

# **JFK Boulevard – Jersey City, NJ**

## **Road Safety Audit**

FINAL REPORT

May 2014

Submitted by

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

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

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

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

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## Introduction

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On April 19<sup>th</sup>, 2013, a fatal pedestrian crash occurred at JFK Boulevard & Fairmount Avenue. As a result of the crash, the community initiated a dialogue with the county engineer’s office regarding safety, especially pedestrian safety along this corridor. After reviewing the corridor’s crash history, the county felt it warranted conducting a full study of short-term safety improvements. In July 2013, the county finalized a traffic safety report and began installation of short-term improvements. Due to the amount and severity of crashes, the Hudson County engineer’s office requested that a Road Safety Audit be done along the corridor to help define additional future safety improvements.

TSRC conducted an analysis of JFK Boulevard between the intersections of Montgomery Street and Communipaw Avenue. Three intersections—Communipaw Avenue, Duncan Avenue, and Montgomery Street—were identified as candidate sites for an RSA due to a high incidence of right angle and left turn crashes. Harrison Avenue was also identified due to a significant number of right angle crashes—35 percent throughout the corridor.

Intersection	Communipaw	Harrison	Lincoln	Bentley	Gifford	Belmont	Kensington	Jewett	Fairview	Duncan	Fairmount	Montgomery	Total
# of Crashes	89	21	0	18	15	0	22	26	21	41	16	37	306
% of Corridor Crashes	27%	6%	0%	6%	5%	0%	7%	8%	6%	13%	5%	11%	94%

Corridor Crashes (2010—2012)

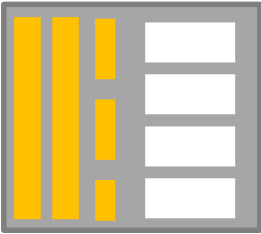

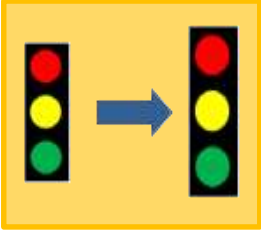
TSRC and Hudson County Division of Engineering subsequently confirmed the location of the RSA to be of JFK Boulevard (CR 501), at the specific hot-spot intersections of:

1. Communipaw Avenue
2. Harrison Avenue
3. Duncan Avenue
4. Montgomery Street

## Traffic Study

The Hudson County Division of Engineering conducted a traffic study in July 2013 in response to the community's traffic safety concerns near the intersection of Duncan Avenue and John F. Kennedy Boulevard West. The report includes information on traffic volume, speed, crash data, recent corridor and intersection improvements, proposed traffic studies, references to relevant news articles, and highlights the following:

1. A speed-related crash that involved a **pedestrian fatality** on April 19, 2013
2. Average daily traffic on JFK Boulevard of 8,985 vehicles northbound, and average daily traffic on JFK Boulevard of 9,538 vehicles southbound, totaling to approximately **19,000 vehicles per day** (ADT)
3. Speeding:
  - a. Speed limit is 25 MPH
  - b. The 85<sup>th</sup> percentile speed was 34 MPH northbound and 32 MPH southbound
  - c. Speeding predominantly occurs between 10 AM and 6PM
  - d. **Fifteen percent of cars travel between 35 and 50 MPH**; some may even approach 60 MPH
4. Improvements along CR 501 (JFK Boulevard) funded by the NJTPA Local Safety Program (includes improvements on JFK Boulevard outside of the RSA study area):

	Project Name	Construction Cost	Construction Completed
	<b>FY 2005</b> CR 501 (a.k.a. JFK Boulevard) (MP 35.99-37.21) from 67th St. to 91st St. : Pavement markings including crosswalks, centerlines, stop line, cross hatching	\$ 161,572	7/17/2006
	<b>FY 2006</b> CR 501 (a.k.a. JFK Boulevard) (MP 29.37-33.8) from Communipaw Avenue to 18th St. : Pavement markings including crosswalks, centerlines, stop line, cross hatching; At 32nd St.: left turn lane, traffic signals, pavement markings	\$ 340,000	6/19/2007
	<b>FY 2008</b> CR 501 (JFK Boulevard) (MP 34.31-37.21) from 36th Street to 91st Street: new LED countdown Ped. Signals at 39 intersections	\$ 239,290	4/6/2009
	<b>FY 2009</b> CR 501 (a.k.a. JFK Boulevard) (MP 27.19-33.2) from Pamrapo St. and 15th St.: New LED countdown Ped. Signals at 39 intersections	\$ 590,000	1/22/2010
	<b>FY 2011</b> CR 501 (a.k.a. JFK Boulevard) (MP 34.31 - 37.07) from 36th Street and 89th Street: Replacing existing traffic signals heads from 8" to 12" at 42 intersections	\$ 413,000	6/5/2012
	<b>FY 2013</b> CR 501 (a.k.a. JFK Boulevard) (MP 31.35 - 33.90) from Spruce Street to 27th Street: Replacing existing traffic signals heads from 8" to 12" at 42 intersections	\$ 385,000	
		<b>\$ 2,128,862</b>	



## Background

The audit focused on intersections on JFK Boulevard, as shown in Figure 1 below, located within Hudson County, in the City of Jersey City:

- Communipaw Avenue
- Harrison Avenue
- Duncan Avenue
- Montgomery Street

The RSA intersections are along a three-quarter-mile stretch of JFK Boulevard, just a half-mile south of the Journal Square PATH station. Each intersection along the designated corridor is signalized and several, most notably Montgomery Street, have undergone improvements including repainted centerlines and curbs, the installation of LED pedestrian countdown timers, and red light running cameras.

The area surrounding JFK Boulevard accommodates a variety of activities: commercial, residential, community organizations, schools, churches, Lincoln Park, and St. Peter’s University. New Jersey Transit buses and jitneys run the entire length of the corridor and routes also intersect JFK Boulevard at both Montgomery Street and Communipaw Avenue. The variety of land uses allows residents to make their work commute on foot (11 percent) or via public transit (47 percent)<sup>1</sup>, both of which result in consistent pedestrian traffic along JFK Boulevard. The roadway is designated as Urban Minor Arterial, and its jurisdiction falls under the county. The roadway measures 60 feet curb to curb and supports two lanes northbound and two lanes southbound with parallel parking along the both sides. JFK Boulevard is part of the Route 501 corridor, which begins in South Plainfield (Middlesex County) and runs north 53 miles until it intersects the New York state line in Rockleigh Borough (Bergen County). Colloquial references for Route 501 vary from segment to segment—including “Hudson” or “Kennedy” Boulevard—but this report will simply use the name JFK Boulevard.

The intersection of **Communipaw Avenue and JFK Boulevard** is a slightly skewed, four legged signalized intersection. The Communipaw east-and westbound approaches feature two through lanes, with an eastbound lead protected-permitted left and permitted westbound left. The north- and southbound approaches also have two through lanes with an opposing head-to-head left turn lane. The JFK Boulevard left turns are phased with a simultaneous lead protected-permitted left. In contrast to the rest of the corridor, this intersection has a distinctively industrial and automotive character due to two large gas stations located on both sides of JFK Boulevard south of the intersection. A number of driveways also add a more complex nature to the intersection. Hudson County has installed orange bollards to provide a visual cue of the left turn prohibition into and out of the driveways

immediately north and south of the intersection. It was also noted that impending construction on the Pulaski Skyway may generate more traffic along JFK Boulevard and Communipaw Avenue.

<sup>1</sup>American Community Survey 2011, Means of Transportation to Work, <http://factfinder2.census.gov>



Figure 1 – JFK Boulevard



Figure 2 – Communipaw Avenue & JFK Boulevard

The **Harrison Avenue and JFK Boulevard intersection** is located just north and slightly up a hill from the Communipaw Avenue intersection. There are two through lanes on the north- and southbound approaches along JFK Boulevard and a single one-way through lane going east along Harrison Avenue. This intersection accounted for a large number of the right angle crashes in the study area. Harrison Avenue may be used as a cut-through to avoid the heavily trafficked Communipaw Avenue/JFK Boulevard intersection. Harrison Avenue is largely residential, though there is a synagogue on the northwest corner, a clinic on the northeast corner, and a bank on the southeast corner.



Figure 3 – JFK Boulevard & Harrison Avenue

There is an S-curve between Duncan Avenue and Montgomery Street. The curve begins at the intersection of **Duncan Avenue and JFK Boulevard**. Duncan is a one-way street running east to west. East of the intersection is the Engine 9 Fire Station, and fire trucks travel westbound along Duncan Avenue through the intersection with JFK Boulevard. Residents report Duncan Avenue is frequently used as a cut-through to Route 1/9. Adjacent to the intersection is the future sight of the improved Boyd-McGuinness Park. At the time of the RSA, the intersection has a delayed green on the southbound approach that created a leading left turn for northbound traffic not displayed on the existing signal equipment. The delayed green is a 2013 improvement and is unlikely to have contributed to the crashes occurring during the study period. Just north of Duncan Avenue is Fairmount Avenue and JFK Boulevard, where there was a pedestrian fatality in April 2013. The intersection is slightly skewed but otherwise similar to the rest of the intersections in the study area in the permitted phasing of left turns, two through north- and southbound lanes and a one-way cross street (west to east in this case). A “no turn on red” sign was recently added on the Duncan Avenue approach (previously red turns were allowed during specific hours).



Figure 5 – Duncan Avenue & JFK Boulevard

The **Montgomery Street and JFK Boulevard** intersection was recently upgraded to include new pedestrian heads, fully protected turns on all approaches, and the larger 12 inch signal heads. Many of these improvements may have actually addressed some of the crash issues. The intersection is heavily trafficked during the morning and evening rush hours, particularly the stretch between JFK Boulevard and Bergen Street to the east. The intersection may also see increased traffic during the upcoming Pulaski Skyway closure. The intersection experiences heavy bus and pedestrian usage. St. Peter’s University pedestrian bridge, which provides access over JFK Boulevard, is adjacent to the intersection.



Figure 6 – Montgomery Street & JFK Boulevard

## Road Safety Audit Process

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The JFK Boulevard RSA followed a process that began with data collection, a crucial task that served as the backbone for the recommended improvement. At the selected sites, crash data was collected using Plan4Safety, a crash data analysis tool, and consisted of crash types, locations, crash years, road conditions, and contributing circumstances. Using the crash data, a crash diagram, shown in Appendix B, was produced for each intersection showing crash types and locations.



Figure 7 – RSA team conducting site visit

The Road Safety Audit occurred on Wednesday, September 25<sup>th</sup>, 2013. The day began with a pre-audit meeting that involved the definition of a road safety audit, an overview of the intersections, and a brief discussion on items to consider before going in the field. A presentation detailing the crash analysis and aerial images of the different site followed. Next, site visits were conducted where all participants were given a chance to inspect the intersections and utilize their various backgrounds to brainstorm recommended improvements. After the site visits, the team reconvened to discuss what they observed and make recommendations to improve safety.

## Information Sources

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Several sources of information were used in the RSA process. For example, crash data from 2010 to 2012 was examined for trends and patterns. Specific resources used in the analysis include:

- NJDOT Crash Database (2010–2012)
- Plan4Safety Crash Data Analysis Tool
- NJTR-1 Crash Reports
- NJDOT Straight Line Diagrams
- Google Earth



## RSA Team

The RSA team consisted of approximately 20 members, including police officers, engineers, and planners from different agencies across the state.

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## Crash Data

As of the date of this report, the crash data reported by the NJDOT shows that a total of 333 crashes (between Montgomery Street and Communipaw Avenue) occurred between 2010 and 2012. The following tables summarize crash data analyzed. While not included in these data tables, residents and police also reported numerous crashes occurring in this area in 2013 as well—some of which were witnessed first-hand by residents.

After the preliminary screening (see “Introduction”), the TSRC conducted a secondary screening and a more in-depth crash data analysis of the following intersections:

- Communipaw Avenue
- Duncan Avenue
- Harrison Avenue
- Montgomery Street

The table on the following page is based loosely on the FHWA’s Crash Risk Assessment Ratings<sup>1</sup>. Rather than assessing every single accident, the crashes studied in this RSA were categorized by crash type (Table 1), severity (EDPO) and total occurrences (Table 2) during the three years studied. Once the crashes are correctly situated within the grid, they are assigned a risk level (Table 3).

SEVERITY RATING	TYPICAL CRASHES EXPECTED	EXPECTED CRASH SEVERITY
<i>Extreme</i>	crashes involving high speeds or heavy vehicles, pedestrians, or bicycles	probable fatality or incapacitating injury
<i>High</i>	crashes involving medium to high speed; head-on, crossing, or off-road crashes	moderate to severe injury
<i>Moderate</i>	crashes involving medium to low speeds; left turn and right turn crashes	minor to moderate injury
<i>Low</i>	crashes involving low to medium speeds; rear-end or sideswipe crashes	property damage only or minor injury

Table 1

FREQUENCY RATING	TOTAL OCCURRENCES OF CRASH TYPE OVER THREE-YEAR PERIOD
<i>Frequent</i>	10 or more crashes per year
<i>Occasional</i>	3 – 9 crashes per year
<i>Infrequent</i>	2 – 3 crashes per year
<i>Rare</i>	0 – 1 crashes per year

Table 2

	<i>A: lowest risk level</i>
	<i>B: low risk level</i>
	<i>C: moderate-low risk level</i>
	<i>D: moderate-high risk level</i>
	<i>E: high risk level</i>
	<i>F: highest risk level</i>

Table 3

<sup>1</sup> Road Safety Audits,” U.S. Department of Transportation, Federal Highway Association  
[http://safety.fhwa.dot.gov/rsa/case\\_studies/fhwasa06017/page2.cfm](http://safety.fhwa.dot.gov/rsa/case_studies/fhwasa06017/page2.cfm)

### Crash Risk Assessment

Risk Category		Severity Rating			
		Low	Moderate	High	Extreme
Frequency Rating	Frequent	<p>1) Lane changing causing sideswipes--particularly around Communipaw and Duncan Avenues; three bus-related sideswipes at Communipaw Avenue</p> <p>2) Struck parked vehicle, especially at Duncan and Jewett Avenues</p>	<p>1) Rear end crashes, especially at southbound Duncan Avenue</p> <p>2) Left turns, especially at Communipaw Avenue, usually property damage only (PDO), some pain and moderate injury at Communipaw Avenue</p>		
	Occasional	<p>Backing cars; all PDO and one Pain crash (Communipaw Avenue)</p>	<p>Right angle crashes, especially at Harrison Avenue</p>		<p>1) Ped/cyclists crossing against signal or out of crosswalk</p> <p>2) Ped/cyclists struck in crosswalk (usually struck by left turning vehicles)</p>
	Infrequent		<p>1) Opposite direction with various severity</p>		
	Rare		<p>Car strikes various fixed object, mostly PDO, 1 pain (Fairview Avenue) and 1 incapacitating (Communipaw Avenue)</p>		

**Table 4**

**Communipaw Avenue & JFK Boulevard:** 30.7 crashes/year

The Communipaw Avenue intersection experiences a significant number of left turn crashes, especially in the northwest quadrant. Communipaw Avenue accounted for 61 percent of all left turn crashes. The number of crashes at Communipaw Avenue has also been increasing over the past three years, with 18 percent of the 92 total crashes occurring in 2010, 39 percent in 2011 and 42 percent in 2012. Over the study period, four crashes were affiliated with bus activity—typically vehicles changing lanes to pass a bus—and six crashes involved exit movements from one of the many driveways or parking lots that surround the intersection. The largest percentage of crashes occurred during the afternoon rush from 3 to 6 PM. Three crashes involved bicyclists, while four involved pedestrians.

**Harrison Avenue & JFK Boulevard:** 7.7 crashes/year

The Harrison Avenue intersection accounted for a disproportionate number (38 percent) of right angle crashes. The reason is unclear from the crash reports, but it was speculated by the RSA team that vehicles may be speeding downhill through the Harrison intersection in hopes of catching the green light at Communipaw. Harrison Avenue may also have more vehicles than other cross streets if it serves as a cut-through for people who want to avoid the congestion of Communipaw Avenue. Most of the crashes were PDO, though about half of the right angle crashes resulted in a complaint of pain, while the three left turn crashes resulted in either complaint of pain or moderate injury.

**Duncan Avenue & JFK Boulevard:** 13.7 crashes/year

The Duncan Avenue intersection ranked high in sideswipe and rear end crashes. Residents also told the RSA team that a few years ago a crossing guard was killed in a motor vehicle crash at the intersection. The intersection also had several “Struck Parked Vehicle” crashes on the southwest side of the intersection (near the bus stop).

**Montgomery Street & JFK Boulevard:** 13.3 crashes/year

Like Communipaw Avenue, the Montgomery Street intersection is the site of four bicycle and three pedestrian crashes, many of which were serious. Sixty percent of the intersection’s crashes were same direction, most of which were rear end crashes. Unlike most of the other intersections in the study area, Montgomery Street did not see an increase in the number of crashes over the study period; rather, crashes stayed consistent.

## RSA Team Findings

The following represents the findings and recommendations of the RSA team. All recommendations and designs should be thoroughly evaluated and designed as appropriate by the roadway owner and/or a professional engineer for conformance with codes, standards, and best practices.

