Safe Streets for Seniors

Greenpoint, Brooklyn

FINAL REPORT

September, 2011

NEW YORK CITY DOT

Janette Sadik-Khan, Commissioner

The RBA Group

Safe Streets for Seniors

GREENPOINT

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1 Project Description

1. PROJECT DESCRIPTION

Since 1990 the number of pedestrian fatalities in New York City has decreased by 56%. Moreover, prior to 1950, pedestrians accounted for three-fourths of all traffic fatalities and since then, that percentage has decreased to account for about one-half of all traffic fatalities. Despite these statistical improvements, pedestrians continue to be the largest at risk mode – with older adults more likely to suffer serious injuries or fatalities from traffic crashes than other pedestrians. The rate of pedestrian fatalities for every 100,000 persons in the City has decreased by nearly half since 1991 – to 2.0 from 3.8 – while the rate of senior pedestrian fatalities per 100,000 seniors has decreased even more sharply – to 6.6 from 13.1. Nevertheless, while seniors make up only 12% of the population in New York City, they still comprise 39% of pedestrian fatalities. The recognition of the disproportional representation of the senior population among severe pedestrian injuries and fatalities led to the development of the Department of Transportation's Safe Streets for Seniors (SSS) Program.

The purpose of this project is to address senior pedestrian safety issues at 25 Senior Pedestrian Focus Areas (SPFAs) in the five boroughs of New York City and to develop and implement mitigation measures to improve the safety of seniors and other pedestrians within the 25 SPFAs. DOT identified SPFAs to include the top senior pedestrian crash (severe injury and fatality) areas within each borough. Four of the SPFAs are located in the Bronx, seven in Brooklyn, five in Queens, eight in Manhattan and one in Staten Island. The SPFAs have been selected based on the density of senior pedestrian crashes resulting in fatalities or severe injuries in a five-year period. DOT conducted in-house studies for five pilot SPFAs and is utilizing consultant services to perform a comprehensive study of pedestrian safety conditions at intersections and along corridors within 20 selected SPFAs.

The project evaluates the crash history and existing traffic conditions and controls (e.g., roadway geometry, signal timing) at selected intersections and corridors within each SPFA in order to develop short- and long-term measures to reduce pedestrian crashes specifically for seniors, and improve safety and traffic operations for all users. DOT makes specific safety recommendations consisting of low-cost as well as capital engineering and design improvements for these 20 areas. In addition, DOT conducts data analysis as needed, prepares engineering and design schematics and related services, as necessary, for capital improvements.

2. BACKGROUND

Land-use in the Greenpoint Study Area is a mix of commercial and residential buildings. A senior center, BFFY Northside Senior Center, is located at North 6th Street between Bedford Avenue and Driggs Avenue.

A public park, McCarren Park, is located in the center of the study area and is bordered by Berry Street/Nassau Avenue, Manhattan Avenue, Bayard Street and North 12th Street.

There are three schools located near the study area:

- P.S. 34 Oliver H. Perry School at 131 Norman Avenue between Eckford Street and McGuinness Boulevard
- P.S. 31 Samuel F. Dupont School at 75 Meserole Avenue between Guernsey Street and Lorimer Street
- Automotive High School at 50 Bedford Avenue between North 12th Street and Lorimer Street

A medical center, New York Methodist Hospital: Family Health Centers, is located near the study area at 894 Manhattan Avenue between Greenpoint Avenue and Milton Street.

Bicycle Facilities

In the vicinity of Greenpoint Study Area, Berry Street, Driggs Avenue, Banker Street and Leonard Street have existing class 2 bike routes installed. In addition, Eckford Street is a NYC DOT 2010 Bicycle Master Plan planned/proposed route (Exhibit 2).

Truck Routes

McGuinness Boulevard, North 11th Street and North 10th Street are local truck routes in the vicinity of the study area (Exhibit 3).

Bus Lines and Subway

Three bus lines operate in the study area including:

- B61: Operates along Bedford Avenue, Driggs Avenue & Manhattan Avenue
- B43: Operates along Manhattan Avenue, Driggs Avenue & Graham Avenue
- B48, Operates along Nassau Avenue, Driggs Avenue & Lorimer Street

The G (Brooklyn-Queens Cross town) and L (14th Street-Canarsie) Local Lines run through the study area. A subway station for the G line is at the intersection of Nassau Avenue and Manhattan Avenue. A station for the L line is located at the intersection of Bedford Avenue and North 7th Street (Exhibit 4).

EXHIBIT 1 - AERIAL PHOTO

EXHIBIT 2 – BIKE MAP

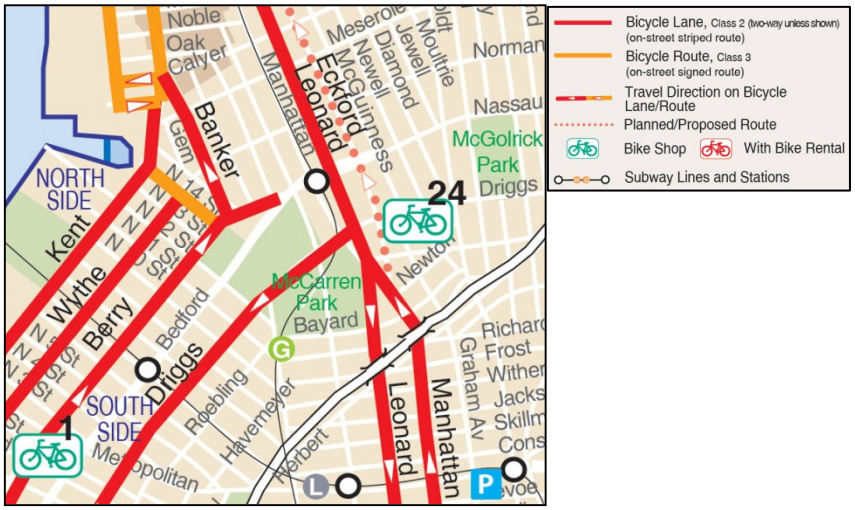


EXHIBIT 3 – TRUCK MAP

EXHIBIT 4 – TRANSIT MAP

3 Existing Conditions

3. EXISTING CONDITIONS

3.1 About the Study Area

The Greenpoint Study Area consists of one major north-south corridor, McGuinness Boulevard (Photo No. 1). The existing street geometry of McGuinness Boulevard includes four moving lanes, two in each direction with parking lanes on each side. There are medians separating the traffic directions as well as left-turn bays at many of the intersections.

There were several accidents in the study area, including eight senior pedestrian accidents between 2001 and 2006, two of which resulted in fatalities.

Photo No. 1: McGuinness Blvd. & Norman Ave.

In 2005, New York City's Department of City Planning approved a rezoning of 175 blocks in Greenpoint and Williamsburg. The rezoning is expected to bring approximately 16,700 new residents to the neighborhood by 2013, 7,300 new units of housing and a 28-acre waterfront park for recreational use. The Greenpoint Study Area's proximity to Manhattan, Mass Transit (L and G subway lines and B61, B43, B48, B24 Bus Service, see Exhibit 4) and expected construction has made the neighborhood one of the fastest growing in New York.

The combination of heavy traffic volumes, operational factors and geometric factors makes many of the streets, especially the McGuinness Boulevard corridor, difficult for a senior pedestrian to safely cross.

3.2 Field Observations and Pedestrians' Concerns

There were numerous issues that were repeatedly observed during the field visits and/or conveyed by senior pedestrians during interviews. Those issues are:

- Insufficient crossing time
- Turning vehicles not yielding to pedestrians
- Missing crosswalk striping
- Missing or non-standard ADA pedestrian ramps

4 Traffic Operations

4. TRAFFIC OPERATIONS

4.1 Crash Summary

Crash data was obtained from the New York City Department of Transportation (NYCDOT) in the Greenpoint Study Area from 2001 through 2006. This data provides some detail relating the circumstances and cause of each crash. Table 1 and Exhibit 5 show a summary of crashes.

Table 1: DMV Six Year Crash Summary (2001-2006)

INTERSECTION		SENIOR PEDESTRIAN CRASHES	SENIOR PEDESTRIAN FATALITIES
McGuinness Boulevard	Nassau Avenue	1	1
	Graham Avenue	1	0
Guernsey Street	Meserole Avenue	1	0
	Norman Avenue	1	1
Bedford Avenue	Manhattan Avenue	1	0
	North 12th Street	1	0
	North 5th Street	1	0
Driggs Avenue	North 7th Street	1	0
TOTAL		**8**	**2**

EXHIBIT 5 – PEDESTRIAN CRASH STATISTICS (2001-2006)

4 Traffic Operations

4.2 Traffic Volumes

The level of vehicle and pedestrian conflicts at the intersections utilized by senior pedestrians, in the Greenpoint Study Area, was assessed using traffic volume data collected at key locations in May of 2010 (Table 2).

