



FERRY STREET ROAD SAFETY AUDIT

Newark, New Jersey
Report

>> October 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 the City of Newark, with funding provided by FHWA and NJDOT

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>> INTRODUCTION

WHAT IS A ROAD SAFETY AUDIT (RSA)?

The Center for Advanced Infrastructure and Transportation's (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 road surveys, which are 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, 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 by the State of New Jersey in preparing the design and construction documents, to implement any of the safety countermeasures mentioned in this 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.

EXECUTIVE SUMMARY

The Ferry Street RSA was conducted on Wednesday, June 3rd, 2015 along Ferry Street between Wilson Avenue/Merchant Street northeast towards Lexington Street. The RSA corridor is approximately 0.5 miles long and includes 12 intersections. The corridor ranked as Newark's 4th highest pedestrian crash corridor and included the city's 10th highest pedestrian crash "spot."

The RSA corridor is mixed use with commercial storefronts concentrated on the western end, large stores and parking lots in the middle section, and primarily housing on the eastern end. The eastern end is also characterized by increasingly industrial activities and vacant properties. Bus traffic is fairly heavy along the corridor. Census data shows that nearly half of the population in the area surrounding the corridor does not have access to a motorized vehicle and instead commutes via public transit, walking, or biking. There are schools on either end of the study corridor and new development of mixed used buildings and a farmers market is underway.

The cross section is fairly consistent throughout the corridor with curbside parking and one lane in each direction. Minor streets intersect Ferry Street at a slightly skewed angle, sometimes aligning with a street or driveway on the opposite side of Ferry Street and sometimes terminating as a t-intersection.

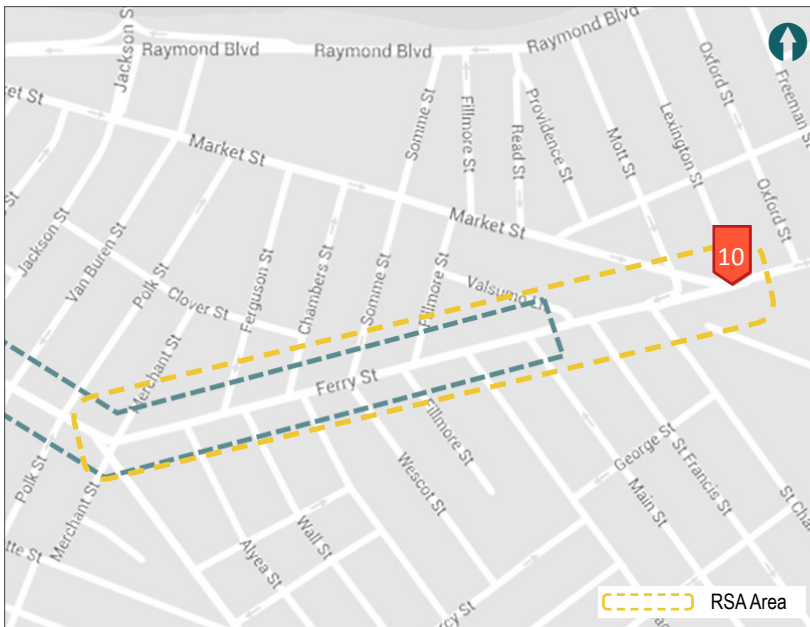
When compared to citywide crash data, the RSA area shows an overrepresentation of right angle, struck parked vehicle and pedestrian or cyclist crashes. The highest number of crashes took place in the afternoon hours. There was also a slight overrepresentation of crashes occurring in daylight and dry conditions.

The RSA identified both corridor and intersection-specific issues. The corridorwide issues included missing or deficient pedestrian or bicycle accommodations, maintenance needs, visibility and navigability issues, and operational issues like aggressive driving and freight truck maneuvering. Intersection-specific issues included more clearly delineating geometry at wide, skewed intersections.

General recommendations were to consider adding bulbouts and bike lanes, refresh pavement markings, and update antiquated signals. Concept designs and a photosimulation are also provided to help visualize the written recommendations.

>> 1.0 CORRIDOR DESCRIPTION AND ANALYSIS

1.1 SITE SELECTION



Each year, the North Jersey Transportation Planning Authority supports one RSA in the Newark subregion. The Newark Engineering Department chose to locate the RSA on Ferry Street because it was identified in the 2015 network screenings as being Newark’s 4th highest-ranked mile-long pedestrian corridor. The study area is also the location of the city’s 10th highest-ranked pedestrian “spot”.

The 3 higher-ranking pedestrian corridors and 9 higher-ranking pedestrian spots not located in the Ferry Street RSA area are either county-owned or have been part of previous RSAs.

Symbol	Safety Focus	Newark Ranking	NJTPA Ranking
	Pedestrian Spot	10	50
	Pedestrian Corridor	4	12

Figure 1 – Identified Priority High Crash Locations

1.2 TRAFFIC VOLUMES

No traffic counts were available for the segment of Ferry Street running through the RSA corridor, but traffic counts were available to both the east and the west of it. Directly east of the corridor, after Market Street merges with Ferry Street to travel eastwards towards the turnpike, the ADT was just under 12,000. West of the RSA corridor, prior to the Wilson Avenue/Merchant Street split, the bi-directional ADT was just under 14,000. For more information on traffic counts, see the maps in appendix B.

1.3 TRANSIT SERVICE

According to U.S. census data, 42% Newark residents in the census tracts located in or immediately adjacent to the study area (see Figure 3) do not have a vehicle available to commute to work, compared with 8% of residents of the NJTPA region. As such, a relatively large percentage of Newark residents either walk, bike or take public transit to work.

Commute to Work by Residency	% in RSA Area	% in Newark	% in NJTPA
No vehicle available	42%	27%	8%
Do not drive/carpool	39%	38%	22%

Figure 3 – Crash Type in RSA Area and County

There are several NJ Transit buses that travel through the RSA study area, either along the length of the entire corridor, or by intersecting it at least once. The most frequent buses are the #1 and the #25, which both have daytime headways of 10 minutes or less. The #1 travels the entirety of the corridor. The #25 only intersects the corridor at the Merchant Street / Wilson Avenue intersection. For more information on area transit, see the maps in Appendix B.

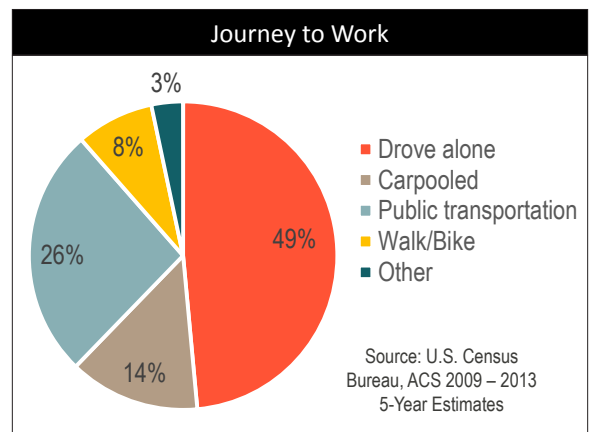


Figure 2 – Journey to Work for Newark, NJ

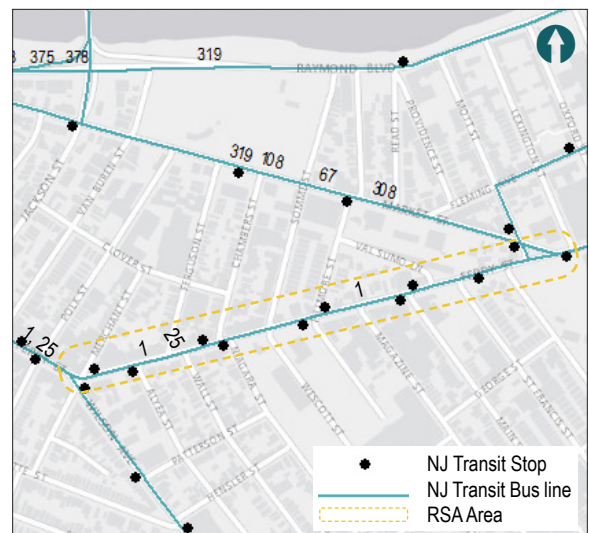


Figure 4 – Area Transit

1.4 AREA CHARACTERISTICS

The Ferry Street RSA area begins in the west at the intersection of Wilson Avenue and Merchant Street, a skewed, 5-street intersection that was recently renovated as part of Ferry Street corridor improvements in (2010??). After the Wilson Avenue/Merchant Street intersection, Ferry Street makes a sharp turn eastwards and takes on a less commercial character, especially towards the east end of the study area where there are several vacant lots. There are also a series of large parking lots and driveway entrances in the middle of the corridor along the south curb, interrupting the continuous commercial and residential facade characteristic of the Ferry Street until it takes on a more industrial character at Lexington Street.

There are upcoming projects in this area.

- At the intersection of St. Francis Street, there is a planned development for a mixed-use building with 9,600 square feet of retail space, 89 new apartment units and 89 parking spaces.
- The Ironbound Community Corporation (ICC) is converting the parking lot at the old Ballentine Brewery site into a farmers market. ICC received funds to redesign the intersection of Mott Street/Market Street/Ferry Street/St. Charles to increase safety and community access to the incoming farmers market. They are working with the Newark Engineering Department and the neighborhood to assess design alternatives.

Another important area characteristic is the presence of the heavy industrial zones and the port, which can be accessed less than half a mile south of the St. Charles Street intersection.

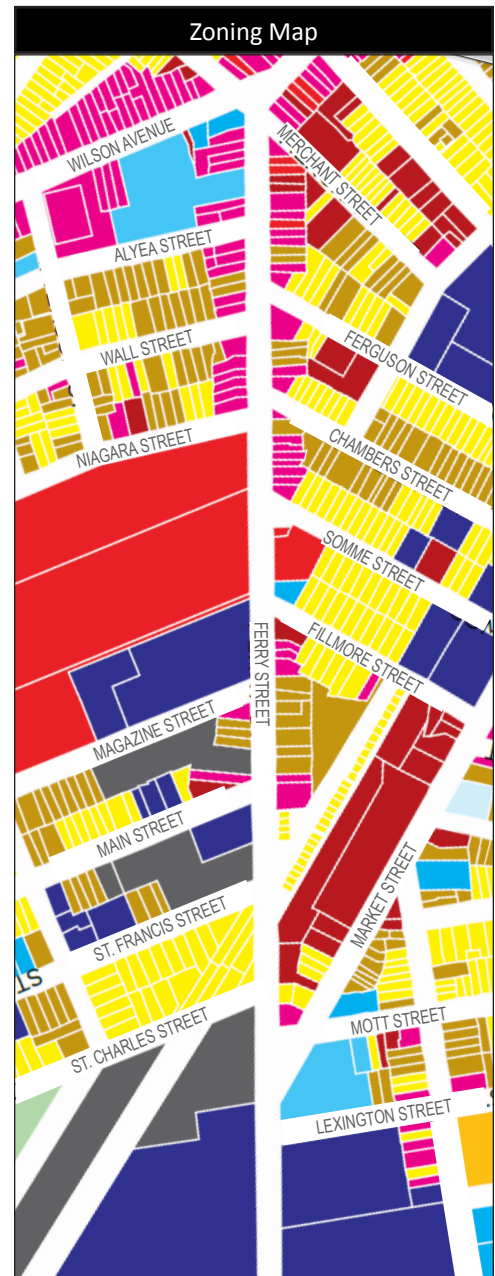
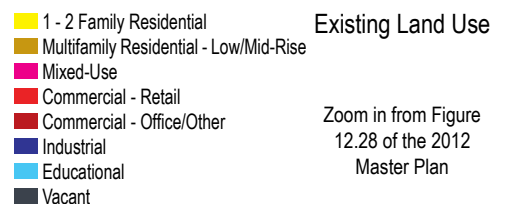


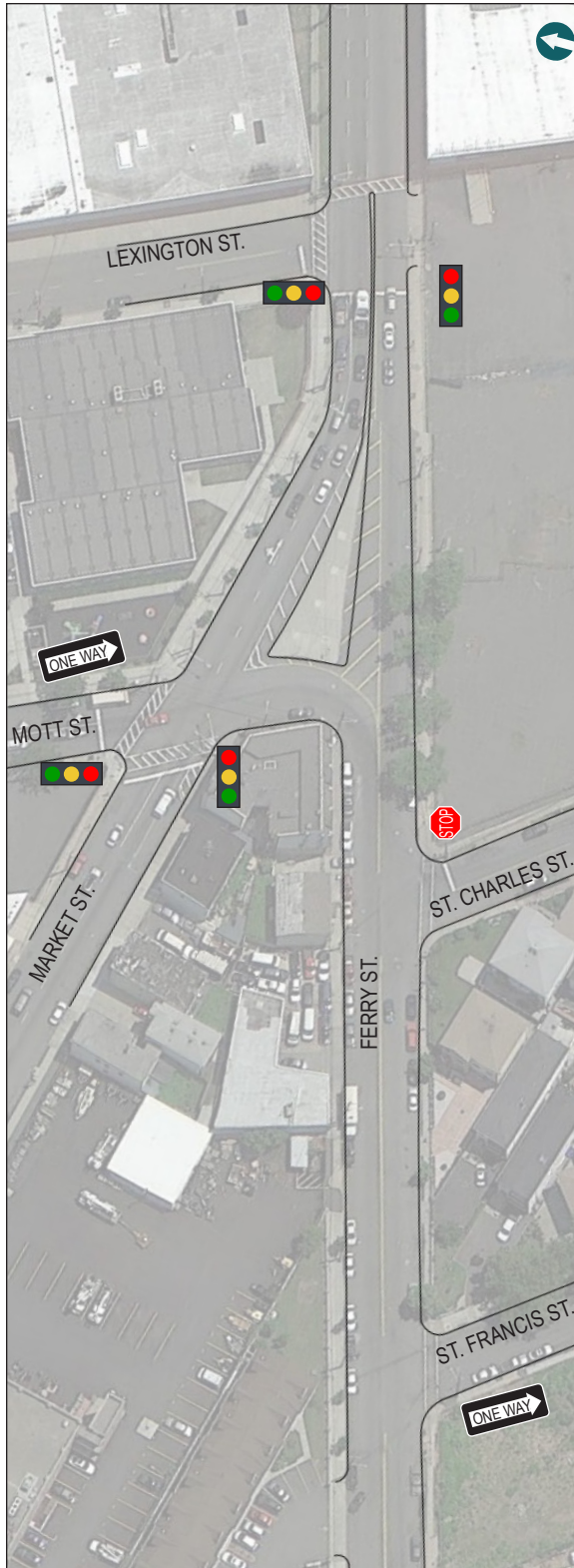
Figure 5 – Existing Land Use



1.5 INTERSECTION CHARACTERISTICS

Each of the intersections in the corridor is slightly skewed, intersecting Ferry Street at an approximate 70/110 degree angle. Many of the streets are also misaligned, and terminate in one of the following patterns:

- T-intersections: Alyea Street, Magazine Street, Main Street, St. Francis Street, St. Charles Street
- Offset 4-way intersections: Chambers Street and Niagara Street, Ferguson Street and Wall Street
- 4-way intersections where one leg is a driveway: Somme Street, Fillmore Street



Lexington Street and Ferry Street

- Signalized
- East leg: 4 receiving lanes
- South leg: Driveway large, empty vacant lot
- West leg: 1 left-turn/through lane, 3 through lanes, separated by narrow concrete median
- North leg: 1 left-turn lane, 1 receiving lane, curbside parking (both sides)

Mott Street and Market Street/Ferry Street

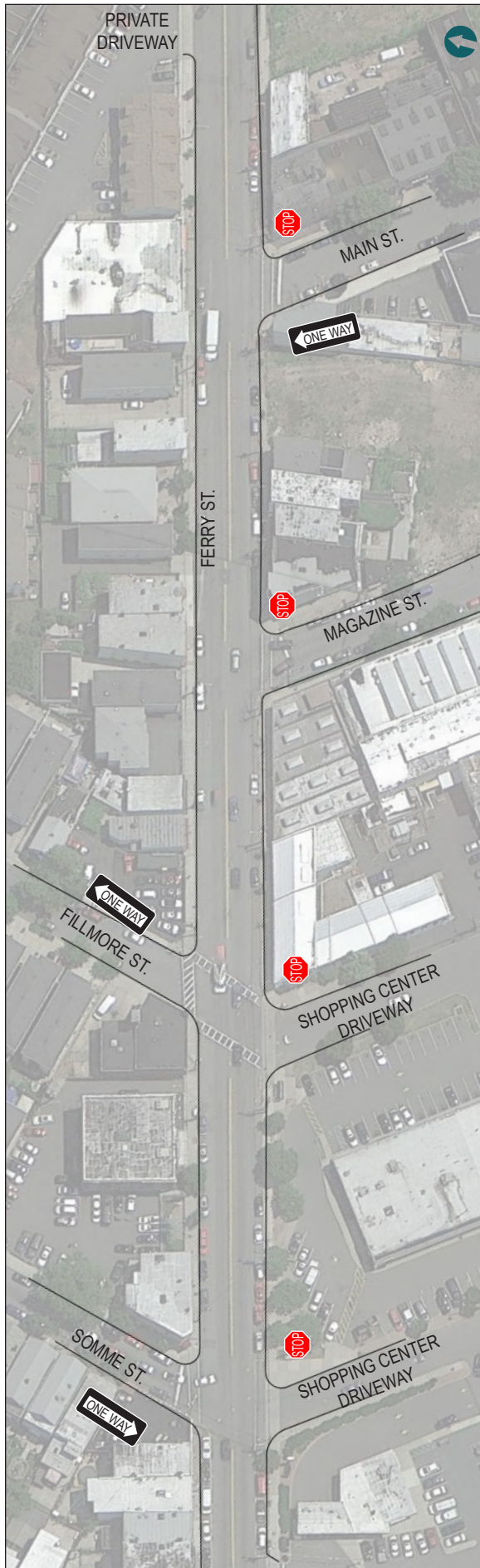
- Mott Street and Market Street is signalized.
- Mott Street and Ferry Street is uncontrolled because there is no lane conflict
- East leg: 2 receiving lanes on Market Street, 1 continued through lane on Ferry Street
- South leg: 1 wide receiving lane
- West leg: Market Street - 2 through lanes, curbside parking (both sides); Ferry Street: See St. Charles Street description
- North leg: 1 left-turn lane, 1 through lane, curbside parking (both sides)

St. Charles Street and Ferry Street

- Stop-controlled on St. Charles Street approach
- East leg and west legs: 1 through lane in each direction, curbside parking (both sides)
- South leg: 1 lane in each direction, curbside parking (both sides)

St. Francis Street and Ferry Street

- East leg and west legs: 1 through lane in each direction, curbside parking (both sides)
- South leg: 1 receiving lane, curbside parking (both sides) with painted edgeline



Main Street and Ferry Street

- Main Street approach is stop-controlled intersection
- East leg and west leg: 1 through-traffic lane in each direction, curbside parking (both sides)
- South leg: 1 northbound through lane, curbside parking (both sides)