Issue	Pedestrian and Bicyclist Issues	Corridor	Communipaw Ave.	Harrison Ave.	Duncan Ave.	Fairmount Ave.	Montgomery St.
1	<b>Large crossing distance across JFK Boulevard</b>	X					
2	<b>Pedestrians crossing against signal</b> • Some push buttons do not appear to function.	X			X		
3	<b>Limited pedestrian crossing time</b> • Some pedestrians, particularly senior citizens and those with disabilities, require more crossing time.	X			X	X	
4	<b>Sidewalks not ADA compliant</b> • Sections of sidewalks are uneven and pose a tripping hazard.	X					
5	<b>Non-ADA compliant pedestrian push buttons and orientation</b>	X					
6	<b>Lack of bicycle facilities</b> • Bicyclist crashes accounted for 3percent of crashes and there are currently no specific cyclist facilities. Also, a portion of the East Coast Greenway runs through the RSA site.	X					
7	<b>Many curb ramps are not ADA-compliant</b>	X					



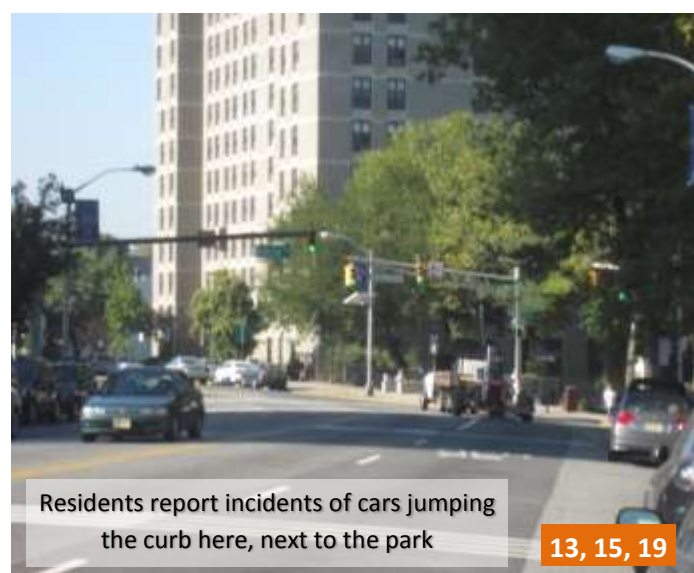


Issue	Safety Impacts of Congestion	Corridor	Communipaw Ave.	Harrison Ave.	Duncan Ave.	Fairmount Ave.	Montgomery St.
8	<b>Blocked intersection box</b>	X	X				X
9	<b>Possible cut-through traffic due to congestion</b>		X	X			X

Issue	Traffic Signals	Corridor	Communipaw Ave.	Harrison Ave.	Duncan Ave.	Fairmount Ave.	Montgomery St.
10	<b>Left turn conflicts</b> <ul style="list-style-type: none"> <li>• During permitted phasing, multiple intersections are experiencing a pattern of left turn crashes.</li> <li>• Duncan Avenue: The northbound approach has a lead left without an arrow, which many left-turning northbound motorists don't appear to realize. This leads northbound left-turning drivers to be confused about who has right of way.</li> </ul>	X	X	X	X		X
11	<b>Vertical curve limits drivers' visibility of the intersection</b> <ul style="list-style-type: none"> <li>• Coming westbound from Duncan Avenue, the placement of the light makes the green signal visible from over the vertical curve, contributing to aggressive driving as motorists try to catch the green despite limited sight distance.</li> </ul>			X	X		
12	<b>Traffic signal heads are antiquated</b> <ul style="list-style-type: none"> <li>• Existing incandescent lights aren't as bright as LED.</li> <li>• All the intersections except Montgomery Street and Communipaw Avenue have 8-inch heads.</li> </ul>	X		X	X	X	

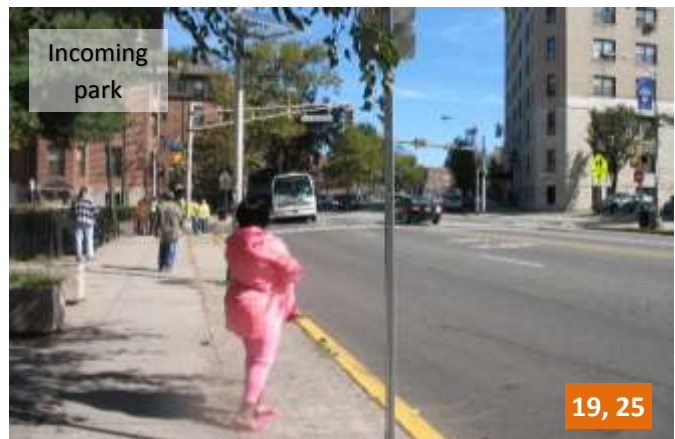


Issue	Sight Distance	Corridor	Communipaw Ave.	Harrison Ave.	Duncan Ave.	Fairmount Ave.	Montgomery St.
13	<b>Sharp curve between Montgomery Street and Duncan Avenue</b> <ul style="list-style-type: none"> <li>Cars cross over double line in intersection, despite painted skip lines.</li> <li>Visibility along the curve is limited.</li> </ul>				X	X	
14	<b>Cars park or idle or park too near intersection, limiting visibility for approaching vehicles</b>	X	X	X	X	X	
15	<b>Pedestrian and vehicle lighting appears to be less than optimal</b>	X					



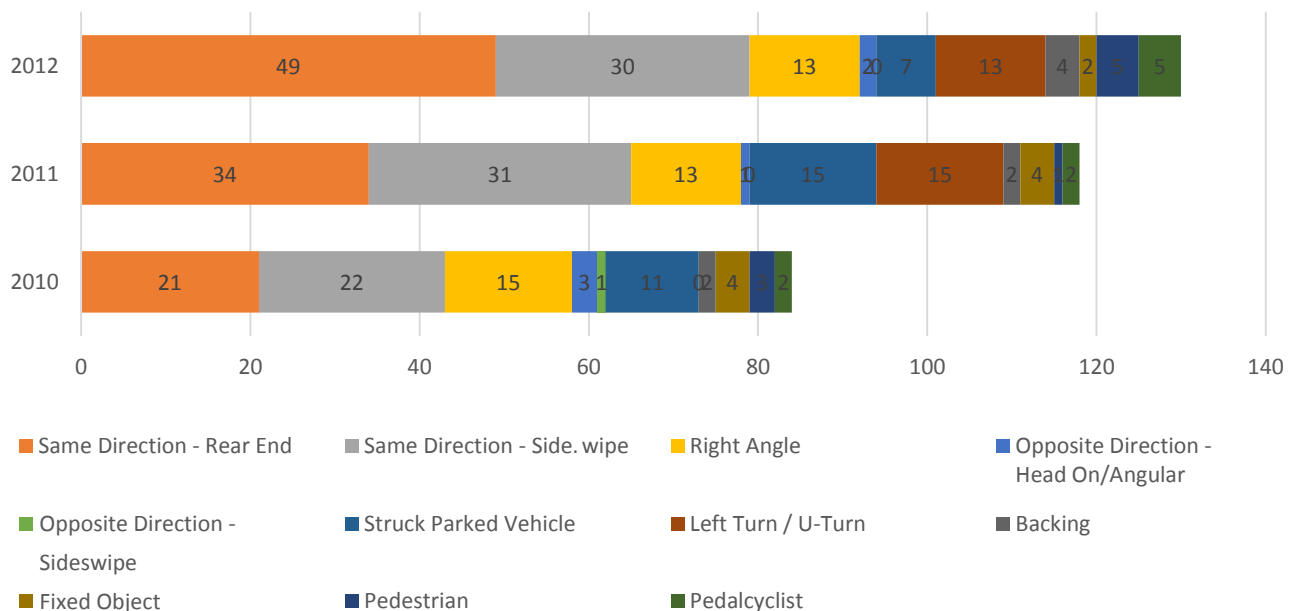
Issue	Maintenance Issues	Corridor	Communipaw Ave.	Harrison Ave.	Duncan Ave.	Fairmount Ave.	Montgomery St.
18	<b>Missing or damaged signs</b>	X					
19	<b>Missing bus shelter</b> The bus shelter at the southwest corner of the Duncan Avenue and JFK Boulevard intersection was damaged in a crash several years ago but has not been replaced.				X		
20	<b>Faded crosswalk markings</b>	X	X				
21	<b>Many potholes and uneven pavement</b>		X				
22	<b>Loops appear to be broken, causing them to not function</b>					X	
23	<b>Damaged signal heads</b> <ul style="list-style-type: none"> <li>• Missing eastbound yellow arrow at Communipaw Avenue</li> <li>• Broken pedestrian signal at Communipaw Avenue</li> </ul>		X				

Issue	Roadway Environment	Corridor	Communipaw Ave.	Harrison Ave.	Duncan Ave.	Fairmount Ave.	Montgomery St.
24	<b>Sign clutter, lack of signage, or low visibility of signage</b> <ul style="list-style-type: none"> <li>• Trees block some of the signage.</li> </ul>	X				X	X
25	<b>Roadway environment encourages speeding (four lane cross section) (see Case Study 2 for further analysis)</b>	x					
26	<b>Bus stop signage confusion</b> <ul style="list-style-type: none"> <li>• Bus stop signs along Montgomery Street on both sides of the JFK Boulevard intersection are placed very close to each other, causing confusion as to where the actual bus stop is located.</li> </ul>						X



Issue	Crash History	Corridor	Communipaw Ave.	Harrison Ave.	Duncan Ave.	Fairmount Ave.	Montgomery St.
27	<b>Same direction–rear end (see Case Study 1 for further analysis)</b> <ul style="list-style-type: none"> <li>• 31 percent (104) of corridorwide crashes</li> <li>• 38 percent (20) of Duncan Avenue crashes</li> <li>• 43 percent (15) of Montgomery Street crashes</li> </ul>		X		x		X
28	<b>Same direction – side swipe</b> <ul style="list-style-type: none"> <li>• 25 percent (85) of corridor-wide crashes</li> <li>• 21 percent (19) of Communipaw Avenue crashes</li> </ul>	X	X				
29	<b>Right angle: 12 percent</b> 35 percent (8) of Harrison Avenue crashes			X			
30	<b>Pedestrian crashes</b>		X				X
31	<b>Cyclist crashes</b>		X				X
32	<b>Left turns</b> 61 percent (17) of corridor’s crashes occurred at Communipaw Avenue and they only occurred in 2011 and 2012		X				X
33	<b>Increasing number of crashes</b> <b>26 percent of crashes occurred in 2010 → 34 percent in 2011 → 40 percent in 2012</b>	X	X	X	X	X	
34	<b>Afternoon crashes</b> <ul style="list-style-type: none"> <li>• 25 percent of corridor crashes occurred in the afternoon</li> <li>• Early afternoon crashes accounted for 35 percent (14) of crashes at Montgomery Street</li> </ul>	X					X

Crash Type, 2010 – 2012





## Case Study 1

Though opposition to red light cameras may appear to be quite strong, research confirms there is public support for use of the technology to address red light running. According to a 2011 Insurance Institute for Highway Safety study, two-thirds of drivers in 14 big cities with established red lighting cameras were in favor of the program. Similar national and local surveys corroborate this finding.<sup>1</sup>

New Jersey's red light running (RLR) program began in December 2009 and is statutorily mandated to run for the subsequent five years as a pilot program. By the end of 2011, two locations had at least two years of crash and citation data and 24 locations had at least one year of information. Right angle and same direction – rear end are the most common crashes associated with RLR locations. After installation of RLR cameras, right angle crashes, which are typically more severe than rear end crashes, tended to decrease while the less severe rear end crashes tended to initially increase.<sup>2</sup>

P	1-Year Data	2-Year Data
% change in RLR citations	-50%	-85%
% change in right angle crashes	-15%	-85%
% change in same direction crashes	+20%	-42%
% change in total crashes	+0.9%	-57%

New Jersey's RLR program is consistent with other states' and cities' RLR or red-light-camera (RLC) program findings, in which there is typically a decrease in right angle crashes and an initial increase in rear end crashes. In the Federal Highway Administration's (FHWA) report "Safety Evaluation of Red-Light Cameras," it was found that despite an increase in rear end crashes, the aggregate cost-benefit analysis of total crash costs is reduced, thus supporting the overall goal of increased road safety through the implementation of red light cameras.<sup>3</sup>

Crash data from NJDOT's Red Lighting Running program (Source: NJDOT)



Red light cameras were installed on JFK Boulevard in 2011 and quite likely account for the increase in rear-ended crashes.

What's the impact of red light running cameras?

<sup>1</sup> "Red light running." Insurance Institute for Highway Safety. Highway Loss Data Institute. [www.iihs.org](http://www.iihs.org) Accessed 11/11/2013.

<sup>2</sup> Report on red-light traffic control signal monitoring systems: Second annual report. New Jersey Department of Transportation. Nov 2012. [www.iihs.org](http://www.iihs.org). Accessed 11/11/2013.

<sup>3</sup> Council, F.M., Persaud, B., Eccles, K. et. al. "Safety evaluation of red-light cameras." US Department of Transportation. Federal Highway Administration. April 2005. [www.fhwa.dot.gov](http://www.fhwa.dot.gov). Accessed 11/11/2013.

## Case Study 2



Why is speeding such a big deal?

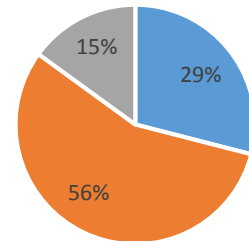


The image above shows the intersection of Duncan Avenue and JFK Boulevard with an overlay of the stopping distance required for each speed range.

Vehicle speed is also a key factor in crash severity, especially when a pedestrian is involved. At 34 MPH—the 85<sup>th</sup> percentile speed for JFK Boulevard northbound—over 60 percent of the pedestrian-involved crashes would be expected to result in a severe injury and nearly 30 percent in death. For the 15 percent of vehicles that travel at even higher speeds (demonstrated by the grey-shaded areas in the table below), the probability of both severe injury and risk of death increase dramatically.

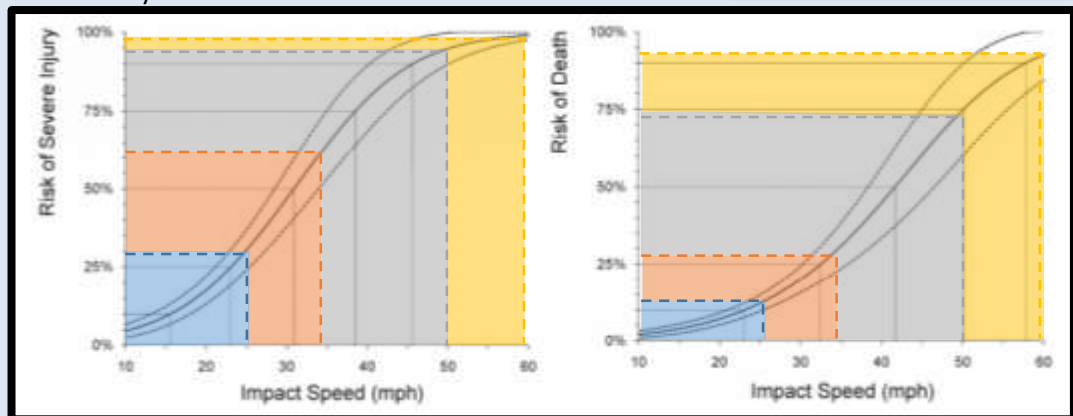
Vehicle speed plays an important role in stopping distance requirements—the faster a vehicle travels, the more distance it needs to come to a complete stop. According to the AASHTO design standards, a vehicle traveling at 25 MPH requires a 150-foot stopping distance, whereas at 50 MPH the vehicle requires a 400-foot distance.<sup>4</sup> At 34 MPH, the 85<sup>th</sup> percentile speed for JFK northbound, vehicles require 250-foot of pavement to stop. The curve in the road at Duncan Avenue makes it difficult for vehicles to clearly see ahead 250-foot, the distance needed for a full stop.

Northbound Traffic Speeds on JFK Boulevard



- 25 MPH or less
- 26-34 MPH
- 35-50 MPH or more

Some cars were observed to travel up to 60 mph



<sup>4</sup>Tefft, B. C. Impact speed and a pedestrian's risk of severe injury or death. Sept 2011. AAA Foundation for Traffic Safety. [www.aaafoundation.org](http://www.aaafoundation.org). Accessed 11/11/2013.

## Implementing Recommendations

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The RSA team's recommendations suggested in this report should improve safety along JFK Boulevard. Most of the recommendations fall under Hudson County roadway jurisdiction, with the exception being the area beyond the curb (e.g., sidewalk, bus shelters, etc.). Any potential projects generated from this report would be led by Hudson County in conjunction with the City of Jersey City.

Many of the recommendations contained within this report can be implemented through routine maintenance, such as trimming vegetation and maintaining sign/pavement conditions, while others will take more time and investment. Partnerships should be explored to maximize resources and ensure a positive safety impact. Rutgers' TSRC can assist municipalities and counties in identifying partnership opportunities. The North Jersey Transportation Planning Authority (NJTPA) can assist with crash data and capacity analysis.

Some of the recommendations may require sizable capital investment to obtain a long-term safety benefit. It is understood that larger projects may require funding assistance from non-municipal entities. Potential funding sources are listed.

### Key:

\$ = Low cost

\$\$ = Medium cost

\$\$\$ = High cost

CMF = Crash Modification Factor

## A) Improve Pedestrian Accommodations

Ref #	Recommendation Type	CMF	Cost	Safety Benefit	Jurisdiction
<b>Short Term</b>					
A-1	The addition of pedestrian way-finding signs to clearly direct pedestrians may result in improved pedestrian behavior.		\$	Low	Municipal
A-2	Replace worn and missing striping with high visibility crosswalk markings in conformance with the MUTCD, while keeping style of crosswalk striping consistent throughout corridor.	0.6 <sup>1</sup>	\$	High	County
A-3	Add audible ADA-compliant push buttons.		\$	Medium	County
A-4	Allow for additional pedestrian crossing time to accommodate senior citizens. Additional crossing time can be actuated by depressing existing pedestrian push buttons for an extended amount of time. Add appropriate signage designating it as such.		\$	Low	County
<b>Medium Term</b>					
A-6	All handicap ramps shall be evaluated to check for ADA compliance.	0.63 <sup>2</sup>	\$\$	Medium	County
A-7	Consider creating a signal phase solely for pedestrians (a Barnes dance) at Montgomery Street and JFK Boulevard	0.49 <sup>3</sup>	\$	Medium /High	County
A-8	Conduct a pedestrian-level lighting study to determine which areas need more night-time illumination.	0.58 <sup>4</sup>	\$\$	Medium	Municipal
<b>Long Term</b>					
A-9	Consider the needs of pedestrian and ADA compliancy to complete a sidewalk audit to assess what sections of sidewalk need to be repaired or repaved. FHWA Proven Safety Countermeasure (2009): Walkways		\$\$	High	Municipal
A-10	Add bollards on the sidewalk between JFK Boulevard and Boyd McGuinness Park to stop vehicles that jump the curb south of the Duncan Avenue southbound approach.		\$\$	Medium	Municipal
A-11	Add bump-outs (painted or poured concrete) at all corners to reduce pedestrian crossing distance.		\$\$	High	County

<sup>1</sup>Install high-visibility crosswalk (for pedestrian crashes only; all severity) <http://www.cmfclearinghouse.org/detail.cfm?facid=4123>

<sup>2</sup>Install pedestrian crossing-signed and marked with curb ramps and extensions (for all crash types and all severity) [http://www.cmfclearinghouse.org/study\\_detail.cfm?stid=73](http://www.cmfclearinghouse.org/study_detail.cfm?stid=73)

<sup>3</sup>Implement Barnes Dance (for pedestrian crashes only and all severity crashes) <http://www.cmfclearinghouse.org/detail.cfm?facid=4117>

<sup>4</sup>Provide intersection illumination (for nighttime, pedestrian crashes only and serious or minor injuries) <http://www.cmfclearinghouse.org/detail.cfm?facid=436>



Issue #	Concerns Addressed:
1	Large crossing distance across JFK Boulevard
2	Pedestrians crossing against signal
3	Limited pedestrian crossing time
4	Sidewalks not ADA compliant
5	Non-compliant pedestrian push buttons
7	Many curb ramps are not ADA-compliant
20	Faded crosswalk markings
21	Many potholes and uneven paving
30	Pedestrian crashes
16	Pedestrian and vehicle-level lighting is less than optimal
13	Sharp curve between Montgomery Street and Duncan Avenue
26	Bus stop signage confusion and grouping
31	Bicyclist crashes



Example of recommendation A-10

**Metal bollards, like these near the Grove Street PATH Station, offer added protection to pedestrians from vehicles that might jump the curb. (Source: Google Maps)**