Table 2: Traffic Volume Data

Locations	ATR[1]	TMC[2]	PED COUNTS
Banker Street & North 15th Street	x		x
North 7th Street between Bedford Avenue & Driggs Avenue	x		
North 7th Street & Driggs Avenue		x	x
Bedford Avenue & North 9th Street		x	x
Bedford Avenue & North 7th Street		x	x
Bedford Avenue & North 5th Street	x	x	x
Bedford Avenue & North 4th Street		x	x
Bedford Avenue & North 10th Street	x	x	x
Nassau Avenue & Banker Street	x		x

Notes:
1. Twenty-four hour Automatic Traffic Recorder (ATR)
2. Turning Movement Counts (TMC's)

The results of the ATR, TMC and pedestrian counts are included in Appendices A, B, C and the Technical Supplement.

4 Traffic Operations

4.3 Existing Level of Service

The common practices used to evaluate both un-signalized and signalized intersections are level-of-service (LOS), delay, and volume-to-capacity ratio (v/c). The intersections and corridors to be evaluated were selected based on the pedestrian crash locations and what was observed during the field visit. At some signalized intersections, delay and v/c were analyzed. The baseline conditions at a specific intersection are measured in the amount of time (delay) that a vehicle has to wait at that intersection. This delay is measured in seconds per vehicle (sec/veh) during the busiest one hour (peak hour) in both the morning (AM) and evening (PM), and referred to as total delay. Total delay is adjusted for additional accrued time due to traffic controls and queuing conditions. A volume-to-capacity ratio indicates the amount of congestion that occurs at a particular location. An intersection with a v/c that is greater than or equal to one proves that the traffic conditions are above or at capacity; whereas an intersection with a v/c less than one indicates that traffic operations are below capacity.

For un-signalized intersections, the level of service is determined by the time spent while the vehicle is not moving (stopped delay). The two approaches can be used to measure the average stopped delay, either by minor movements of the intersection as a whole or by lane grouping.

The results of existing level of service analysis for two key intersections in the study area during AM, PM and Saturday peak hours are indicated in Table 3. The detailed results of the analysis are included in Appendix D and the Technical Supplement.

Table 3: Existing (2010) Intersection Level of Service and Delays (sec)

Intersection	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
	v/c	Delay (sec/veh)	LOS	v/c	Delay (sec/veh)	LOS	v/c	Delay (sec/veh)	LOS
North 7th Street & Bedford Avenue	-	20.7	C	-	21.5	C	-	18.5	B
North 7th Street & Driggs Avenue	-	17.4	B	-	44.9	D	-	18.6	B

4 Traffic Operations

4.4 Signal Timing: Pedestrian Interval

According to MUTCD 2009 (Manual on Uniform Traffic Control Devices) Section 4E.06, a minimum of seven seconds is allocated for a walk interval, in addition to a pedestrian clearance time based on a walking speed of 3.5 feet per second. All signalized intersections in the study area were modified to provide a clearance interval of three feet per second to accommodate slower walking speeds.

NYCDOT was able to provide more crossing time at 54% of the signalized intersections in the Greenpoint Study Area.

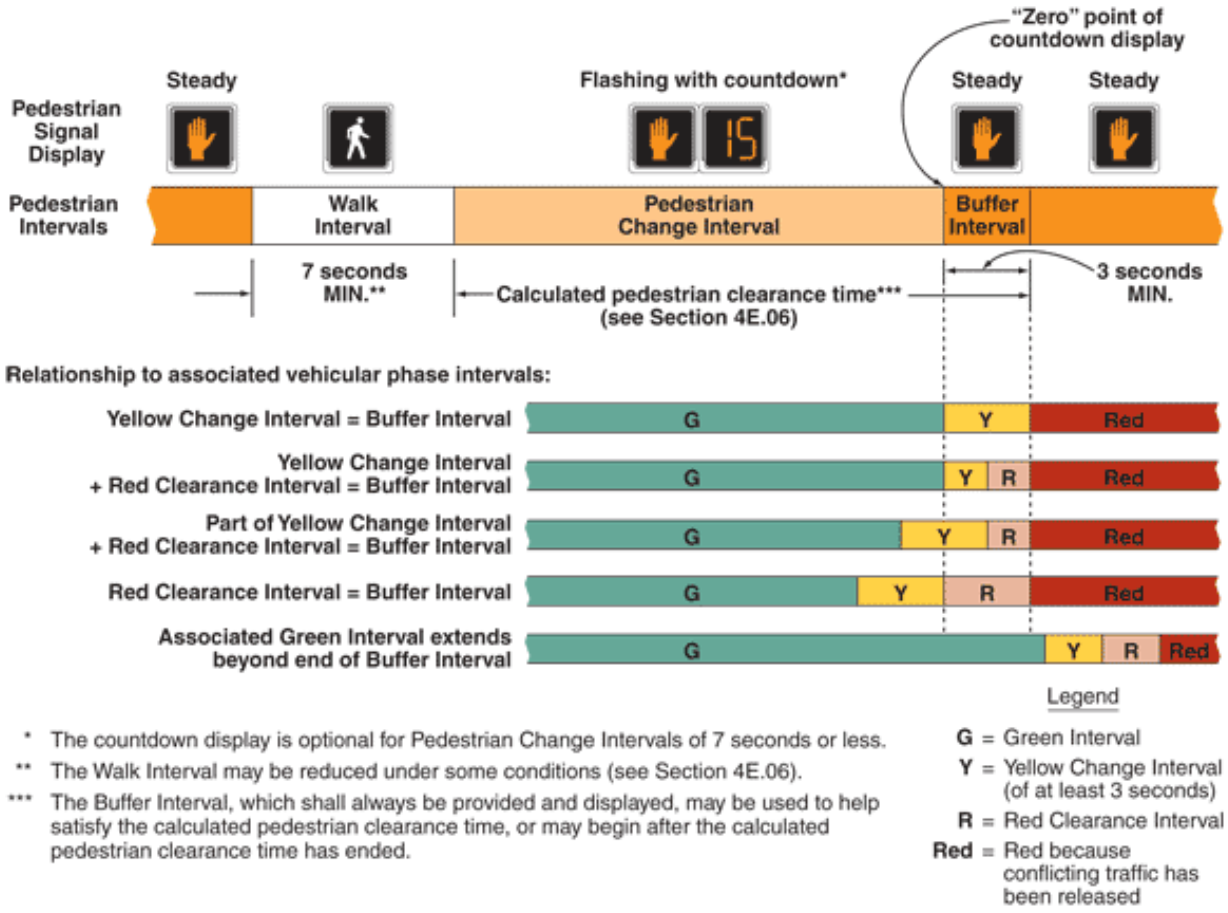


Figure No. 1: Pedestrian Intervals from MUTCD 2009

5 Illustrating The Solution

5. ILLUSTRATING THE SOLUTION

5.1 Executive Summary and General Recommendations

Table 4: Summary of Specific Recommendations

Section	Locations	Street Closure	Install Traffic Signal	Pedestrian Countdown signal	Reconstruct Corner Quadrants / Pedestrian Ramps	Raised Crosswalk	Right-turn Bay	Stripe Parking Lane	Stripe Blockbuster	Stripe Channelization	Stripe Bike Lane	Stripe High-visibility Crosswalk	Stripe Standard Crosswalk
5.2	N 7th St. & Bedford Ave.				x								
5.2	N 7th St. & Driggs Ave.				x								
5.3	Bedford Ave. & N 9th St.		x										x
5.3	Bedford Ave. & N 12th St.											x	
5.3	Driggs Ave. & N 12th St.											x	
5.3	Union Ave. btw Driggs Ave. & N 12th St.	x											
5.4	Nassau Ave. & Banker St.												x
5.4	Nassau Ave. & Dobbin St.												x
5.4	Nassau Ave. & Guernsey St.				x	x			x				
5.5	Eckford Street btw Greenpoint Ave. & Manhattan Ave.										x		
5.6	McGuinness Blvd. & Meserole Ave.			x									
5.6	McGuinness Blvd. & Norman Ave.			x									
5.6	McGuinness Blvd. & Nassau Ave.			x									
5.6	McGuinness Blvd. & Driggs Ave.			x									
5.6	McGuinness Blvd. & Graham Ave.									x			
5.6	McGuinness Blvd. btw Meserole Ave. & Driggs Ave.							x					

Note: x recommendations pending approval from NYCDOT

5 Illustrating The Solution

General Recommendations

- *Place stop bars ten feet in advance of all crosswalks*
  The NYCDOT standard for placement of a stop bar is 10 feet in advance of any marked pedestrian crosswalk, including school and high-visibility crosswalks. This helps to maximize pedestrian visibility and to minimize the potential for pedestrian/vehicle conflicts. Therefore, it is recommended that stop bars be placed ten feet in advance of all crosswalks.