Magazine Street and Ferry Street

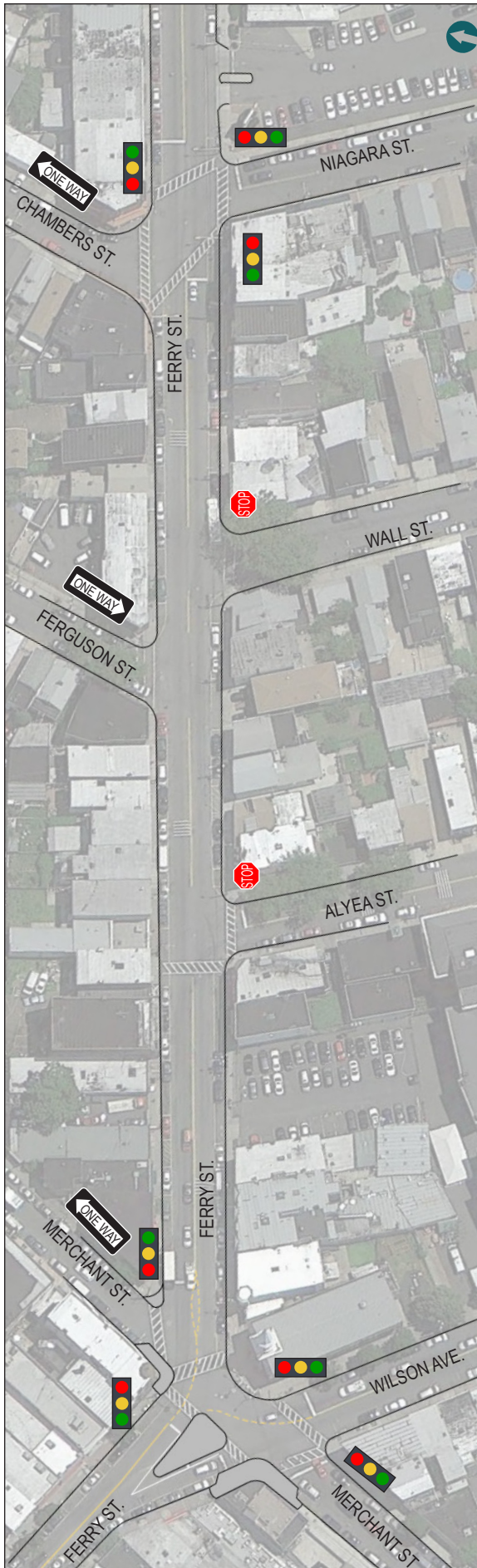
- Stop-controlled on Magazine Street approach
- East leg and west legs: 1 lane through- traffic in each direction, curbside parking (both sides)
- South leg: 1 lane in each direction, curbside parking (both sides)

Fillmore Street and Ferry Street

- Stop-sign on south leg approach
- East leg and west legs: 1 lane through- traffic in each direction, curbside parking (both sides)
- South leg: Driveway, 1 lane in each direction
- North leg: 1 receiving lane, curbside parking (both sides)

Somme Street and Ferry Street

- Stop sign on south leg approach
- East leg and west legs: 1 through lane in each direction, curbside parking (both sides)
- South leg: Driveway, 1 lane in each direction
- North leg: 1 receiving lane, curbside parking (both sides)



Niagara Street / Chambers Street and Ferry Street

- Signalized
- East leg and west legs: 1 through lane in each direction, curbside parking (both sides)
- South leg: Driveway, 1 lane in each direction
- North leg: 1 receiving lane, curbside parking (both sides)

Wall Street and Ferry Street

- Stop-controlled (on Wall Street)
- East leg and west legs: 1 through lane in each direction, curbside parking (both sides)
- South leg: 1 lane in each direction, curbside parking (both sides)
- North leg: none

Ferguson Street and Ferry Street

- East leg and west leg: 1 through lane in each direction, curbside parking (both sides)
- North leg: 1 receiving lane, curbside parking (both sides)

Alyea Street and Ferry Street

- Stop-controlled (on Alyea Street)
- East leg and west leg: 1 through lane in each direction, curbside parking (both sides)
- South leg: 1 lane in each direction, curbside parking (both sides)
- North leg: none
- Crossing guard directs morning and afternoon traffic across Ferry Street for Wilson Avenue School with an entrance on Alyea Street

Merchant Street, Wilson Avenue and Ferry Street

- Signalized
- East leg (Ferry Street): 1 lane in each direction. No left turns onto Merchant or Wilson are permitted; curbside parking (both sides)
- Southeast leg (Wilson Avenue): 1 lane in each direction, curbside parking (both sides)
- Southwest leg (Merchant Street): 1 northeast-bound through lane to continue on Merchant Street or turn right/left onto Ferry Street, curbside parking (both sides)
- West leg: Curbside parking (both sides) and splits in 2:
 - Turns east with 1 through lane in each direction
 - Turns south with 1 through lane onto Wilson Avenue

1.6 CROSS SECTION

The cross section is consistent throughout the corridor, measuring approximately 45 feet from curb to curb. There is curbside parking on both sides of the street with one vehicular travel lane in each direction.

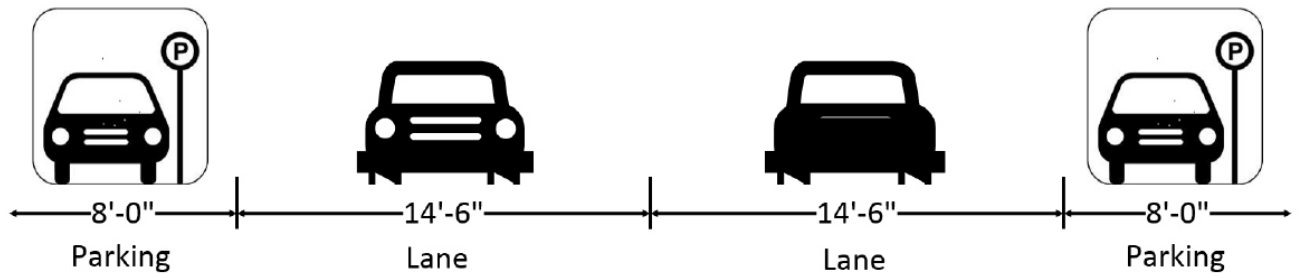


Figure 7 – Cross Section
(Measurements are approximate)

>> 2.0 CRASH FINDINGS

The three-year RSA dataset is compared with Newark crash data from the same three-year time period. The limited number of crashes (90) makes it somewhat difficult to measure statistically significant trends in the dataset; the following comparative analyses should be viewed with this in mind.

2.1 TEMPORAL TRENDS

The following temporal overrepresentations exist in the RSA dataset:

- Year: Crashes varied slightly from year to year
- Time of day: More crashes between 12 – 8 p.m., and 10 p.m. – 4 a.m.
- Month: More crashes in April, June – July, and September – November
- Day of Week: More crashes Tuesday and weekends

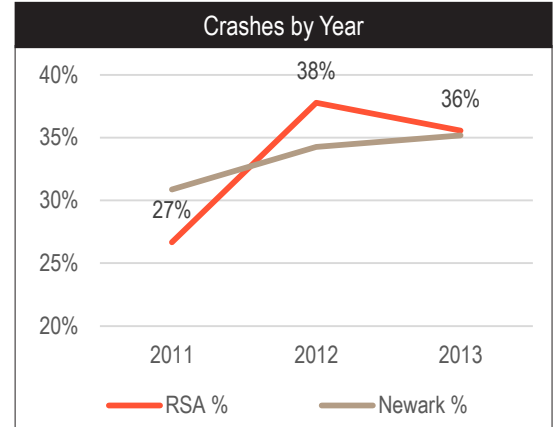


Figure 8 – Crashes by Year

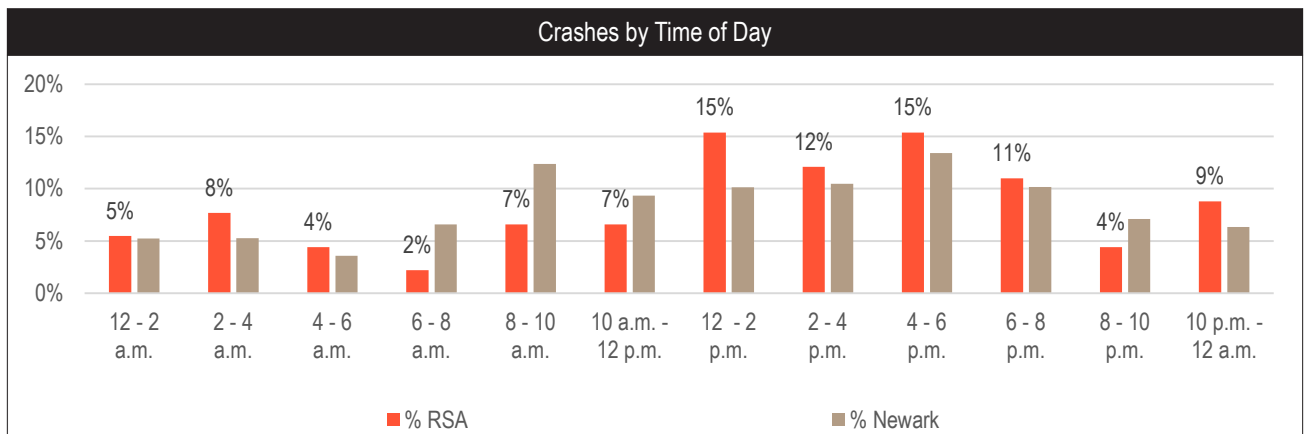


Figure 9 – Crashes by Time of Day

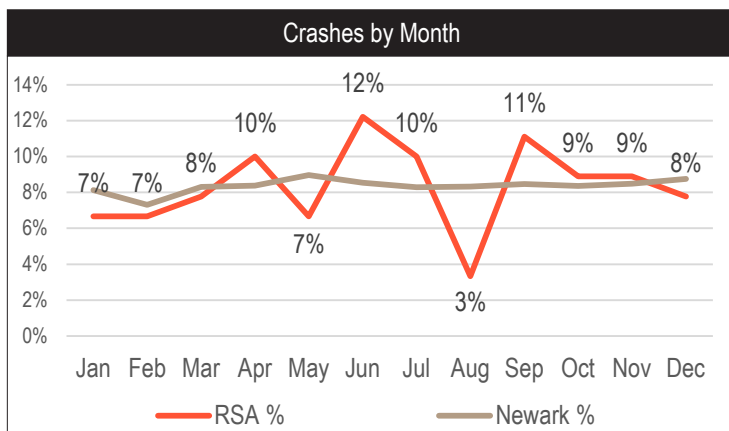


Figure 10 – Crashes by Month

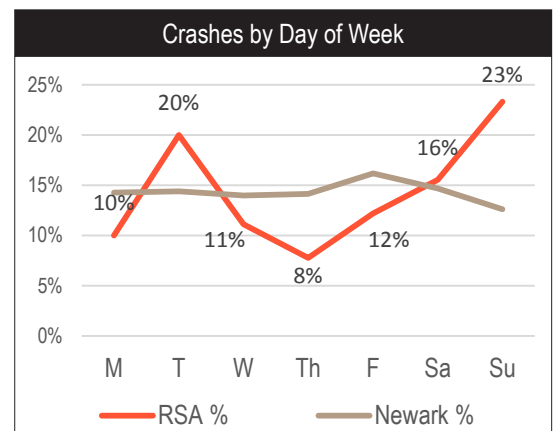


Figure 11 – Crashes by Day of Week

2.2 COLLISION TYPE

Crash Type	Count in RSA Area	% in RSA Area	% in Newark
Same Direction - Rear End	12	13%	21%
Same Direction - Side Swipe	10	11%	17%
Right Angle	16	18%	13%
Struck Parked Vehicle	29	32%	21%
Left Turn / U-Turn	2	2%	3%
Backing	4	4%	4%
Pedestrian or Cyclist	13	14%	6%
Other*	4	4%	16%
TOTAL	90	100%	100%

Figure 12 – Crash Type in RSA Area and County

As seen in the table to the left and the chart below, the following crash types were overrepresented when compared with countywide data over the same years (2011 – 2013):

- Right angle
- Struck parked Vehicle
- Pedestrian/Cyclist

*Other includes: Opposite direction, Encroachment, Overturned, Fixed Object, Animal, Non-fixed object, Railcar-vehicle, and "Other"

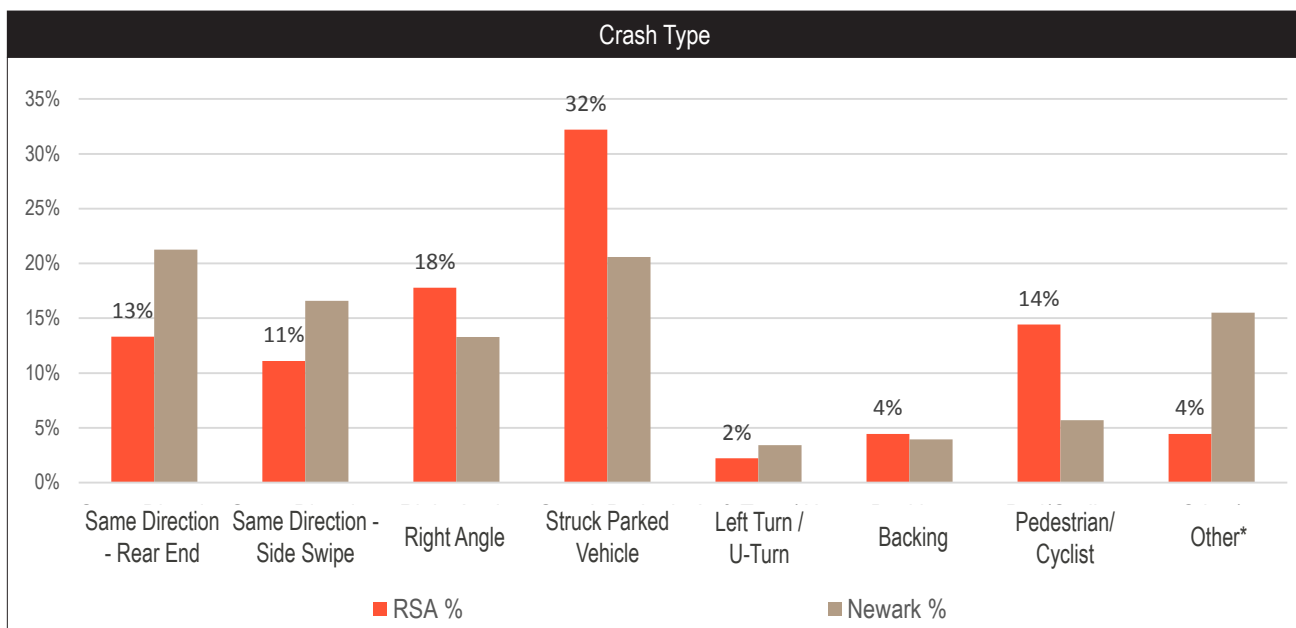


Figure 13 – Crashes by Light Condition

2.3 SEVERITY

Severity	Pedestrians	Bicyclists	Other
Moderate Injury	-	1	1
Complaint of Pain	11	1	14
Property Damage Only	-	-	63

When severity is taken into account, the pedestrian/cyclist crashes have the highest number of injuries. The single moderate injury crash in the struck parked vehicle category was unusual since this crash type is not typically associated with more severe injuries.

Figure 14 – Severity

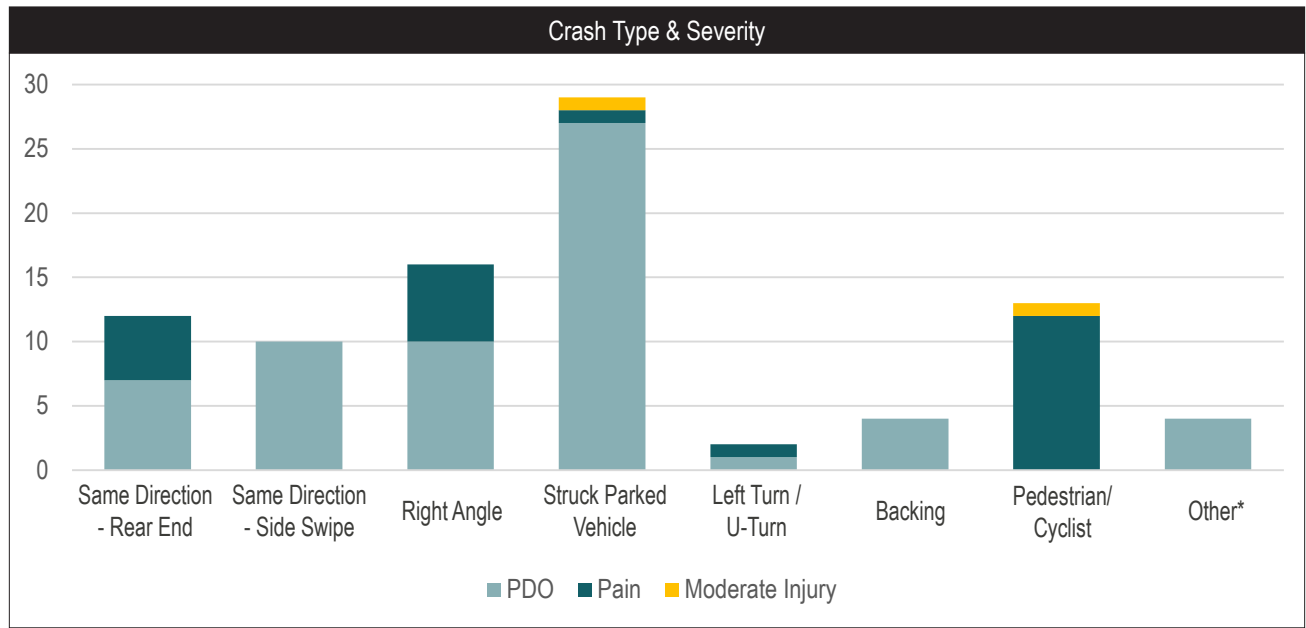


Figure 15 – Crash Type & Severity

2.4 ROADWAY SURFACE AND LIGHTING CONDITIONS

Crashes occurred primarily on dry surfaces and in daylight conditions.