## B) Increase Intersection and Signal Visibility

Ref #	Recommendation Type	CMF	Cost	Safety Benefit	Jurisdiction
<b>Short Term</b>					
B-1	Realign the pedestrian push buttons to be in conformance with the MUTCD & ADA.		\$	Low	County
B-2	Evaluate the signal timing and consider revising the timing to improve traffic operations and better accommodate pedestrians.		\$	Medium	County
B-3	Consider the installation of backplates with retroreflective borders. FHWA Proven Safety Countermeasure (2012): Backplates with retroreflective borders	0.85 <sup>5</sup>	\$	Medium	County
B-4	Increase sight triangle at intersection, possibly by removing parking and daylighting corners with flexible bollards.	0.44 <sup>6</sup> 0.51 <sup>7</sup>	\$	Medium / High	County
B-5	Add curve pavement markings on JFK Boulevard southbound before Duncan Avenue.	0.81 <sup>8</sup>	\$	Medium / High	County
B-14	Add "Do Not Block the Box" signs at Montgomery Street, Communipaw Avenue, and Duncan Avenue intersections to prevent vehicles from blocking the intersection.		\$	Low	County
B-6	Investigate prohibiting left turns from JFK Boulevard (southbound) onto Harrison Avenue during rush hours to reduce left turn crashes and cut-through traffic.	0.32 <sup>9</sup>	\$	Medium	County
B-7	Consider upgrading the signal heads to 12-inch LED.	0.69 <sup>10</sup>	\$	Medium	County
B-8	Review the current change and clearance intervals and, if applicable, increase to meet current standards.	0.798 <sup>11</sup>	\$	Medium	County
<b>Medium Term</b>					
B-9	Add a northbound four-section signal head with left-turn arrow at Duncan Avenue.		\$\$	Medium	County
B-10	Consider adding optically programmed traffic signal heads to limit the visibility of the green signal indication for the Duncan Avenue westbound and Harrison Avenue eastbound approaches. This could discourage drivers from aggressively speeding to catch the green light.		\$\$\$	Low	County
<b>Long Term</b>					
B-12	Communipaw Avenue approaches <ul style="list-style-type: none"> <li>Option 1: Install head to head left turns on Communipaw Avenue.</li> <li>Option 2: In addition to installing head to head left turns, signalize as protected-only left turns.</li> <li>Option 3: Install single directional lead left on both east and westbound approaches and alternate which direction receives the lead every cycle (see diagram 1).</li> </ul>	0.01 <sup>12</sup>	\$\$\$	High	County
B-13	JFK Boulevard approaches: Change protected-permitted left turns to protected-only left turns on north and southbound approaches at Communipaw Avenue to reduce left turn crashes.	0.01 <sup>12</sup>	\$\$\$	High	County

<sup>5</sup>Add 3-inch yellow retroreflective sheeting to signal backplates (for all crashes) [http://www.cmfclearinghouse.org/study\\_detail.cfm?stid=85](http://www.cmfclearinghouse.org/study_detail.cfm?stid=85)

<sup>6</sup>Increase triangle sight distance extensions (for all crash types and all severity) <http://www.cmfclearinghouse.org/detail.cfm?facid=1637>

<sup>7</sup>Restrict parking near intersections (to off-street) (for all crash types and all severity)

[http://www.cmfclearinghouse.org/study\\_detail.cfm?stid=73](http://www.cmfclearinghouse.org/study_detail.cfm?stid=73)

<sup>8</sup>Placing edgelines and background/directional markings on horizontal curves (for run off road crashes and serious or minor injuries)

<http://www.cmfclearinghouse.org/detail.cfm?facid=91>

<sup>9</sup>Prohibit left-turns with "No Left Turn" sign (for all crash types and all severity) <http://www.cmfclearinghouse.org/detail.cfm?facid=391>

<sup>10</sup>Add additional signal and upgrade to 12-inch lenses (for all crash types and all severity)

<http://www.cmfclearinghouse.org/detail.cfm?facid=1411>

<sup>11</sup>Increase all red clearance interval (for all crash types and all severity) <http://www.cmfclearinghouse.org/detail.cfm?facid=4211>

<sup>12</sup>Change left-turn phase to protected phasing on one or more approaches (for left turn and all severity crashes)

<http://www.cmfclearinghouse.org/detail.cfm?facid=4576>

Issue #	Concerns Addressed:
10	Left turn conflicts
8	Blocked intersection box
11	Green lights are more visible from farther away than red
12	Traffic signal heads are antiquated
3	Limited pedestrian crossing time
22	Loops appear to be broken, causing them to not function
23	Damaged signal heads
32	Left turns
24	Sign clutter or lack of signage



Example of recommendation B-4



Example of recommendation B-4



Example of recommendation B-5

Hoboken's use of plastic bollards (above left) prevent vehicles from parking too close to the intersection. (Source, Andrew Besold on Walk Bike Jersey Blog) The corner of the Manhattan intersection (above right) has been emphasized with the application of a texturized paint and plastic bollards. (Source: Clarence Eckerson, Jr. on Streets Blog)

(Source: FHWA)

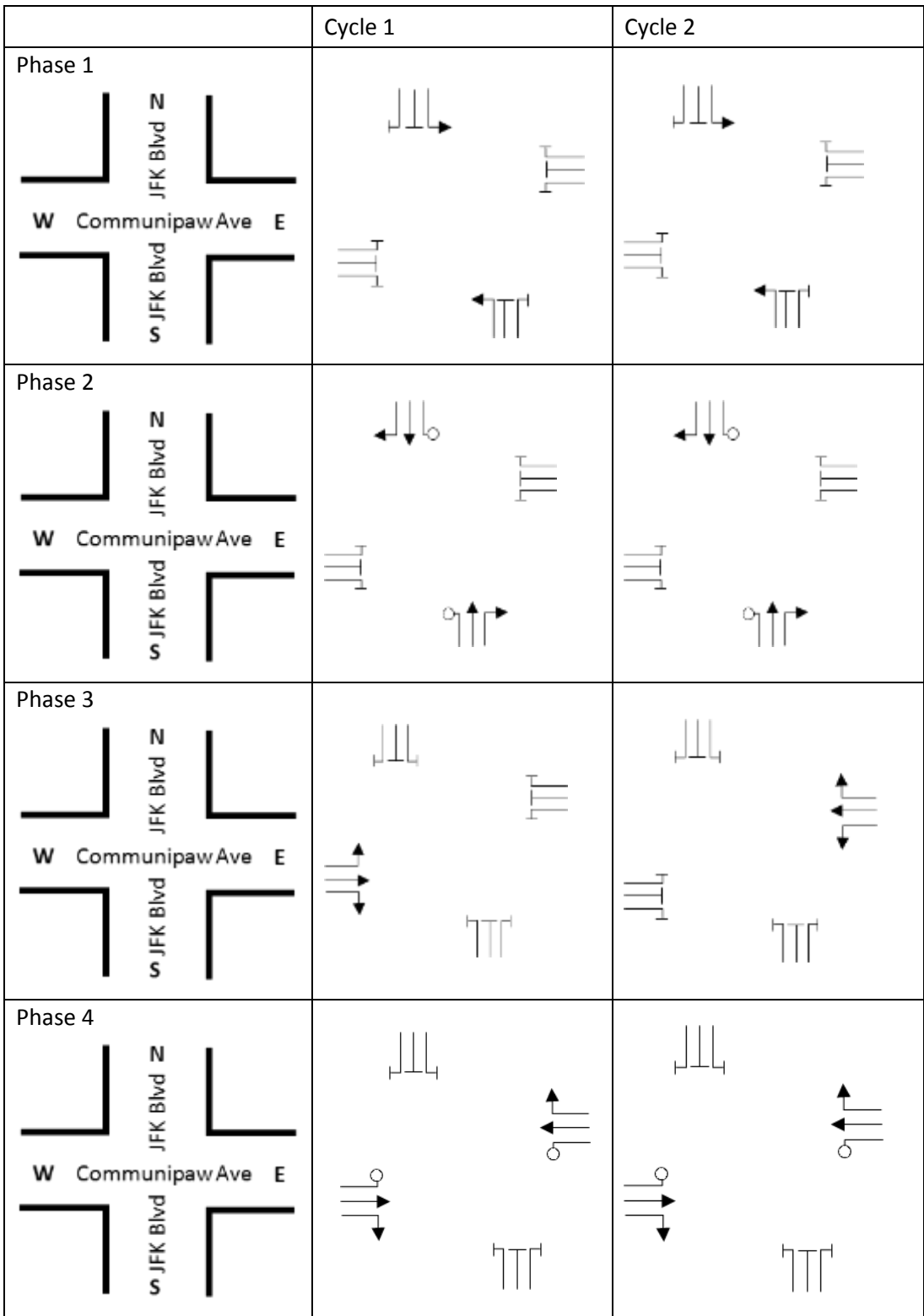


Diagram 1 (see recommendation B-12)

### C) Reduce Roadway Speeding

Ref #	Recommendation Type	CMF	Cost	Safety Benefit	Jurisdiction
<b>Short Term</b>					
C-1	Continue the use of the speed display device at various points throughout the corridor.		\$	Medium	Municipal
C-2	Stripe a white edge line along the parking lane of JFK Boulevard to better define and narrow the travel lanes.		\$	Medium	County
C-3	Increase speed enforcement.		\$\$	Medium /High	Municipal
<b>Long Term</b>					
C-4	Conduct an engineering study to understand the impacts of a road-diet along JFK Boulevard A road diet would convert the four-lane cross-section into a three-lane cross-section with two through lanes, a center lane, and bike lanes with the remaining space. FHWA Proven Safety Countermeasure (2012): Road Diet	0.944 <sup>14</sup>	\$\$\$	Medium / High	County

<sup>14</sup>Install bike lanes (for all crashes and all severity) <http://www.cmfclearinghouse.org/detail.cfm?facid=4656>

Issue #	Concerns Addressed:
25	Roadway environment encourages speeding



Example of recommendation C-4



Example of recommendation C-4



Example of recommendation C-1

Road diets are widely recognized as helping to reduce driver speed since they limit the passing options. Typically, only roadways with AADTs of greater than 20,000 vehicles are affected by the reduction of travel lanes. The July traffic counts indicated that this section of JFK Boulevard carries approximately 19,000 vehicles each day.

Speed display signs help drivers be more aware of their speed. The Information Display Company offers trial use and discounts on such displays. (Source: speeders.org)



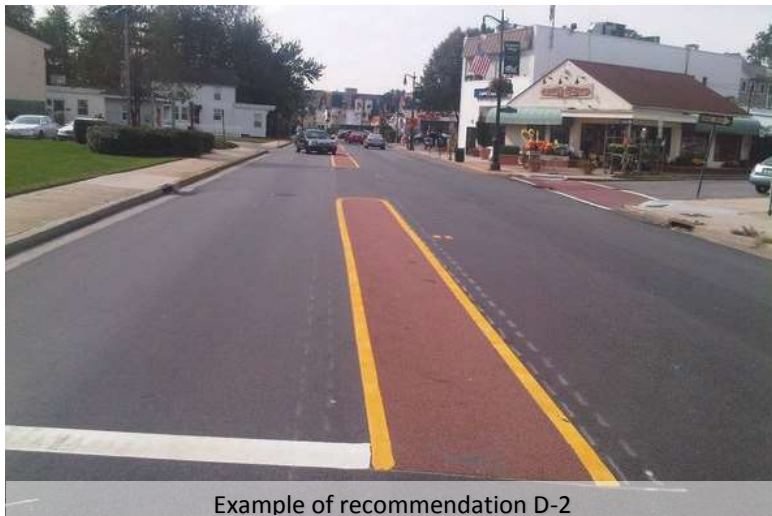
## D) Improve Road Geometry

Ref #	Recommendation Type	CMF	Cost	Safety Benefit	Jurisdiction
<b>Short Term</b>					
D-1	Increase sight triangle at intersection, possibly by removing parking and daylighting corners with flexible plastic bollards.	0.44 <sup>15</sup> 0.51 <sup>16</sup>	\$	High	County
<b>Long Term</b>					
D-2	Add painted, high friction surface median islands (approximately three feet wide) by the stop bars at Duncan Avenue to guide north- and southbound vehicles to stay in the correct lane.		\$\$	High	County

<sup>15</sup>Increase triangle sight distance extensions (for all crash types and all severity) <http://www.cmfclearinghouse.org/detail.cfm?facid=1637>

<sup>16</sup>Restrict parking near intersections (to off-street) (for all crash types and all severity) [http://www.cmfclearinghouse.org/study\\_detail.cfm?stid=73](http://www.cmfclearinghouse.org/study_detail.cfm?stid=73)

Issue #	Concerns Addressed:
1	Large crossing distance across JFK Boulevard
13	Sharp curve between Montgomery Street and Duncan Avenue
27	Same direction–rear end
25	Roadway environment encourages speeding



Example of recommendation D-2

This high-visibility painted median is texturized to increase surface friction. It visually narrows the road and provides increased guidance.  
(Source: Traffic Calming USA)

## E) Maintenance

Ref #	Recommendation Type	CMF	Cost	Safety Benefit	Jurisdiction
<b>Short Term</b>					
E-1	Check loops for Fairmount Avenue at JFK Boulevard, and repair them as needed.*		\$	Medium	County
E-2	Re-stripe all crosswalks and no parking areas on JFK Boulevard from Belmont Avenue to Communipaw Avenue.		\$	Medium	County
E-3	Replace the bus shelter on the southwest corner of the Duncan Avenue intersection.		\$\$	Low	Municipal
E-4	Repave certain sections along JFK Boulevard, especially at the Communipaw Avenue intersection.		\$\$	Medium /High	County

\*Has been addressed. See Appendix G for additional repairs.

Issue #	Concerns Addressed:
26	<b>Bus stop signage confusion and grouping</b>
20	<b>Faded crosswalk markings</b>
21	<b>Many potholes and uneven paving</b>
19	<b>Missing bus shelter</b>
18	<b>Missing or damaged signs</b>
17	<b>Abandoned utilities</b>

## Example Visualizations of Proposed Changes



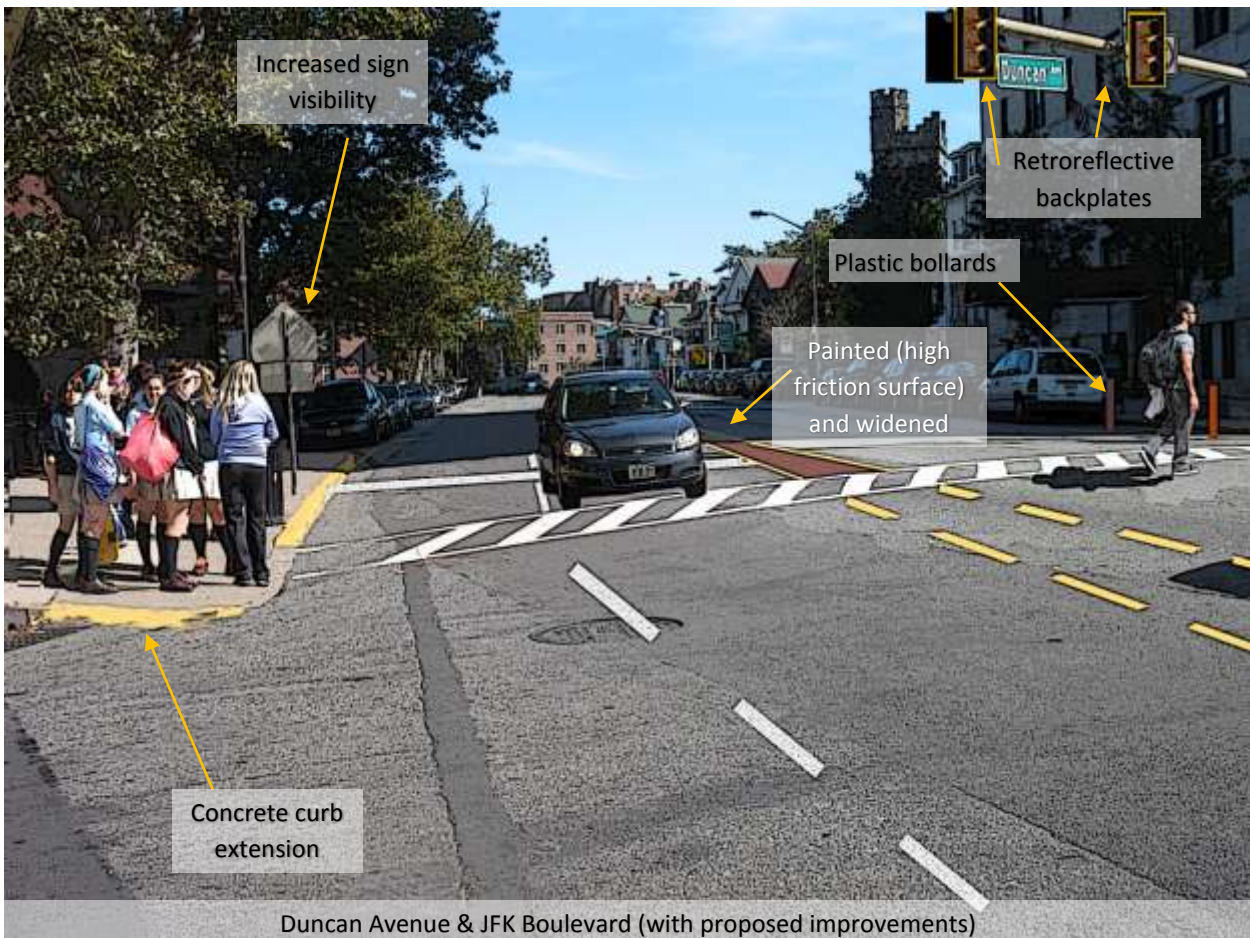
Duncan Avenue & JFK Boulevard (Current)

### Road Diet: Alternative 1

#### Short to Medium Term Improvements

Four-Lane cross-section with bulb-outs and narrower lanes.

Below is a visualization of some of the proposed improvements at Duncan Avenue & JFK Boulevard since it is here where the curve is most pronounced. The visualization also demonstrates a typical application of improvements that can be applied more systematically along the corridor.



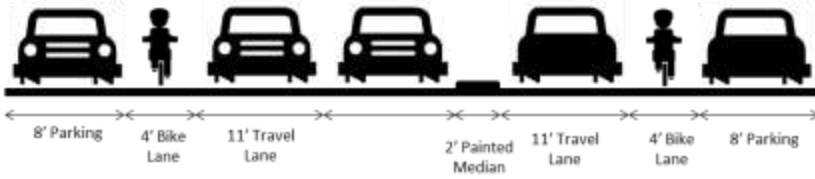
Duncan Avenue & JFK Boulevard (with proposed improvements)



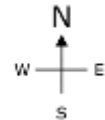
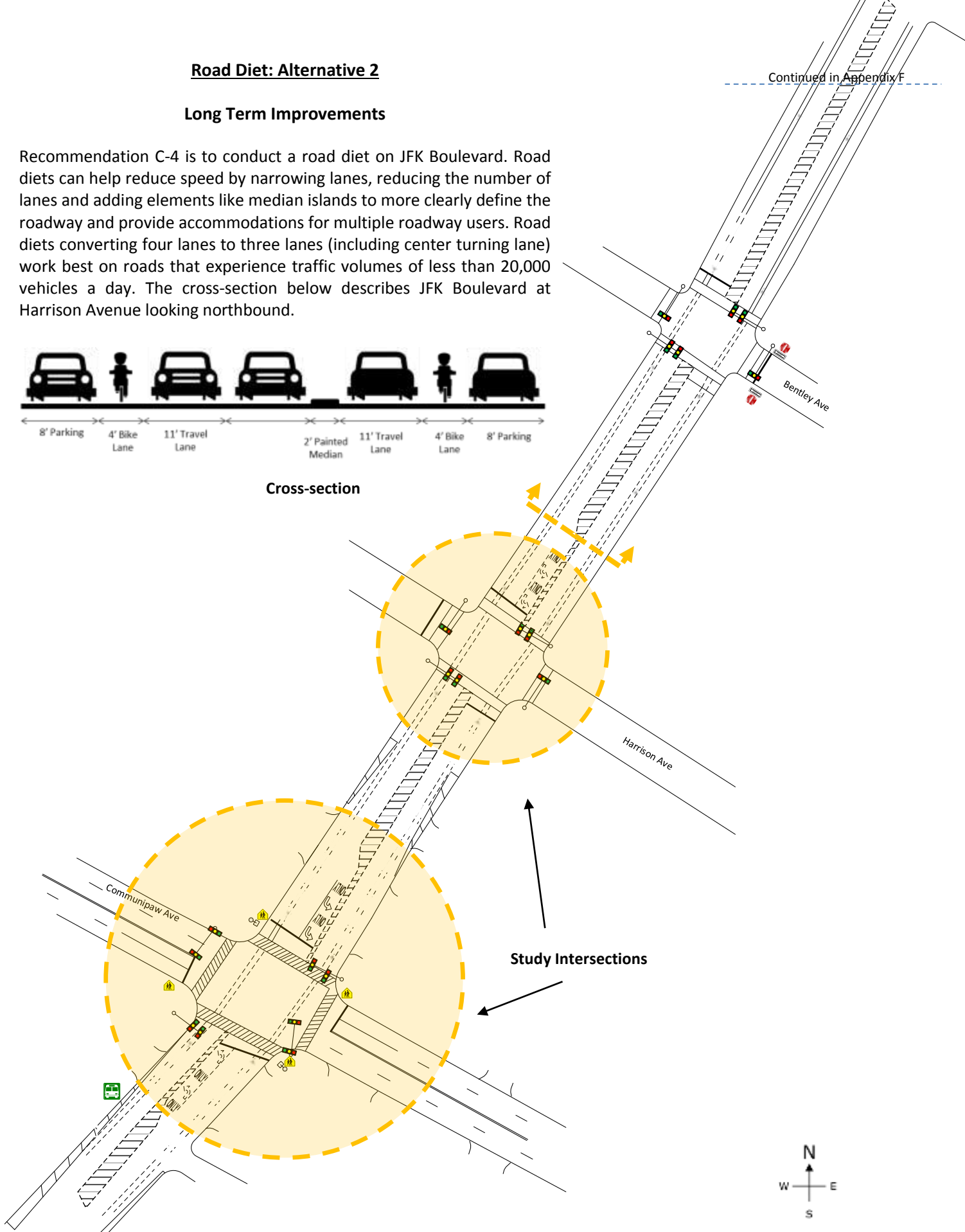
## Road Diet: Alternative 2

### Long Term Improvements

Recommendation C-4 is to conduct a road diet on JFK Boulevard. Road diets can help reduce speed by narrowing lanes, reducing the number of lanes and adding elements like median islands to more clearly define the roadway and provide accommodations for multiple roadway users. Road diets converting four lanes to three lanes (including center turning lane) work best on roads that experience traffic volumes of less than 20,000 vehicles a day. The cross-section below describes JFK Boulevard at Harrison Avenue looking northbound.



