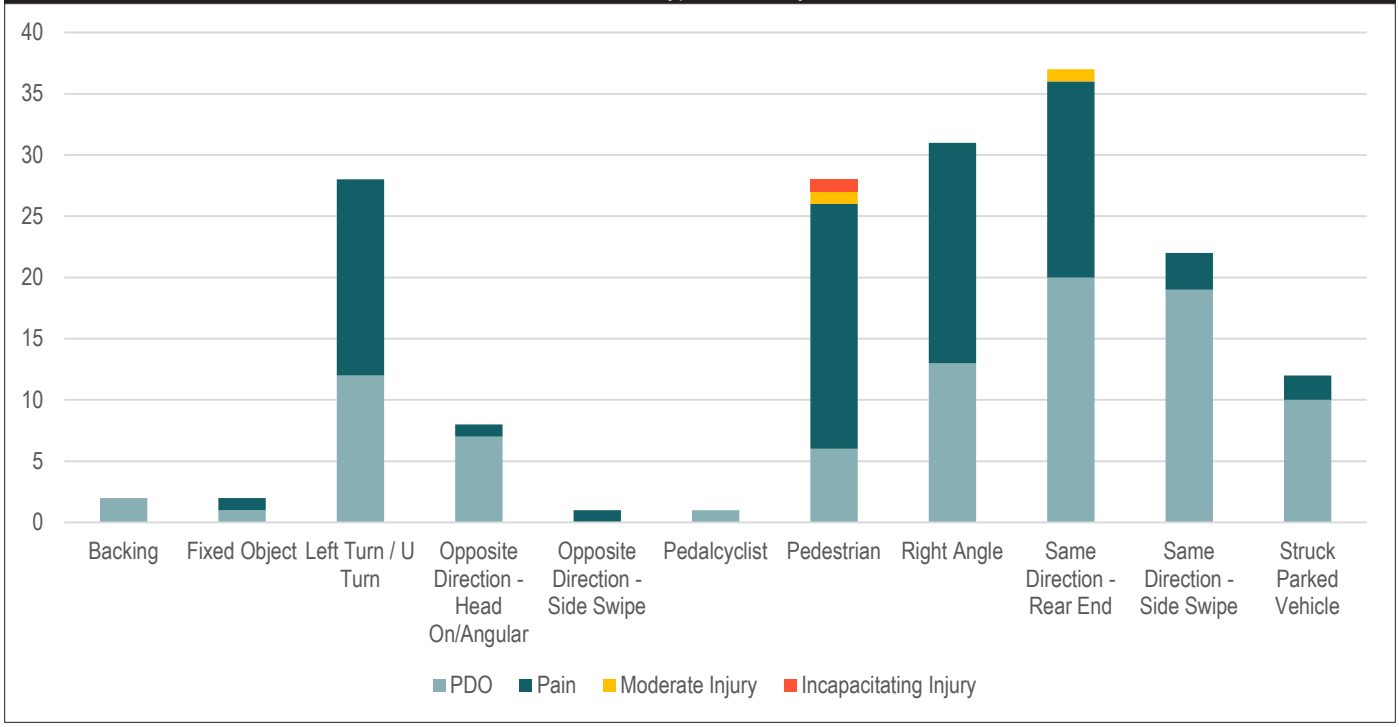
Intersection	#
At intersection	123
Not at intersection	49
At or Near Railroad	-
Total	172

Surface Condition	#
Dry	123
Wet	38
Snowy	8
Icy	1
Slush	2
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	172

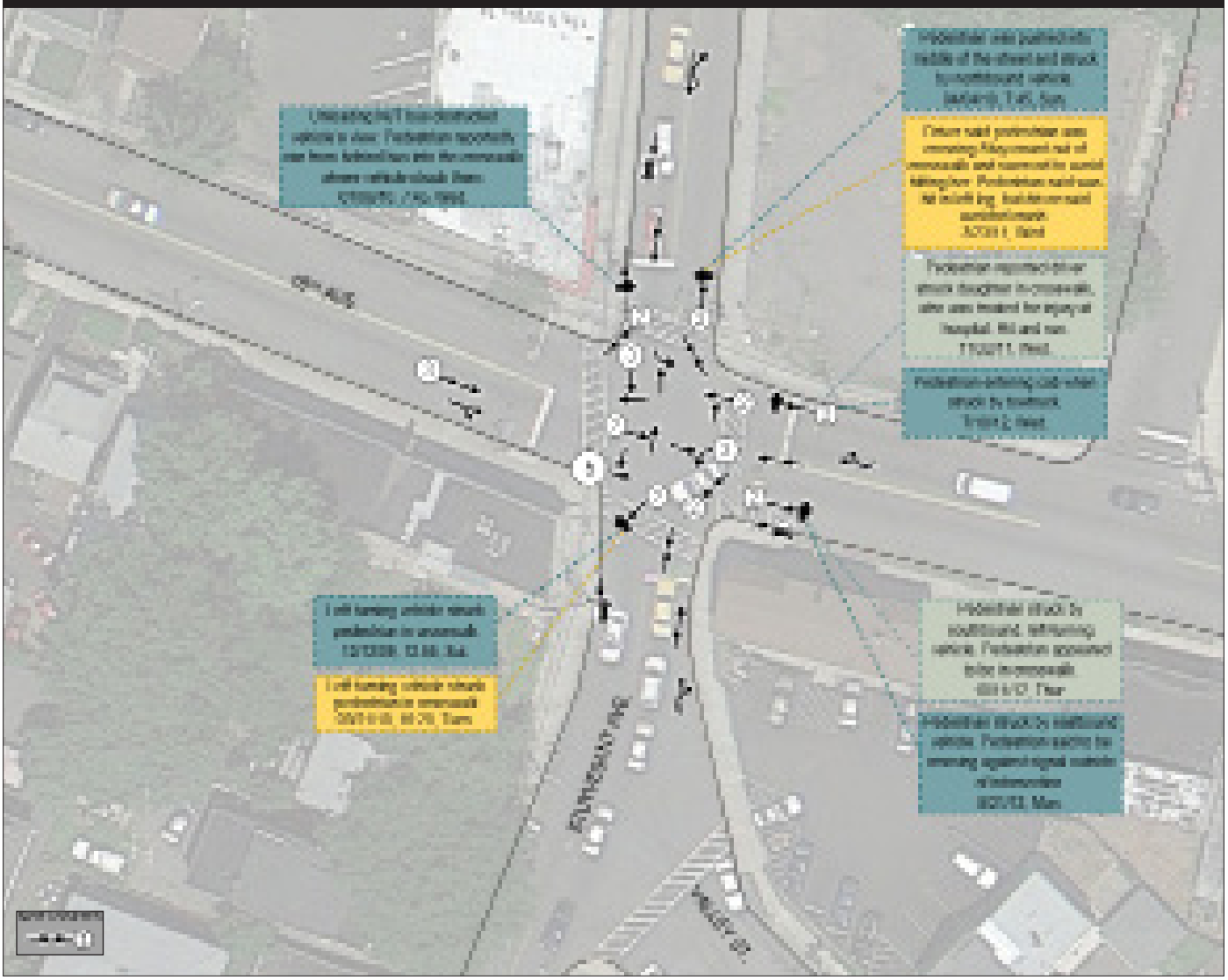
Light Condition	#
Daylight	98
Dawn	-
Dusk	5
Dark – No Street Lights	4
Dark – Street Lights On/ Continuous	59
Dark – Street Lights On/ Spot	3
Dark – Street Lights Off	2
Other	1
Total	175