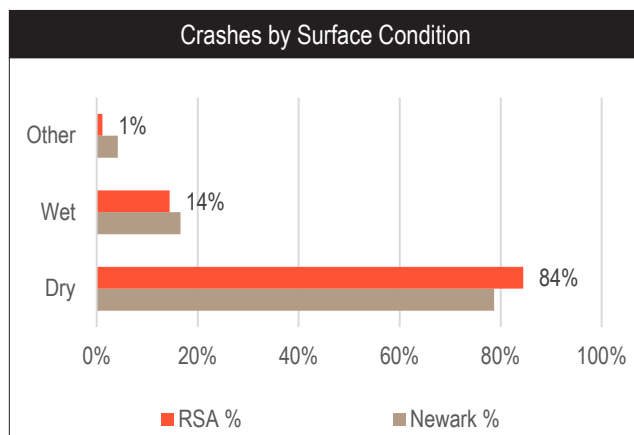


Figure 16 – Crashes by Surface Condition

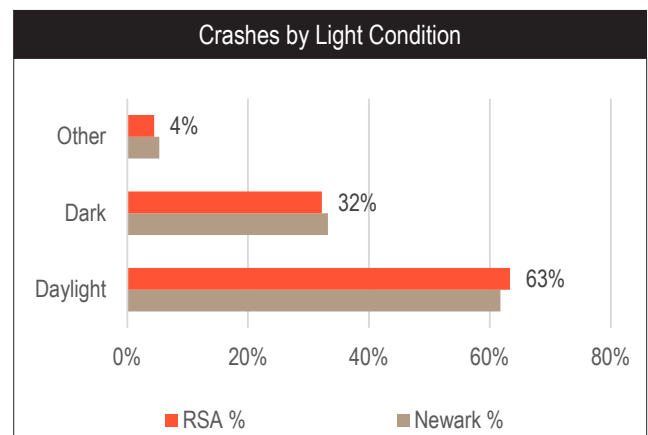


Figure 17 – Crashes by Light Condition

>> 3.0 IDENTIFIED ISSUES

3.1 CORRIDOR-WIDE

CORRIDORWIDE ISSUES	
Ref #	Identified Issues
	Bicycle and Pedestrian
1	No on-street bicyclist accommodations
2	Missing ADA facilities (e.g. tactile pads and curb cuts)
3	Pedestrian facilities (i.e. sidewalks, crosswalks, etc.) are insufficient (e.g. narrow, skewed, deteriorating, etc.).
4	A highway-like feeling is evoked by the absence of pedestrian amenities (e.g. shade trees).
	Maintenance
5	Antiquated signal equipment
6	Pavement markings are faded (e.g. parking demarcation).
7	Abandoned utility poles
8	Poor pavement conditions, damaged curbs, potholes
	Visibility and Navigability
9	Insufficient roadway and sidewalk lighting
10	Sightlines are compromised by awkward street geometry, buildings, parked vehicles, etc.
11	Inconsistent level of signage (i.e. signage was absent or redundant)
12	The majority of crosswalks lacked signage.
13	Overgrown foliage blocked signage.
	Operations
14	Skewed or awkward intersections set the stage for dangerous driving maneuvers (e.g. U-turns).
15	Vehicles exhibited aggressive passing or turning maneuvers and speeding.
16	Automobile-only streets are illegally used by freight trucks.
17	Vehicles are parked in bus loading zones, at the corners of intersections, and in the crosswalks of T-intersections.
18	Buses failed to pull curbside for passengers, thereby exacerbating hectic traffic operations.
19	Some streets are unnecessarily wide, resulting in risky driving maneuvers (e.g. drivers pulling alongside each other when turning at intersections, etc.).

3.2 INTERSECTIONS

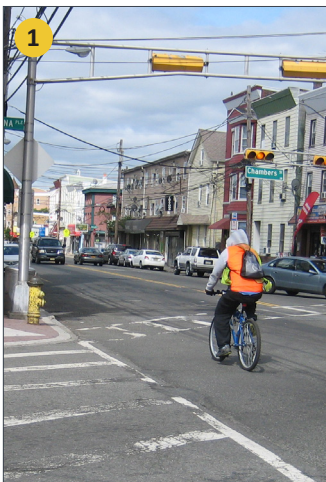
Intersection-specific Issues						
Ref #	Identified Issues	Wilson / Merchant to Alyea	Ferguson to Niagara	Somme / Wescot to Fillmore	Magazine to Valsumo	St. Francis to Lexington
Bicycle and Pedestrian						
20	Inadequate number of signalized pedestrian crossings			×	×	×
21	Pedestrian push buttons incorrectly oriented	×				
32	No marked crosswalks across Ferry Street	×	×	×	×	×
Maintenance						
22	Ponding occurring on sidewalk and street		×		×	
Visibility and Navigability						
23	Signage and signals are difficult to see, or unclear (i.e. blocked by foliage or buildings, too small, etc.).		×			×
Operations						
24	Illegally turning freight trucks block the roadway.					×
25	Illegal parking (e.g. double parking, parking on sidewalk, or parking in bus loading zone)	×		×		×
26	Long stretches of corridor without signalized intersections to facilitate safe crossing of pedestrians and vehicles	×		×	×	
27	Inadequate or unclear roadway demarcation and separation (i.e. wide lanes that insufficiently demarcate parking spaces from active traffic lanes).			×	×	×
28	Buses loading and unloading mid-street	×		×		
29	Vehicles using residential streets to cut through to other roadways					×
Other						
30	New development expected that may generate significantly more foot and vehicle traffic.				×	
31	School generating heavy foot traffic.	×				

VISUALIZING ISSUES—GENERAL

CYCLIST ISSUES



Vehicle failing to yield to cyclist



Cyclist traveling in opposite direction of traffic



Cyclist traveling on sidewalk

PEDESTRIAN ISSUES



Lack of truncated domes



Tripping hazard in sidewalk; lack of marked crosswalks or signals to cross Ferry Street; parking in intersection which limits visibility of pedestrians in crosswalk



Pooling and tripping hazards in sidewalk

VISUALIZING ISSUES—GENERAL (CONTINUED)

MAINTENANCE ISSUES



Broken pavement

OPERATIONAL AND VISIBILITY ISSUES



Bus unloading in travel lane



Damaged curb



Truck parked at corner limits sight distance and visibility.

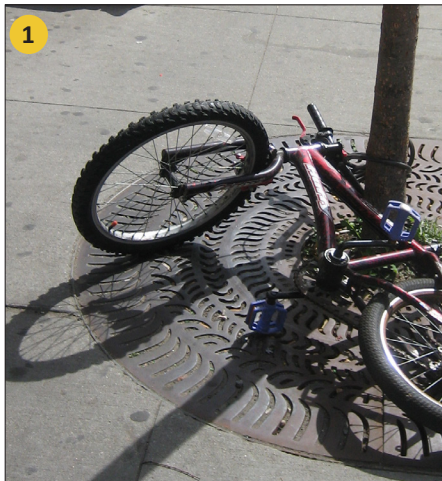


Faded pavement markings

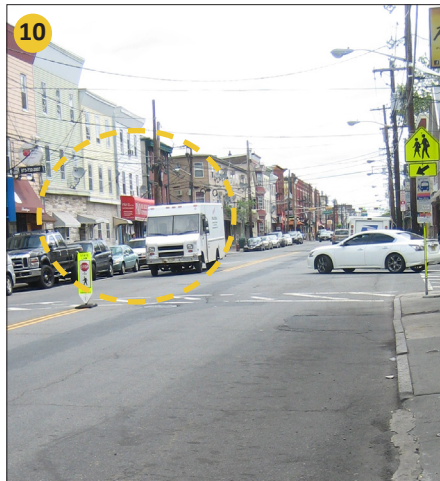


Wide lanes tend to have higher speeds and provide space for more aggressive passing maneuvers.

ISSUE VISUALIZATION: WILSON AVE. / MERCHANT ST. TO ALYEA ST.



Lack of bicyclist facilities prompts individuals to misuse other street amenities.



Parking in intersection limits visibility of pedestrian crossings.



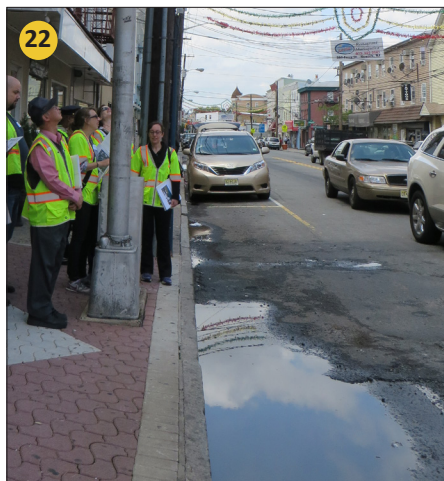
Illegal vehicle parking obstructs roadway operations and bus loading.



Crosswalk and other pavement markings are fading and need repainting.

- 14 Vehicles illegally turn left from westbound Ferry St. onto Wilson Ave.
- 31 Heavy foot traffic generated by Wilson Avenue School.
- 21 Pedestrian push buttons around the five-corner intersection are difficult to use, as they are incorrectly mounted and lack explanatory signage.

ISSUE VISUALIZATION: FERGUSON ST. TO NIAGARA ST.



Ponding observed around the Chambers intersection, indicating poor drainage



Antiquated signal equipment; lack of pedestrian signal heads



Narrow sidewalks and skewed crosswalks around Chambers intersection



Some STOP signs and signals are difficult to see.

- 20 Chambers/Niagara intersection lacks pedestrian near-side signals
- 15 Vehicles cross centerline while turning left.
- 29 Some vehicles use residential Chambers Street to access Jackson St. Bridge.

ISSUE VISUALIZATION: SOMME ST. / WESCOT ST. TO FILLMORE ST.



Illegal vehicle parking obstructs bus loading and unloading



Illegal vehicle parking forces buses to load and unload mid-street.



Insufficient differentiation between the wide driveway entrance (with long turning radii) and the sidewalks

- 26 No signalized intersections in this stretch of the corridor
- 10 Drivers turning onto Ferry St. from Somme St. have poor visibility due to the placement of the stop bar.
- 4 Lack of pedestrian amenities gives this stretch of the corridor a highway-like quality—which can lead to higher vehicle speeds.
- 19 Wescot St. and Fillmore St. are very wide, ambiguous streets that lack adequate pavement demarcations.

ISSUE VISUALIZATION: MAGAZINE ST. TO VALSUMO LN.



Portions of the sidewalk are flooded, rendering them unusable.



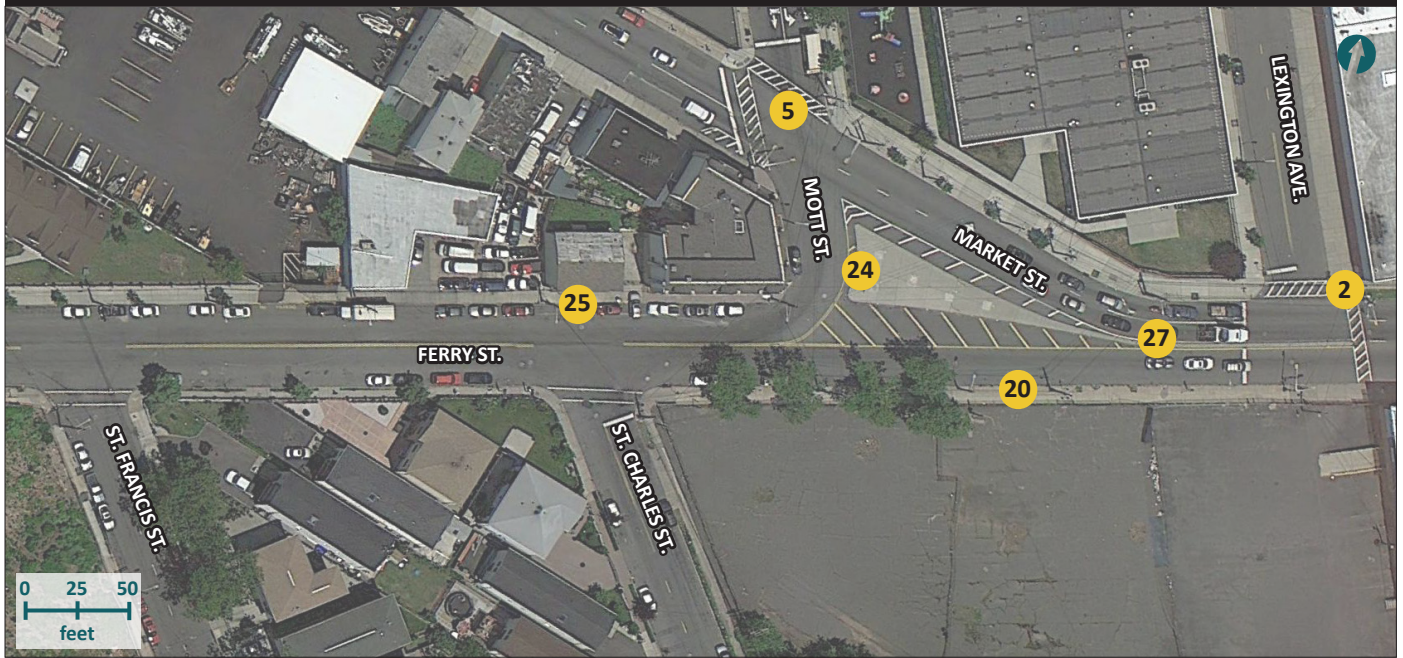
Tripping hazards in sidewalk



The intersections lacked true ADA facilities (e.g. tactile pads and curb cuts).

- 26 No signalized intersections in this stretch of the corridor
- 27 Parking areas on side streets are not clearly demarcated.
- 30 62- to 89-unit development is expected in the near future (which may generate additional foot and vehicle traffic.)

ISSUE VISUALIZATION: ST. FRANCIS ST. TO LEXINGTON AVE.



Median is too narrow and inadequately demarcated; stop bar is severely faded



Auto body shop illegally obstructed sidewalk with parked cars



Lack of curb cut at Lexington Street



Freight trucks illegally accessing the roadway obstruct roadway operations.

- 5 Signals are antiquated, with reduced visibility
- 3 Portions of the sidewalk are too narrow and/or deteriorating.
- 20 East-bound bus stop at the Lexington St. intersection is too far from crosswalk, resulting in pedestrians illegally crossing mid-block

>> 4.0 RECOMMENDATIONS

CORRIDOR-WIDE RECOMMENDATIONS						
Rec. #	Recommendations	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
Bicycle						
A-1	Install high-visibility bike lanes along Ferry St.	Med. / High	Long	\$\$	Newark	1
A-2	Install bicycle parking and/or racks.	Low	Short	\$	Newark	1
A-3	Install bicycle-safe inlet grates.	Low	Short	\$	Newark	1
Pedestrian						
A-4	Plant shade trees.	Low	Short	\$	Newark	4
A-5	Install street amenities (e.g. benches and waste receptacles).	Low	Short	\$	Newark	4
A-6	Install pedestrian countdown signals at signalized intersections.	Med.	Med.	\$\$	Newark	3
A-7	Install tactile pads and curb ramps to make pedestrian facilities universally accessible.	Med.	Med.	\$\$	Newark	2
A-8	Repair sidewalks and remove all obstructions (e.g. abandoned utility poles).	Low / Med.	Med.	\$\$	Newark	3, 7
A-9	Consider installation of ergonomic crosswalks where consistent with pedestrian walking patterns.	Med.	Med.	\$\$	Newark	3
A-10	Consider sidewalk code enforcement and education campaign.	Med. / High	Long	\$\$	Newark	3
A-11	Clearly and uniformly demarcate all crosswalks.	Med. / High	Short	\$	Newark	3, 32
A-12	Straighten crosswalks and ensure logical placement.	Med. / High	Med.	\$\$	Newark	3
A-13	Construct concrete or textured-paint bulbouts to minimize pedestrian exposure to traffic, and square off skewed intersections.	High	Med. / Long	\$\$ / \$\$\$	Newark	3
Maintenance						
A-14	Repair pavement by filling in potholes, and milling or repaving, where appropriate.	Med.	Short / Med.	\$	Newark	8
A-15	Restripe crosswalks, hatching, and edgelines on both Ferry St. and the minor streets.	Med.	Short	\$	Newark	6
A-16	Perform necessary maintenance to ensure that foliage does not block signage or pedestrian pathways and remove abandoned obstacles.	Med.	Short / Med.	\$	Newark	3, 13, 7
Visibility / Navigability						
A-17	Conduct a formal lighting study.	Med. / High	Short	\$	Newark	9
A-18	Conduct a formal signage study.	Med. / High	Short	\$	Newark	11
A-19	Conduct a formal signal study.	Med. / High	Short	\$	Newark	5, 10, 12
A-20	Implement a corridor-wide signal upgrade. Replace all 8-inch-head traffic signals with 12-inch-head signals, with retroreflective backplates.	Med.	Med.	\$\$	Newark	5
Operations						
A-21	Improve enforcement of weight limits. Adding and revising weight limit restrictions needs NJDOT approval.	Low	Short	\$	Newark	16
A-22	Coordinate with local law enforcement to reduce illegal car and truck activity.	Low / Med.	Short	\$	Newark	15, 17, 17
A-23	Install edgeline along Ferry St.	Low	Short	\$	Newark	6, 19