- *Time all signals where feasible*
  Number of senior residents interviewed, indicated that there was not enough time to cross a lot of the streets. All the signals, where possible, will be retimed to allow more crossing time for pedestrians.

5 Illustrating The Solution

Photo No. 2: N 7th St. & Bedford Ave. (looking west)

5.2 North 7th Street

North 7th Street is a 30-foot wide southbound street with one moving lane and parking on both sides. The intersections of North 7th Street and Bedford Avenue and North 7th Street and Driggs Avenue have heavy vehicular and pedestrian volumes (Photo No. 2). Pedestrians were observed crossing midblock and ignoring the traffic signal and many seniors raised concerns about these particular intersections. Additional pedestrian traffic is generated from the 'L' Train entrances/exits at the northeast and southeast corners of both intersections. There is also a bus stop for the B61 line on the east leg of Bedford Avenue and on the east leg of Driggs Avenue.

Traffic data was collected along North 7th Street and synchro analysis was conducted to evaluate the level of service at these intersections (Table 5). In order to improve pedestrian safety and reduce pedestrian and vehicular conflicts, a 10-second pedestrian phase was evaluated at both intersections to facilitate pedestrians crossing North 7th Street, Bedford Avenue and Driggs Avenue. The analysis indicated that an all pedestrian phase is not feasible at these intersections. Detailed analysis is presented in Appendix D.

The pedestrian ramps on the northeast corner of North 7th Street and Bedford Avenue should be replaced with new NYCDOT standard pedestrian ramps and ADA safety surfaces.

The northeast and the southeast corners of North 7th Street and Driggs Avenue are missing pedestrian ramps. NYCDOT standard pedestrian ramp and ADA safety surfaces are recommended at these locations. On the northeast corner, a street light may need to be relocated to accommodate the ramps (Photo No. 3).

Photo No. 3: N 7th St. & Driggs Ave. (northeast corner)

5 Illustrating The Solution

5.3 Bedford Avenue

Bedford Avenue is a 30-foot wide eastbound street with one moving lane and parking on both sides. It is lined with commercial stores, restaurants and residential housing and has heavy pedestrian volume. Bedford Avenue is also a bus route (Exhibit 4) and there are bus stops located every two blocks within the study area.

Bedford Avenue is uncontrolled at the intersection of Bedford Avenue and North 4th Street and North 9th Street. NYCDOT collected TMC and pedestrian counts (see Appendix B & C) at these intersections. The traffic counts showed that the combination of the vehicular and pedestrian volumes at North 4th Street is especially high during the PM peak hour partially because this is also a school crossing. However, the analysis showed that an all-way stop is not feasible at the intersection of Bedford Avenue and North 4th Street.

Between North 7th Street and North 12th Street, a distance of 1235 feet, there are no controlled crosswalks for crossing Bedford Avenue. It is recommended that a controlled crossing be located within this distance to facilitate a safe pedestrian crossing for seniors. Since it is preferred this crossing is central and at a location near a bus stop, a signal is recommended at North 9th Street. This recommendation is pending approval from NYCDOT. Traffic volume data to support this recommendation are located in appendices A, B and C.

At the intersections of North 12th Street and both Bedford Avenue and Driggs Avenue, high visibility crosswalks are recommended for all four legs to increase visibility of pedestrians in the street.

NYCDOT has recommended a closure of Union Avenue between Driggs Avenue and North 12th Street to unify the McCarren Park.

5 Illustrating The Solution

5.4 Nassau Avenue

Near McCarren Park, Nassau Avenue is a one-lane eastbound street with a bike lane and parking on both sides. The traffic flow changes between Guernsey Street and Lorimer Street to a two-way street with one moving lane in each direction and a shared bike lane for eastbound traffic (Photo No. 4).

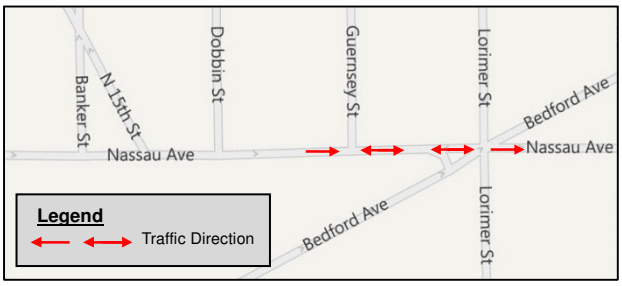


Figure No.2: Nassau Avenue Traffic Pattern

Photo No. 4: Nassau Ave. & Guernsey St. (looking west)

Photo No. 5: Banker St. & Nassau Ave. (looking north)

At the intersections of Nassau Avenue and Banker Street and Nassau Avenue and North 15th Street, there are no crosswalks across Banker Street and North 15th Street (Photo No. 5). Specific recommendations to improve senior pedestrian safety at this intersection are under consideration by NYCDOT as part of Capital Project HWK476B.

Dobbin Street terminates at the stop-controlled T-intersection with Nassau Avenue. It is a 25-foot wide southbound roadway with one travel lane and "No standing except trucks loading and unloading 8AM-6PM Mon thru Fri" on both sides. Currently, there is no crosswalk on Dobbin Street and a standard crosswalk is recommended.

With the sudden change in traffic flow at Nassau Avenue and Guernsey Street, blockbuster striping is recommended for the northwest corner to channelize the eastbound vehicles away from the oncoming two-way traffic. Currently, there is no crosswalk on Guernsey Street at this location. It is recommended that a raised crosswalk is installed on Guernsey Street. A raised crosswalk will reduce the speed of turning vehicles from Nassau Avenue improving the safety of both pedestrians and vehicles.

5 Illustrating The Solution

There is heavy pedestrian volume at the island located between Nassau Avenue, Bedford Avenue, Lorimer Street and Manhattan Avenue. The volumes are generated from the G Train entrances/exits at all four corners of Nassau Avenue and Manhattan Avenue and the bus stops for the B61 line on the north side of the island and for the B48 line on the east leg of Nassau Avenue (Photo No. 6).

This intersection is under review by NYCDOT as part of Capital Project HWK476B.

Photo No. 6: Nassau Ave. & Manhattan Ave. (looking west)

5.5 Eckford Street

Eckford Street's traffic flow changes at Driggs Avenue. North of Driggs Avenue is a 24-foot wide northbound street with one travel lane and parking on both sides and south of Driggs Avenue is a 30-foot wide two-way street with one moving lane in each direction and parking on both sides.

The 2010 NYC Bike Map shows Eckford Street as a planned/proposed bicycle route. Shared bike lane striping is recommended along Eckford Street from Greenpoint Avenue to Manhattan Avenue. The shared lane striping should continue along Driggs Avenue, west of Eckford Street, and connect to the existing bike lane along Driggs Avenue, west of Leonard Street (Exhibit 9).