Day	#
Monday	30
Tuesday	14
Wednesday	24
Thursday	24
Friday	28
Saturday	28
Sunday	24
Total	172

Crash Type & Severity



Stuyvesant Avenue and 18th Avenue



All pedestrian and cyclist crashes from 2009–2013 have a brief crash narrative included in the diagram and are color coded by severity.

Additionally, any other crash type having a severity of "moderate injury" or greater has a color-coded narrative.

= Moderate injury

= Complaint of pain

= Property damage only

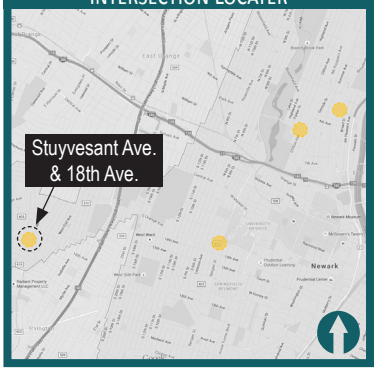
Legend

- Right angle
- Cyclist
- Pedestrians
- Backing
- Left-turn
- Opposite direction - Side Swipe
- Same direction - Side swipe
- Same direction - Rear End
- Struck parked vehicle
- Fixed-object
- Opposite direction - Head on/angular

Google Imagery, 2015

Crash diagrams based on reports retrieved from NJDOT

Intersection Locater



Stuyvesant Avenue and 18th Avenue—Crash Summary (2011–2013)

Crash Type	#
Same Direction – Rear End	6
Same Direction – Side Swipe	4
Right Angle	12
Opposite Direction – Head On/ Angular	6
Opposite Direction – Side Swipe	1
Struck Parked Vehicle	3
Left Tum / U-Tum	4
Backing	-
Encroachment	-
Overturned	-
Fixed Object	-
Animal	-
Pedestrian	5
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
Total	41

Month	#
January	-
February	4
March	3
April	6
May	4
June	4
July	5
August	1
September	1
October	4
November	5
December	4
Total	41

Severity	#
Property Damage Only (PDO)	24
Pain	16
Moderate Injury	1
Incapacitating Injury	-
Fatal	-
Total	41

Crash Year	#
2011	9
2012	20
2013	12
Total	41

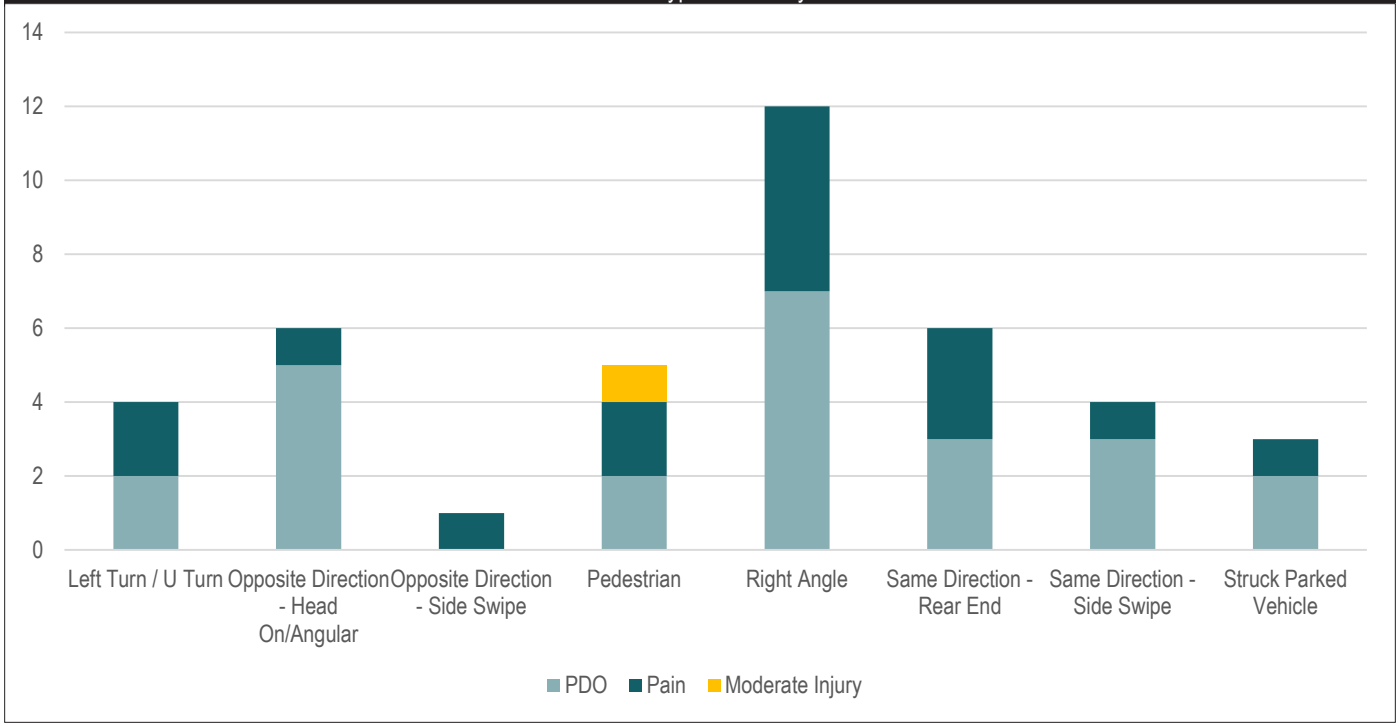
Intersection	#
At intersection	32
Not at intersection	9
At or Near Railroad	-
Total	41