INTERSECTION-SPECIFIC RECOMMENDATIONS

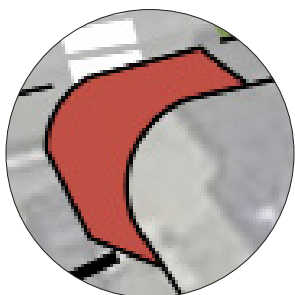
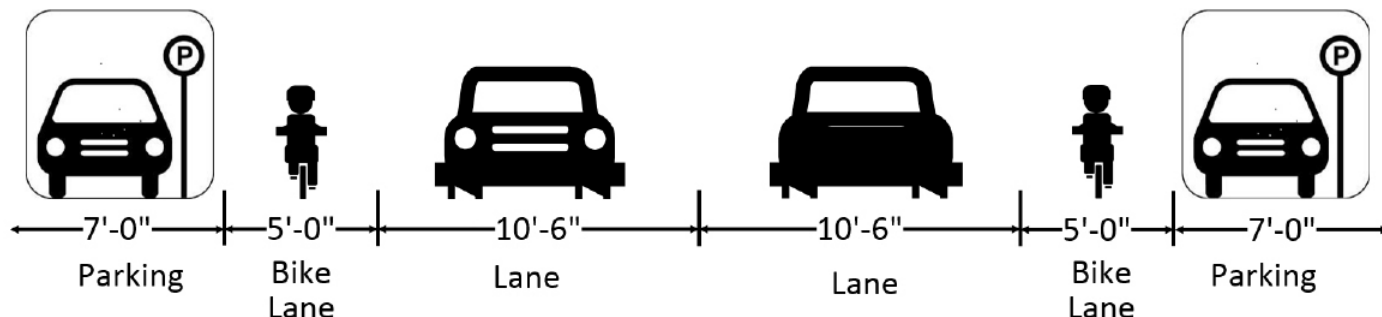
Rec. #	Recommendations	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
Wilson Ave. / Merchant St.						
B-1	Install angled green signal arrow to signal straight ahead on Ferry St. across five-corner intersection from eastern approach.	Med.	Short	\$	Newark	23
B-2	Consider reorienting or removing push buttons from five-corner intersection.	Low	Short	\$	Newark	21
Alyea St.						
G-1	Re-evaluate the intersection's safe routes program.	Med.	Short	\$	Newark	31
G-2	Repaint pavement markings.	Low / Med	Short	\$	Newark	6
G-4	Investigate the installation of a Rectangular Rapid Flash Beacon and Pedestrian Push Buttons.	Med. / High	Med.	\$\$	Newark	3
G-5	Construct a pedestrian crossing island at Alyea St. intersection.	High	Med / Long	\$\$\$	Newark	3
G-6	Install corner bulbouts.	High	Med. / Long	\$\$ / \$\$\$	Newark	3
Ferguson St. to Niagara St.						
C-1	Construct bulbouts to minimize pedestrian exposure to traffic, channelize traffic, and increase visibility between vehicles and pedestrians.	High	Med. / Long	\$\$ / \$\$\$	Newark	3
C-2	Investigate the feasibility of creating a dead-end on Chambers St. to prevent vehicles from using Chambers to access Jackson St. Bridge.	Low / Med.	Med.	\$\$	Newark	29
C-3	Examine the feasibility of constructing an ergonomic crosswalk at the intersection.	Med.	Short / Med.	\$	Newark	3, 32
C-4	Affix retroreflective backplates to signal for improved visibility.	Low / Med.	Short / Med.	\$	Newark	23
C-5	Review drainage system design when re-grading streets.	Low	Long	\$\$ / \$\$\$	Newark	22
C-6	Evaluate whether the red-yellow clearance time meets current design standards.	Med.	Med.	\$	Newark	15
C-7	Install a full signal upgrade.	Med.	Long	\$\$\$	Newark	5
Somme St. / Wescot St. to Filmore St.						
D-1	Signalize intersection.	Med. / High	Med.	\$\$\$	Newark	26
D-2	Construct bulbouts to minimize pedestrian exposure to traffic.	High	Med. / Long	\$\$ / \$\$\$	Newark	3
D-3	Add curb edge to differentiate roadway and sidewalk on Wescot St.	Low / Med.	Short / Med.	\$	Private	27
D-4	Add centerline, stop bar, STOP sign, and crosswalk markings on driveway approaches (leading to and from the shopping center.)	Med	Med. / Long	\$\$	Private	3, 20
D-5	Add marked crosswalks across Ferry Street where feasible.	Med. / High	Med.	\$\$	Newark	3, 32
Magazine St. to St. Francis Street						
E-1	Paint edgelines on minor streets to clearly demarcate parking areas.	Low	Short	\$	Newark	27
E-2	Install tactile pads and curb ramps to ensure pedestrian facilities are universally accessible.	Med.	Med.	\$\$	Newark	2

INTERSECTION-SPECIFIC RECOMMENDATIONS

Rec. #	Recommendations	Safety Benefit	Time Frame	Cost	Jurisdiction	Issue Ref. #
E-3	Install missing sidewalk on south side of Ferry Street.	Low / Med.	Med.	\$\$	Newark	3
F-15	Add marked crosswalks across Ferry Street where feasible.	Med. / High	Med.	\$\$	Newark	3, 32
St. Francis St. to Lexington St.						
F-1	Construct pedestrian crossing island, and relocate bus stop to far side of the street.	Med. / High	Med.	\$\$	Newark	3
F-2	Elevate crosswalks by constructing speed tables.	High	Med. / Long	\$\$ / \$\$\$	Newark	3
F-3	Install fencing barrier to prevent pedestrians from crossing at median.	Med.	Short / Med.	\$\$	Newark	26
F-4	Delineate curve by installing stanchions with chevrons, and painting hatching.	Low / Med.	Short / Med.	\$ / \$\$	Newark	27
F-5	Install school zone signs.	Low	Short	\$	Newark	3
F-6	Plant trees in tree wells.	Low / Med.	Med.	\$\$	Newark	4
F-7	Install STOP and YIELD signs with retroreflective materials.	Med.	Short	\$	Newark	23
F-8	Construct crosswalk on the western side of the Lexington St – Ferry St. intersection.	Med. / High	Med.	\$\$	Newark	3, 32
F-9	Realign crosswalk with sidewalk on the eastern side of the Lexington St. – Ferry St. intersection.	Med. / High	Med.	\$\$	Newark	3
F-10	Install pedestrian countdown signals at signalized intersections.	Med.	Short / Med.	\$\$	Newark	3
F-11	Consider additional signage to deter freight trucks from illegally operating on roadway.	Low	Short	\$	Newark	24, 29
F-12	Install signage to assist vehicle navigation to key roadways (i.e. Turnpike).	Low	Short	\$	Newark	11, 29
F-13	Install green arrow on eastbound Ferry St. to emphasize that left turns are prohibited.	Low / Med.	Short / Med.	\$ / \$\$	Newark	14
F-14	Install merge arrows on eastbound Market St.	Med	Short	\$ / \$\$	Newark	23
F-15	Add marked crosswalks across Ferry St. where feasible.	Med. / High	Med.	\$\$	Newark	3, 32

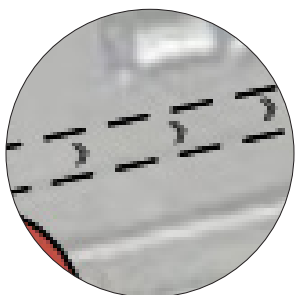
CONCEPT DESIGNS

The basic recommended cross section includes a 7 foot parking lane along each curb, a 5-foot bike lane in each direction, and a 10 1/2-foot vehicular lane in each direction. Intersections have bulbouts at each corner to shorten pedestrian crossing distance and increase visibility.



Bulbouts

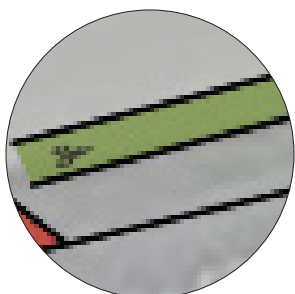
New Jersey has prohibited vehicles from being parked in an intersection or within 25 feet of a marked or unmarked crosswalk (Title 39:4-138 Motor vehicles and traffic regulation). Physical bulbouts can help to enforce this measure, and can make pedestrians in intersections more visible to drivers (“daylight” the intersections).



Bike Lane at Intersection

“Pavement markings extended into or continued through an intersection or interchange area shall be the same color and at least the same width as the line markings they extend.”

Federal Highway Administration. (2009). Manual on Uniform Traffic Control Devices. Section 3B.08.

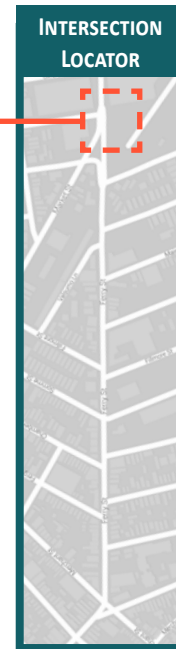
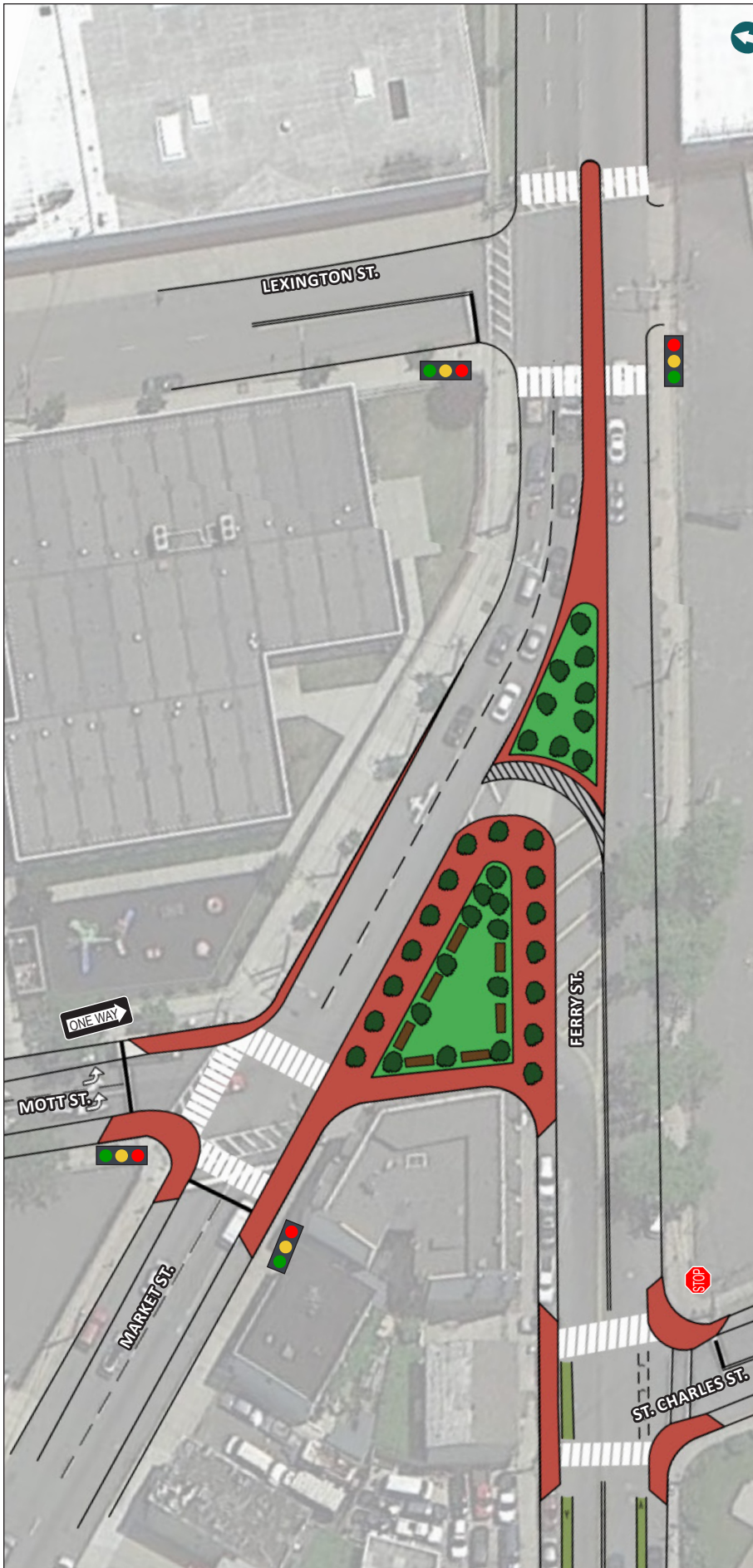


Bike Lane Adjacent to Parking

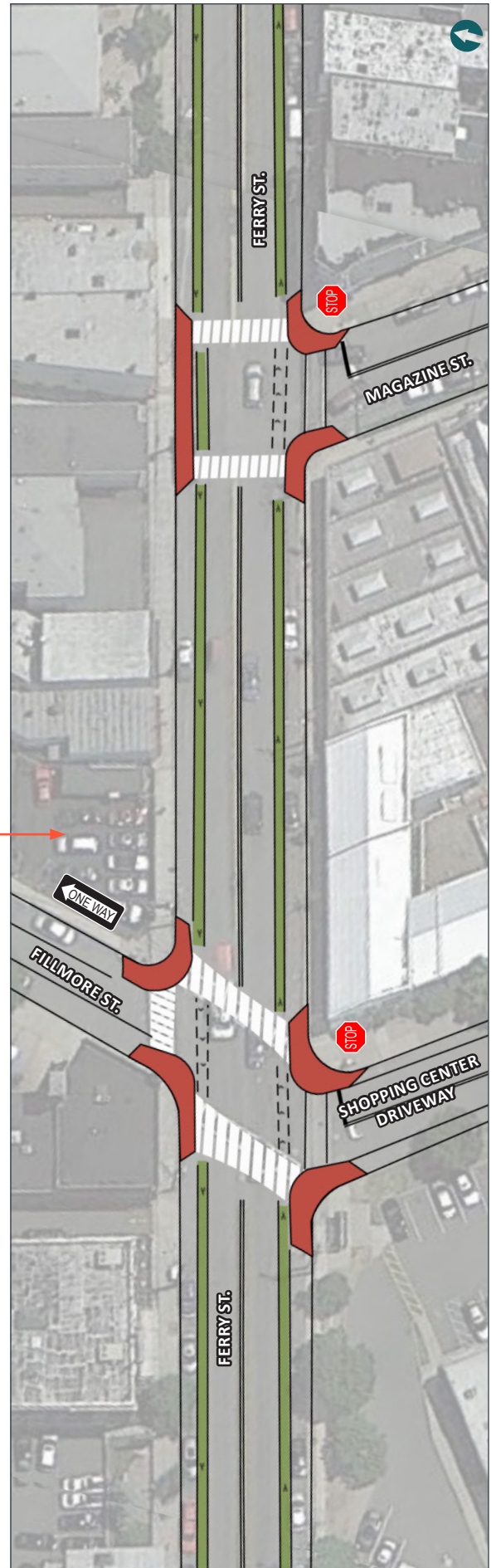
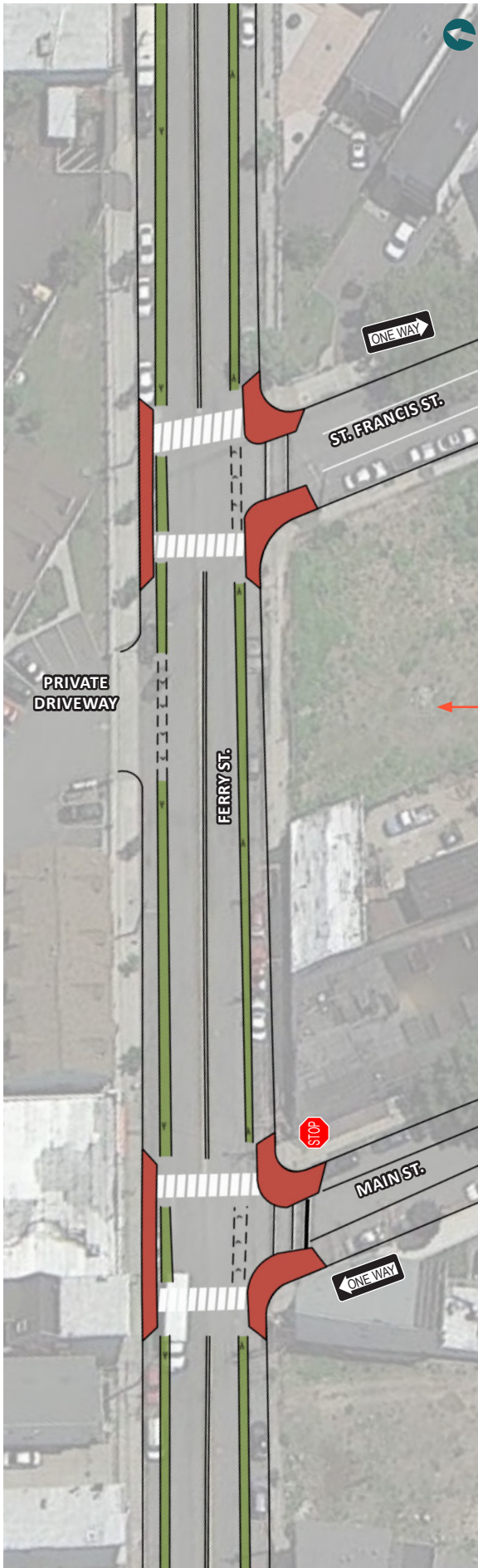
“If parking is permitted, ... the bike lane should be placed between the parking area and the travel lane and have a minimum width of 1.5 m (5 feet).”

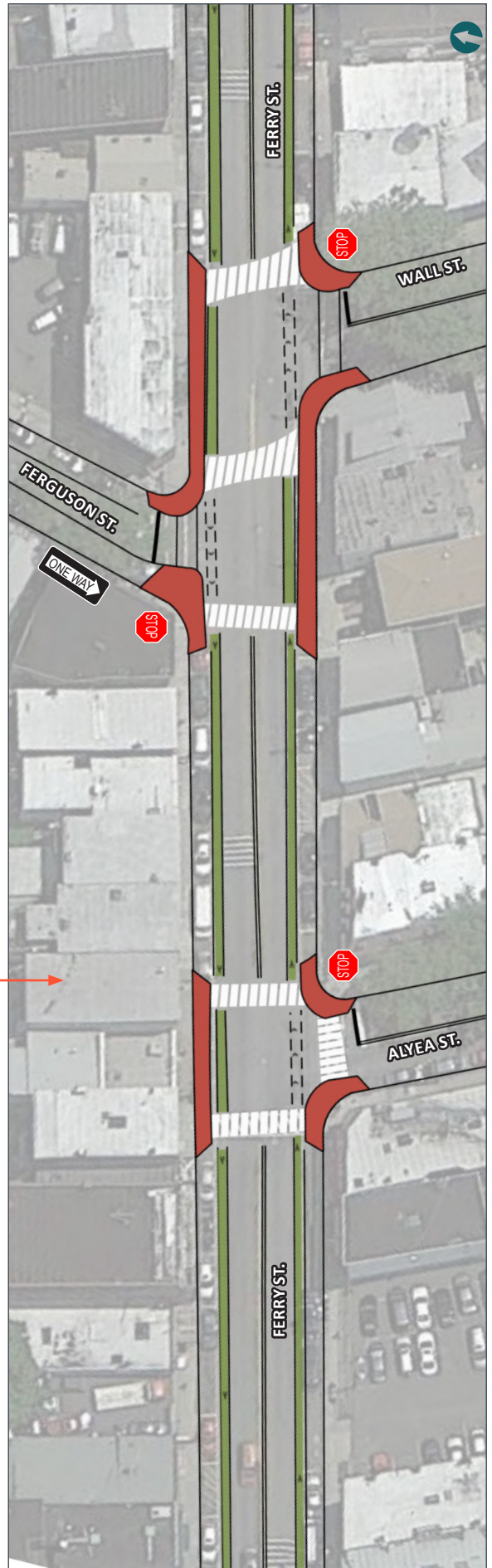
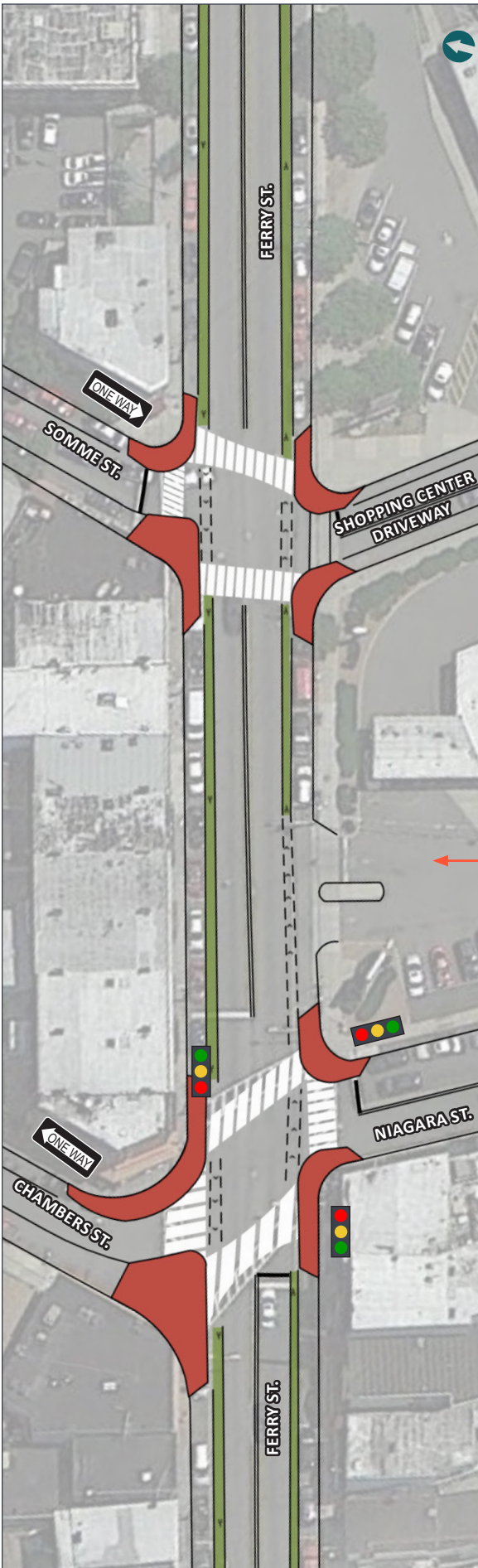
“Where parking is permitted but a parking stripe or stalls are not utilized, the shared area should be a minimum 3.6 m (12 feet) adjacent to a curb face ... If the parking volume is substantial or turnover is high, an additional 0.3 to 0.6 m (1 to 2 feet) of width is desirable.”