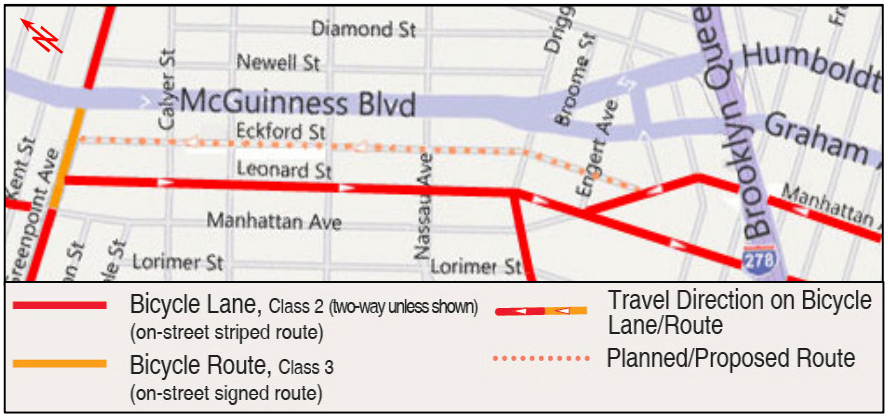


Figure No. 3: Eckford Street Bicycle Route

5 Illustrating The Solution

5.6 McGuinness Boulevard

McGuinness Boulevard is a 75-foot wide street with two travel lanes in each direction and parking on both sides. It is a designated truck route and has heavy pedestrian and vehicular volumes (Photo No. 7). During the field visit, pedestrians were observed stuck at the median, unable to cross McGuinness Boulevard in one signal cycle. Pedestrian countdown signals are recommended for the following intersections:

- McGuinness Boulevard & Meserole Avenue
- McGuinness Boulevard & Norman Avenue
- McGuinness Boulevard & Nassau Avenue
- McGuinness Boulevard & Driggs Avenue

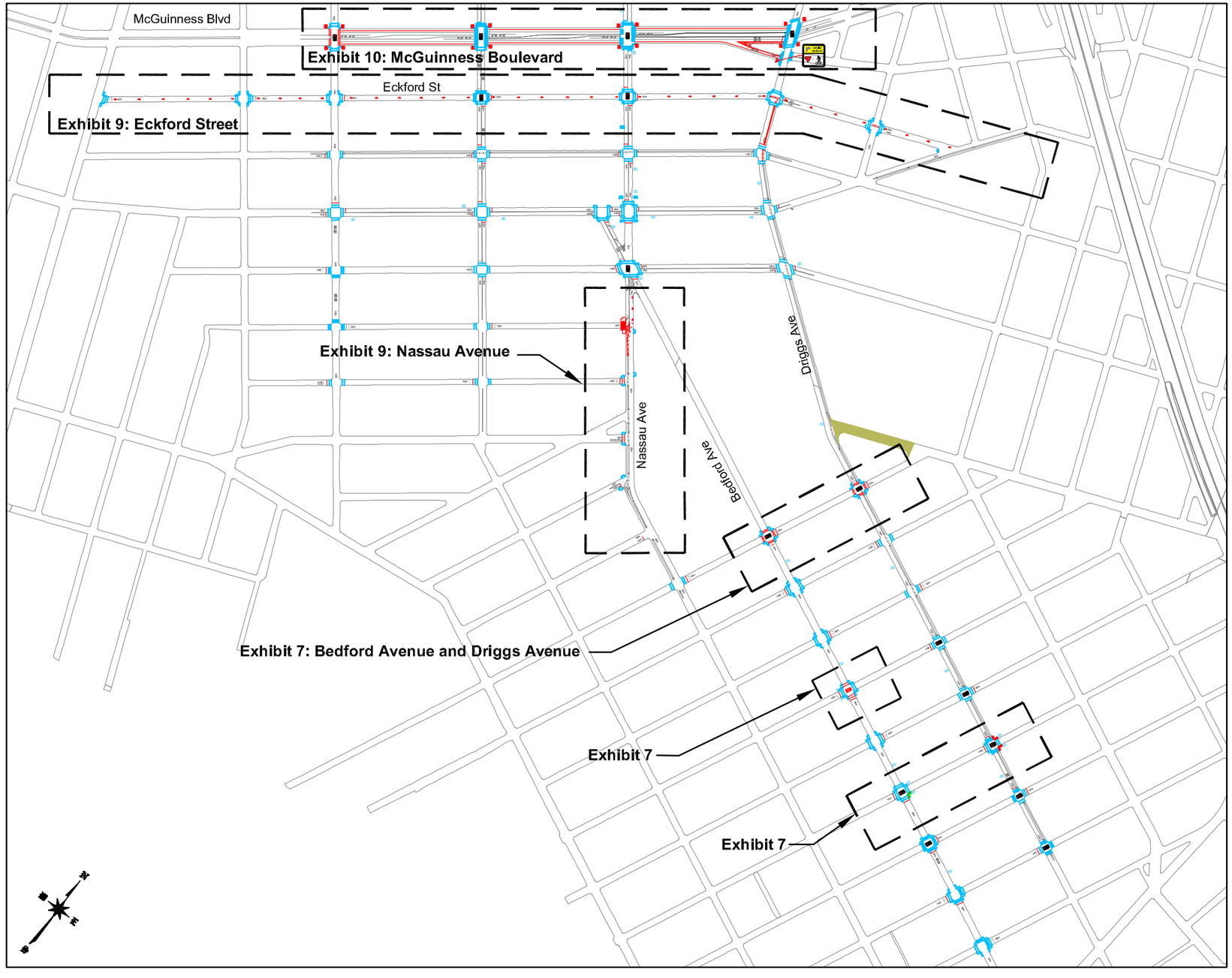
The pedestrian countdown signals will help to eliminate any guesswork on behalf of pedestrians when crossing busy intersections.

Parking lane striping is recommended for both sides of McGuinness Boulevard from Meserole Avenue to Driggs Avenue. This measure will narrow the travel lanes and slow down moving traffic.

Channelization striping along McGuinness Boulevard and Graham Avenue is recommended to keep moving traffic in-line and to prevent the drivers from using the extra space to pass each other.

Photo No. 7: McGuinness Blvd. & Nassau Ave.

EXHIBIT 6 - RECOMMENDATION INDEX



LEGEND:

- EXISTING TRAVEL DIRECTION
- EXISTING SIGNALIZED INTERSECTION
- EXISTING SCHOOL CROSSWALK
- EXISTING HIGH VISIBILITY CROSSWALK
- EXISTING STANDARD CROSSWALK
- EXISTING PEDESTRIAN RAMP
- EXISTING CATCH BASIN
- EXISTING TRAFFIC SIGN
- S SUBWAY STOP
- B BUS STOP
- PROPOSED STOP BAR
- PROPOSED SCHOOL CROSSWALK
- PROPOSED HIGH VISIBILITY CROSSWALK
- PROPOSED STANDARD CROSSWALK
- PROPOSED NEW PEDESTRIAN RAMP
- REPLACE EXISTING PEDESTRIAN RAMP
- PROPOSED CATCH BASIN
- PROPOSED TRAFFIC SIGN
- PROPOSED CURB EXTENSION (NECKDOWN)
- PROPOSED SIGNALIZED INTERSECTION
- PROPOSED PEDESTRIAN COUNTDOWN SIGNAL
- PROPOSED BIKE LANE
- PROPOSED SHARED BIKE LANE
- PLANNED DOT PROJECTS

*NOTE: NOT ALL ITEMS ARE USED AND NOT ALL ITEMS ARE SHOWN.