Surface Condition	#
Dry	29
Wet	8
Snowy	4
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	41

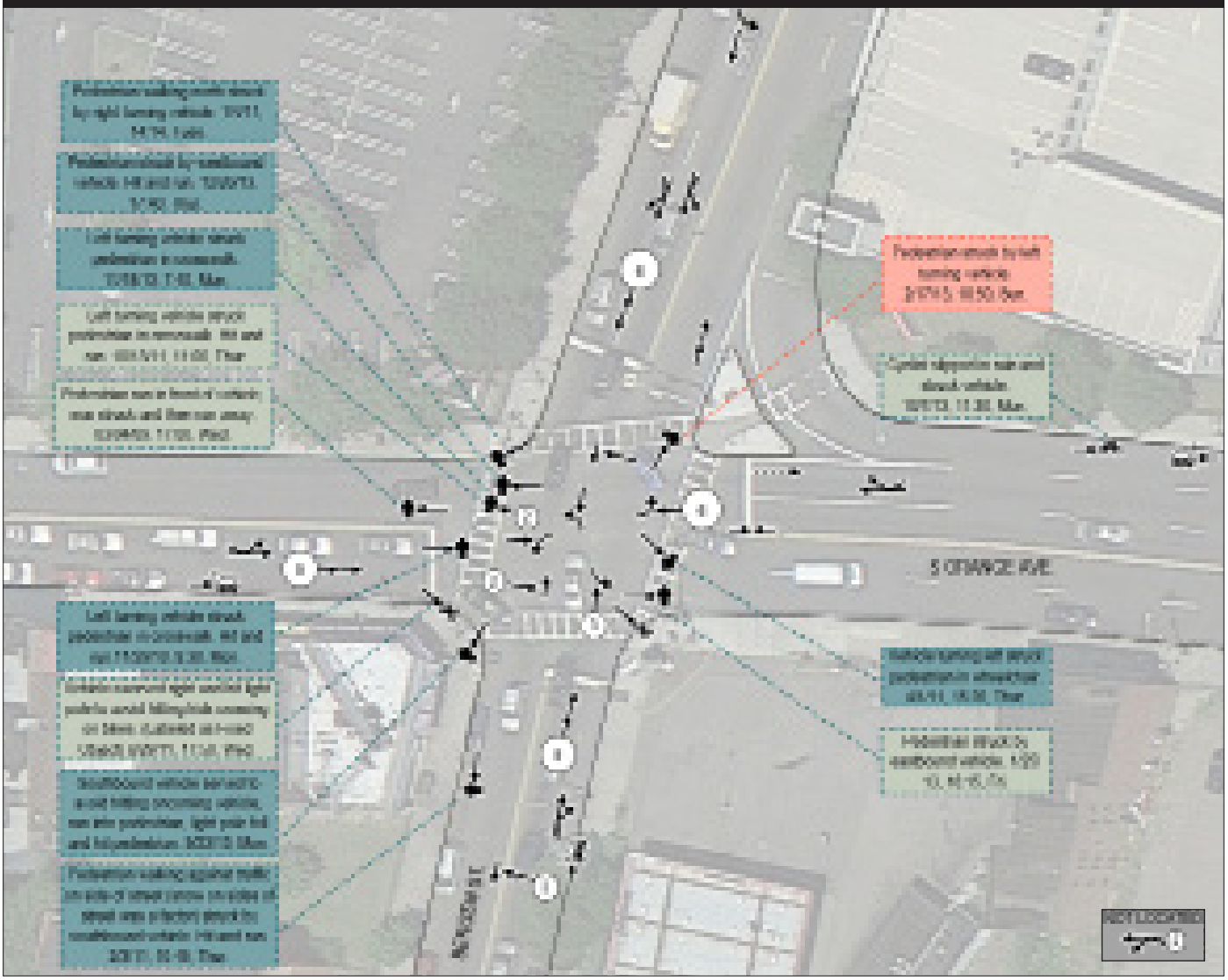
Light Condition	#
Daylight	22
Dawn	-
Dusk	1
Dark – No Street Lights	1
Dark – Street Lights On/ Continuous	16
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	1
Total	41

Day	#
Monday	3
Tuesday	6
Wednesday	8
Thursday	3
Friday	6
Saturday	8
Sunday	7
Total	41

Crash Type & Severity



Bergen Street and South Orange Avenue



All pedestrian and cyclist crashes from 2009–2013 have a brief crash narrative included in the diagram and are color coded by severity.

Additionally, any other crash type having a severity of "moderate injury" or greater has a color-coded narrative.