Cross-section



Not to scale

## Potential Funding Sources

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In this economy, budget constraints may hamper the implementation of some of these recommendations. Finding alternative funding sources is critical to ensuring the investment in the safety of the intersections' users.

### *A) Local Funding Sources*

#### **ROADWAY OWNER'S MAINTENANCE AND OPERATION BUDGET:**

Existing funds from local and county sources, as appropriate, which are allocated for investment in maintenance and operational activity, can be used to implement the above suggestions. Many of the above countermeasures may be eligible for the appropriate use of these existing funds. The manager of these funds who understands the full budget picture should be consulted.

### *B) State Funding Sources*

#### **NJDOT LOCAL AID DISTRICT 2, NEWARK (BERGEN, ESSEX, HUDSON, UNION):**

153 Halsey Street - 5th floor  
Newark, NJ 07102  
Phone: 973-877-1500  
Fax: 973-877-1556

#### **1. MUNICIPAL AID/URBAN AID PROGRAM (NJDOT Local Aid)**

This program has been a significant resource for municipalities in funding local transportation projects. All municipalities are eligible. The department continues to encourage municipalities to consider using the Municipal Aid Program to fund projects such as resurfacing, rehabilitation, or reconstruction and signalization.

<http://www.state.nj.us/transportation/business/localaid/municipaid.shtm>

#### **2. LOCAL AID INFRASTRUCTURE FUND (Discretionary Aid)**

Subject to funding appropriation, a discretionary fund is established to address emergencies and regional needs throughout the state. Any county or municipality may apply at any time. These projects are approved at the discretion of the commissioner. Payment of project costs is the same as the Municipal Aid Program. Under this program a county or municipality may also apply for funding for local pedestrian safety and bikeway projects.

<http://www.state.nj.us/transportation/business/localaid/descrfunding.shtm>

### 3. SAFE STREETS TO TRANSIT

This program provides funding to counties and municipalities in improving access to transit facilities and all modes of public transportation. The objectives of the SSTT program are:

- To improve the overall safety and accessibility for mass transit riders walking to transit facilities.
- To encourage mass transit users to walk to transit stations.
- To facilitate the implementation of projects and activities that will improve safety in the vicinity of transit facilities (approximately one-half mile for pedestrian improvements).

<http://www.state.nj.us/transportation/business/localaid/safe.shtm>

### 4. BIKEWAY

The NJDOT Bikeway Grant Program provides funds to counties and municipalities to promote bicycling as an alternate mode of transportation in New Jersey. A primary objective of the Bikeway Grant Program is to support the state's goal of constructing 1,000 new miles of dedicated bike paths. This program is available to every municipality and county throughout New Jersey.

<http://www.state.nj.us/transportation/business/localaid/bikewaysf.shtm>

### 5. TRANSIT VILLAGES

The Transit Village Grant Program is designed to assist municipalities who have been formally designated as Transit Villages. These are municipalities that have made a commitment to grow in the area surrounding a transit facility. The facility can service commuter rail, bus, ferry, or light rail. It funds projects within a half mile radius of major transit facilities.

**Contact:** Monica Etz  
Principal Planner Transportation  
NJDOT Statewide Planner

<http://www.state.nj.us/transportation/business/localaid/transitvillagef.shtm>

### 6. COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG)

This grant program provides funds for economic development, housing rehabilitation, community revitalization, and public facilities designated to benefit people of low and moderate income or prevent or eliminate slums and blight or to address recent local needs for which no other source of funding is available.

**Contact:**  
New Jersey Department of Community Affairs  
101 South Broad Street, PO Box 811, 5<sup>TH</sup> Floor  
Trenton, NJ 08625-0800  
Terry Schrider  
Phone: 609-633-6283  
Email: [terence.schrider@dca.state.nj.us](mailto:terence.schrider@dca.state.nj.us)  
<http://www.nj.gov/dca/divisions/dhcr/offices/cdbg.html>

### ***C) Federal Funding Sources – via NJDOT Office of Local Aid***

#### **CONTACT (SEE DETAILS UNDER STATE FUNDING SECTION):**

NJDOT Local Aid District 2, Newark (Bergen, Essex, Hudson, Union)

#### **SAFE ROUTES TO SCHOOLS (SRTS)**

The Safe Routes to Schools Program (SRTS) is a federally funded program and is administered by the State Departments of Transportation. This program provides funds to substantially improve the ability of primary and middle school students to walk and bicycle to school safely.

The purposes of the program are:

- to enable and encourage children, including those with disabilities, to walk and bicycle to school;
- to make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age;
- to facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity (approximately two miles) of primary and middle schools (grades K through 8).

The program establishes two distinct types of funding opportunities: infrastructure projects (the planning, design, and construction of engineering improvements) and non-infrastructure related activities (such as education, enforcement, and encouragement programs).

#### **Contact:**

Elise M Bremer-Nei  
Supervising Planner Transportation, NJDOT  
Statewide Planning

<http://www.state.nj.us/transportation/business/localaid/srts.shtm>

## ***D) Federal Funding Sources – via North Jersey Transportation Planning Authority (NJTPA)***

### **Contact:**

North Jersey Transportation Planning Authority  
One Newark Center, 17th Floor  
Newark, NJ 07102  
Phone: 973-639-8400  
Fax: 973-639-1953

### **1. LOCAL SAFETY PROGRAM**

The federally funded Local Safety Program (LSP) is a component of wider safety planning at the NJTPA, supporting construction of quick-fix, high-impact safety improvements on county and local roadway facilities in the NJTPA region. Projects supported by this program include new and upgraded traffic signals, signage, pedestrian indications, crosswalks, curb ramps, pavement markings, and other improvements to increase the safety of drivers, bicyclists, and pedestrians.

The Local Safety Program:

- typically addresses NJTPA and/or NJDOT derived high priority crash locations on county or local roadways;
- supports quick-fix projects, backed with detailed crash data, with minimal or no environmental or cultural resource impacts (eligible for programmatic categorical exclusion from FHWA);
- funds the construction phase of work only—planning, design, and right-of-way acquisition are the responsibility of the sponsor.

[http://www.njtpa.org/Project/Devel/local\\_safety/default.aspx](http://www.njtpa.org/Project/Devel/local_safety/default.aspx)

### **2. LOCAL CMAQ MOBILITY INITIATIVES**

The NJTPA has established the CMAQ Local Mobility Initiatives Program to promote a variety of initiatives to lessen the level of pollutants and greenhouse gases generated through the use of fossil fuels including ridesharing, transit usage, travel demand management, and traffic mitigation projects. Proposals must implement strategies and policies in the Regional Transportation Plan, Plan 2040.

<http://www.njtpa.org/Project/Mobility/Default.aspx>

### **3. LOCAL CONCEPT DEVELOPMENT PHASE of the LOCAL CAPITAL PROJECT DELIVERY PROGRAM**

[http://www.njtpa.org/Project/Devel/local\\_capital\\_program/local\\_concept/default.aspx](http://www.njtpa.org/Project/Devel/local_capital_program/local_concept/default.aspx)

The Local Capital Project Delivery Program (LCPD) provides federal funding for priority local projects. The LCD Phase involves drafting a well-defined and well-justified Purpose and Need Statement focusing on the primary transportation need to be addressed. The LCD Phase elements include, but are not limited to: data collection, coordination, development of a reasonable number of prudent and feasible conceptual alternatives, and investigation of all aspects of a project: environmental, right-of-way (ROW), access, utilities, design, community involvement, constructability, etc. at a “planning level of effort”, addressing requirements of the NJTPA Congestion Management Process (CMP).

#### 4. SUBREGIONAL STUDIES PROGRAM

This is a competitive program that provides two-year grants to individual subregions or subregional teams. The program is designed to assist subregions in refining and developing transportation improvement strategies rooted in the NJTPA's Regional Transportation Plan (RTP). Ultimately, the program aims to generate project concepts ready for further development or implementation consistent with the RTP and/or other transportation planning activities in the region.

[http://www.njtpa.org/Plan/Subregion/subregional\\_studies/default.aspx](http://www.njtpa.org/Plan/Subregion/subregional_studies/default.aspx)

#### 5. TRANSPORTATION ALTERNATIVES PROGRAM

This is new under MAP-21 and is currently under development at the NJDOT.

The Transportation Alternatives Program (TAP) provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, and environmental mitigation; recreational trail program projects; safe routes to school projects; and projects for the planning, design, or construction of boulevards and other roadways largely in the right-of-way of former interstate system routes or other divided highways.

<http://www.fhwa.dot.gov/map21/guidance/guidetap.cfm>

### *E) Federal Funding Sources – via NJ Department of Highway Traffic Safety*

**Contact:**

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The NJ Division of Highway Traffic Safety offers, on an annual basis, federal grant funding to agencies that wish to undertake programs designed to reduce motor vehicle crashes, injuries, and fatalities on the roads of New Jersey. Municipal, county, state government, and law enforcement agencies, as well as nonprofit organizations, are encouraged to apply for NJDHTS grant funding to address specific, local traffic safety issues.

<http://www.nj.gov/oag/hts/grants/index.html>

# Appendix A – Raw Crash Data

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***Communipaw Avenue & JFK Boulevard***

CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
3/9/2010	8:23 AM	Same Direction - Rear End	Clear	Pain	Daylight	0	Dry	0	2
3/15/2010	7:43 AM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Wet	0	2
3/20/2010	7:45 PM	Opposite Direction - Head On/Angular	Clear	PDO	Dark (Street Lights Off)	0	Dry	0	2
4/5/2010	2:35 PM	Fixed Object	Clear	PDO	Daylight	0	Dry	0	2
5/24/2010	8:37 AM	Right Angle	Clear	PDO	Daylight	0	Dry	0	2
7/18/2010	4:36 AM	Opposite Direction - Head On/Angular	Clear	PDO	Dawn	0	Snowy	0	2
8/2/2010	12:13 PM	Right Angle	Clear	PDO	Daylight	0	Dry	0	2
10/27/2010	5:23 PM	Same Direction - Side Swipe	Rain	PDO	Dark (Street Lights On/Continuous)	0	Dry	2	2
11/3/2010	8:35 AM	Right Angle	Clear	Pain	Daylight	0	Dry	0	1
11/19/2010	3:37 PM	Same Direction - Side Swipe	Clear		Dusk	0	Dry	0	2
1/31/2011	3:49 PM	Right Angle	Clear	PDO	Daylight	0	Wet	3	2
1/31/2011	5:20 PM	Left Turn / U - Turn	Clear	PDO	Dark (No Street Lights)	0	Dry	0	2
4/3/2011	5:17 AM	Same Direction - Side Swipe	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
4/6/2011	5:28 PM	Same Direction - Rear End	Overcast	PDO	Daylight	0	Dry	0	2
4/25/2011	7:18 PM	Left Turn / U - Turn	Clear	Pain	Daylight	0	Wet	0	2
6/4/2011	5:36 PM	Same Direction - Side Swipe	Overcast	PDO	Daylight	1	Dry	1	1
6/8/2011	7:58 AM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	0	2



CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
6/25/2011	12:28 AM	Left Turn / U - Turn	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	3
7/9/2011	7:14 PM	Right Angle	Clear	Pain	Daylight	0	Dry	0	2
7/10/2011	12:33 AM	Left Turn / U - Turn	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	2	2
9/14/2011	5:46 PM	Left Turn / U - Turn	Clear	PDO	Daylight	0	Dry	0	2
10/1/2011	2:50 PM	Right Angle	Overcast	PDO	Daylight	0	Dry	0	2
10/3/2011	1:20 PM	Left Turn / U - Turn	Overcast	PDO	Daylight	0	Dry	0	2
10/5/2011	6:50 AM	Right Angle	Clear	Pain	Dawn	0	Wet	0	2
10/9/2011	3:13 AM	Left Turn / U - Turn	Clear	Pain	Dark (Street Lights On/Continuous)	0	Dry	0	3
10/14/2011	4:06 PM	Left Turn / U - Turn	Rain	PDO	Daylight	0	Dry	1	3
10/26/2011	11:13 AM	Fixed Object	Clear	Incapacitating Injury	Daylight	0	Dry	1	3
11/5/2011	2:09 PM	Left Turn / U - Turn	Clear	PDO	Daylight	0	Dry	0	2
11/9/2011	12:35 PM	Left Turn / U - Turn	Clear	PDO	Daylight	0	Dry	0	2
11/17/2011	7:46 AM	Backing	Clear	PDO	Daylight	0	Dry	0	2
11/20/2011	10:52 PM	Same Direction - Side Swipe	Clear	PDO	Dark (Street Lights On/Continuous)	0	Wet	2	2
12/1/2011	10:02 AM	Left Turn / U - Turn	Clear	PDO	Daylight	0	Dry	0	2
12/2/2011	4:53 AM	Backing	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
12/22/2011	10:29 PM	Same Direction - Side Swipe	Rain	PDO	Dark (Street Lights On/Spot)	0	Dry	0	2
12/29/2011	5:56 PM	Same Direction - Side Swipe	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
1/1/2012	2:53 AM	Same Direction - Rear End	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2

CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
1/1/2012	1:18 AM	Pedalcyclist	Clear	Moderate Injury	Dark (Street Lights On/Continuous)	0	Dry	0	2
2/1/2012	10:55 AM	Right Angle	Clear	Pain	Daylight	0	Wet	2	2
2/3/2012	11:44 AM	Same Direction - Rear End	Clear	PDO	Daylight	0	Dry	1	2
2/13/2012	8:01 PM	Same Direction - Side Swipe	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
2/20/2012	6:46 PM	Left Turn / U - Turn	Clear	Moderate Injury	Dark (Street Lights On/Spot)	0	Dry	1	1
3/22/2012	4:10 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Dry	0	3
3/30/2012	3:23 PM	Pedestrian	Clear	Pain	Daylight	1	Dry	1	0
3/30/2012	3:23 PM	Pedestrian	Clear	Pain	Daylight	0	Dry	0	2
4/2/2012	5:44 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Wet	0	2
4/23/2012	9:05 AM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Wet	0	2
5/8/2012	7:12 PM	Same Direction - Side Swipe	Rain	PDO	Daylight	0	Dry	1	2
5/10/2012	7:45 AM	Same Direction - Rear End	Clear	PDO	Daylight	0	Wet	1	1
5/12/2012	4:30 PM	Right Angle	Clear	Pain	Daylight	0	Wet	0	2
5/21/2012	11:48 PM	Pedestrian	Rain	Pain	Dark (Street Lights On/Continuous)	0	Wet	0	2
5/24/2012	1:09 PM	Backing	Rain	PDO	Daylight	0	Dry	1	1
6/2/2012	1:32 AM	Same Direction - Rear End	Rain	PDO	Dark (Street Lights On/Continuous)	0	Wet	0	2
7/27/2012	9:55 PM	Pedestrian	Clear	Pain	Dark (Street Lights On/Continuous)	0	Dry	0	2

CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
8/12/2012	2:42 PM	Backing	Clear	PDO	Daylight	0	Dry	0	2
8/16/2012	11:15 AM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	0	2
8/28/2012	7:22 AM	Left Turn / U - Turn	Rain	PDO	Daylight	0	Snowy	0	2
8/30/2012	1:58 PM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	1	1
10/21/2012	11:40 AM	Same Direction - Rear End	Clear	PDO	Daylight	0	Wet	0	2
10/27/2012	12:23 AM	Left Turn / U - Turn	Clear	Moderate Injury	Dark (Street Lights On/Continuous)	0	Wet	0	2
11/5/2012	12:38 PM	Right Angle	Clear	PDO	Daylight	0	Dry	0	2
3/9/2010	8:23 AM	Same Direction - Rear End	Clear	Pain	Daylight	0	Dry	0	2
3/15/2010	7:43 AM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Wet	0	2
3/20/2010	7:45 PM	Opposite Direction - Head On/Angular	Clear	PDO	Dark (Street Lights Off)	0	Dry	0	2
4/5/2010	2:35 PM	Fixed Object	Clear	PDO	Daylight	0	Dry	0	2
5/24/2010	8:37 AM	Right Angle	Clear	PDO	Daylight	0	Dry	0	2
7/18/2010	4:36 AM	Opposite Direction - Head On/Angular	Clear	PDO	Dawn	0	Snowy	0	2
8/2/2010	12:13 PM	Right Angle	Clear	PDO	Daylight	0	Dry	0	2
10/27/2010	5:23 PM	Same Direction - Side Swipe	Rain	PDO	Dark (Street Lights On/Continuous)	0	Dry	2	2
11/3/2010	8:35 AM	Right Angle	Clear	Pain	Daylight	0	Dry	0	1
11/19/2010	3:37 PM	Same Direction - Side Swipe	Clear	PDO	Dusk	0	Dry	0	2
1/31/2011	3:49 PM	Right Angle	Clear	PDO	Daylight	0	Wet	3	2
1/31/2011	5:20 PM	Left Turn / U - Turn	Clear	PDO	Dark (No Street Lights)	0	Dry	0	2

CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
4/3/2011	5:17 AM	Same Direction - Side Swipe	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
4/6/2011	5:28 PM	Same Direction - Rear End	Overcast	PDO	Daylight	0	Dry	0	2
4/25/2011	7:18 PM	Left Turn / U - Turn	Clear	Pain	Daylight	0	Wet	0	2
6/4/2011	5:36 PM	Same Direction - Side Swipe	Overcast	PDO	Daylight	1	Dry	1	1
6/8/2011	7:58 AM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	0	2
6/25/2011	12:28 AM	Left Turn / U - Turn	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	3
7/9/2011	7:14 PM	Right Angle	Clear	Pain	Daylight	0	Dry	0	2
7/10/2011	12:33 AM	Left Turn / U - Turn	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	2	2
9/14/2011	5:46 PM	Left Turn / U - Turn	Clear	PDO	Daylight	0	Dry	0	2
10/1/2011	2:50 PM	Right Angle	Overcast	PDO	Daylight	0	Dry	0	2
10/3/2011	1:20 PM	Left Turn / U - Turn	Overcast	PDO	Daylight	0	Dry	0	2
10/5/2011	6:50 AM	Right Angle	Clear	Pain	Dawn	0	Wet	0	2
10/9/2011	3:13 AM	Left Turn / U - Turn	Clear	Pain	Dark (Street Lights On/Continuous)	0	Dry	0	3
10/14/2011	4:06 PM	Left Turn / U - Turn	Rain	PDO	Daylight	0	Dry	1	3
10/26/2011	11:13 AM	Fixed Object	Clear	Incapacitating Injury	Daylight	0	Dry	1	3
11/5/2011	2:09 PM	Left Turn / U - Turn	Clear	PDO	Daylight	0	Dry	0	2
11/9/2011	12:35 PM	Left Turn / U - Turn	Clear	PDO	Daylight	0	Dry	0	2
11/17/2011	7:46 AM	Backing	Clear	PDO	Daylight	0	Dry	0	2
11/20/2011	10:52 PM	Same Direction - Side Swipe	Clear	PDO	Dark (Street Lights On/Continuous)	0	Wet	2	2
12/1/2011	10:02 AM	Left Turn / U - Turn	Clear	PDO	Daylight	0	Dry	0	2

CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
12/2/2011	4:53 AM	Backing	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
12/22/2011	10:29 PM	Same Direction - Side Swipe	Rain	PDO	Dark (Street Lights On/Spot)	0	Dry	0	2
12/29/2011	5:56 PM	Same Direction - Side Swipe	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
1/1/2012	2:53 AM	Same Direction - Rear End	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
1/1/2012	1:18 AM	Pedalcyclist	Clear	Moderate Injury	Dark (Street Lights On/Continuous)	0	Dry	0	2
2/1/2012	10:55 AM	Right Angle	Clear	Pain	Daylight	0	Wet	2	2
2/3/2012	11:44 AM	Same Direction - Rear End	Clear	PDO	Daylight	0	Dry	1	2
2/13/2012	8:01 PM	Same Direction - Side Swipe	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
2/20/2012	6:46 PM	Left Turn / U - Turn	Clear	Moderate Injury	Dark (Street Lights On/Spot)	0	Dry	1	1
3/22/2012	4:10 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Dry	0	3
3/30/2012	3:23 PM	Pedestrian	Clear	Pain	Daylight	1	Dry	1	0
3/30/2012	3:23 PM	Pedestrian	Clear	Pain	Daylight	0	Dry	0	2
4/2/2012	5:44 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Wet	0	2
4/23/2012	9:05 AM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Wet	0	2
5/8/2012	7:12 PM	Same Direction - Side Swipe	Rain	PDO	Daylight	0	Dry	1	2
5/10/2012	7:45 AM	Same Direction - Rear End	Clear	PDO	Daylight	0	Wet	1	1

CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
5/12/2012	4:30 PM	Right Angle	Clear	Pain	Daylight	0	Wet	0	2
5/21/2012	11:48 PM	Pedestrian	Rain	Pain	Dark (Street Lights On/Continuous)	0	Wet	0	2
5/24/2012	1:09 PM	Backing	Rain	PDO	Daylight	0	Dry	1	1
6/2/2012	1:32 AM	Same Direction - Rear End	Rain	PDO	Dark (Street Lights On/Continuous)	0	Wet	0	2
7/27/2012	9:55 PM	Pedestrian	Clear	Pain	Dark (Street Lights On/Continuous)	0	Dry	0	2
8/12/2012	2:42 PM	Backing	Clear	PDO	Daylight	0	Dry	0	2
8/16/2012	11:15 AM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	0	2
8/28/2012	7:22 AM	Left Turn / U - Turn	Rain	PDO	Daylight	0	Snowy	0	2
8/30/2012	1:58 PM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	1	1
10/21/2012	11:40 AM	Same Direction - Rear End	Clear	PDO	Daylight	0	Wet	0	2
10/27/2012	12:23 AM	Left Turn / U - Turn	Clear	Moderate Injury	Dark (Street Lights On/Continuous)	0	Wet	0	2
11/5/2012	12:38 PM	Right Angle	Clear	PDO	Daylight	0	Dry	0	2



***Harrison Avenue & JFK Boulevard***

CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
6/10/2010	5:26 PM	Right Angle	Clear	PDO	Daylight	0	Dry	0	2
8/23/2010	1:38 PM	Right Angle	Rain	PDO	Daylight	0	Wet	0	2
9/12/2010	6:00 PM	Right Angle	Rain	Pain	Daylight	0	Dry	0	2
10/8/2010	2:11 PM	Struck Parked Vehicle	Clear	PDO	Daylight	0	Dry	0	2
1/25/2011	8:30 AM	Same Direction - Rear End	Snow	PDO	Daylight	0	Dry	0	2
1/26/2011	10:13 AM	Struck Parked Vehicle	Snow	PDO	Daylight	0	Snowy	0	3
4/2/2011	7:21 PM	Right Angle	Clear	PDO	Daylight	0	Dry	0	2
4/25/2011	3:45 PM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	0	2
4/25/2011	3:10 PM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	0	6
5/14/2011	1:50 PM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Wet	0	2
8/26/2011	8:43 AM	Right Angle	Clear	PDO	Daylight	0	Dry	0	2
9/2/2011	1:00 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Dry	2	2
10/6/2011	10:57 PM	Right Angle	Clear	Pain	Dark (Street Lights On/Continuous)	0	Dry	1	2
10/12/2011	9:13 AM	Same Direction - Side Swipe	Rain	PDO	Daylight	0	Dry	0	2
1/31/2012	7:35 PM	Right Angle	Clear	Pain	Dark (Street Lights On/Continuous)	0	Dry	0	2
3/19/2012	3:28 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Dry	0	3

CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
4/25/2012	8:44 PM	Left Turn / U - Turn	Clear	Pain	Dark (Street Lights On/Continuous)	0	Dry	2	4
8/17/2012	10:24 AM	Struck Parked Vehicle	Clear	PDO	Daylight	0	Dry	0	2
10/4/2012	7:19 AM	Left Turn / U - Turn	Clear	Moderate Injury	Daylight	0	Wet	0	2
12/11/2012	6:45 PM	Same Direction - Side Swipe	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
12/14/2012	6:12 PM	Left Turn / U - Turn	Clear	Pain	Dark (Street Lights On/Continuous)	0	Wet	0	2

### *Duncan Avenue & JFK Boulevard*

CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
1/18/2010	7:37 AM	Struck Parked Vehicle	Overcast	PDO	Daylight	0	Wet	0	2
2/5/2010	8:24 AM	Struck Parked Vehicle	Clear	PDO	Daylight	0	Dry	0	2
2/10/2010	3:36 PM	Struck Parked Vehicle	Snow	PDO	Daylight	0	Dry	0	2
4/27/2010	4:51 PM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	0	2
5/4/2010	8:09 AM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	3	2
5/5/2010	12:06 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Wet	0	2
6/2/2010	5:30 PM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	1	2
6/26/2010	2:39 AM	Same Direction - Side Swipe	Clear	PDO	Dark (No Street Lights)	0	Dry	0	2
7/13/2010	11:57 AM	Pedestrian	Rain	Moderate Injury	Daylight	1	Wet	1	1
8/6/2010	12:20 AM	Opposite Direction - Head On/Angular	Clear	Pain	Dark (Street Lights On/Continuous)	0	Dry	2	2
8/12/2010	4:42 PM	Fixed Object	Clear	PDO	Daylight	0	Wet	0	1
9/16/2010	4:49 PM	Same Direction - Rear End	Overcast	Pain	Daylight	0	Wet	0	2
1/1/2011	9:57 AM	Same Direction - Rear End	Clear	PDO	Daylight	0	Wet	0	2
6/26/2011	1:01 AM	Struck Parked Vehicle	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	1	2

CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
7/7/2011	6:09 PM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	0	2
9/29/2011	3:54 PM	Same Direction - Rear End	Rain	Pain	Daylight	0	Dry	0	2
10/5/2011	10:18 PM	Struck Parked Vehicle	Clear	Pain	Dark (Street Lights On/Continuous)	0	Dry	4	2
11/27/2011	6:26 AM	Fixed Object	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	1
12/9/2011	8:43 AM	Struck Parked Vehicle	Clear	PDO	Daylight	0	Dry	0	2
12/12/2011	3:30 PM	Same Direction - Rear End	Clear	PDO	Daylight	1	Wet	1	1
1/4/2012	8:57 PM	Same Direction - Side Swipe	Clear	Pain	Dark (Street Lights On/Continuous)	0	Dry	0	2
3/12/2012	7:50 PM	Same Direction - Side Swipe	Clear	Pain	Dark (Street Lights On/Continuous)	0	Wet	1	3
4/10/2012	12:29 PM	Same Direction - Side Swipe	Clear	Pain	Daylight	0	Wet	1	2
5/9/2012	11:57 PM	Same Direction - Rear End	Rain	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
5/21/2012	5:12 PM	Same Direction - Rear End	Rain	PDO	Dusk	0	Dry	0	2
6/4/2012	1:48 PM	Same Direction - Rear End	Overcast	PDO	Daylight	0	Wet	0	2
7/5/2012	2:29 PM	Pedalcyclist	Clear	Pain	Daylight	0	Dry	0	1
7/6/2012	6:40 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Wet	0	2
8/21/2012	3:38 PM	Right Angle	Clear	PDO	Daylight	0	Wet	0	2

CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
8/30/2012	8:10 AM	Same Direction - Side Swipe	Rain	PDO	Dark (Street Lights On/Spot)	0	Dry	2	2
9/27/2012	6:53 AM	Opposite Direction - Head On/Angular	Rain	Pain	Daylight	0	Dry	1	1
10/7/2012	3:26 AM	Struck Parked Vehicle	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
10/9/2012	7:32 AM	Same Direction - Rear End	Rain	Pain	Daylight	1	Dry	1	1
10/10/2012	5:53 PM	Same Direction - Rear End	Rain	Pain	Daylight	0	Wet	0	2
11/14/2012	6:13 PM	Same Direction - Rear End	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
12/3/2012	7:25 AM	Same Direction - Rear End	Clear	PDO	Daylight	0	Dry	4	2
12/3/2012	11:12 AM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	0	2
12/9/2012	4:04 PM	Same Direction - Rear End	Rain	PDO	Dusk	0	Dry	0	2
12/16/2012	1:40 AM	Fixed Object	Clear	PDO	Dark (No Street Lights)	0	Dry	1	2
12/21/2012	11:54 AM	Same Direction - Rear End	Overcast	Pain	Daylight	0	Dry	0	2

**Montgomery Street & JFK Boulevard**

CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
1/27/2010	1:48 PM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	1	2
2/3/2010	8:04 AM	Same Direction - Rear End	Clear	PDO	Daylight	0	Wet	0	2
4/3/2010	3:00 AM	Same Direction - Rear End	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
5/3/2010	1:45 PM	Same Direction - Rear End	Rain	Pain	Daylight	0	Dry	0	2
6/15/2010	8:10 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Dry	0	2
6/28/2010	5:35 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Dry	2	2
8/31/2010	5:22 PM	Struck Parked Vehicle	Clear	PDO	Daylight	0	Dry	0	2
9/27/2010	7:52 AM	Same Direction - Side Swipe	Rain	PDO	Daylight	1	Wet	1	1
9/27/2010	6:39 PM	Pedalcyclist	Rain	Moderate Injury	Dark (Street Lights On/Continuous)	0	Dry	0	2
3/7/2011	12:55 PM	Pedalcyclist	Clear	Pain	Daylight	0	Dry	0	2
4/28/2011	2:28 PM	Same Direction - Rear End	Rain	PDO	Daylight	0	NULL	0	2
5/20/2011	11:47 PM	Pedestrian	Clear	Pain	Dark (Street Lights On/Continuous)	0	Snowy	3	2
6/4/2011	12:05 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Wet	2	2
6/25/2011	2:07 PM	Right Angle	Clear	Pain	Daylight	0	Dry	0	2
7/15/2011	6:14 PM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	0	2



CRASH DATE	CRASH TIME	CRASH TYPE	Environmental Condition	EPDO	LIGHT CONDITION	PEDESTRIANS INJURED	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
9/4/2011	1:58 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Dry	0	2
9/19/2011	8:47 AM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Wet	0	2
10/4/2011	8:24 PM	Fixed Object	Clear	PDO	Dark (Street Lights On/Continuous)	0	NULL	4	2
10/28/2011	7:20 PM	Same Direction - Side Swipe	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
11/8/2011	1:09 PM	Same Direction - Rear End	Clear	Pain	Daylight	0	Wet	0	2
11/29/2011	5:33 PM	Opposite Direction - Head On/Angular	Rain	PDO	Dark (Street Lights On/Spot)	0	Wet	0	2
5/30/2012	9:27 PM	Pedalcyclist	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	1	2
7/31/2012	7:00 PM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	0	2
8/18/2012	1:35 PM	Same Direction - Rear End	Clear	PDO	Daylight	0	Dry	0	2
9/16/2012	8:24 PM	Pedalcyclist	Clear	Pain	Dark (Street Lights On/Continuous)	0	Dry	2	2
9/26/2012	8:57 AM	Same Direction - Side Swipe	Clear	PDO	Daylight	0	Dry	0	2
10/6/2012	9:37 PM	Same Direction - Rear End	Clear	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	3
11/7/2012	1:05 PM	Same Direction - Rear End	Snow	Pain	Daylight	0	Wet	0	2
12/9/2012	3:25 AM	Right Angle	Rain	PDO	Dark (Street Lights On/Continuous)	0	Dry	0	2
12/17/2012	6:35 AM	Same Direction - Rear End	Rain	PDO	Dark (Street Lights On/Continuous)	0	Dry	1	2



# Appendix B – Crash Diagrams

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# Communi paw Avenue & JFK Boulevard

## Same Direction - Side Swipe

<b>A</b>	6/8/11	7:58 AM	O	
	11/20/11	10:52 PM	O	
	4/23/12	9:05 AM	O	
	5/8/12	7:12 PM	O	
	8/2/10	12:13 PM	O	Turned right in front of bus, labeled as RA
<b>B</b>	6/1/12	3:57 PM	C	
	11/8/10	2:20 PM	O	
	2/21/11	1:39 PM	O	
	7/3/11	4:06 PM	O	
<b>C</b>	3/15/10	7:43 AM	O	
	11/19/10	3:37 PM	O	
	11/5/12	12:38 PM	O	Gas line b/c Sandy, labeled RA
<b>E</b>	6/4/11	5:36 PM	O	
<b>F</b>	12/22/11	10:29 PM	O	Passing bus
<b>G</b>	8/16/12	11:15 AM	O	Changing lane to pass stopped police
<b>I</b>	2/13/12	8:01 PM	O	Pulling out of Exxon
<b>L</b>	10/27/10	5:23 PM	O	Passing bus
	12/29/11	5:56 PM	O	
<b>K</b>	6/29/2012	1:09 PM	C	

## Left Turn

<b>L</b>	7/31/12	8:31 AM	O	Visibility blocked by trucks
	10/3/12	7:47 PM	O	
<b>M</b>	10/27/12	12:23 AM	B	
	6/25/11	12:28 AM	O	
	11/9/11	12:35 PM	O	
<b>N</b>	2/20/12	6:46 PM	B	
	4/25/11	7:18 PM	C	
	10/9/11	3:13 AM	C	
	10/5/11	6:50 AM	C	labeled RA
	1/31/11	5:20 PM	O	
	7/10/11	12:33 AM	O	
	11/5/11	2:09 PM	O	
	8/28/12	7:22 AM	O	
<b>O</b>	7/9/11	7:14 PM	C	Labeled RA
	10/3/11	1:20 PM	O	
	12/1/11	10:02 AM	O	
	3/20/10	7:45 PM	O	Labeled OD-H/A
	7/18/10	4:36 AM	O	Labeled OD-H/A
	10/1/11	2:50 PM	O	Labeled RA
<b>P</b>	6/23/10	4:16 PM	C	
	8/29/11	5:34 PM	O	
<b>Q</b>	11/3/10	8:35 AM	C	Labeled RA
	9/14/11	5:46 PM	O	
	5/24/10	8:37 AM	O	Labeled RA

## Same Direction - Rear End

<b>R</b>	9/13/11	1:43 PM	C	
	7/14/12	4:05 AM	O	
	5/29/10	4:41 AM	O	
	11/7/10	6:33 AM	O	
	1/12/12	5:29 PM	O	Stopped short b/c heard sirens
<b>S</b>	2/25/11	6:27 PM	O	
	6/2/12	1:32 AM	O	
<b>T</b>	3/22/12	4:10 PM	O	
	5/10/12	7:45 AM	O	
	10/21/12	11:40 AM	O	Exiting gas station
<b>U</b>	3/2/11	8:27 PM	C	
	8/28/10	12:14 AM	O	
	8/24/12	5:56 PM	O	
<b>V</b>	3/9/10	8:23 AM	C	
	1/1/12	2:53 AM	O	
<b>W</b>	5/29/12	1:17 PM	C	Involved truck
<b>X</b>	4/6/11	5:28 PM	O	Waiting for ped to cross Exxon driveway

## Right Angle

<b>Y</b>	03/25/11	10:45 PM	C	Exiting Walgreens
	09/21/10	9:02 AM	O	Exiting gas station
	9/5/12	2:07 PM	O	
<b>Z</b>	2/1/12	10:55 AM	C	Involved police vehicle
<b>a</b>	1/31/11	3:49 PM	O	To avoid hitting bus
<b>b</b>	7/15/11	6:10 PM	C	
<b>p</b>	2/13/11	6:23 AM	O	

## Backing

<b>C</b>	10/20/12	9:57 AM	O	
<b>e</b>	1/31/12	11:35 AM	C	From Exxon parking lot
	2/3/12	11:44 AM	O	Labeled as SR-R
<b>f</b>	5/24/12	1:09 PM	O	To avoid red light camera
	4/2/12	5:44 PM	O	To avoid red light camera
<b>g</b>	11/17/11	7:46 AM	O	Stalled vehicle
	12/2/11	4:53 AM	O	

## Pedestrian or Pedalcyclist

<b>h</b>	3/30/12	3:23 PM	C	
<b>i</b>	1/1/12	1:18 AM	B	
<b>j</b>	7/27/12	9:55 PM	C	
<b>k</b>	6/29/12	1:09 PM	C	
<b>l</b>	12/8/11	6:42 PM	C	
<b>n</b>	5/21/12	11:48 PM	C	

## Fixed Object

<b>q</b>	4/5/10	2:35 PM	O	Struck safety poles
<b>g</b>	8/20/12	8:18 AM	O	Struck crossing sign
<b>r</b>	10/26/11	11:13 AM	A	Fleeing suspect, hit building



## KEY

- Bus stop
- School crossing sign
- Plastic bollards
- Bus stop shelter

Crash severity uses KABCO scale: K- Fatal, A- Incapacitating injury, B- Non-incapacitating injury, C- Possible injury, O- Property damage only