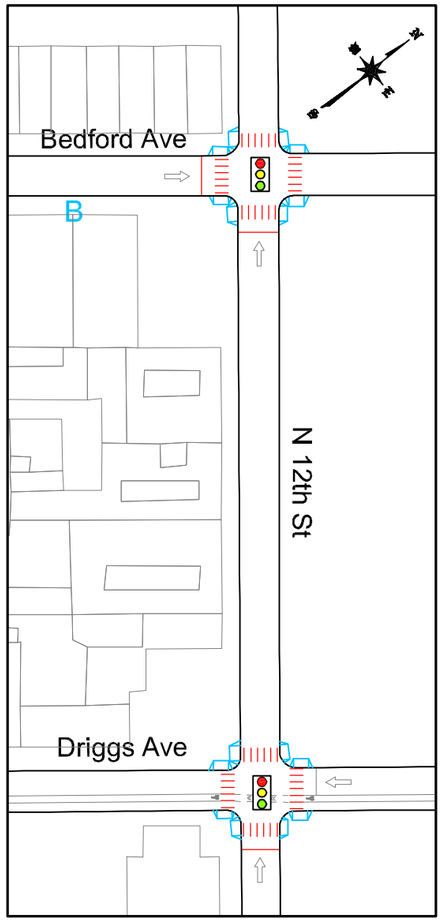
GREENPOINT, BROOKLYN

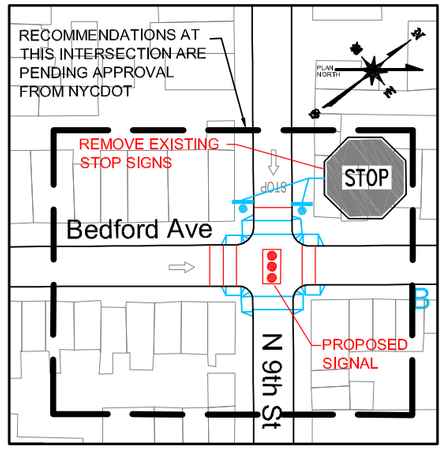
RECOMMENDATION INDEX

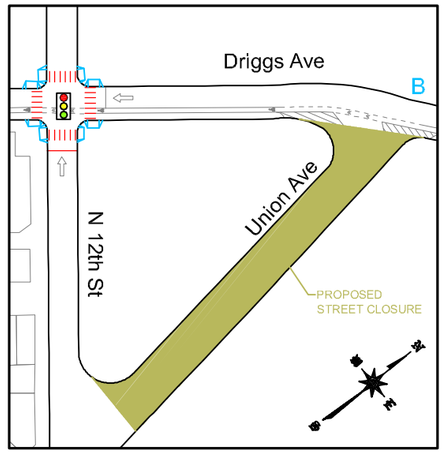
5

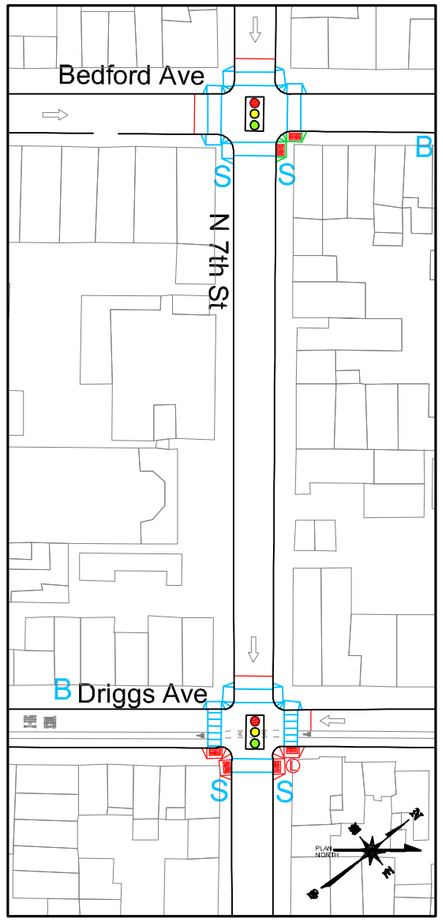
Illustrating The Solution

EXHIBIT 7 - Bedford Avenue and Driggs Avenue









Pedestrian concerns in this area:

- Turning vehicles not yielding to pedestrians
- Signal timing (insufficient crossing time)
- Missing or inadequate pedestrian ramps

Recommended improvements include:

- Time all signals for seniors and where feasible, the crossing time will be extended
- Install new advance stop bars
- Install signal at North 9th Street & Bedford Avenue
- Stripe new standard crosswalk
  -north & south legs of Bedford Avenue & North 9th Street
- Stripe new high-visibility crosswalk
  -all four legs of Bedford Avenue & North 12th Street
  -all four legs of Driggs Avenue & North 12th Street
- Close Union Avenue between Driggs Avenue & North 12th Street

EXISTING HIGH VISIBILITY CROSSWALK
EXISTING STANDARD CROSSWALK
EXISTING SCHOOL CROSSWALK
EXISTING STOP BAR
EXISTING PEDESTRIAN RAMP
PROPOSED NEW PED RAMP
REPLACE EXISTING PED RAMP

PROPOSED HIGH VISIBILITY CROSSWALK
PROPOSED STANDARD CROSSWALK
PROPOSED SCHOOL CROSSWALK
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PROPOSED CURB EXTENSION (NECKDOWN)
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EXISTING TRAVEL DIRECTION
PLANNED DOT PROJECTS

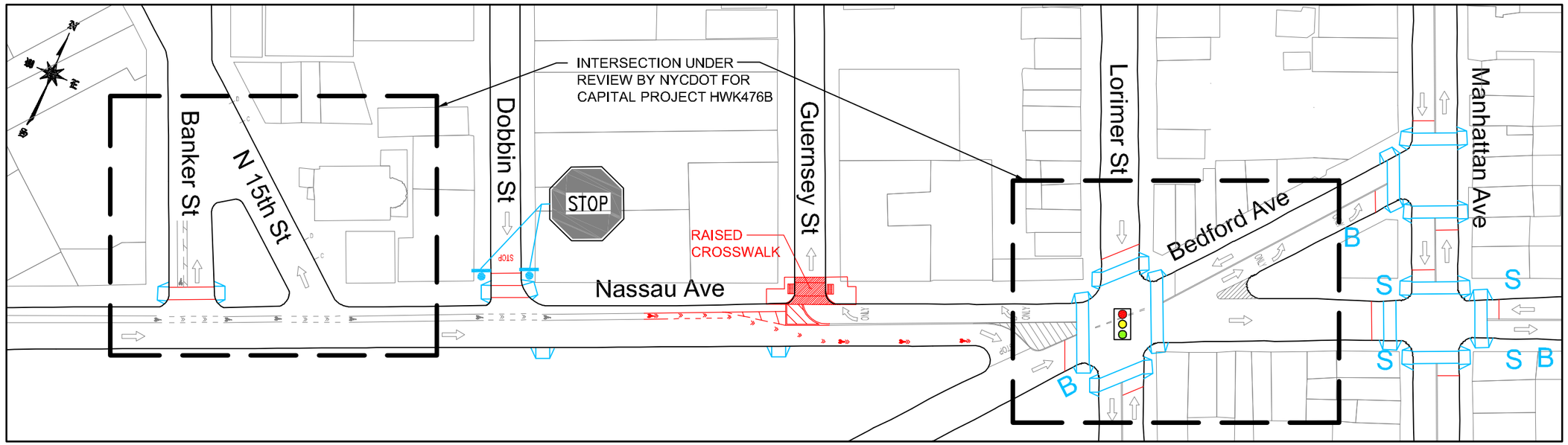
EXISTING SIGNALIZED INTERSECTION
PROPOSED SIGNALIZED INTERSECTION
EXISTING CATCH BASIN
PROPOSED CATCH BASIN
EXISTING TRAFFIC SIGN
PROPOSED TRAFFIC SIGN

*NOTE: NOT ALL ITEMS ARE USED AND NOT ALL ITEMS ARE SHOWN.

Additional Information:

- This study area was visited on March10th, 2010
- Recommendations are pending approval from NYCDOT at Bedford Avenue & North 9th Street

EXHIBIT 8 - Nassau Avenue (From Banker Street to Lorimer Street)



Pedestrian concerns in this area:

- Turning vehicles not yielding to pedestrians
- Signal timing (insufficient crossing time)
- Missing or inadequate pedestrian ramps

Recommended improvements include:

- Time all signals for seniors and where feasible, the crossing time will be extended
- Install new advanced stop bars
- Stripe standard crosswalk
  - -north leg of Nassau Avenue & Dobbins Street
  - -north leg of Nassau Avenue & Banker Street
- Stripe 'STOP'
  - -north leg of Nassau Avenue & Dobbins Street
- Install a raised crosswalk on the north leg of Nassau Avenue & Guernsey Street
- Stripe new blockbuster striping along Nassau Avenue & Guernsey Street

Traffic Analysis:

- *Turning Movement Counts (TMC)*
  - -Banker Street & N 15th Street
  - -Nassau Avenue & N 15th Street
- *Automatic Traffic Recorder Counts (ATR)*
  - -Banker Street between Nassau Avenue & N 15th Street
  - -Eastbound Nassau Avenue west of Banker Street

Additional Information:

- This study area was visited on March 11th, 2010
- Intersections are under review by NYCDOT for Capital Project HWK476B
  - -Nassau Avenue & Manhattan Avenue
  - -Lorimer Street, Bedford Avenue & Nassau Avenue
  - -Nassau Avenue & North 15th Street
  - -Nassau Avenue & Banker Street