= Incapacitating Injury

= Complaint of pain

= Property amage only

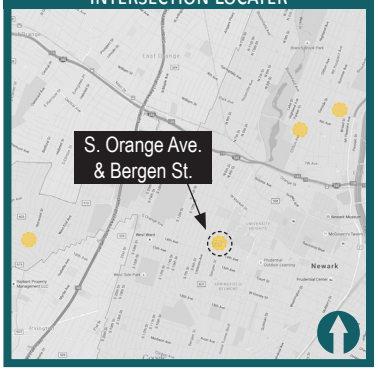
Legend

- Right angle
- Cyclist
- Pedestrians
- Backing
- Left-turn
- Opposite direction - Side Swipe
- Same direction - Side swipe
- Same direction - Rear End
- Struck parked vehicle
- Fixed-object
- Opposite direction - Head on/angular

Google Imagery, 2015

Crash diagrams based on reports retrieved from NJDOT

Intersection Locater



Bergen St and South Orange Avenue—Crash Summary (2011–2013)

Crash Type	#
Same Direction – Rear End	17
Same Direction – Side Swipe	7
Right Angle	6
Opposite Direction – Head On/ Angular	1
Opposite Direction – Side Swipe	-
Struck Parked Vehicle	3
Left Tum / U-Tum	11
Backing	1
Encroachment	-
Overturned	-
Fixed Object	2
Animal	-
Pedestrian	9
Pedalcyclist	1
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
Total	58

Month	#
January	2
February	9
March	7
April	4
May	3
June	5
July	2
August	3
September	6
October	7
November	5
December	5
Total	58

Severity	#
Property Damage Only (PDO)	31
Pain	25
Moderate Injury	1
Incapacitating Injury	1
Fatal	-
Total	58

Crash Year	#
2011	23
2012	15
2013	20
Total	58

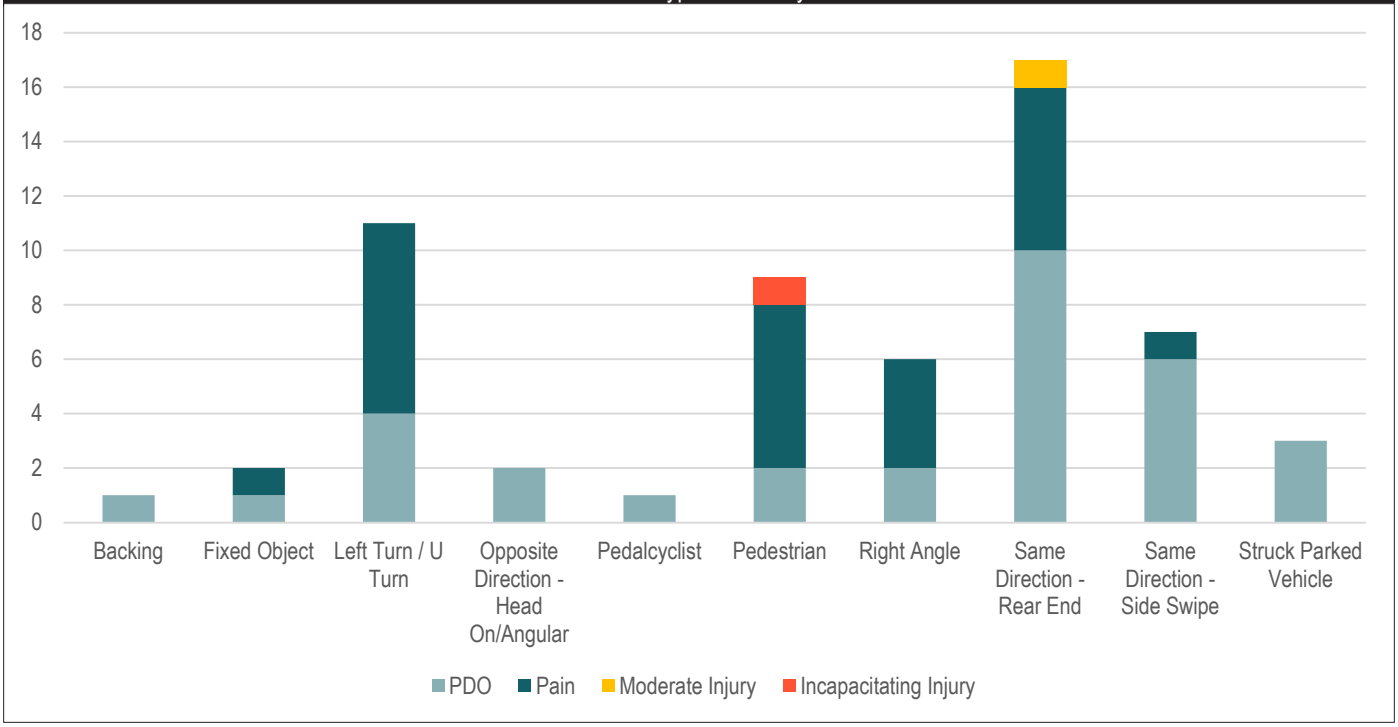
Intersection	#
At intersection	37
Not at intersection	21
At or Near Railroad	-
Total	58

Surface Condition	#
Dry	38
Wet	16
Snowy	2
Icy	1
Slush	1
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	58