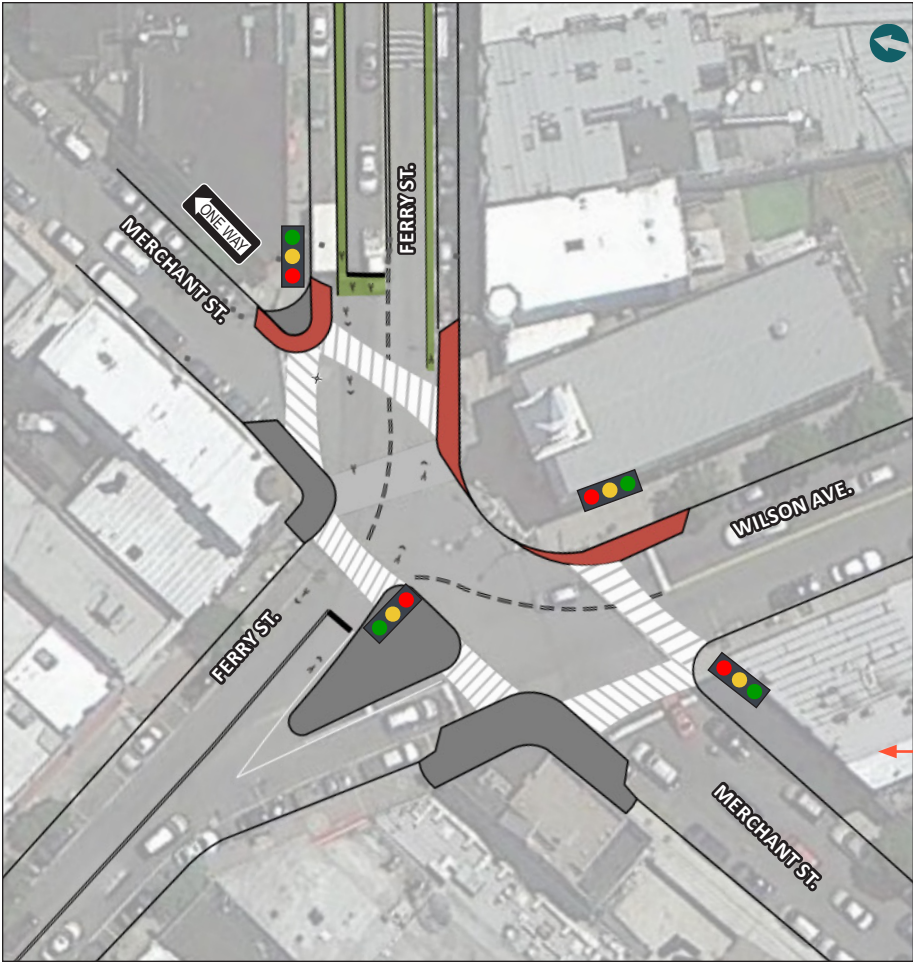
AASHTO. (1999). Guide for the Development of Bicycle Facilities.



The Newark Engineering Department is working with the Ironbound Community Corporation (ICC) to redesign the intersection of Ferry, Market, and Mott Sts. The diagram to the left shows one potential design, which extends the nose of the block to increase the visibility of pedestrians crossing Ferry St. near St. Charles St. It also tightens the radius to promote slower turns. Widening the concrete median near Lexington St. creates a pedestrian refuge island, and also promotes lower travel speeds by narrowing the travel lane from Ferry St.



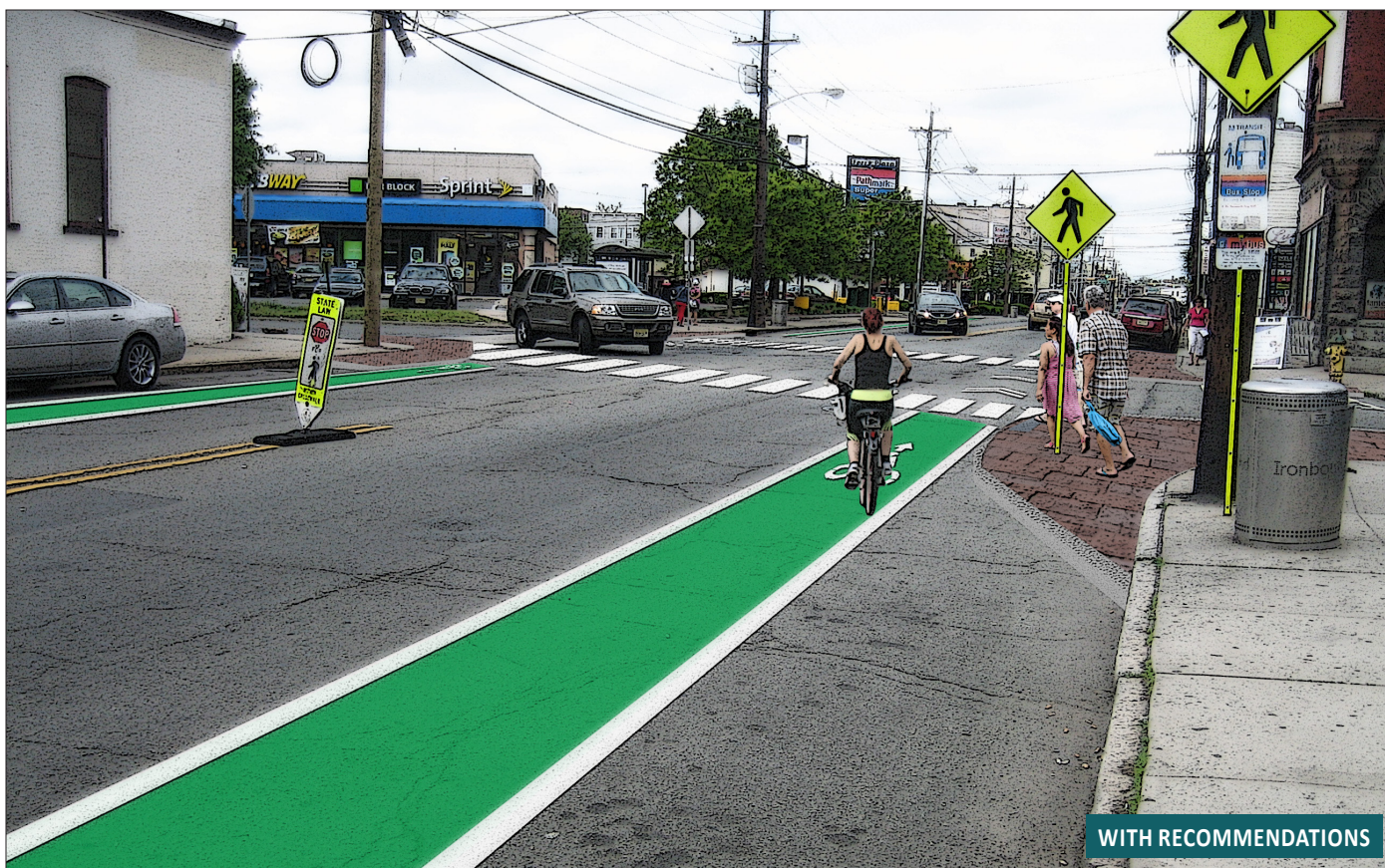




PHOTOSIMULATIONS



CURRENT



WITH RECOMMENDATIONS

>> APPENDIX A – RSA TEAM

Name	Representing	E-mail
Jack M. Nata	City of Newark Engineering	NataJ@ci.newark.nj.us
Sing Wong	City of Newark Engineering	wongs@ci.newark.nj.us
Juan Feijoo	City of Newark Engineering	JuanF@ci.newark.nj.us
Isaac Ojeda	City of Newark Engineering	ico5@njit.edu
Jordan Kocak	City of Newark Engineering	Kocakj@ci.newark.nj.us
Benito Torres	Newark Police Department	benitot@ci.newark.nj.us
Efrem Gonzales	Newark Police Department	gonzalezef@ci.newark.nj.us
Elvin Polanco	Newark Police Department	polanco@ci.newark.nj.us
Drew Curtis	Ironbound Community Corporation	dcurtis@ironboundcc.org
Daniel Wiley	Ironbound Community Corporation	Dwiley@Ironboundcc.org
Betsy Harvey	Alan M. Voorhees Transportation Center	ebharvey@ejb.rutgers.edu
Amon Boucher	NJDOT	Amon.Boucher@dot.nj.gov
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Elizabeth Thompson	NJTPA	ethompson@njtpa.org
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Sally Karasov	Rutgers TSRC	sally.karasov@rutgers.edu
Aimee Jefferson	Rutgers TSRC	aimee.jefferson@rutgers.edu

>> APPENDIX B – POST-RSA IMPROVEMENTS

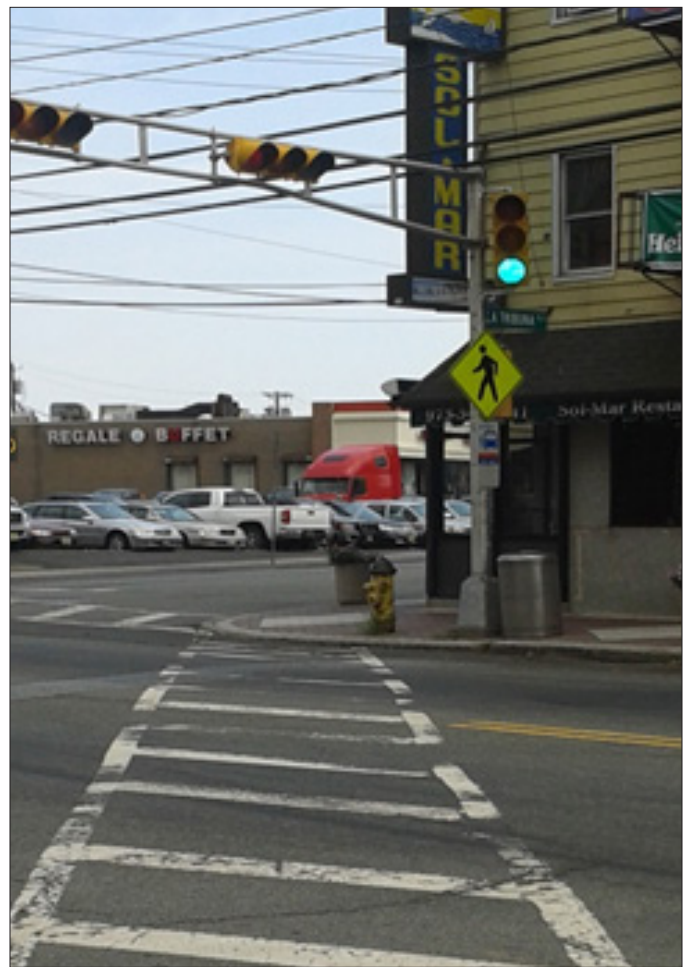
After the June 3 RSA, the Newark Engineering Department installed six new traffic signals at the intersection of Ferry Street and Niagara/Chambers Streets, and the size of one signal was increased to 12 inches.

The yellow and red clearance times were also changed, to provide the extra time needed to enter and clear the intersection before conflicting traffic gets the green. It was found that drivers need higher red clearance times, due to the poor pavement condition, the offset street, and pedestrian activity.

Countdown pedestrian signals must wait to be added as part of a comprehensive signal project, due to the age of the existing underground wiring system.



At the intersection of Niagara Street and Ferry Street prior to the Ferry Street RSA.



One of the new signal heads installed post-RSA on the west crosswalk, looking south.

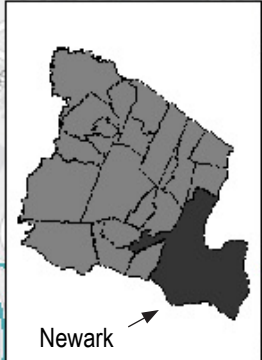
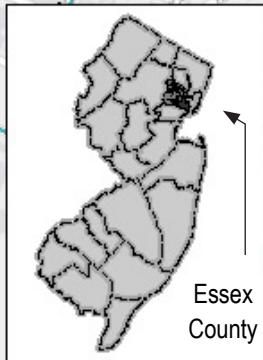
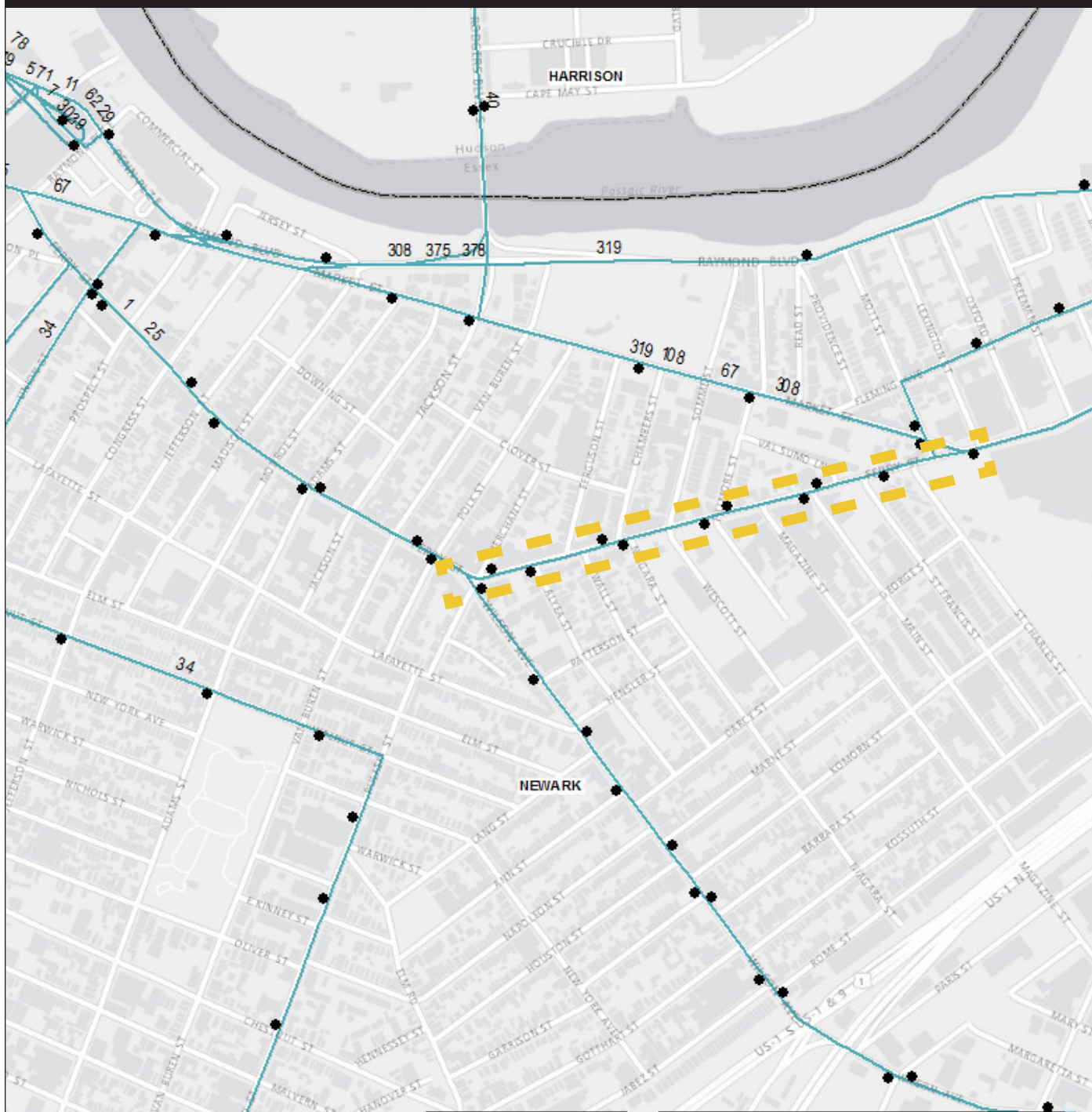
>> APPENDIX C—AREA MAPS

STUDY AREA



Source: Esri, DigitalGlobe, GeoEye, AeroGRID, IGN, SDA, USDA, CNES, Aerial, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