Not to scale

## Harrison Avenue & JFK Boulevard

### Left Turn

<b>A</b>	10/4/12	7:19 AM	B
	4/25/12	8:44 PM	C
	12/14/12	6:12 PM	C

### Same Direction - Rear End

<b>B</b>	9/2/11	1:00 PM	O Had stopped to turn left
	3/19/12	3:28 PM	O
	10/12/12	3:28 PM	C Changed lane at intersection

<b>C</b>	1/25/11	8:30 AM	O
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### Right Angle

<b>E</b>	9/12/10	6:00 PM	C
	10/6/11	10:57 PM	C
	4/2/11	7:21 PM	O
	7/13/10	1:43 PM	C
<b>F</b>	1/31/12	7:35 PM	C
	8/26/11	8:43 AM	O
?	8/23/10	1:38 PM	O Direction of travel unclear

### Same Direction - Side Swipe

<b>G</b>	4/25/11	3:45 PM	O Pulling out of parking space
	4/25/11	3:10 PM	O Pulling out of parking space
	10/12/11	12:00 AM	O

<b>H</b>	5/14/11	1:50 PM	O
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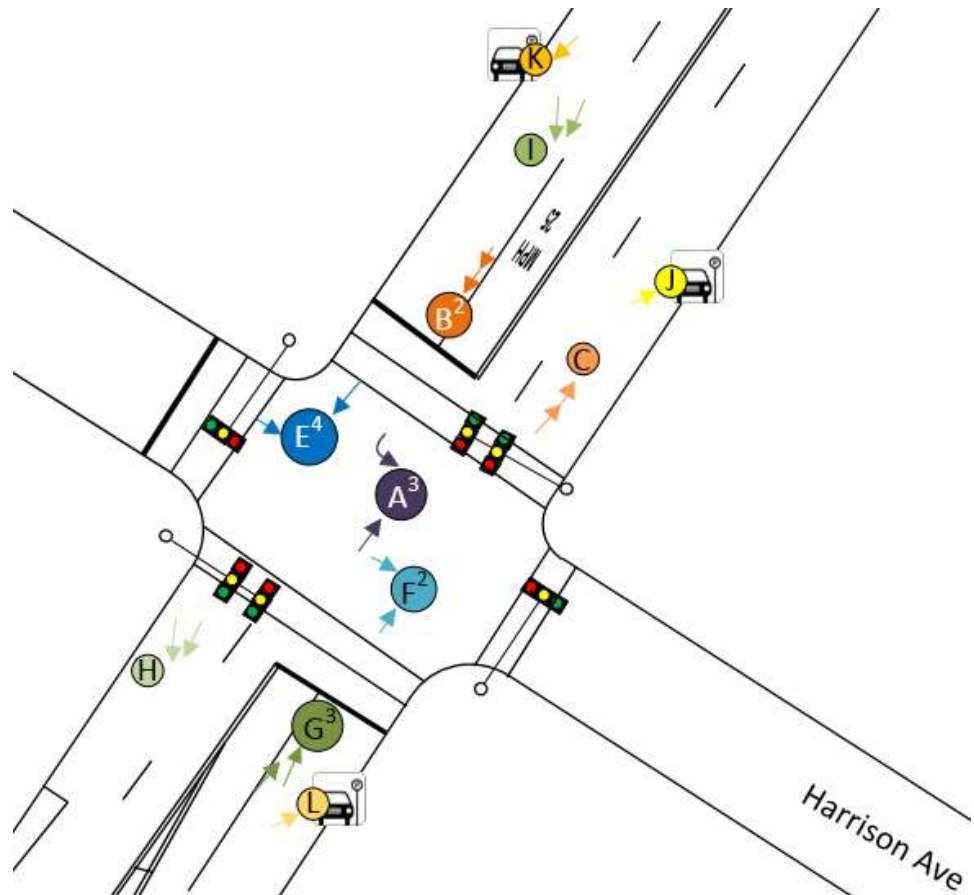
<b>I</b>	12/11/12	6:45 PM	O
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### Struck Parked Vehicle

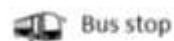
<b>J</b>	8/17/12	10:24 AM	O
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<b>K</b>	1/26/11	10:13 AM	O
----------	---------	----------	---

<b>L</b>	10/8/10	2:11 PM	O
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### KEY



Bus stop



School crossing sign



Plastic bollards



Bus stop shelter

Crash severity uses KABCO scale: K- Fatal, A- Incapacitating injury, B- Non-incapacitating injury, C- Possible injury, O- Property damage only



Not to scale

## Duncan Avenue & JFK Boulevard

### Same Direction - Rear End

A	5/5/10	12:06 PM	O
	1/1/11	9:57 AM	O
	12/12/11	3:30 PM	O
	5/9/12	11:57 PM	O
	5/21/12	5:12 PM	O
	6/4/12	1:48 PM	O
	7/6/12	6:40 PM	O
	11/14/12	6:13 PM	O
B	9/16/10	4:49 PM	C
	10/10/12	5:53 PM	C
	10/9/12	7:32 AM	C
	12/3/12	7:25 AM	O
	12/9/12	4:04 PM	O
C	9/29/11	3:54 PM	C

### Struck Parked Vehicle

D	10/5/11	10:18 PM	C
	6/26/10	2:39 AM	O Labeled as SD-SS
	6/26/11	1:01 AM	O
	10/7/12	3:26 AM	O
E	2/10/10	3:36 PM	O
	1/18/10	7:37 AM	O
F	12/9/11	8:43 AM	O

### Same Direction Side Swipe

G	4/27/10	4:51 PM	O
	6/2/10	5:30 PM	O Struck car was leaving parking space
	8/30/12	8:10 AM	O Involved bus
H	1/4/12	8:57 PM	C Struck car was leaving parking space
	7/7/11	6:09 PM	O
I	2/5/10	8:24 AM	O Labeled as SPV
	5/4/10	8:09 AM	O Struck car was leaving parking space

### Pedestrian or Pedalcyclist

J	7/5/12	2:29 PM	C Struck bike in crosswalk
K	7/13/10	11:57 AM	B Struck ped in crosswalk

### Opposite Direction - Head on/ Angular

L	8/6/10	12:20 AM	C
M	9/27/12	6:53 AM	C

### Fixed Object

N	8/12/10	4:42 PM	O Bus involved, struck light pole
O	12/16/12	1:40 AM	O Struck pots, bench and signpost
P	11/27/11	6:26 AM	O Struck fence and curb

### Right Angle

Q	8/21/12	3:38 PM	O First car had stopped for ped
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### Left Turn

R	3/12/12	7:50 PM	C Labeled as SD-SS, tried to U-Turn
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### KEY

	Bus stop		School crossing sign
	Plastic bollards		Bus stop shelter

Crash severity uses KABCO scale: K- Fatal, A- Incapacitating injury, B- Non-incapacitating injury, C- Possible injury, O- Property damage only



Not to scale



## Montgomery Street & JFK Boulevard

### Same Direction - Rear End

A	2/3/10	8:04 AM	O
	4/3/10	3:00 AM	O
	6/15/10	8:10 PM	O
	4/28/11	2:28 PM	O
	8/18/12	1:35 PM	O
B	10/12/12	3:28 PM	C
	11/8/11	1:09 PM	C
	11/7/12	1:05 PM	C Possibly weather-related
	6/4/11	12:05 PM	O
	9/4/11	1:58 PM	O Had stopped for ambulance
C	6/28/10	5:35 PM	O
	11/24/11	2:06 PM	O
	5/18/12	10:10 PM	O
D	5/3/10	1:45 PM	C
E	2/1/11	1:55 PM	O

### Right Angle

F	6/25/11	2:07 PM	C
	12/9/12	3:25 AM	O
G	3/3/10	2:31 PM	O

### Same Direction - Side Swipe

H	7/15/11	6:14 PM	O
	9/19/11	8:47 AM	O
I	9/27/10	7:52 AM	O
J	1/27/10	1:48 PM	O
	10/28/11	7:20 PM	O
K	7/31/12	7:00 PM	O
L	9/26/12	8:57 AM	O

### Pedestrian or Cyclist

M	2/1/10	8:22 AM	B
N	9/27/10	6:39 PM	B
O	1/18/12	10:22 AM	B Hit ped in crosswalk
P	3/7/11	12:55 PM	C
Q	5/20/11	11:47 PM	C Hit ped in crosswalk
R	5/30/12	9:27 PM	O
S	9/16/12	8:24 PM	C

### Opposite Direction - Head on/ Angular

T	11/29/11	5:33 PM	O
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### Backing

U	6/25/12	6:55 PM	O
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### Struck Park Vehicle

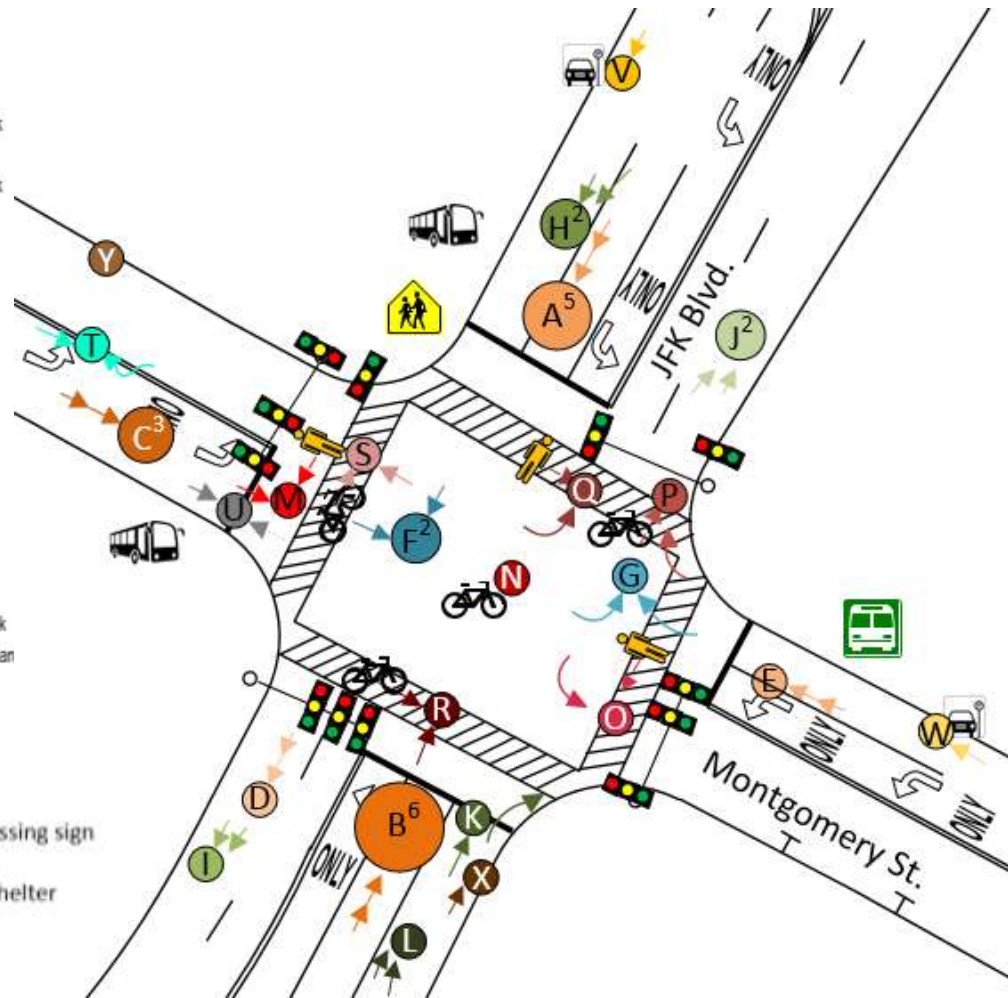
V	8/31/10	5:22 PM	O Struck open door
W	1/30/10	4:16 AM	O

### Fixed Object

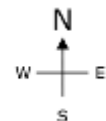
X	10/4/11	8:24 PM	O Struck hydrant
Y	9/6/10	2:00 PM	O While parking, struck meters, or returned an struck building

### KEY

	Bus stop		School crossing sign
	Plastic bollards		Bus stop shelter



Crash severity uses KABCO scale: K- Fatal, A- Incapacitating injury, B- Non-incapacitating injury, C- Possible injury, O- Property damage only



Not to scale

# Appendix C – Straight Line Diagram

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**ROUTE 501 (South to North)**

**Mile Posts: 29.000 - 32.000**



Pavement	46
Shoulder	0
Number of Lanes	4
Speed Limit	25
Street Name	Hudson Boulevard   JFK Boulevard
Interstate Route	287
US Route	22
NJ Route	21
County Road	689
Interchange Number	2
Grade Separated Interchange	
Traffic Signal	
Traffic Monitoring Sites	
Road Underpass	
Road Overpass	

Street Name	Hudson Boulevard	JFK Boulevard
Jurisdiction	County	County
Functional Class	Urban Minor Arterial	Urban Principal Arterial
Federal Aid - NHS Sy	NHS	NHS
Control Section		
Speed Limit	25	25
Number of Lanes	4	3   5   4
Med. Type	None	Curbed   None
Med. Width	0	VAR   0
Pavement	60	30   60
Shoulder	0	0
Traffic Volume	23,515 (2009)	
Traffic Sta. ID	3-4-405	
Structure No.		N/A   N/A
Enlarged Views		

**SRI = 0000501\_**

Date last inventoried: September 2006

Page Created: May 2010


# Appendix D – Bus Routes

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# 80

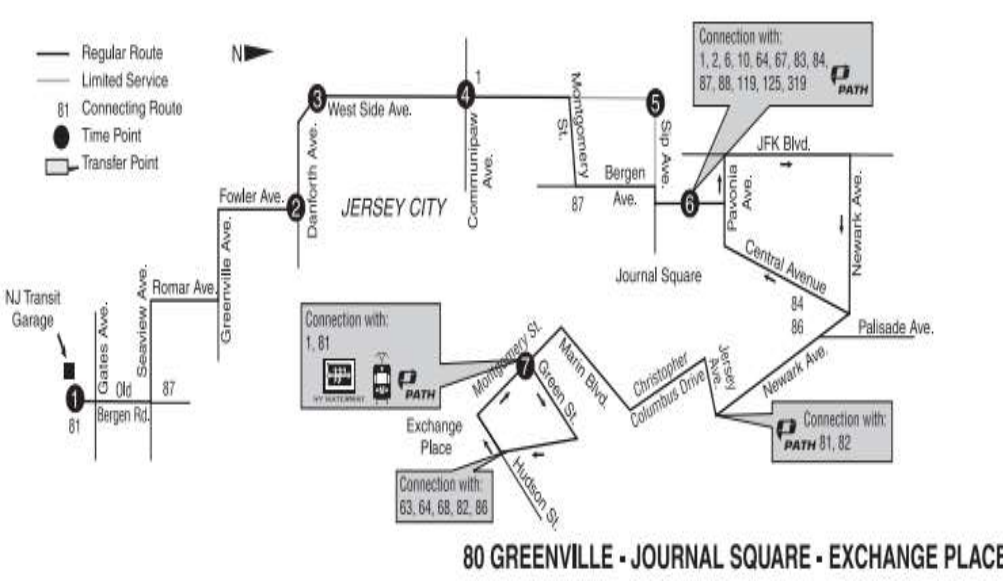


© JANUARY 2014  
NJ Transit  
NJ TRANSIT

**BUS** Greenville ↔ Journal Square ↔ Exchange Place  
Issued 8/31/13

**REGULAR SERVICE**  
 - Regular Route  
 - Limited Service  
 - 81 Connecting Route  
 - Time Point  
 - Transfer Point

**STATIONS**  
 - NJ TRANSIT  
 - PATH  
 - NJ TRANSIT



# 119

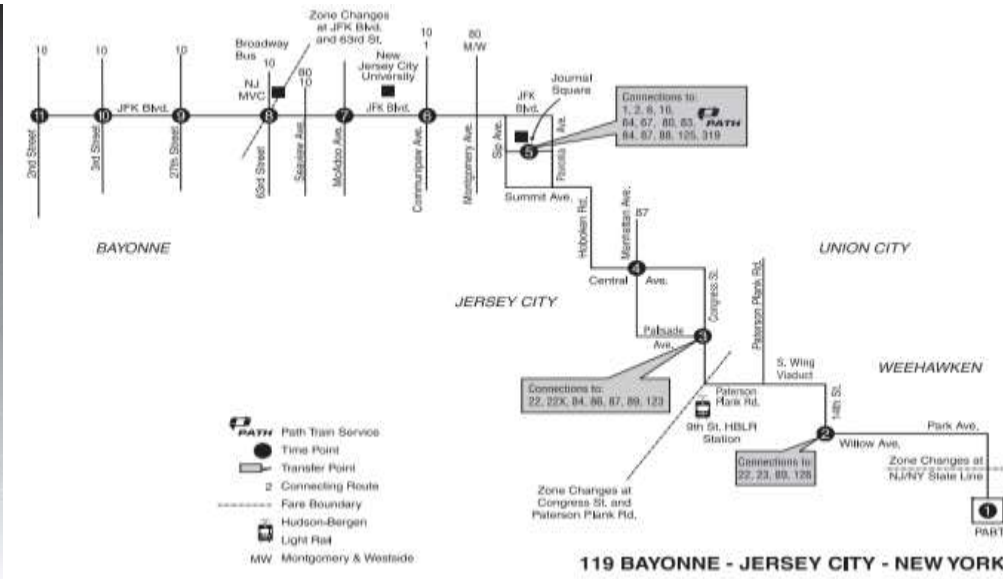


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NJ TRANSIT  
NJ TRANSIT

**BUS** Bayonne ↔ Jersey City ↔ New York  
Issued 8/31/13

**REGULAR SERVICE**  
 - Regular Route  
 - Limited Service  
 - 81 Connecting Route  
 - Time Point  
 - Transfer Point

**STATIONS**  
 - NJ TRANSIT  
 - PATH  
 - NJ TRANSIT





# Appendix E – Crash Tables

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## Communipaw Avenue & JFK Boulevard

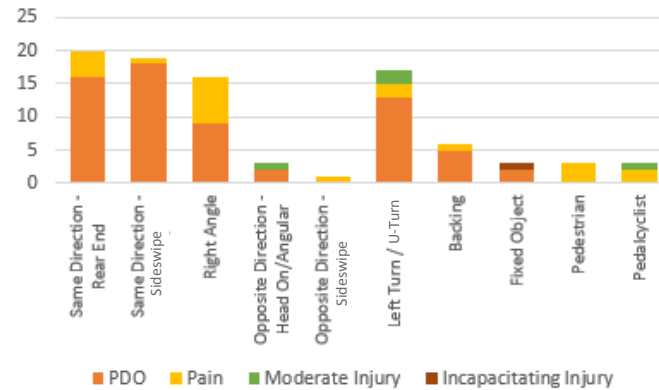
EPDO vs. Crash Type

	PDO	Pain	Moderate Injury	Incapacitating Injury	TOTALS
Same Direction - Rear End	16	4			20
Same Direction - Sideswipe	18	1			19
Right Angle	9	7			16
Opposite Direction - Head On/Angular	2		1		3
Opposite Direction - Sideswipe		1			1
Left Turn / U-Turn	13	2	2		17
Backing	5	1			6
Fixed Object	2			1	3
Pedestrian		3			3
Pedalcyclist		2	1		3
<b>TOTALS</b>	<b>66</b>	<b>21</b>	<b>4</b>	<b>1</b>	<b>92</b>