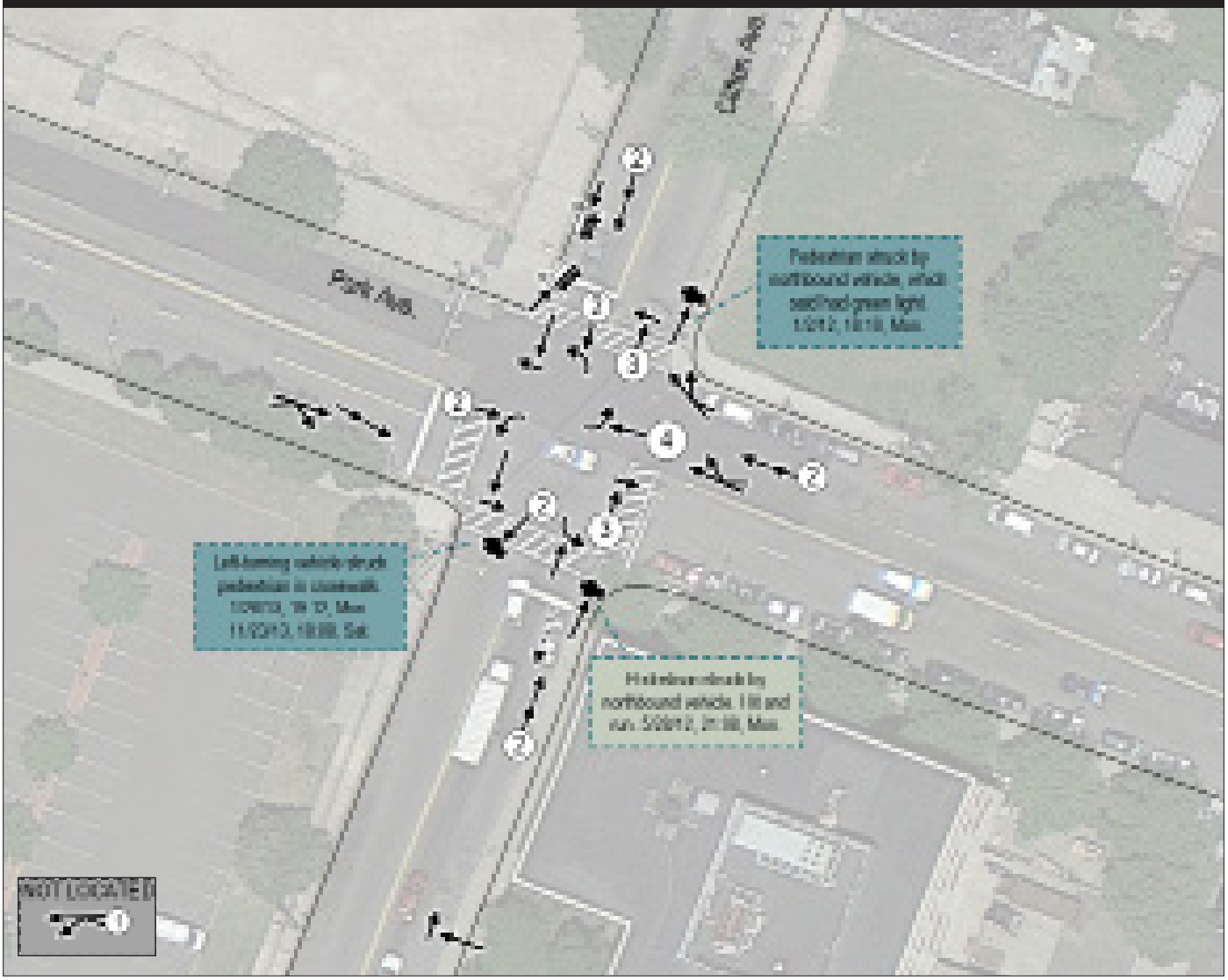
Light Condition	#
Daylight	37
Dawn	-
Dusk	3
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	18
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	1
Total	58

Day	#
Monday	9
Tuesday	4
Wednesday	8
Thursday	10
Friday	12
Saturday	7
Sunday	8
Total	58

Crash Type & Severity



Clifton Avenue and Park Avenue



All pedestrian and cyclist crashes from 2009–2013 have a brief crash narrative included in the diagram and are color coded by severity.

Additionally, any other crash type having a severity of "moderate injury" or greater has a color-coded narrative.

= Complaint of pain

= Property damage only

Legend

- Right angle
- Cyclist
- Pedestrians
- Backing
- Left-turn
- Opposite direction - Side Swipe
- Same direction - Side swipe
- Same direction - Rear End
- Struck parked vehicle
- Fixed-object
- Opposite direction - Head on/angular

Google Imagery, 2015

Crash diagrams based on reports retrieved from NJDOT

Intersection Locater

Clifton Avenue and Park Avenue—Crash Summary (2011–2013)

Crash Type	#
Same Direction – Rear End	7
Same Direction – Side Swipe	4
Right Angle	8
Opposite Direction – Head On/ Angular	-
Opposite Direction – Side Swipe	-
Struck Parked Vehicle	2
Left Tum / U-Tum	9
Backing	1
Encroachment	-
Overturned	-
Fixed Object	-
Animal	-
Pedestrian	4
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
Total	35

Month	#
January	4
February	1
March	-
April	5
May	6
June	4
July	3
August	1
September	4
October	3
November	3
December	1
Total	35

Severity	#
Property Damage Only (PDO)	18
Pain	17
Moderate Injury	-
Incapacitating Injury	-
Fatal	-
Total	35

Crash Year	#
2011	8
2012	9
2013	18
Total	35

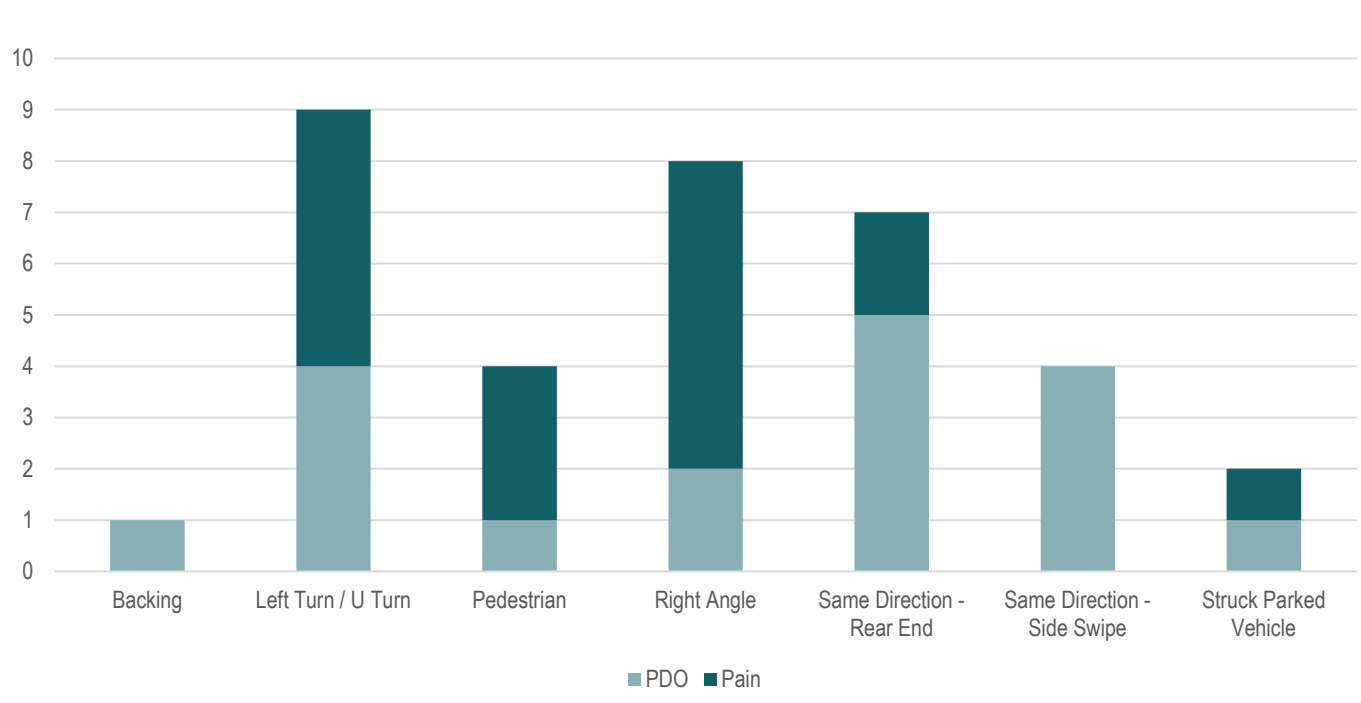
Intersection	#
At intersection	18
Not at intersection	17
At or Near Railroad	-
Total	35