EXISTING HIGH VISIBILITY CROSSWALK
EXISTING STANDARD CROSSWALK
EXISTING SCHOOL CROSSWALK
EXISTING STOP BAR
EXISTING PEDESTRIAN RAMP
PROPOSED NEW PED RAMP
REPLACE EXISTING PED RAMP
PROPOSED HIGH VISIBILITY CROSSWALK
PROPOSED STANDARD CROSSWALK
PROPOSED SCHOOL CROSSWALK
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PROPOSED SHARED BIKE LANE
EXISTING TRAVEL DIRECTION
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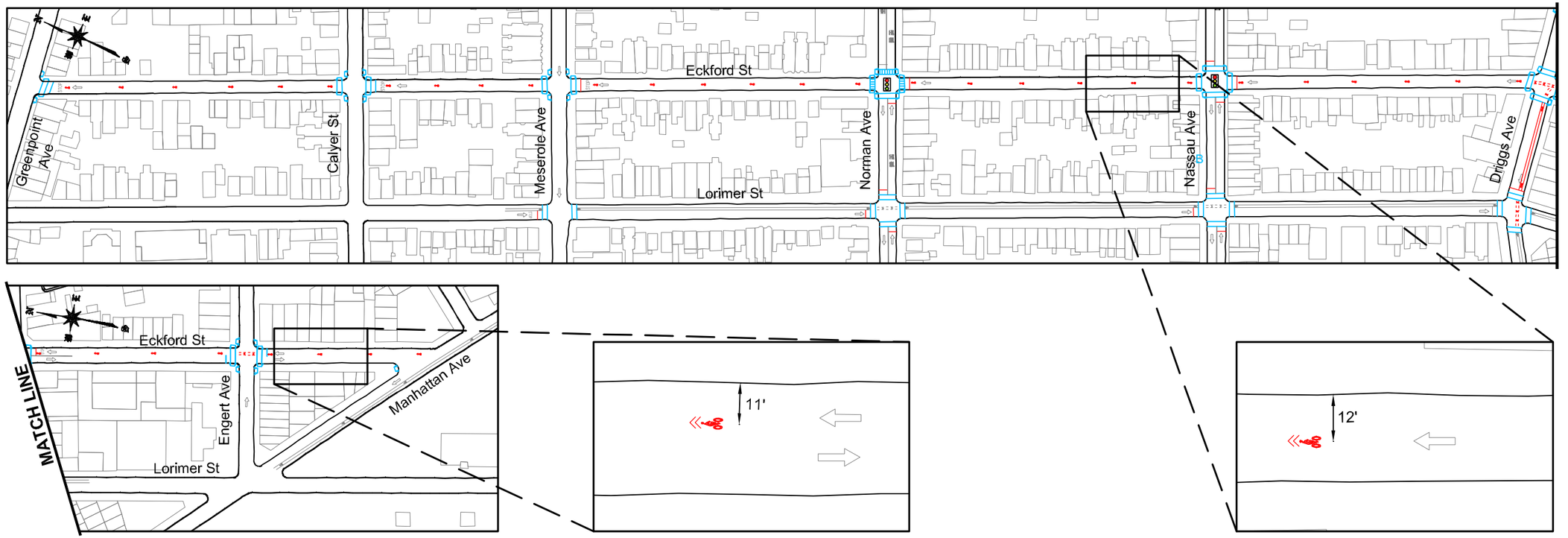
EXISTING SIGNALIZED INTERSECTION
PROPOSED SIGNALIZED INTERSECTION
EXISTING CATCH BASIN
PROPOSED CATCH BASIN
EXISTING TRAFFIC SIGN
PROPOSED TRAFFIC SIGN

*NOTE: NOT ALL ITEMS ARE USED AND NOT ALL ITEMS ARE SHOWN.

EXHIBIT 9 - Eckford Street (From Greenpoint Avenue to Manhattan Avenue)



Pedestrian concerns in this area:

- Turning vehicles not yielding to pedestrians
- Signal timing (insufficient crossing time)

Recommended improvements include:

- Time all signals for seniors and where feasible, the crossing time will be extended
- Install new advanced stop bars
- Stripe shared bike lane along Eckford Street
  -from Greenpoint Avenue to Driggs Avenue, 12-feet from the curb
  -from Driggs Avenue to Manhattan Avenue, 11-feet from the curb
- Stripe bike lane along Driggs Avenue between Eckford Street & Leonard Street

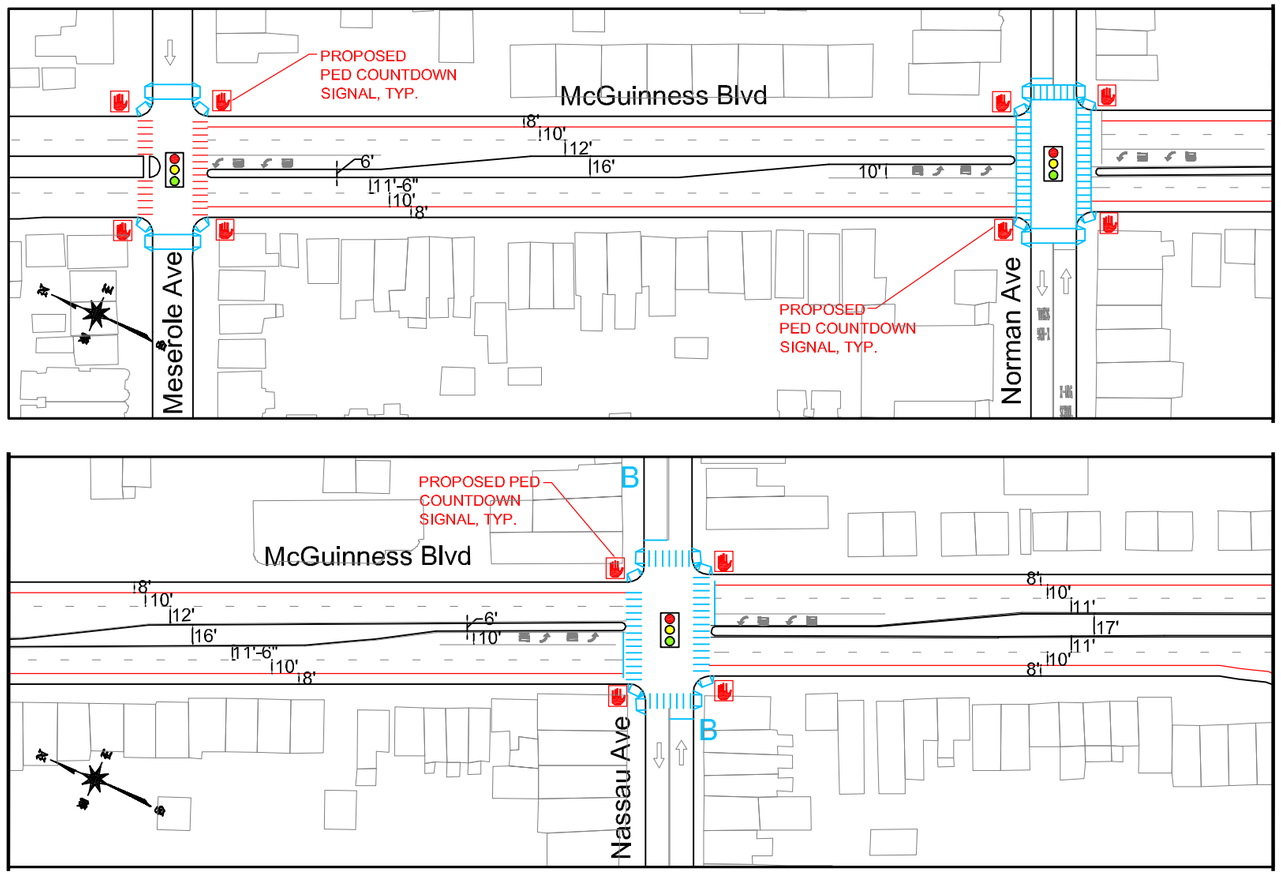
Additional Information:

- This study area was visited on March 11th, 2010
- Detailed drawings of this area are shown in Exhibit 11

EXISTING HIGH VISIBILITY CROSSWALK
EXISTING STANDARD CROSSWALK
EXISTING SCHOOL CROSSWALK
EXISTING STOP BAR
EXISTING PEDESTRIAN RAMP
PROPOSED NEW PED RAMP
REPLACE EXISTING PED RAMP
PROPOSED HIGH VISIBILITY CROSSWALK
PROPOSED STANDARD CROSSWALK
PROPOSED SCHOOL CROSSWALK
PROPOSED STOP BAR
B EXISTING BUS STOP
S EXISTING SUBWAY STOP
PROPOSED PEDESTRIAN COUNTDOWN SIGNAL
PROPOSED CURB EXTENSION (NECKDOWN)
SW OBSTRUCTION: STREETLIGHT
PROPOSED BIKE LANE
PROPOSED SHARED BIKE LANE
EXISTING TRAVEL DIRECTION
PLANNED DOT PROJECTS
EXISTING SIGNALIZED INTERSECTION
PROPOSED SIGNALIZED INTERSECTION
EXISTING CATCH BASIN
PROPOSED CATCH BASIN
EXISTING TRAFFIC SIGN
PROPOSED TRAFFIC SIGN

*NOTE: NOT ALL ITEMS ARE USED AND NOT ALL ITEMS ARE SHOWN.