AREA TRANSIT



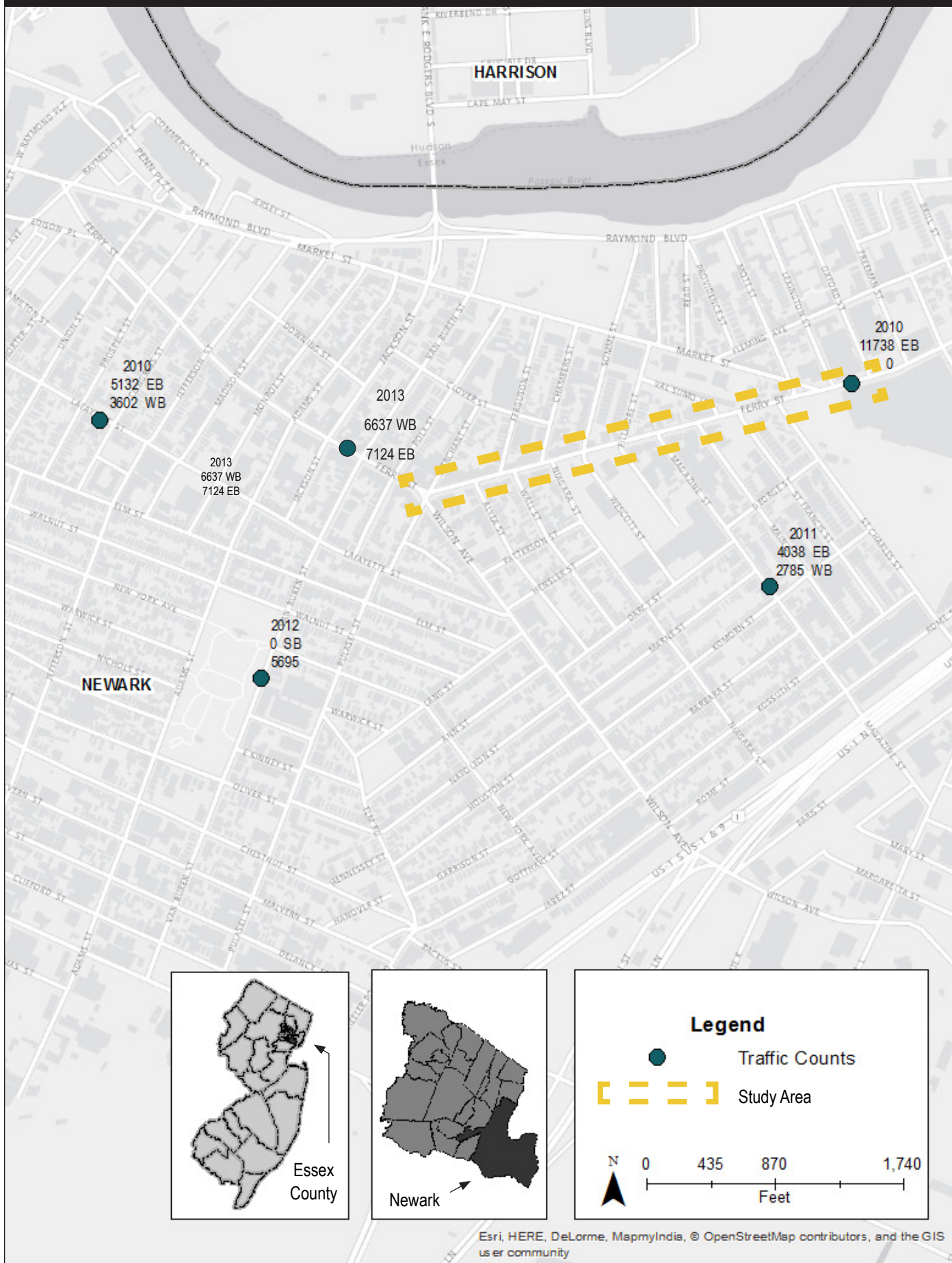
Legend

- NJ Transit Bus Stop
- NJ Transit Buses
- ⌈ ⌋ Study Area

N 0 400 800 1,600
Feet

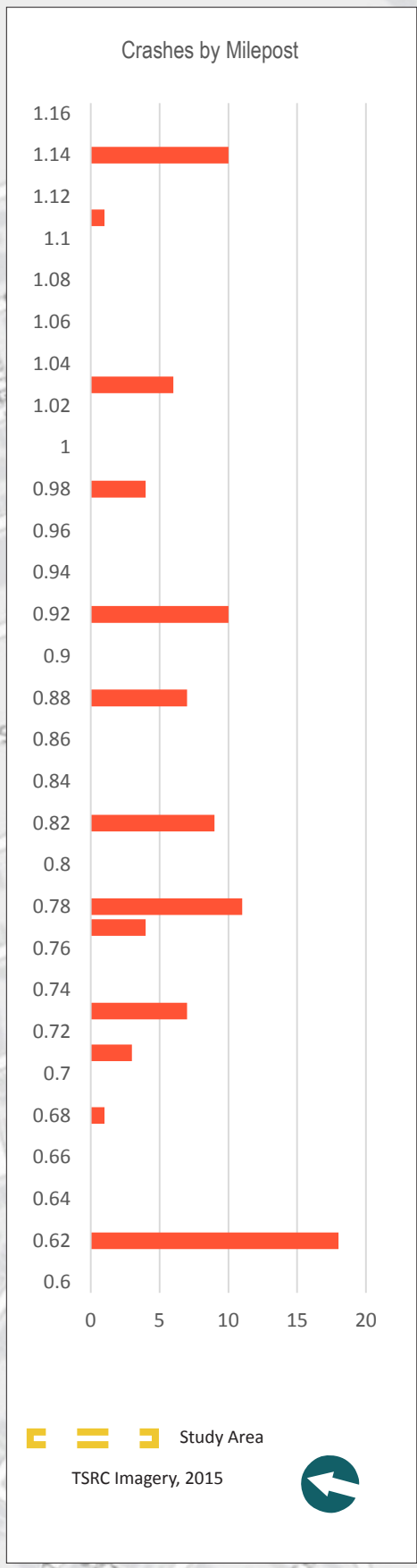
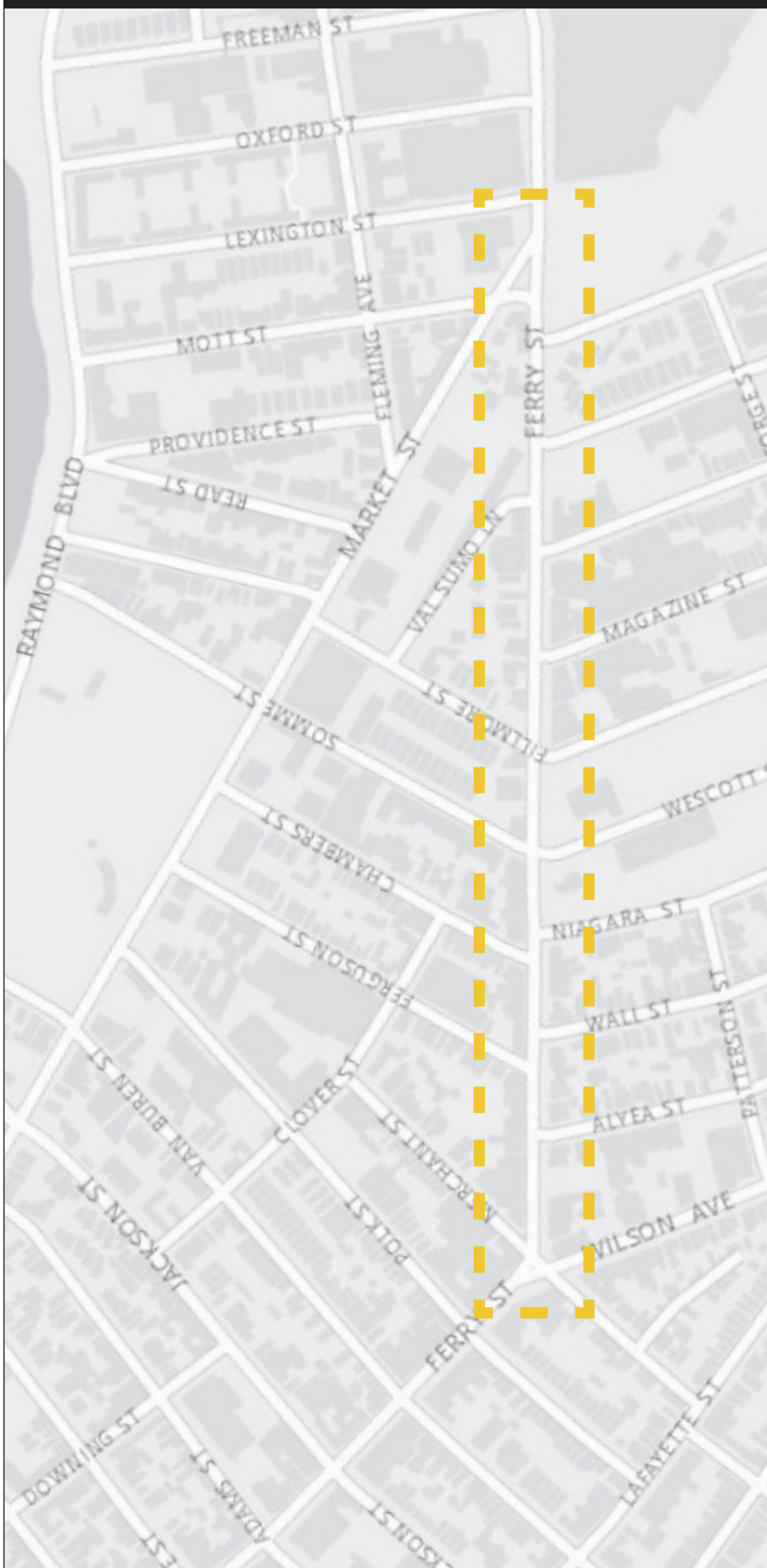
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

TRAFFIC VOLUMES



>> APPENDIX D – CRASH DATA & DIAGRAMS

RSA CORRIDOR



RSA AREA – CRASH SUMMARY (2010 – 2012)

Crash Type	#
Same Direction – Rear End	12
Same Direction – Side Swipe	10
Right Angle	15
Opposite Direction – Head On/ Angular	2
Opposite Direction – Side Swipe	1
Struck Parked Vehicle	27
Left Turn / U-Turn	3
Backing	6
Encroachment	-
Overtaken	-
Fixed Object	1
Animal	-
Pedestrian	11
Pedalcyclist	2
Non-fixed Object	-
Railcar – Vehicle	-
Other	1
Total	91

Month	#
January	6
February	6
March	7
April	9
May	6
June	11
July	9
August	4
September	10
October	8
November	8
December	7
Total	91

Severity	#
Property Damage Only (PDO)	63
Pain	26
Moderate Injury	2
Incapacitating Injury	-
Fatal	-
Total	91

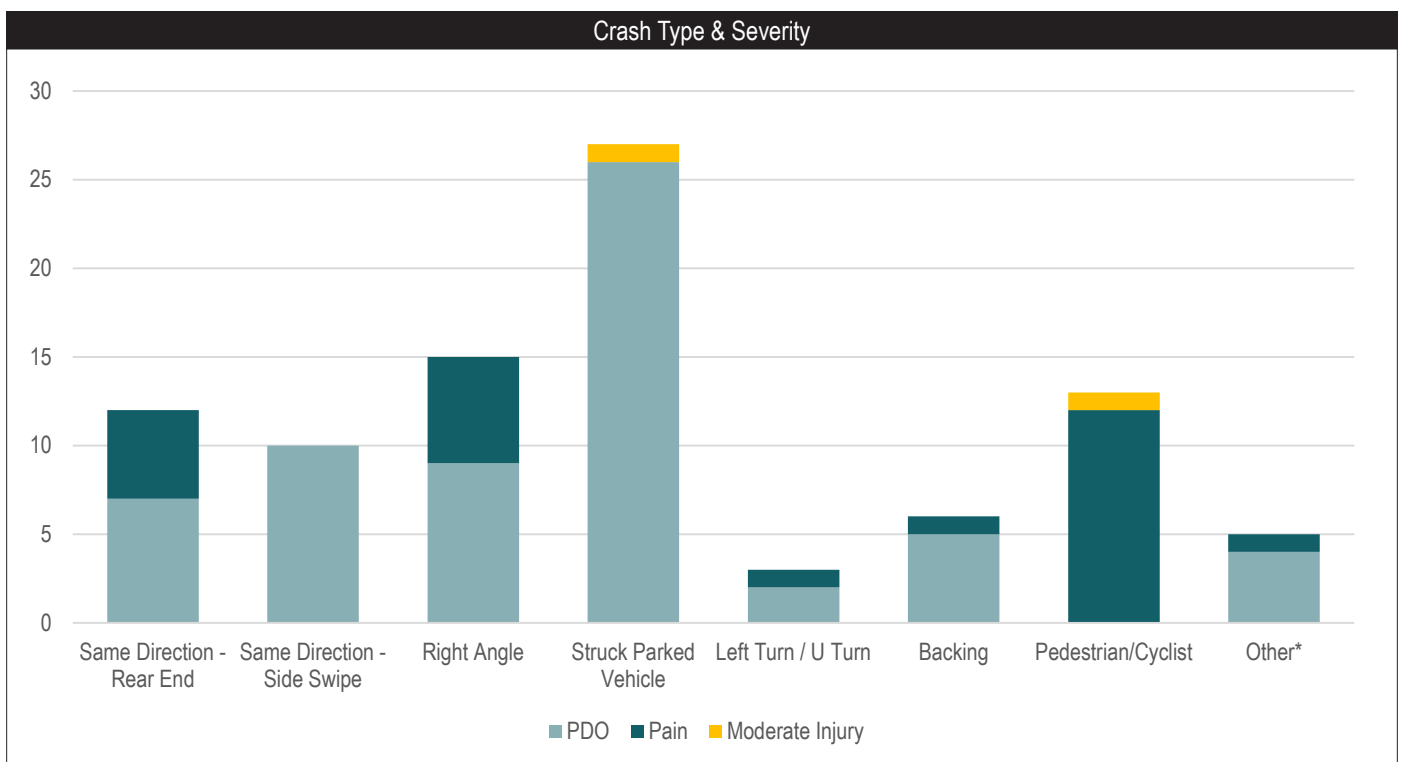
Crash Year	#
2011	24
2012	35
2013	32
Total	91

Intersection	#
At intersection	51
Not at intersection	40
At or Near Railroad	-
Total	91

Surface Condition	#
Dry	77
Wet	13
Snowy	1
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	91

Light Condition	#
Daylight	57
Dawn	1
Dusk	2
Dark – No Street Lights	2
Dark – Street Lights On/ Continuous	27
Dark – Street Lights On/ Spot	1
Dark – Street Lights Off	-
Other	1
Total	91

Day	#
Monday	9
Tuesday	18
Wednesday	10
Thursday	7
Friday	11
Saturday	15
Sunday	21
Total	91



FERRY STREET: WILSON AVENUE/MERCHANT STREET TO ALEA STREET



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

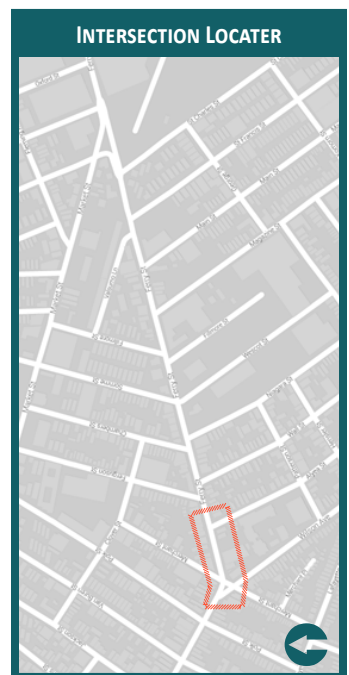
Additionally, any other crash type having a severity of “moderate injury” or greater has a color-coded narrative.

= Complaint of pain

LEGEND

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

Google Imagery, 2015
Crash diagrams based on reports retrieved from NJDOT



FERRY STREET: WILSON AVENUE/MERCHANT STREET TO ALEA STREET – CRASH SUMMARY (2011 – 2013)

Crash Type	#
Same Direction – Rear End	3
Same Direction – Side Swipe	1
Right Angle	3
Opposite Direction – Head On/ Angular	-
Opposite Direction – Side Swipe	1
Struck Parked Vehicle	9
Left Turn / U-Turn	-
Backing	-
Encroachment	-
Overtaken	-
Fixed Object	-
Animal	-
Pedestrian	2
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
Total	19

Month	#
January	2
February	2
March	2
April	3
May	1
June	3
July	1
August	-
September	2
October	1
November	2
December	-
Total	19

Severity	#
Property Damage Only (PDO)	15
Pain	4
Moderate Injury	-
Incapacitating Injury	-
Fatal	-
Total	19

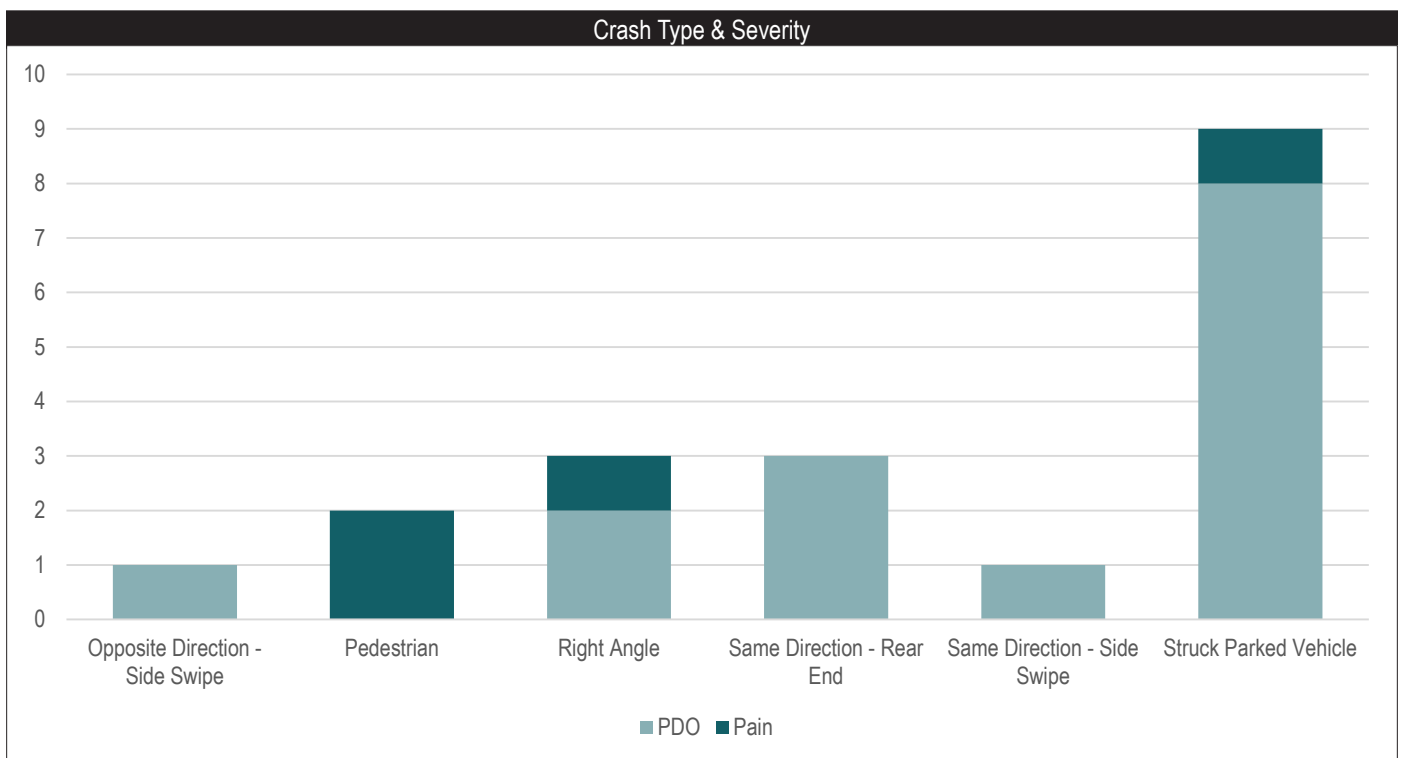
Crash Year	#
2011	5
2012	7
2013	7
Total	19