Surface Condition	#
Dry	30
Wet	5
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	35

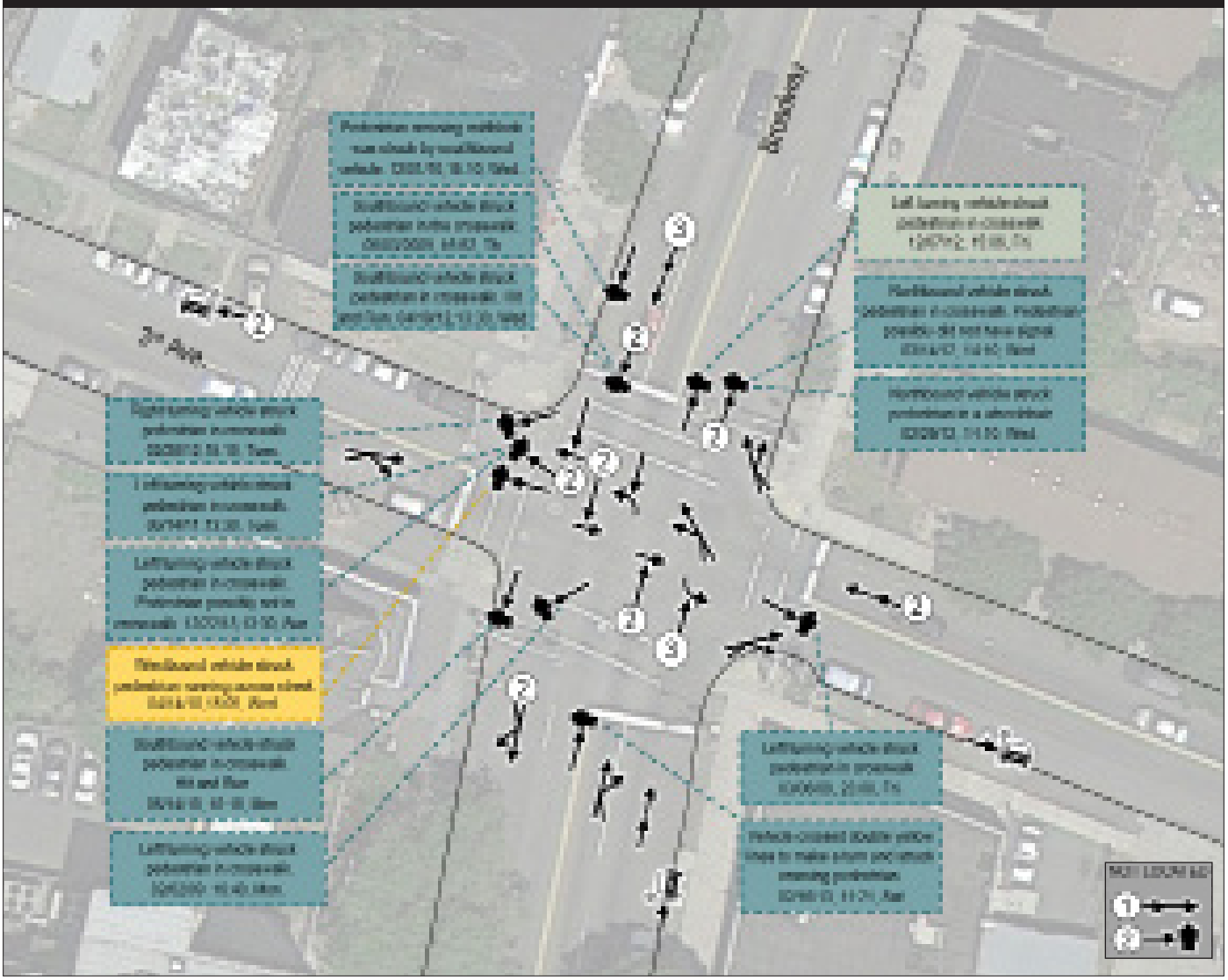
Light Condition	#
Daylight	16
Dawn	-
Dusk	1
Dark – No Street Lights	2
Dark – Street Lights On/ Continuous	14
Dark – Street Lights On/ Spot	1
Dark – Street Lights Off	1
Other	-
Total	35

Day	#
Monday	12
Tuesday	1
Wednesday	2
Thursday	6
Friday	7
Saturday	3
Sunday	4
Total	35

Crash Type & Severity



Broadway and 3rd Avenue



All pedestrian and cyclist crashes from 2009–2013 have a brief crash narrative included in the diagram and are color coded by severity.

Additionally, any other crash type having a severity of "moderate injury" or greater has a color-coded narrative.