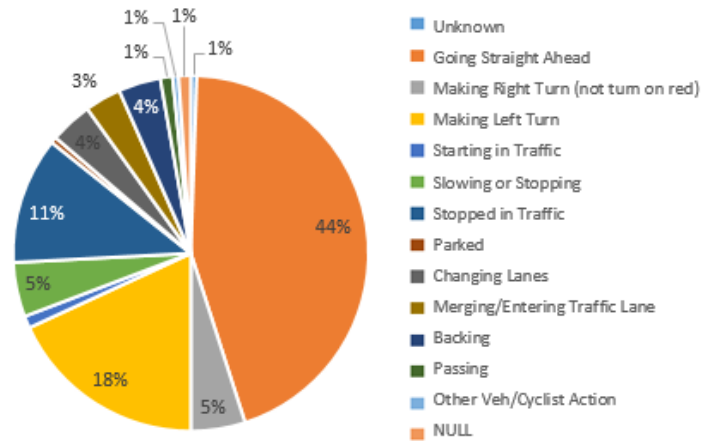
EPDO v. Pre-Crash Action

	PDO	Pain	Moderate Injury	Incapacitating Injury	TOTALS
Unknown	1				1
Going Straight Ahead	59	16	5	1	81
Making Right Turn (not turn on red)	8	1			9
Making Left Turn	22	9	2		33
Starting in Traffic	1	1			2
Slowing or Stopping	5	4			9
Stopped in Traffic	14	7			21
Parked	1				1
Changing Lanes	6	1			7
Merging/Entering Traffic Lane	4	2			6
Backing	6	1			7
Passing	2				2
Other Veh/Cyclist Action			1		1
NULL	1		1		2
<b>TOTALS</b>	<b>130</b>	<b>42</b>	<b>7</b>	<b>3</b>	

Crash Type and Severity



Pre-Crash Action



(Communipaw Avenue & JFK Boulevard continued)

*Pre-Crash Action vs. Contributing Circumstances*

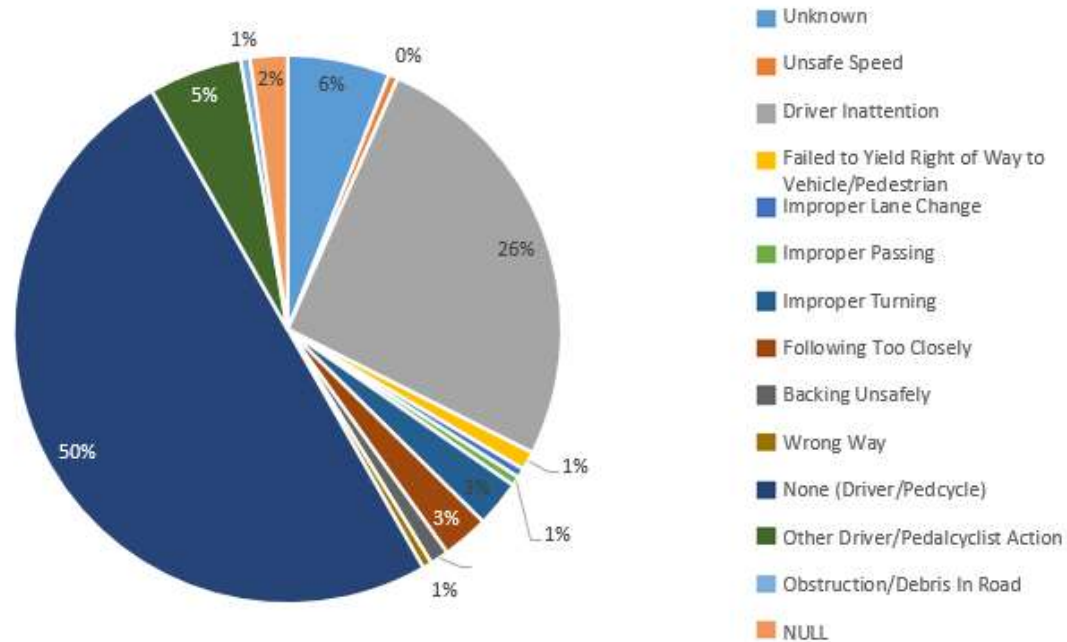
	Unknown	Going Straight Ahead	Making Right Turn (not turn on red)	Making Left Turn	Starting in Traffic	Slowing or Stopping	Stopped in Traffic	Parked	Changing Lanes	Merging/ Entering Traf Lane	Backing	Passing	Other Veh/ Cyclist Action	NULL	TOTALS
Unknown	1	7		3											11
Unsafe Speed		1													1
Driver Inattention		16	3	13	1	1	1		4	4	2	2			47
Failed to Yield Right of Way to Vehicle/Pedestrian		1		1											2
Improper Lane Change									1						1
Improper Passing				1											1
Improper Turning			1	4											5
Following Too Closely		3				2									5
Backing Unsafely											2				2
Wrong Way		1													1
None (Driver/Pedcycle)		47	4	9	1	6	18	1	1	1	2		1		91
Other Driver/Pedalcyclist Action		4	1				1			1	1		1	1	10
Obstruction/Debris In Road									1						1
NULL		1		2			1								4
<b>Totals</b>	<b>1</b>	<b>81</b>	<b>9</b>	<b>33</b>	<b>2</b>	<b>9</b>	<b>21</b>	<b>1</b>	<b>7</b>	<b>6</b>	<b>7</b>	<b>2</b>	<b>1</b>	<b>2</b>	

(Communiapaw Avenue & JFK Boulevard continued)

*Light Condition vs. Surface Condition*

	Dry	Wet	TOTALS
Daylight	48	11	59
Dawn	2		2
Dusk	2		2
Dark (Street Lights Off)	1	1	2
Dark (No Street Lights)	3	1	4
Dark (Street Lights On/Continuous)	17	3	20
Dark (Street Lights On/Spot)	4	2	6
<b>TOTALS</b>	<b>74</b>	<b>18</b>	<b>92</b>

Contributing Crash Circumstances

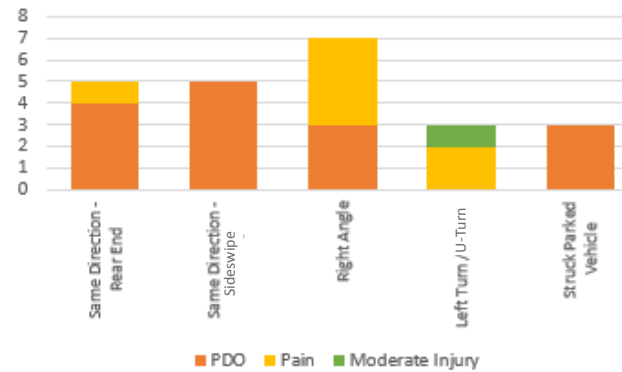


## Harrison Avenue & JFK Boulevard

*EPDO vs. Crash Type*

	PDO	Pain	Moderate Injury	TOTALS
Same Direction - Rear End	4	1		5
Same Direction - Sideswipe	5			5
Right Angle	3	4		7
Left Turn / U-Turn		2	1	3
Struck Parked Vehicle	3			3
<b>TOTALS</b>	<b>15</b>	<b>7</b>	<b>1</b>	<b>23</b>

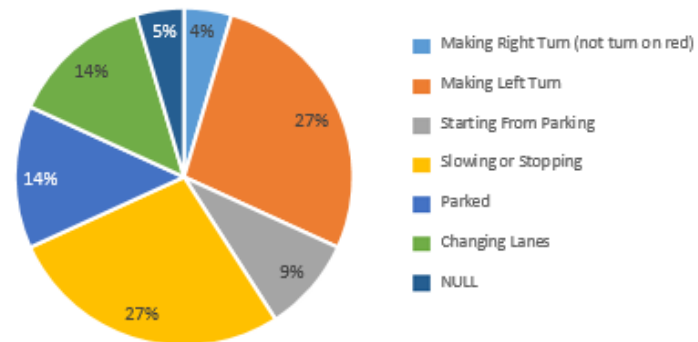
Crash Type and Severity



*EPDO v. Pre-Crash Action*

	PDO	Pain	Moderate Injury	TOTALS
Going Straight Ahead	15	9	1	25
Making Right Turn (not turn on red)	1			1
Making Left Turn	2	3	1	6
Starting From Parking	2			2
Slowing or Stopping	4	2		6
Parked	3			3
Changing Lanes	3			3
NULL	1			1
<b>TOTALS</b>	<b>31</b>	<b>14</b>	<b>2</b>	

Pre-Crash Action



(Harrison Avenue & JFK Boulevard continued)

*Pre-Crash Action vs. Contributing Circumstances*

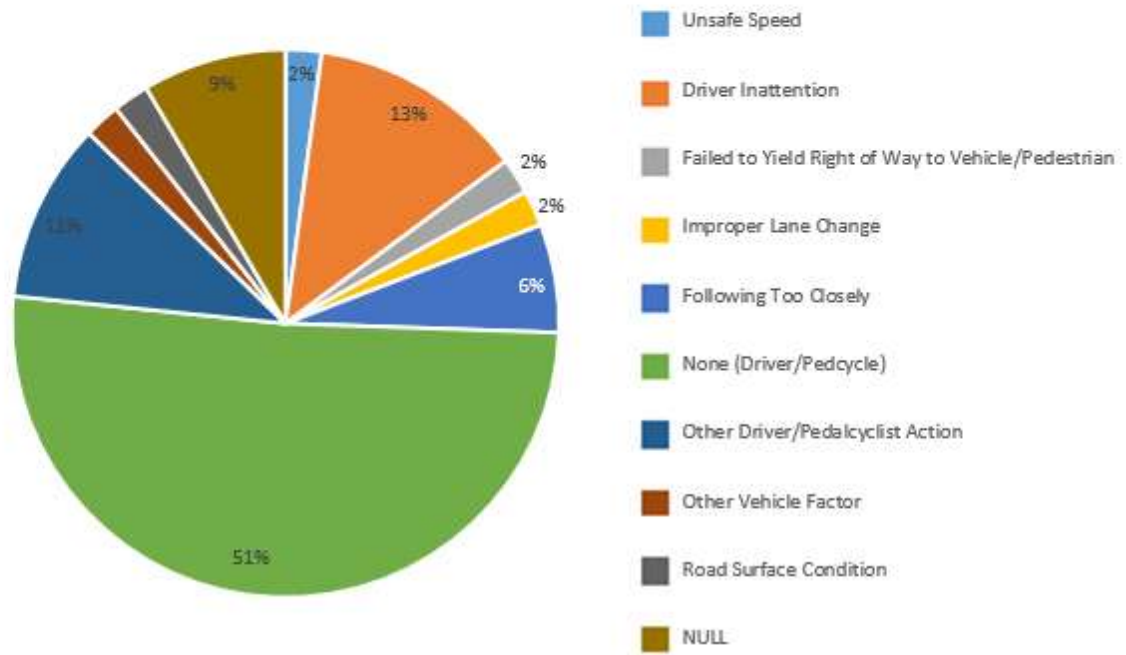
	Going Straight Ahead	Making Right Turn (not turn on red)	Making Left Turn	Starting From Parking	Slowing or Stopping	Parked	Changing Lanes	NULL	TOTALS
Unsafe Speed	1								1
Driver Inattention	5							1	6
Failed to Yield Right of Way to Vehicle/Pedestrian			1						1
Improper Lane Change							1		1
Following Too Closely	1				1		1		3
None (Driver/Pedcycle)	10		5	2	4	2	1		24
Other Driver/Pedalcyclist Action	4	1							5
Other Vehicle Factor	1								1
Road Surface Condition						1			1
NULL	3				1				4
<b>TOTALS</b>	<b>25</b>	<b>1</b>	<b>6</b>	<b>2</b>	<b>6</b>	<b>3</b>	<b>3</b>	<b>1</b>	

(Harrison Avenue & JFK Boulevard continued)

*Light Condition vs. Surface Condition*

	Dry	Wet	Snowy	TOTALS
Daylight	11	5	2	18
Dark (Street Lights On/ Continuous)	5			5
<b>TOTALS</b>	<b>16</b>	<b>5</b>	<b>2</b>	<b>23</b>

Contributing Crash Circumstances



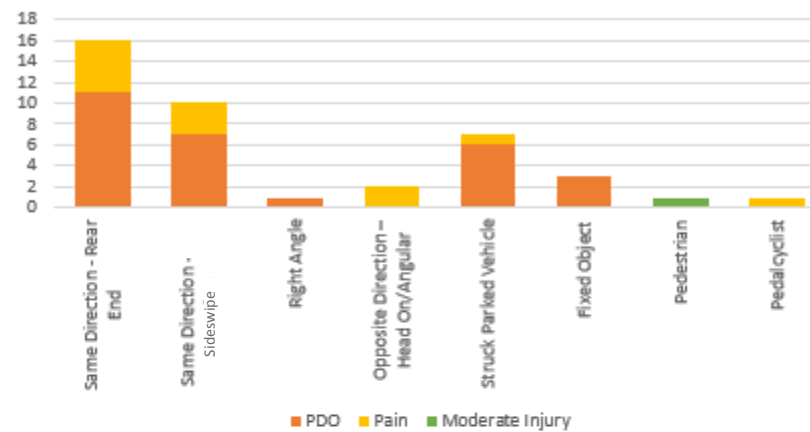


## Duncan Avenue & JFK Boulevard

EPDO vs. Crash Type

	PDO	Pain	Moderate Injury	TOTALS
Same Direction - Rear End	11	5		16
Same Direction - Sideswipe	7	3		10
Right Angle	1			1
Opposite Direction - Head On/Angular		2		2
Struck Parked Vehicle	6	1		7
Fixed Object	3			3
Pedestrian			1	1
Pedalcyclist		1		1
<b>TOTALS</b>	<b>28</b>	<b>12</b>	<b>1</b>	<b>41</b>

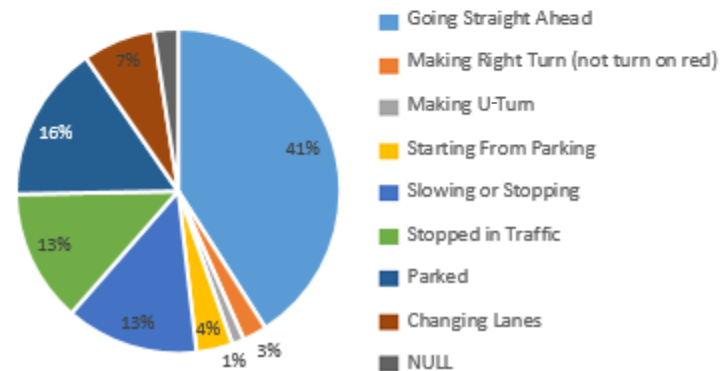
Crash Type and Severity



EPDO vs. Pre-Crash Action

	PDO	Pain	Moderate Injury	TOTALS
Going Straight Ahead	24	10		34
Making Right Turn (not turn on red)	1	1		2
Making U-Turn		1		1
Starting From Parking	2	1		3
Slowing or Stopping	7	4		11
Stopped in Traffic	7	4		11
Parked	11	2		13
Changing Lanes	4	2		6
NULL	1		1	2
<b>TOTALS</b>	<b>57</b>	<b>25</b>	<b>1</b>	

Pre-Crash Action



(Duncan Avenue & JFK Boulevard continued)

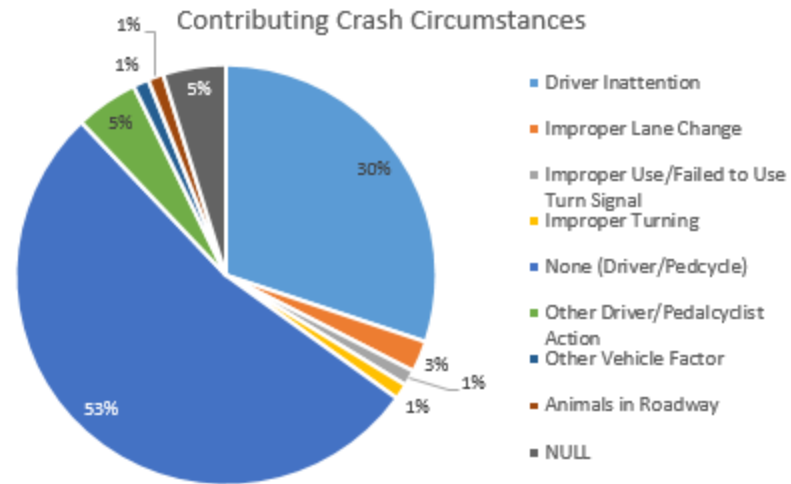
*Pre-Crash Action vs. Contributing Circumstances*

	Going Straight Ahead	Making Right Turn (not turn on red)	Making U Turn	Starting From Parking	Slowing or Stopping	Stopped in Traffic	Parked	Changing Lanes	NULL	TOTALS
Driver Inattention	18			2	3		1	1		25
Improper Lane Change								2		2
Improper Use/Failed to Use Turn Signal								1		1
Improper Turning			1							1
None (Driver/Pedcycle)	12	2		1	6	11	10	2		44
Other Driver/Pedalcyclist Action	3				1					4
Other Vehicle Factor							1			1
Animals in Roadway	1									1
NULL					1		1		2	4
<b>TOTALS</b>	<b>34</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>11</b>	<b>11</b>	<b>13</b>	<b>6</b>	<b>2</b>	

(Duncan Avenue & JFK Boulevard continued)

*Light Condition vs. Surface Condition*

	Dry	Wet	Snowy	TOTALS
Daylight	16	9	1	26
Dusk		2		2
Dark (No Street Lights)	2			2
Dark (Street Lights On/Continuous)	8	2		10
Dark (Street Lights On/Spot)	1			1
<b>TOTALS</b>	<b>27</b>	<b>13</b>	<b>1</b>	<b>41</b>

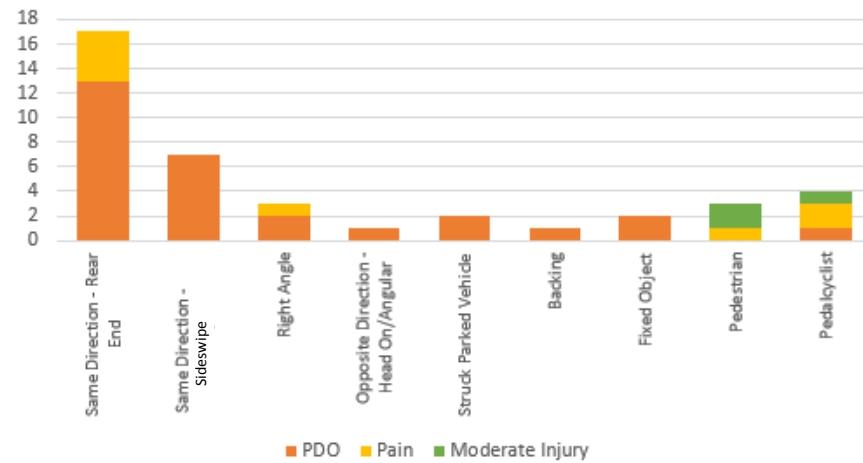


## Montgomery Street & JFK Boulevard

EPDO vs. Crash Type

	PDO	Pain	Moderate Injury	TOTALS
Same Direction - Rear End	13	4		17
Same Direction - Sideswipe	7			7
Right Angle	2	1		3
Opposite Direction - Head On/Angular	1			1
Struck Parked Vehicle	2			2
Backing	1			1
Fixed Object	2			2
Pedestrian		1	2	3
Pedalcyclist	1	2	1	4
<b>TOTALS</b>	<b>29</b>	<b>8</b>	<b>3</b>	<b>40</b>