Intersection	#
At intersection	6
Not at intersection	13
At or Near Railroad	-
Total	19

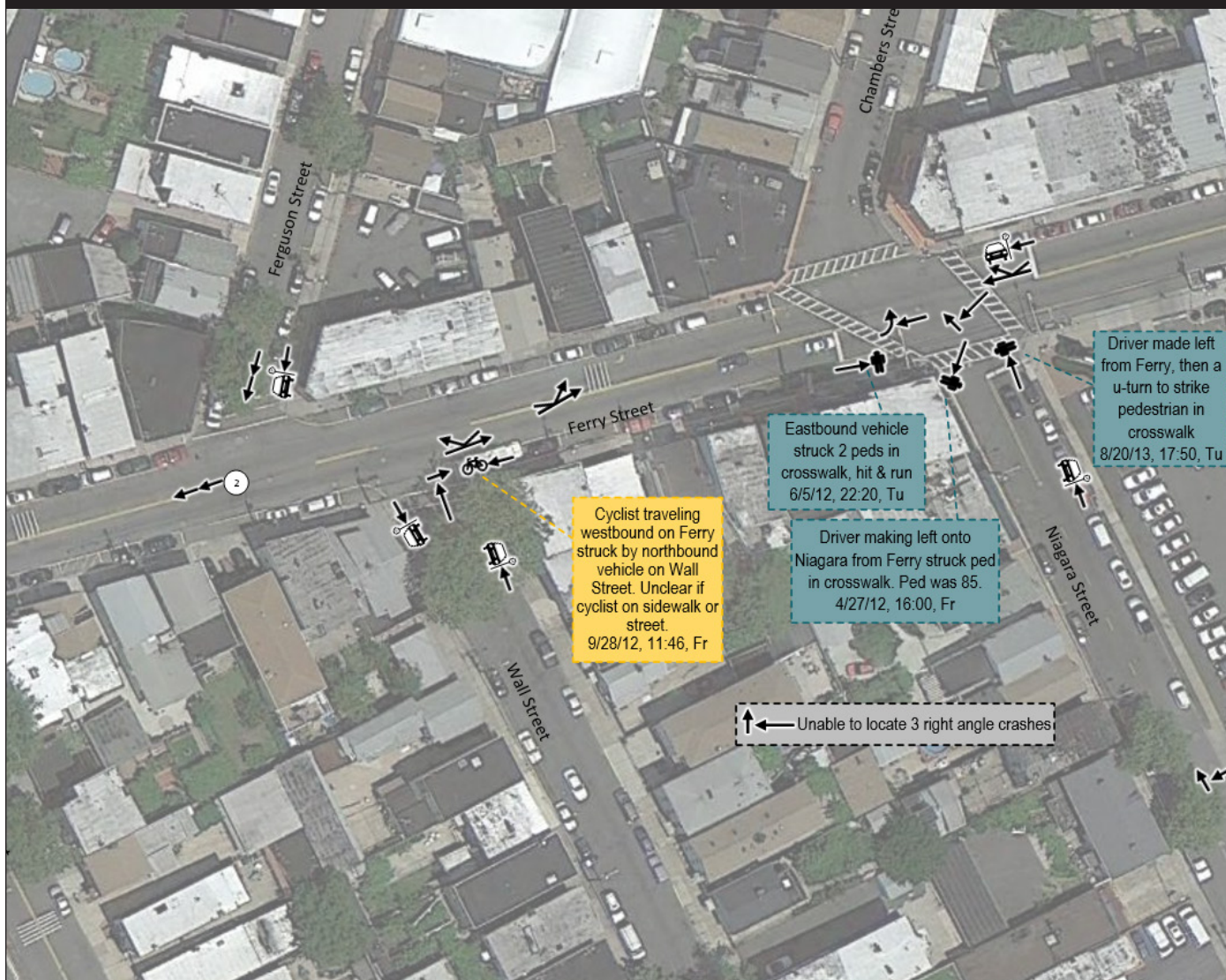
Surface Condition	#
Dry	17
Wet	2
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	19

Light Condition	#
Daylight	9
Dawn	1
Dusk	-
Dark – No Street Lights	1
Dark – Street Lights On/ Continuous	8
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
Total	19

Day	#
Monday	-
Tuesday	2
Wednesday	3
Thursday	1
Friday	2
Saturday	4
Sunday	7
Total	19



FERRY STREET: FERGUSON STREET TO NIAGARA STREET



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

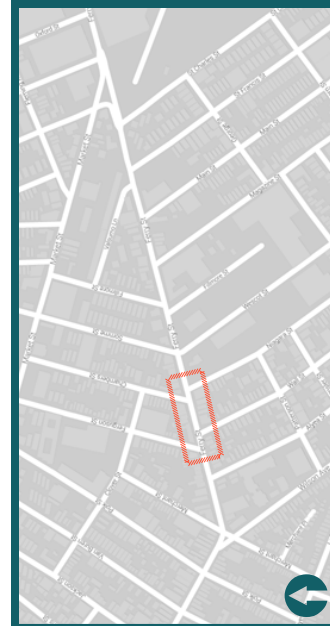
LEGEND

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

Google Imagery, 2015

Crash diagrams based on reports retrieved from NJDOT

INTERSECTION LOCATER



FERRY STREET: FERGUSON STREET TO NIAGARA STREET – CRASH SUMMARY (2011 – 2013)

Crash Type	#
Same Direction – Rear End	3
Same Direction – Side Swipe	2
Right Angle	6
Opposite Direction – Head On/ Angular	1
Opposite Direction – Side Swipe	-
Struck Parked Vehicle	5
Left Turn / U-Turn	1
Backing	3
Encroachment	-
Overtaken	-
Fixed Object	-
Animal	-
Pedestrian	3
Pedalcyclist	1
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
Total	25

Month	#
January	2
February	1
March	3
April	2
May	0
June	1
July	4
August	3
September	2
October	3
November	2
December	2
Total	25

Severity	#
Property Damage Only (PDO)	15
Pain	9
Moderate Injury	1
Incapacitating Injury	
Fatal	
Total	25

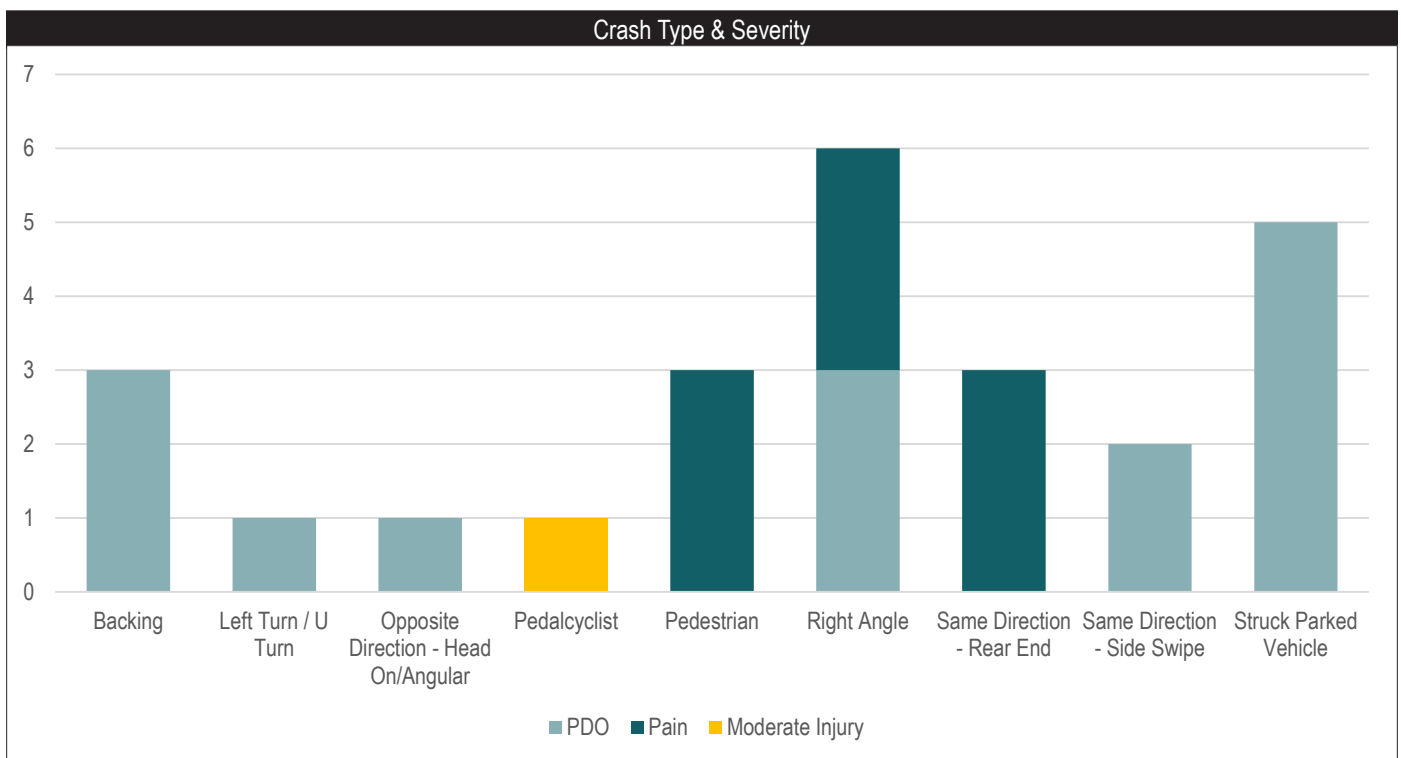
Crash Year	#
2011	5
2012	11
2013	9
Total	25

Intersection	#
At intersection	18
Not at intersection	7
At or Near Railroad	-
Total	25

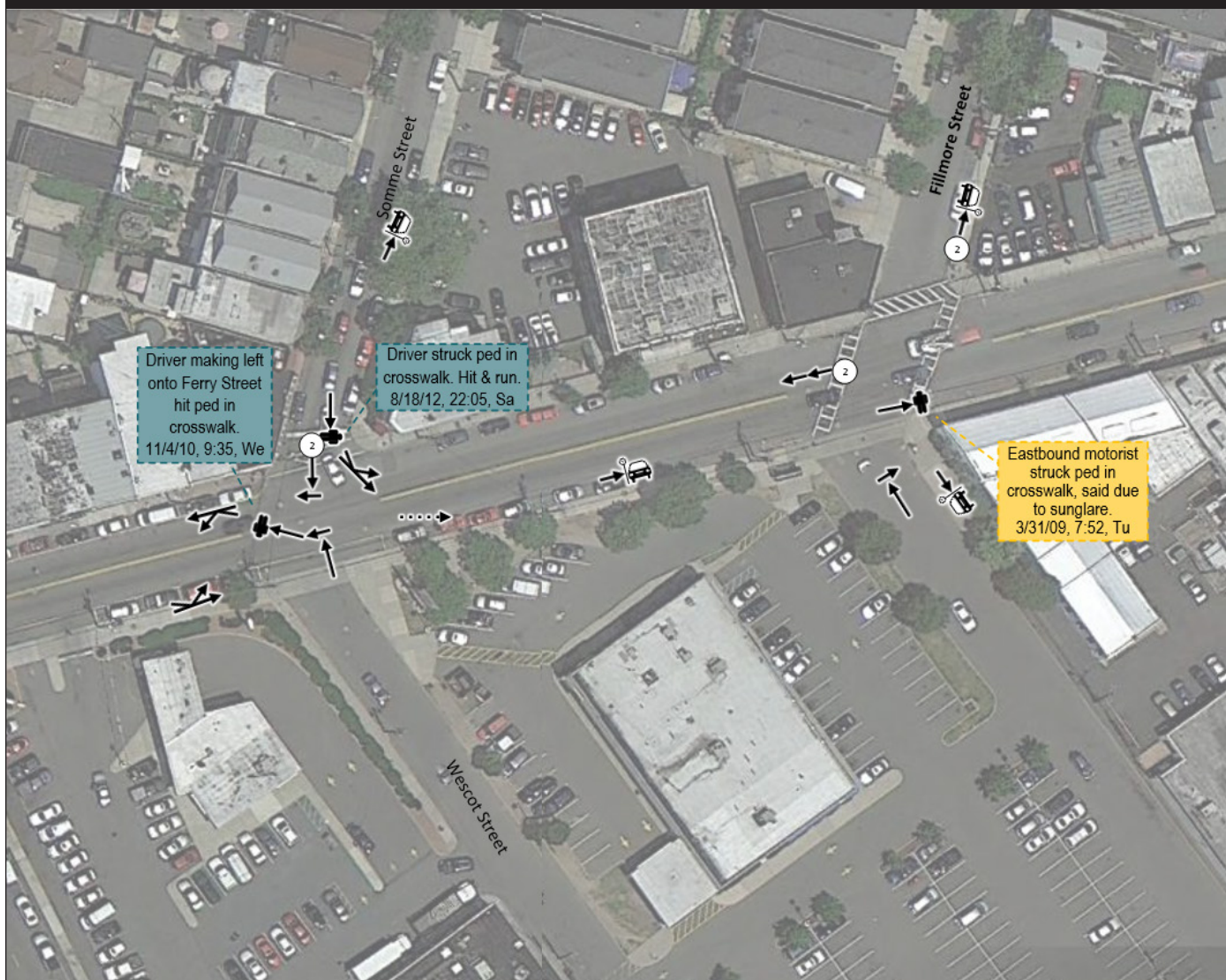
Surface Condition	#
Dry	18
Wet	6
Snowy	1
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	25

Light Condition	#
Daylight	14
Dawn	0
Dusk	1
Dark – No Street Lights	0
Dark – Street Lights On/ Continuous	9
Dark – Street Lights On/ Spot	1
Dark – Street Lights Off	-
Other	-
Total	25

Day	#
Monday	4
Tuesday	7
Wednesday	2
Thursday	3
Friday	2
Saturday	4
Sunday	3
Total	25



FERRY STREET: SOMME STREET TO FILLMORE STREET



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

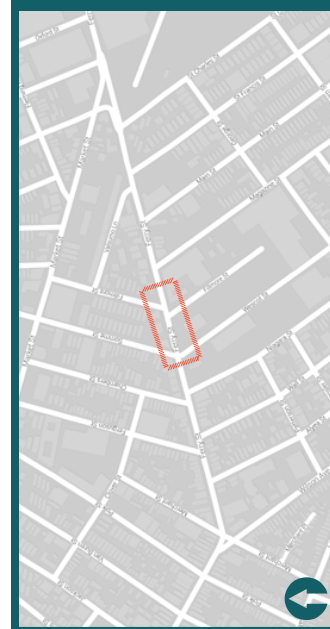
LEGEND

- 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



FERRY STREET: SOMME/WESCOT STREETS TO FILLMORE STREET – CRASH SUMMARY (2011 – 2013)

Crash Type	#
Same Direction – Rear End	2
Same Direction – Side Swipe	3
Right Angle	4
Opposite Direction – Head On/ Angular	-
Opposite Direction – Side Swipe	-
Struck Parked Vehicle	5
Left Turn / U-Turn	-
Backing	1
Encroachment	-
Overtaken	-
Fixed Object	-
Animal	-
Pedestrian	-
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
Total	15

Month	#
January	1
February	-
March	1
April	-
May	2
June	3
July	3
August	-
September	2
October	-
November	1
December	2
Total	15

Severity	#
Property Damage Only (PDO)	13
Pain	2
Moderate Injury	-
Incapacitating Injury	-
Fatal	-
Total	15

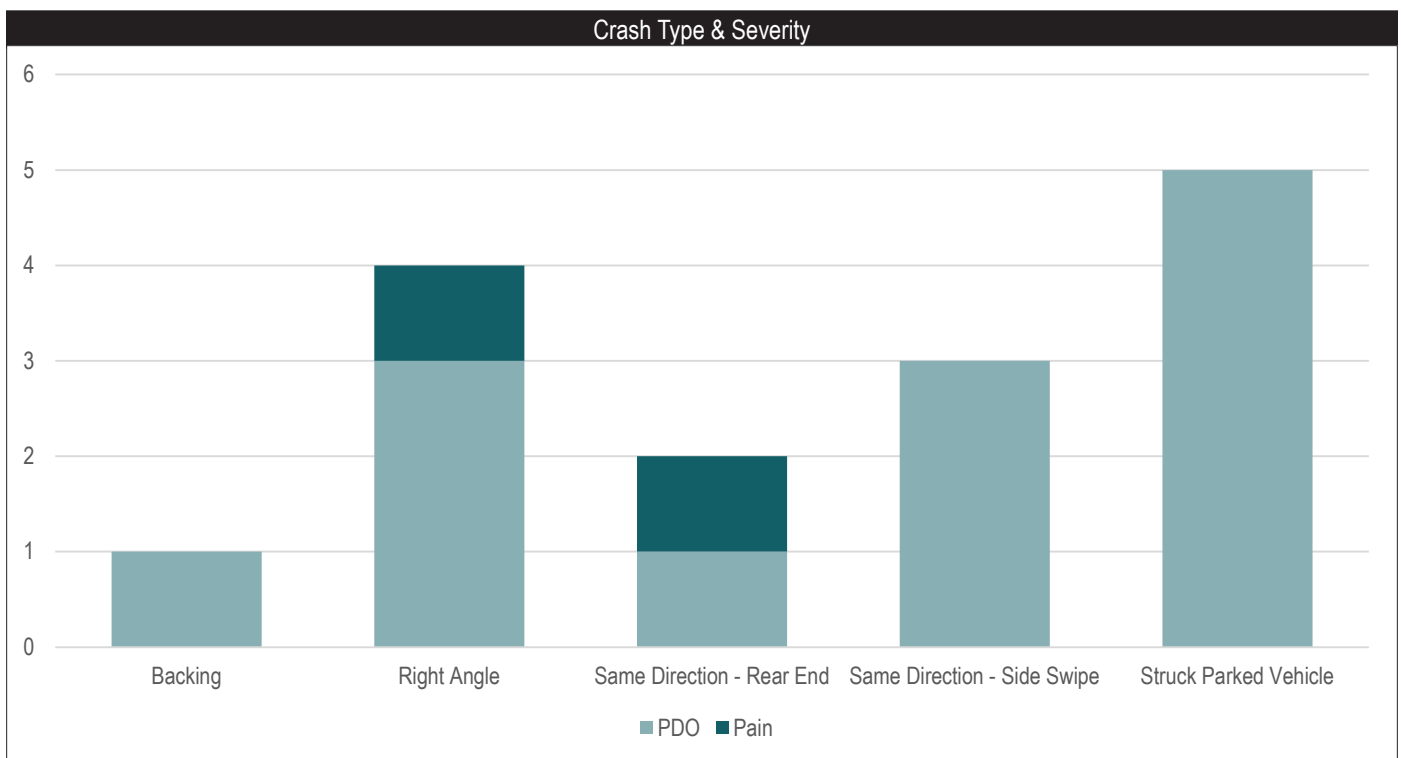
Crash Year	#
2011	4
2012	3
2013	8
Total	15

Intersection	#
At intersection	7
Not at intersection	8
At or Near Railroad	-
Total	15

Surface Condition	#
Dry	13
Wet	2
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	15

Light Condition	#
Daylight	9
Dawn	-
Dusk	1
Dark – No Street Lights	1
Dark – Street Lights On/ Continuous	4
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
Total	15

Day	#
Monday	1
Tuesday	3
Wednesday	2
Thursday	-
Friday	1
Saturday	3
Sunday	5
Total	15



FERRY STREET: MAGAZINE STREET TO VALSUMO LANE



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.