= Moderate injury

= Complaint of pain

= Property damage only

Legend

- Right angle
- Cyclist
- Pedestrians
- Backing
- Left-turn
- Opposite direction - Side Swipe
- Same direction - Side swipe
- Same direction - Rear End
- Struck parked vehicle
- Fixed-object
- Opposite direction - Head on/angular

Google Imagery, 2015

Crash diagrams based on reports retrieved from NJDOT

Intersection Locater

Broadway and 3rd Avenue—Crash Summary (2011–2013)

Crash Type	#
Same Direction – Rear End	7
Same Direction – Side Swipe	7
Right Angle	5
Opposite Direction – Head On/ Angular	-
Opposite Direction – Side Swipe	-
Struck Parked Vehicle	4
Left Tum / U-Tum	4
Backing	-
Encroachment	-
Overturned	-
Fixed Object	-
Animal	-
Pedestrian	10
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
Total	37

Month	#
January	2
February	5
March	4
April	4
May	4
June	3
July	2
August	-
September	2
October	3
November	4
December	4
Total	37

Severity	#
Property Damage Only (PDO)	17
Pain	20
Moderate Injury	-
Incapacitating Injury	-
Fatal	-
Total	37

Crash Year	#
2011	13
2012	13
2013	11
Total	37

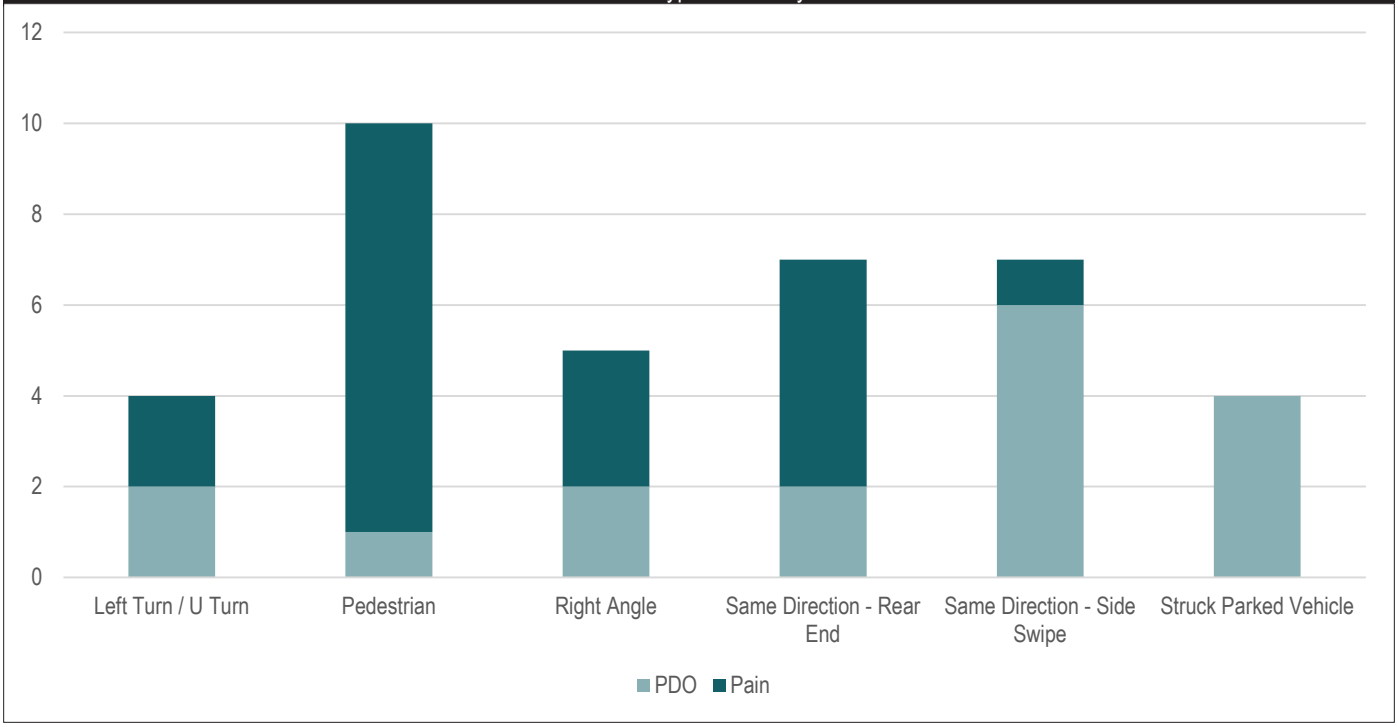
Intersection	#
At intersection	26
Not at intersection	11
At or Near Railroad	-
Total	37

Surface Condition	#
Dry	25
Wet	9
Snowy	2
Icy	-
Slush	1
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	37

Light Condition	#
Daylight	22
Dawn	-
Dusk	-
Dark – No Street Lights	1
Dark – Street Lights On/ Continuous	11
Dark – Street Lights On/ Spot	2
Dark – Street Lights Off	1
Other	-
Total	37

Day	#
Monday	6
Tuesday	3
Wednesday	5
Thursday	5
Friday	3
Saturday	10
Sunday	5
Total	37

Crash Type & Severity



Crash Type (2011–2013)	Stuyvesant Ave. & 18th Ave.		Bergen St. & S. Orange Ave.		Clifton Ave. & Park Ave.		Broadway & 3rd Ave.		Essex County*
	#	%	#	%	#	%	#	%	%
Backing	-	-	1	2%	1	3%	-	-	8%
Fixed Object	-	-	2	3%	-	-	-	-	10%
Left Turn / U Turn	4	10%	11	19%	9	26%	4	11%	4%
Opposite Direction - Head On/ Angular	6	15%	2	3%	-	-	-	-	1%
Opposite Direction - Side Swipe	1	2%	-	-	-	-	-	-	1%
Pedalcyclist	-	-	1	2%	-	-	-	-	1%
Pedestrian	5	12%	9	15%	4	11%	10	27%	4%
Right Angle	12	29%	6	10%	8	23%	5	14%	13%
Same Direction - Rear End	6	15%	17	29%	7	20%	7	19%	23%
Same Direction - Side Swipe	4	10%	7	12%	4	11%	7	19%	15%
Struck Parked Vehicle	3	7%	3	5%	2	6%	4	11%	18%
TOTALS	41	100%	59	100%	35	100%	37	100%	97%

Table 1 – Crash Type

Crash Severity (2011 – 2013)	Stuyvesant Ave. & 18th Ave.		Bergen St. & S. Orange Ave.		Clifton Ave. & Park Ave.		Broadway & 3rd Ave.		Essex County*
	#	%	#	%	#	%	#	%	%
Incapacitating Injury	-	-	1	2%	-	-	-	-	0%
Moderate Injury	1	2%	1	2%	-	-	-	-	3%
Pain	16	39%	25	42%	17	49%	20	54%	21%
PDO	24	59%	32	54%	18	51%	17	46%	75%
TOTALS	41	100%	59	100%	35	100%	37	100%	100%