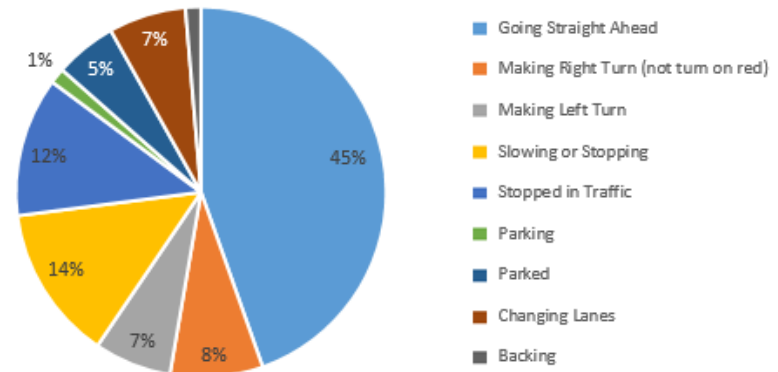
Crash Type and Severity



EPDO vs. Pre-Crash Action

	PDO	Pain	Moderate Injury	TOTALS
Going Straight Ahead	26	5	2	33
Making Right Turn (not turn on red)	3	3		6
Making Left Turn	3	1	1	5
Slowing or Stopping	5	5		10
Stopped in Traffic	9			9
Parking	1			1
Parked	4			4
Changing Lanes	5			5
Backing	1			1
<b>TOTALS</b>	<b>57</b>	<b>14</b>	<b>3</b>	

Pre-Crash Action



(Montgomery Street & JFK Boulevard continued)

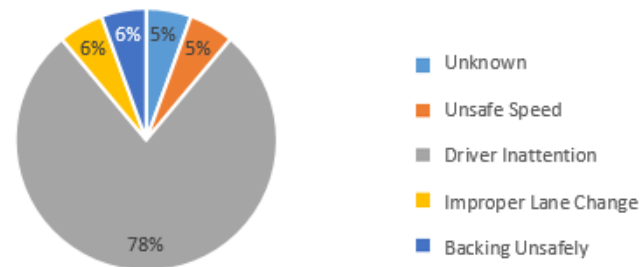
*Pre-Crash Action vs. Contributing Circumstances*

	Going Straight Ahead	Making Right Turn (not turn on red)	Making Left Turn	Slowing or Stopping	Stopped in Traffic	Parking	Parked	Changing Lanes	Backing	Totals
Unknown	1									1
Unsafe Speed	1									1
Driver Inattention	9		1	2		1		1		14
Improper Lane Change								1		1
Backing Unsafely									1	1
None (Driver/Pedcycle)	20	5	4	7	9		4	2		51
Other Driver/Pedalcyclist Action	1							1		2
NULL	1	1		1						3
	33	6	5	10	9	1	4	5	1	

*Light Condition vs. Surface Condition*

	Dry	Wet	Snowy	Icy	TOTALS
Daylight	21	4	1	1	27
Dusk	1				1
Dark (Street Lights On/Continuous)	8	3			11
Dark (Street Lights On/Spot)		1			1
<b>TOTALS</b>	30	8	1	1	40

Contributing Crash Circumstances



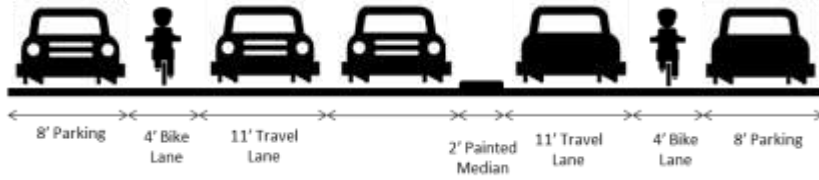
# Appendix F – Diagrams

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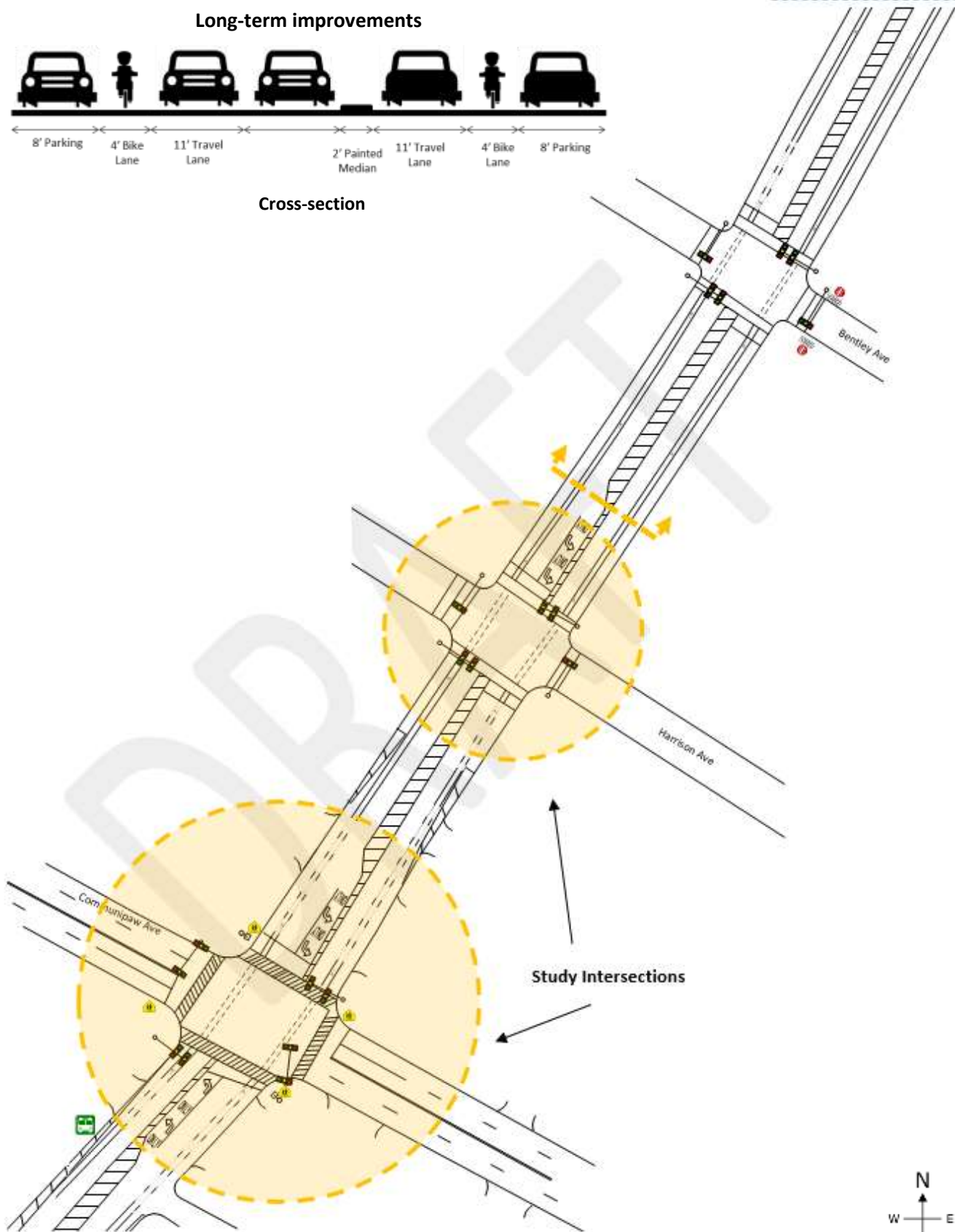
## Road Diet: Alternative 2

Explained in section  
"Implementing Recommendations"

### Long-term improvements

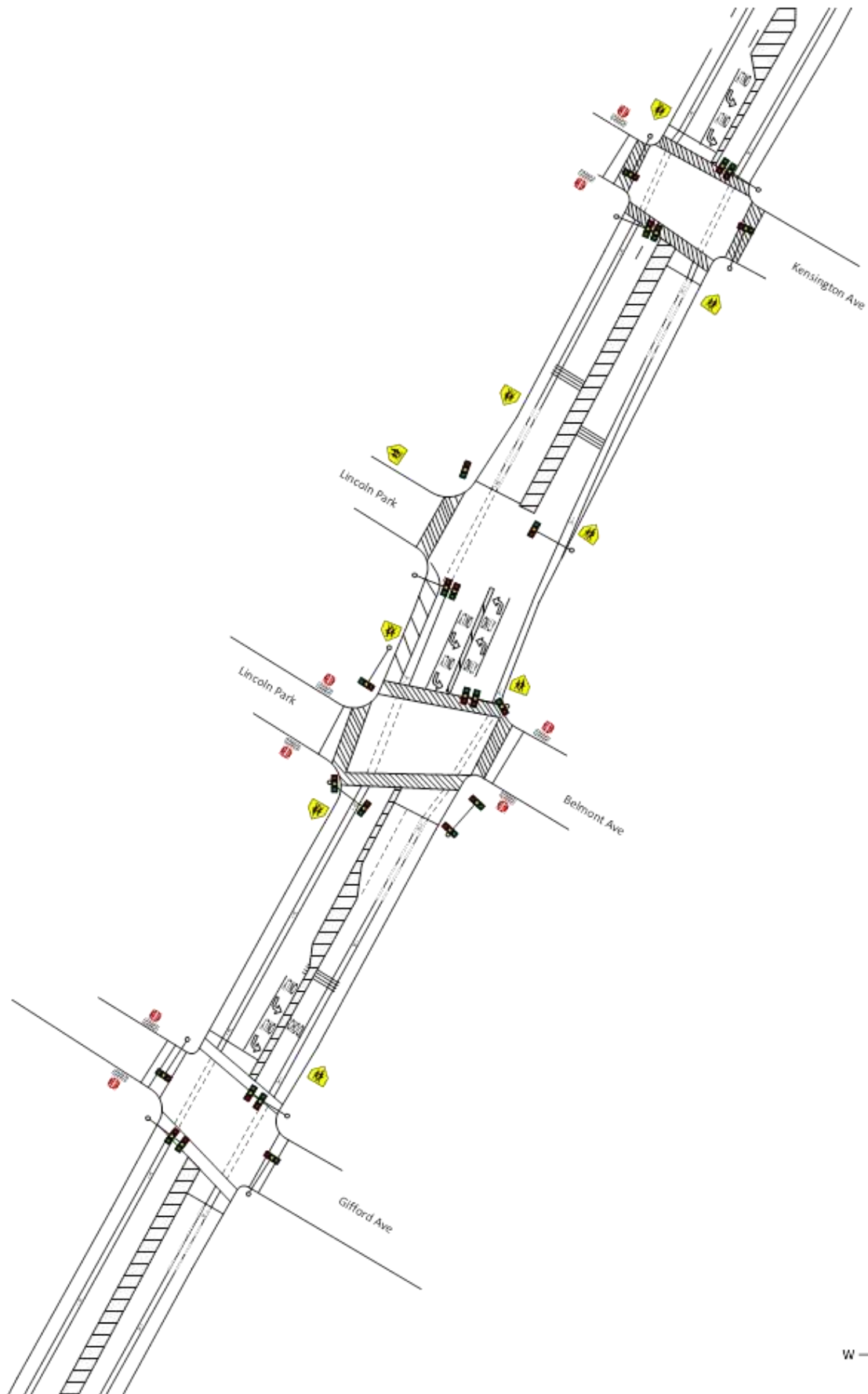


Cross-section



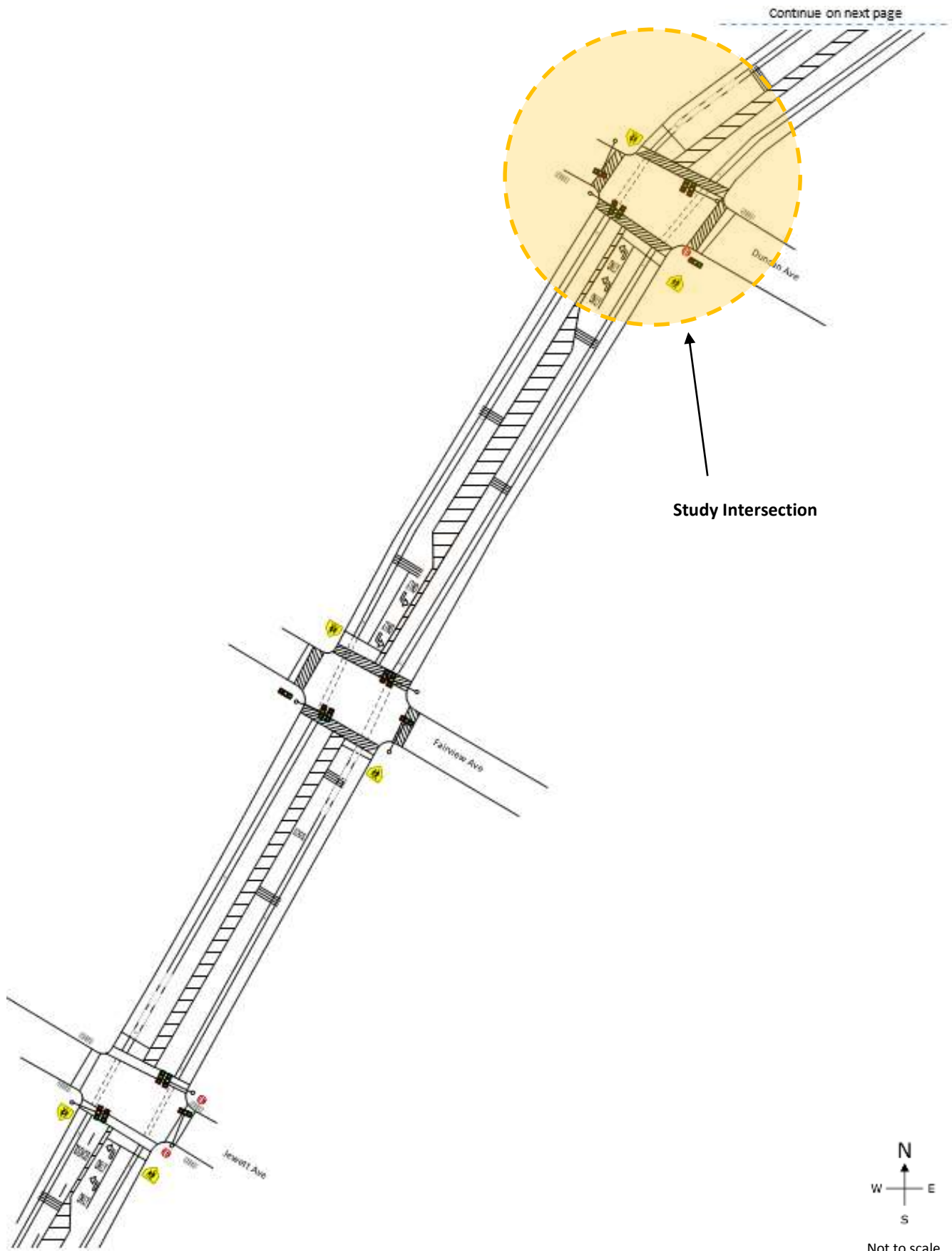
Not to scale





Not to scale

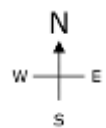
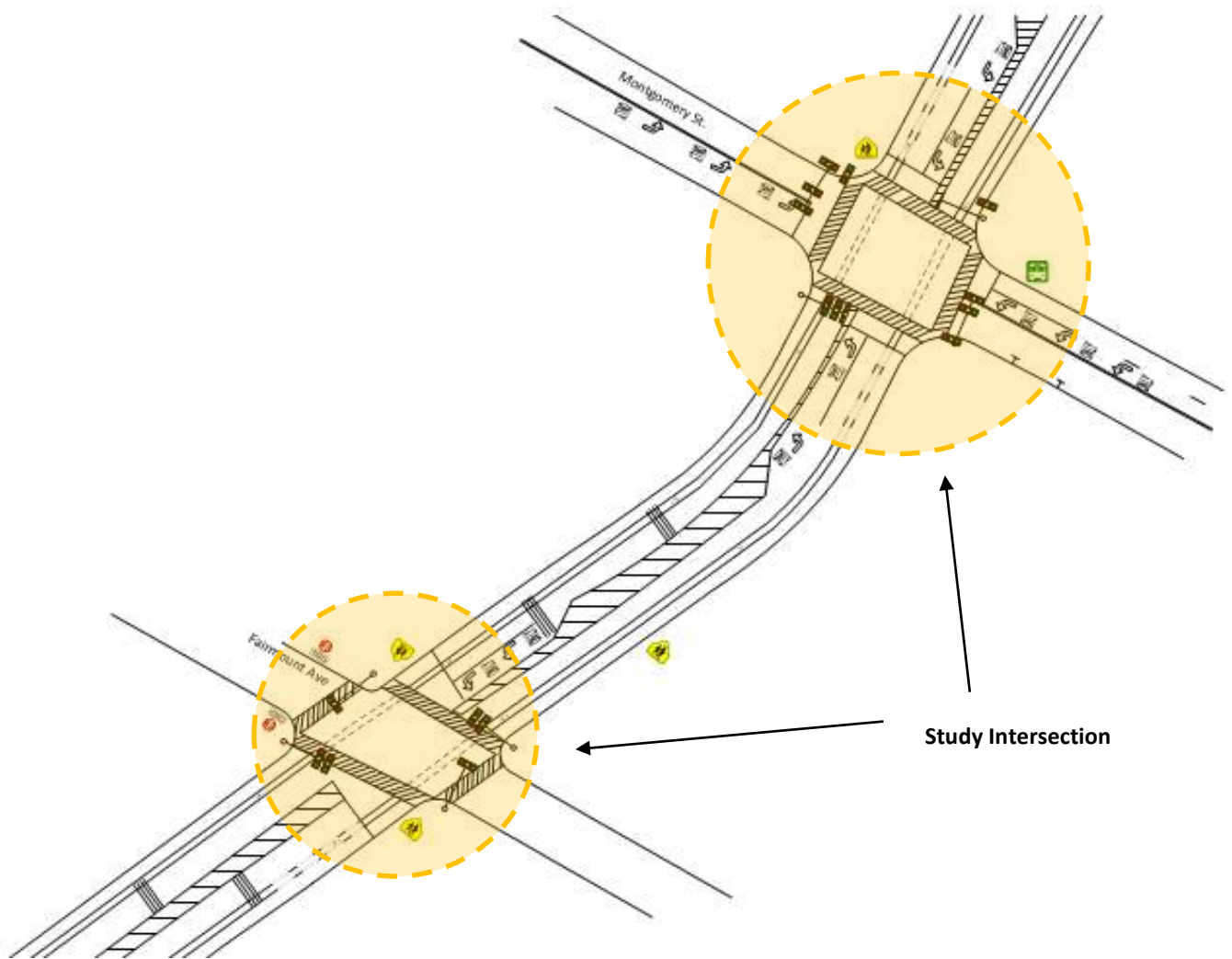
Continue on next page



Study Intersection



Not to scale



Not to scale

# **Appendix G – Improvements Since RSA**

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The Hudson County Maintenance Department has made the following repairs since the RSA:

- All push buttons within the RSA corridor have been repaired.
- Signs have been fixed.
- Trees have been trimmed.
- Potholes on JFK Boulevard northbound by Montgomery Street have been fixed.
- The loops at JFK Boulevard at Fairmount have been checked.
- The eastbound lead arrow (yellow arrow) have been repaired at JFK Boulevard and Communipaw Avenue.
- A 12-inch G/Y bi-modal signal head was installed at the northbound lead at JFK Boulevard and Duncan Avenue.