EXHIBIT 10 - McGuinness Boulevard (From Meserole Avenue to Driggs Avenue)



Pedestrian concerns in this area:

- Turning vehicles not yielding to pedestrians
- Signal timing (insufficient crossing time)

Recommended improvements include:

- Time all signals for seniors and where feasible, the crossing time will be extended
- Install new advanced stop bars
- Stripe high visibility crosswalks at north & south legs of Meserole Avenue & McGuinness Boulevard
- Install pedestrian countdown signals:
  - -Meserole Avenue & McGuinness Boulevard
  - -Norman Avenue & McGuinness Boulevard
  - -Nassau Avenue & McGuinness Boulevard
  - -Driggs Avenue & McGuinness Boulevard
- Stripe parking lane along McGuinness Boulevard
- Stripe channelization at Graham Avenue & McGuinness Boulevard
- Install new signs
  - -no left-turn sign for northbound and southbound traffic on McGuinness Boulevard at Nassau Avenue
  - -yield to pedestrian sign for southbound traffic on Graham Avenue at Driggs Avenue

Additional Information:

- This study area was visited on March 11th, 2010

EXISTING HIGH VISIBILITY CROSSWALK
EXISTING STANDARD CROSSWALK
EXISTING SCHOOL CROSSWALK
EXISTING STOP BAR
EXISTING PEDESTRIAN RAMP
PROPOSED NEW PED RAMP
REPLACE EXISTING PED RAMP
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PROPOSED CURB EXTENSION (NECKDOWN)
SW OBSTRUCTION: STREETLIGHT
PROPOSED BIKE LANE
PROPOSED SHARED BIKE LANE
EXISTING TRAVEL DIRECTION
PLANNED DOT PROJECTS
EXISTING SIGNALIZED INTERSECTION
PROPOSED SIGNALIZED INTERSECTION
EXISTING CATCH BASIN
PROPOSED CATCH BASIN
EXISTING TRAFFIC SIGN
PROPOSED TRAFFIC SIGN

*NOTE: NOT ALL ITEMS ARE USED AND NOT ALL ITEMS ARE SHOWN.

New York City Department of Transportation
Office of School Safety Engineering

SAFE STREETS FOR SENIORS

GREENPOINT

BOROUGH OF BROOKLYN

APPENDIX

Prepared by
The RBA Group

September, 2011

GREENPOINT
APPENDIX

TABLE OF CONTENTS

APPENDIX A

ATR

Twenty-four hour Automatic Traffic Recorder (ATR) Counts were collected in May of 2010. The results are shown in Table 1. Detailed ATR data are presented in the Technical Supplement.

TABLE 1: EXISTING TRAFFIC VOLUMES

Locations	Direction	ADT* (veh/day)
Banker Street. East of North 15th Street	Eastbound	1980
North 7th Street, between Bedford Avenue & Driggs Avenue	Eastbound	3390
Bedford Avenue and North 5th Street	Northbound	6970
	Eastbound	1830
Bedford Avenue and North 10th Street	Northbound	5350
	Eastbound	1740
Nassau Avenue, South of Banker Street	Northbound	4800

*Note: ADT is Average Daily Traffic

APPENDIX B

TMC

Turning Movement Counts (TMCs) in 15-minute increments were collected in May of 2010 during the morning (7:45 am to 9:45 am), evening (3:45 pm to 6:45 pm) and Saturday mid-day (11:15 am to 2:15 pm) peak periods. In addition, a midday school day count was conducted at the intersection of Bedford Avenue & North 4th Street. The results of turning movement counts during AM, PM and Saturday mid-day peak hours are indicated in Table 2. Detailed TMC data are presented in the Technical Supplement.

TABLE 2: TURNING MOVEMENT COUNTS

Intersection	Time	Class	Northbound			Southbound			Eastbound			Westbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Bedford Avenue & North 4th Street	AM	Car	24	218	-	-	-	-	-	-	-	-	70	96
		HV	0	0	-	-	-	-	-	-	-	-	0	0
		Total	**24**	**218**	-	-	-	-	-	-	-	-	**70**	**96**
	School	Car	39	237	-	-	-	-	-	-	-	-	63	99
		HV	0	0	-	-	-	-	-	-	-	-	0	0
		Total	**39**	**237**	-	-	-	-	-	-	-	-	**63**	**99**
	PM	Car	29	238	-	-	-	-	-	-	-	-	50	70
		HV	0	0	-	-	-	-	-	-	-	-	0	0
		Total	**29**	**238**	-	-	-	-	-	-	-	-	**50**	**70**
Bedford Avenue & North 5th Street	AM	Car	-	-	-	1	0	-	-	269	56	-	-	-
		HV	-	-	-	0	0	-	-	2	0	-	-	-
		Total	-	-	-	**1**	**0**	-	-	**271**	**56**	-	-	-
	PM	Car	-	-	-	35	71	-	-	361	40	-	-	-
		HV	-	-	-	0	0	-	-	1	0	-	-	-
		Total	-	-	-	**35**	**71**	-	-	**362**	**40**	-	-	-
	Sat	Car	-	-	-	28	45	-	-	305	38	-	-	-
		HV	-	-	-	0	0	-	-	2	1	-	-	-
		Total	-	-	-	**28**	**45**	-	-	**307**	**39**	-	-	-
Bedford Avenue & North 7th Street	AM	Car	-	227	47	-	-	-	40	115	-	-	-	-
		HV	-	1	0	-	-	-	3	2	-	-	-	-
		Total	-	**228**	**47**	-	-	-	**43**	**117**	-	-	-	-
	PM	Car	-	289	106	-	-	-	49	105	-	-	-	-
		HV	-	1	1	-	-	-	0	1	-	-	-	-
		Total	-	**290**	**107**	-	-	-	**49**	**106**	-	-	-	-
	Sat	Car	-	294	56	-	-	-	31	62	-	-	-	-
		HV	-	3	0	-	-	-	0	0	-	-	-	-
		Total	-	**297**	**56**	-	-	-	**31**	**62**	-	-	-	-

Intersection	Time	Class	Northbound			Southbound			Eastbound			Westbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Bedford Avenue & North 9th Street	AM	Car		247	57				12	66				
		HV		0	0				0	0				
		Total		**247**	**57**				**12**	**66**				
	PM	Car		287	44				28	56				
		HV		0	0				0	0				
		Total		**287**	**44**				**28**	**56**				
Bedford Avenue & North 10th Street	AM	Car	-	33	29	-	-	-	27	237	-	-	-	-
		HV	-	1	2	-	-	-	0	4	-	-	-	-
		Total	-	**34**	**31**	-	-	-	**27**	**241**	-	-	-	-
	PM	Car	-	37	49	-	-	-	44	307	-	-	-	-
		HV	-	2	0	-	-	-	0	0	-	-	-	-
		Total	-	**39**	**49**	-	-	-	**44**	**307**	-	-	-	-
Driggs Avenue & North 7th Street	AM	Car	-	-	-	64	150	-	-	96	79	-	-	-
		HV	-	-	-	0	3	-	-	1	0	-	-	-
		Total	-	-	-	**64**	**153**	**-**	-	**97**	**79**	-	-	-
	PM	Car	-	-	-	113	173	-	-	94	120	-	-	-
		HV	-	-	-	0	3	-	-	0	0	-	-	-
		Total	-	-	-	**113**	**176**	**-**	-	**94**	**120**	-	-	-
	Sat	Car	-	-	-	29	210	-	-	79	63	-	-	-
		HV	-	-	-	0	1	-	-	0	0	-	-	-
		Total	-	-	-	**29**	**211**	**-**	-	**79**	**63**	-	-	-
McGuinness Boulevard & Nassau Avenue	AM	Car	8	972	17	29	777	6	88	86	51	48	32	36
		HV	2	133	0	2	182	2	11	9	6	2	9	2
		Total	**10**	**1105**	**17**	**31**	**959**	**8**	**99**	**95**	**57**	**50**	**41**	**38**
	PM	Car	12	741	26	42	1401	42	82	190	62	38	38	55
		HV	2	95	2	3	95	0	11	7	4	0	7	1
		Total	**14**	**836**	**28**	**45**	**1496**	**42**	**93**	**45**	**66**	**38**	**45**	**56**

APPENDIX C

PEDESTRIAN COUNTS

Pedestrian crossing counts in 15-minute increments were collected in May of 2010 during the morning (7:45 am to 9:45 am) and evening (3:45 pm to 6:45 pm) peak periods. The results of pedestrian counts during both AM and PM peak hours are indicated in Table 3. Detailed Pedestrian Counts Data are presented in the Technical Supplement.