Table 2 – Crash Severity

Surface Condition (2011 – 2013)	Stuyvesant Ave. & 18th Ave.		Bergen St. & S. Orange Ave.		Clifton Ave. & Park Ave.		Broadway & 3rd Ave.		Essex County*
	#	%	#	%	#	%	#	%	%
Dry	29	71%	39	66%	30	86%	25	68%	78%
Not dry	12	29%	20	34%	5	14%	12	32%	21%
TOTALS	41	100%	59	100%	35	100%	37	100%	100%

Table 3 – Surface Condition

Crash Year (2011–2013)	Stuyvesant Ave. & 18th Ave.		Bergen St. & S. Orange Ave.		Clifton Ave. & Park Ave.		Broadway & 3rd Ave.		Essex County*
	#	%	#	%	#	%	#	%	%
2011	9	22%	23	40%	8	23%	13	35%	34%
2012	20	49%	15	26%	9	26%	13	35%	33%
2013	12	29%	20	34%	18	51%	11	30%	33%
TOTALS	41	100%	58	100%	35	100%	37	100%	100%

Table 4 – Crash Year

Crash Month (2011–2013)	Stuyvesant Ave. & 18th Ave.		Bergen St. & S. Orange Ave.		Clifton Ave. & Park Ave.		Broadway & 3rd Ave.		Essex County*
	#	%	#	%	#	%	#	%	%
January	-	-	2	3%	4	11%	2	5%	9%
February	4	10%	9	15%	1	3%	5	14%	8%
March	3	7%	7	12%	-	-	4	11%	8%
April	6	15%	4	7%	5	14%	4	11%	8%
May	4	10%	3	5%	6	17%	4	11%	9%
June	4	10%	5	8%	4	11%	3	8%	9%
July	5	12%	2	3%	3	9%	2	5%	8%
August	1	2%	3	5%	1	3%	-	-	8%
September	1	2%	6	10%	4	11%	2	5%	8%
October	4	10%	7	12%	3	9%	3	8%	9%
November	5	12%	5	8%	3	9%	4	11%	8%
December	4	10%	6	10%	1	3%	4	11%	9%
TOTALS	41	100%	59	100%	35	100%	37	100%	100%

Table 5 – Crash Month

Crash Day of Week (2011–2013)	Stuyvesant Ave. & 18th Ave.		Bergen St. & S. Orange Ave.		Clifton Ave. & Park Ave.		Broadway & 3rd Ave.		Essex County*
	#	%	#	%	#	%	#	%	%
Sunday	7	17%	8	14%	4	11%	5	14%	14%
Monday	3	7%	9	15%	12	34%	6	16%	15%
Tuesday	6	15%	4	7%	1	3%	3	8%	15%
Wednesday	8	20%	9	15%	2	6%	5	14%	15%
Thursday	3	7%	10	17%	6	17%	5	14%	17%
Friday	6	15%	12	20%	7	20%	3	8%	14%
Saturday	8	20%	7	12%	3	9%	10	27%	11%
TOTALS	41	100%	59	100%	35	100%	37	100%	100%

Table 6 – Day of Week

*County percentages represent all crashes occurring in Essex County during the same years as the RSA crash datasets.

Light Condition (2011–2013)	Stuyvesant Ave. & 18th Ave.		Bergen St. & S. Orange Ave.		Clifton Ave. & Park Ave.		Broadway & 3rd Ave.		Essex County*
	#	%	#	%	#	%	#	%	%
Daylight	22	54%	38	64%	16	46%	22	59%	67%
Non-daylight	19	46%	21	36%	19	54%	15	41%	32%
TOTALS	41	100%	59	100%	35	100%	37	100%	100%

Table 7 – Light Condition

Crash Time (2011–2013)	Stuyvesant Ave. & 18th Ave.		Bergen St. & S. Orange Ave.		Clifton Ave. & Park Ave.		Broadway & 3rd Ave.		Essex County*
	#	%	#	%	#	%	#	%	%
12 a.m.	2	5%	3	5%	-	-	-	-	2%
1 a.m.	4	10%	1	2%	-	-	1	3%	2%
2 a.m.	3	7%	-	-	1	3%	1	3%	2%
3 a.m.	2	5%	-	-	2	6%	1	3%	1%
4 a.m.	-	-	-	-	1	3%	-	-	1%
5 a.m.	1	2%	1	2%	-	-	-	-	1%
6 a.m.	1	2%	-	-	1	3%	-	-	2%
7 a.m.	1	2%	2	3%	2	6%	1	3%	4%
8 a.m.	1	2%	5	8%	2	6%	3	8%	7%
9 a.m.	2	5%	1	2%	1	3%	2	5%	5%
10 a.m.	1	2%	2	3%	-	-	-	-	5%
11 a.m.	-	-	7	12%	1	3%	2	5%	5%
12 p.m.	1	2%	2	3%	-	-	1	3%	6%
1 p.m.	2	5%	3	5%	1	3%	2	5%	6%
2 p.m.	5	12%	4	7%	2	6%	3	8%	6%
3 p.m.	2	5%	5	8%	2	6%	4	11%	7%
4 p.m.	2	5%	2	3%	3	9%	6	16%	7%
5 p.m.	1	2%	3	5%	2	6%	1	3%	7%
6 p.m.	1	2%	2	3%	3	9%	1	3%	6%
7 p.m.	4	10%	4	7%	2	6%	1	3%	5%
8 p.m.	1	2%	4	7%	3	9%	4	11%	3%
9 p.m.	1	2%	-	-	2	6%	-	-	3%
10 p.m.	1	2%	1	2%	2	6%	3	8%	3%
11 p.m.	1	2%	3	5%	2	6%	-	-	2%
TOTALS	40	98%	55	93%	35	100%	37	100%	100%

Table 8 – Crash Time

*County percentages represent all crashes occurring in Essex County during the same years as the RSA crash datasets.