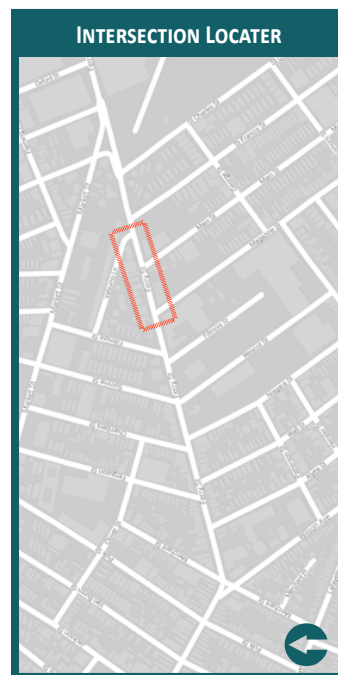
- = Moderate injury
- = Complaint of pain

LEGEND

<ul style="list-style-type: none"> Right angle Cyclist Pedestrians Backing Left-turn Opposite direction - Side Swipe 	<ul style="list-style-type: none"> 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



FERRY STREET: MAGAZINE STREET TO VALSUMO LANE – CRASH SUMMARY (2011 – 2013)

Crash Type	#
Same Direction – Rear End	-
Same Direction – Side Swipe	-
Right Angle	2
Opposite Direction – Head On/ Angular	1
Opposite Direction – Side Swipe	-
Struck Parked Vehicle	8
Left Turn / U-Turn	-
Backing	-
Encroachment	-
Overtaken	-
Fixed Object	-
Animal	-
Pedestrian	3
Pedalcyclist	-
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
Total	14

Month	#
January	1
February	2
March	-
April	1
May	1
June	1
July	-
August	-
September	1
October	3
November	1
December	3
Total	14

Severity	#
Property Damage Only (PDO)	9
Pain	4
Moderate Injury	1
Incapacitating Injury	-
Fatal	-
Total	14

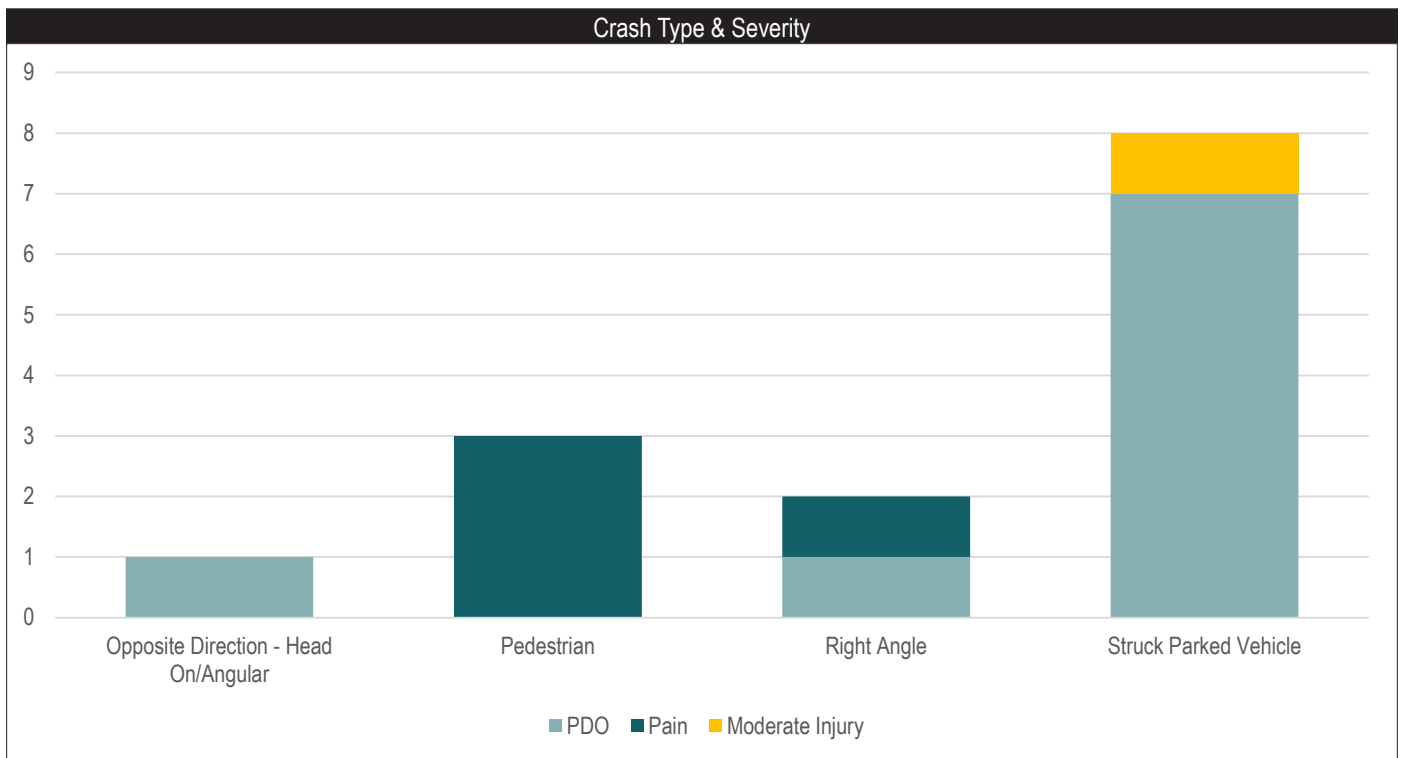
Crash Year	#
2011	2
2012	9
2013	3
Total	14

Intersection	#
At intersection	5
Not at intersection	9
At or Near Railroad	0
Total	14

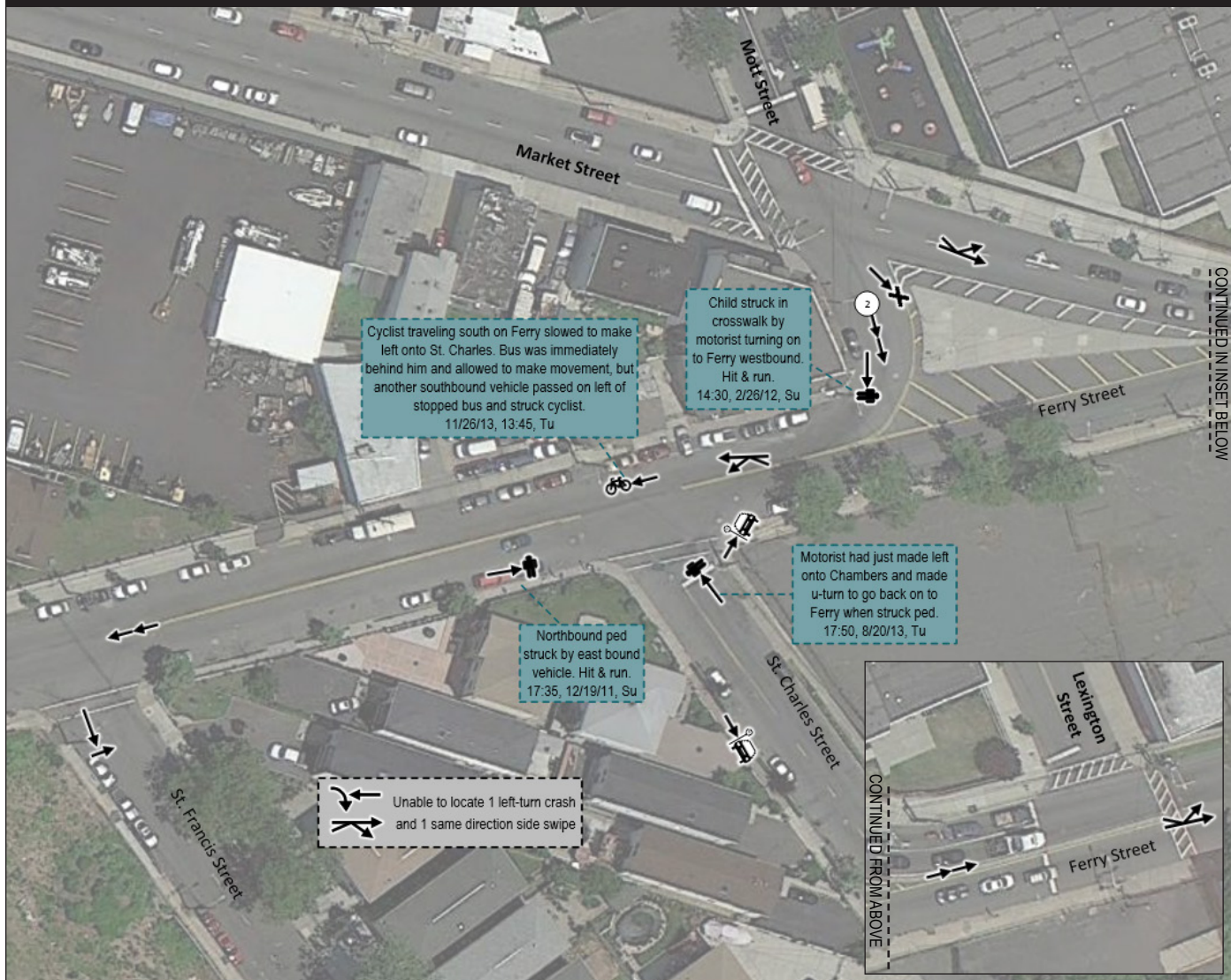
Surface Condition	#
Dry	12
Wet	2
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	14

Light Condition	#
Daylight	9
Dawn	-
Dusk	-
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	4
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	1
Total	14

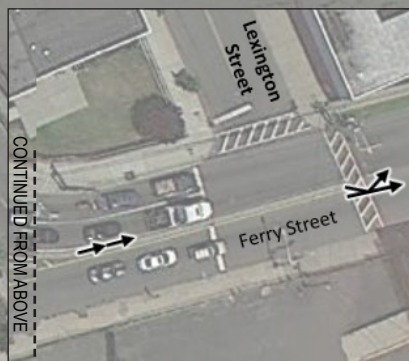
Day	#
Monday	1
Tuesday	3
Wednesday	1
Thursday	1
Friday	2
Saturday	2
Sunday	4
Total	14



FERRY STREET: ST. FRANCIS STREET TO LEXINGTON STREET



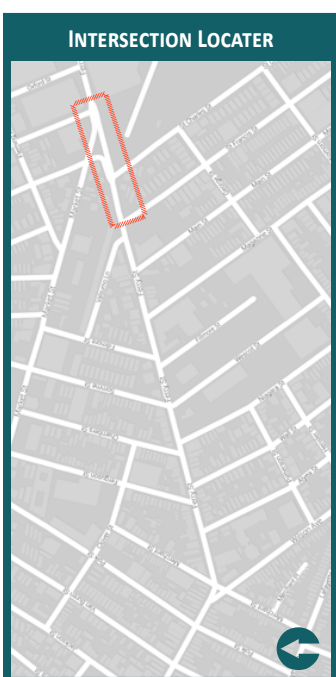
CONTINUED IN INSET BELOW



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.

[Color-coded box] = Complaint of pain



FERRY STREET: ST. FRANCIS STREET TO LEXINGTON STREET—CRASH SUMMARY (2011–2013)

Crash Type	#
Same Direction – Rear End	4
Same Direction – Side Swipe	4
Right Angle	1
Opposite Direction – Head On/ Angular	-
Opposite Direction – Side Swipe	-
Struck Parked Vehicle	2
Left Turn / U-Turn	1
Backing	-
Encroachment	-
Overtaken	-
Fixed Object	1
Animal	-
Pedestrian	3
Pedalcyclist	1
Non-fixed Object	-
Railcar – Vehicle	-
Other	-
Total	17

Month	#
January	-
February	1
March	1
April	3
May	2
June	3
July	1
August	-
September	3
October	1
November	2
December	-
Total	17

Severity	#
Property Damage Only (PDO)	11
Pain	6
Moderate Injury	-
Incapacitating Injury	-
Fatal	-
Total	17

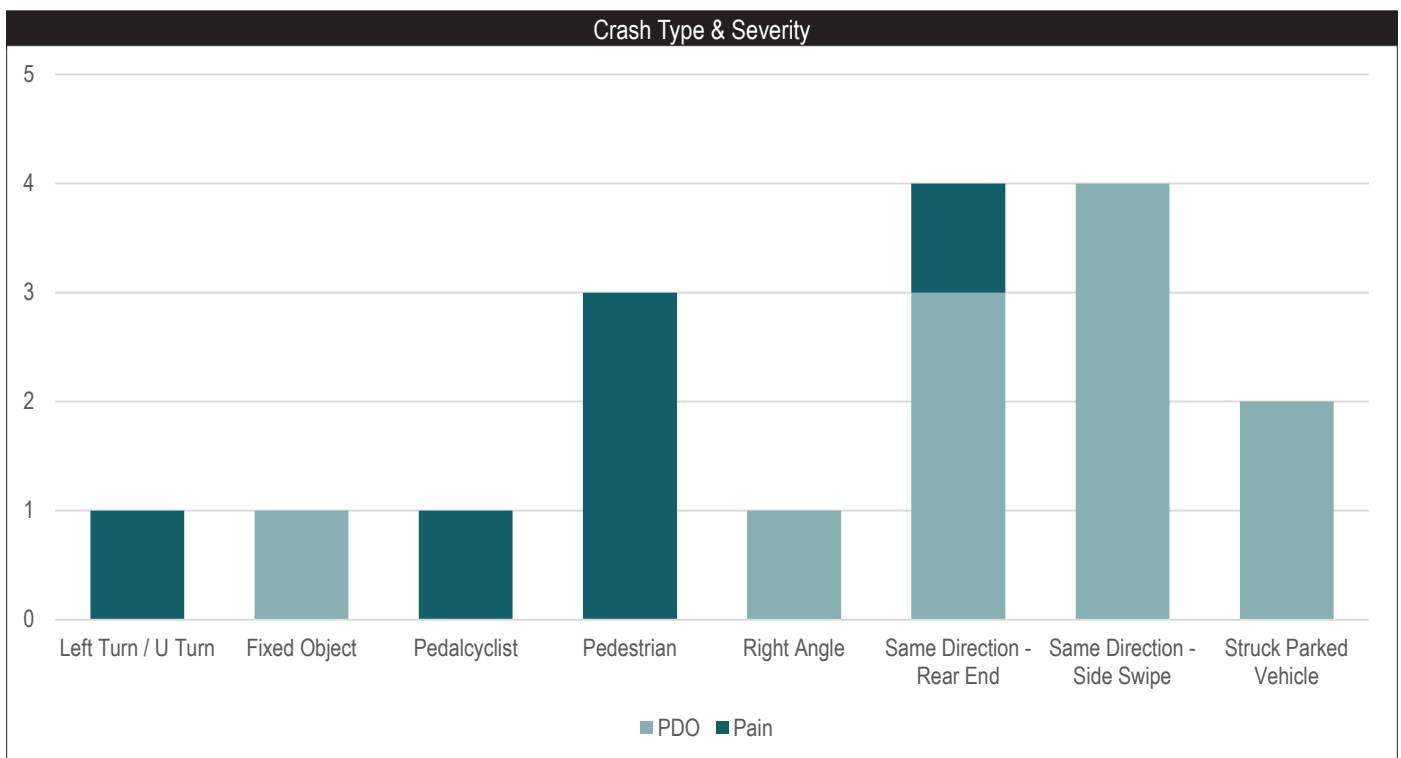
Crash Year	#
2011	8
2012	4
2013	5
Total	17

Intersection	#
At intersection	14
Not at intersection	3
At or Near Railroad	-
Total	17

Surface Condition	#
Dry	16
Wet	1
Snowy	-
Icy	-
Slush	-
Water – Standing/ Moving	-
Sand, Mud, Dirt	-
Oil	-
Total	17

Light Condition	#
Daylight	16
Dawn	-
Dusk	-
Dark – No Street Lights	-
Dark – Street Lights On/ Continuous	1
Dark – Street Lights On/ Spot	-
Dark – Street Lights Off	-
Other	-
Total	17

Day	#
Monday	3
Tuesday	3
Wednesday	2
Thursday	2
Friday	4
Saturday	1
Sunday	2
Total	17



>> APPENDIX E – STRAIGHT LINE DIAGRAM

STRAIGHT LINE DIAGRAMS

Page Created: May, 2011

Mile Posts: 0.000 - 2.000

FERRY ST (West to East)



Pavement/Shoulder		Speed Limit	Street Name	Units in miles		Jurisdiction		Functional Class		Control Section		Speed Limit		Number of Lanes		Med. Type		Med. Width		Pavement		Shoulder		Traffic Volume		Traffic Sta. ID		Structure No.		Enlarged Views	
			LOCKWOOD ST	(1.92)		Newark City, Essex Co		Ferry Street		Municipal		NOT POSTED		2		None		0		40				14,545 (2007)		3N55718					
			FOUNDRY	(1.85)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			WAYDELL	(1.79)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
						Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			FLEMING AVE	(1.53)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			CORTLAND	(1.50)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			SCHALK ST	(1.47)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			RICHARD ST	(1.41)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			BRILL	(1.31)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			CHRISTIE	(1.24)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			FREEMAN ST	(1.16)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			OXFORD ST	(1.11)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			LEXINGTON ST	(1.08)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			MOITT ST	(1.03)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			MARKET ST	(0.98)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			ST CHARLES ST	(0.92)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			ST FRANCIS ST	(0.88)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			MAIN ST	(0.82)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			MAGAZINE ST	(0.77)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			ASBRIDGE ST	(0.71)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			WESCOTT ST	(0.68)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			WALL ST	(0.62)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			ALFA ST	(0.57)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			WILSON AVE	(0.53)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			BUREN ST	(0.47)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			JACKSON	(0.41)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			ADAMS	(0.37)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			MONROE	(0.33)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			MADISON	(0.28)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			JEFFERSON	(0.24)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			CONGRESS	(0.17)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			PROSPECT	(0.11)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			UNION	(0.08)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			MCWHORTER ST	(0.07)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			EDISON PL	(0.00)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			PLAZA	(0.00)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					
			RAYMOND	(0.00)		Newark City, Essex Co		Municipal		Urban Principal Arterial																					

Date last inventor ed: January 2001

SRI = 07141844