TABLE 3: PEDESTRIAN COUNTS

Intersection	Time	Crosswalks (Legs)				Totals
		N	S	E	W	
Banker Street and North 15th Street	AM	25	3	3	3	34
	PM	20	42	8	16	86
Driggs Avenue and North 7th Street	AM	50	104	183	82	419
	PM	51	171	169	81	472
Bedford Avenue and North 4th Street	AM	65	27	442	287	821
	PM	90	77	609	384	1160
Bedford Avenue and North 5th Street	AM	63	53	606	128	850
	PM	58	73	717	398	1246
Bedford Avenue and North 7th Street	AM	269	185	172	149	775
	PM	447	365	392	333	1637
Bedford Avenue and North 9th Street	AM	45	53	346	263	707
	PM	50	87	391	365	893
Bedford Avenue and North 10th Street	AM	19	32	294	281	626
	PM	32	31	403	333	799
Nassau Avenue and Banker Street	AM	72	-	266	389	727
	PM	90	-	33	30	153

APPENDIX D

EXISTING LEVEL OF SERVICE

The results of existing condition Synchro Analysis for the studied corridor of North 7th Street during the AM (8:00 am to 9:00 am), PM (3:45 pm to 4:45 pm) and Saturday (12:00 pm to 1:00 pm) peak hours are indicated in Table 4. Detailed existing level of service analysis is presented in the Technical Supplement.

TABLE 4: EXISTING (2010) INTERSECTION LEVEL OF SERVICE AND DELAYS (SEC)

Movement	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
	v/c	Delay (sec/veh)	LOS	v/c	Delay (sec/veh)	LOS	v/c	Delay (sec/veh)	LOS
Signalized Intersections									
North 7th Street and Bedford Avenue									
EB LT	0.61	40.1	D	0.64	41.4	D	0.53	37.8	D
NB TR	0.39	9.4	A	0.57	12.7	B	0.51	11.5	B
Overall Intersection	-	20.7	C	-	21.5	C	-	18.5	B
North 7th Street and Driggs Avenue									
EB TR	0.66	28.8	C	1.04	91.2	F	0.63	34.5	C
SB LT	0.35	9.1	A	0.47	10.6	B	0.27	8.0	A
Overall Intersection	-	17.4	B	-	44.9	D	-	18.6	B

Notes:
1. Intersection approaches are NB = northbound, SB = Southbound, EB = Eastbound, WB = Westbound
2. Intersection movement groups are L = Left, T= Through, R = Right

The results of existing condition HCS analysis for the studied intersections during both AM (7:45 am to 8:45 am) and PM (5:00 pm to 6:00 pm) peak hours are provided in Table 5. Detailed HCS Analysis is presented in the Technical Supplement.

TABLE 5: EXISTING (2010) INTERSECTION LEVEL OF SERVICE AND DELAYS (SEC)

Movement	AM Peak Hour			PM Peak Hour		
	v/c	Delay (sec/veh)	LOS	v/c	Delay (sec/veh)	LOS
Un-signalized intersections						
Banker Street & North 15th Street						
SB TR	0.02	9.8	A	0.02	10.1	B
WB LT	0.03	7.3	A	0.02	7.3	A
Nassau Avenue & North 15th Street						
NB LT	0.01	7.8	A	0.01	7.5	A
EB L	-	15.6	C	-	11.5	B
EB R	-	13.4	B	-	8.9	A
Nassau Avenue & Banker Street						
NB LT	0.12	8.1	A	0.12	7.9	A
EB L	-	22.9	C	-	16.1	C
EB R	-	13.3	B	-	8.9	A

Notes:
3. Intersection approaches are NB = northbound, SB = Southbound, EB = Eastbound, WB = Westbound
4. Intersection movement groups are L = Left, T= Through, R = Right

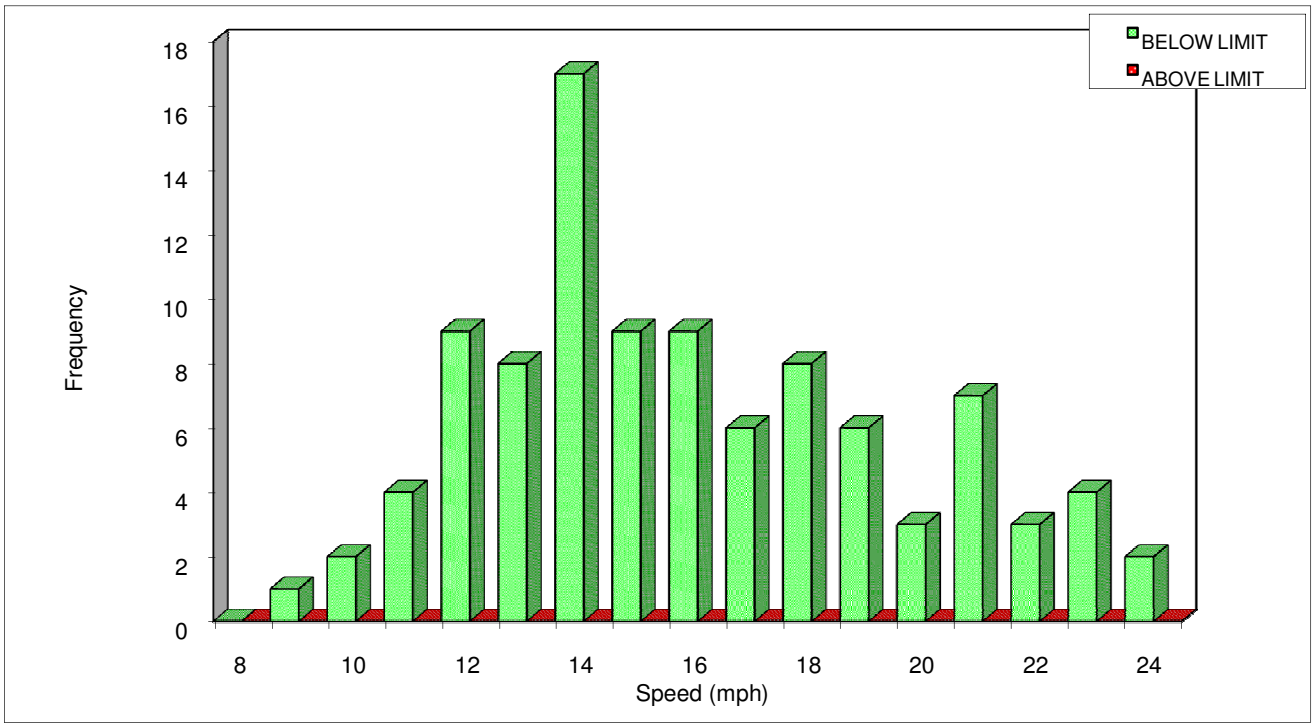
APPENDIX E

SPOT SPEED SURVEY

RADAR SPEED SURVEY

Bedford Ave From: N 9 St To: N 10 St

Boro:	BK	Average Speed:	16.3 mph
Date:	05/12/10		
Day:	Wed.	15th Percentile:	12.0 mph
Weather:	Clear	50th Percentile:	15.5 mph
Time:	10:00 - 14:00	85th Percentile:	21.0 mph
Speed Limit:	30 mph	Above Speed Limit:	0.0 %
Sample Size:	100	Minimum Speed	9.0 mph
		Maximum Speed	25.0 mph
Type of Roadway:	Two-way	Pace:	11.0 - 21.0 mph
Width of Road by Direction:		In Pace:	86.0 %
Number of Moving Lanes:		Below Pace:	3.0 %
Number of Parking Lanes:		Above Pace:	11.0 %
Observer:	0	Standard Deviation:	3.8 mph



RADAR SPEED SURVEY

Bedford Ave From: N 9 St To: N 10 St

Boro:	BK	Average Speed:	18.1 mph
Date:	05/15/10		
Day:	Sat.	15th Percentile:	14.0 mph
Weather:	Clear	50th Percentile:	18.0 mph
Time:	10:00 - 14:00	85th Percentile:	21.2 mph
Speed Limit:	30 mph	Above Speed Limit:	0.0 %
Sample Size:	100	Minimum Speed	10.0 mph
		Maximum Speed	26.0 mph
Type of Roadway:	Two-way	Pace:	14.0 - 24.0 mph
Width of Road by Direction:		In Pace:	87.0 %
Number of Moving Lanes:		Below Pace:	10.0 %
Number of Parking Lanes:		Above Pace:	3.0 %
Observer:	0	Standard Deviation:	3.5 mph