

**NEW YORK CITY DEPARTMENT OF TRANSPORTATION
Office of School Safety Engineering**



School Safety Engineering Project

FINAL REPORT: P.S. 116, The Elizabeth L. Farrell School, Brooklyn



**Prepared by
The RBA Group/Urbitran Associates**



SEPTEMBER 29, 2006

School Safety Engineering Project
P.S. 116, The Elizabeth L. Farrell School, Brooklyn

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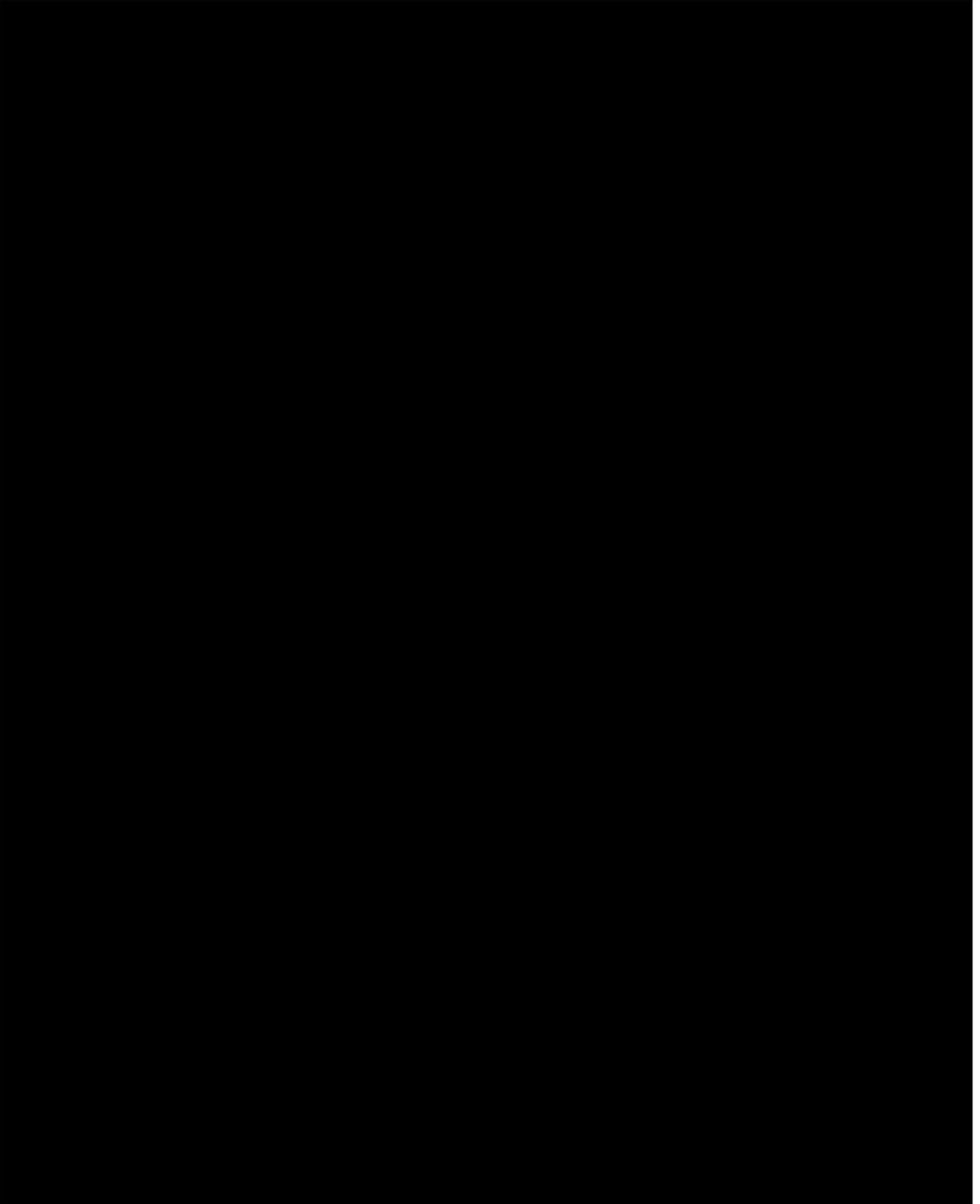
1. INTRODUCTION

1.1 PROJECT DESCRIPTION

The Department of Transportation has developed school safety maps for 1,471 schools throughout the City. Schools currently in the program are primarily elementary and intermediate schools with an enrollment of at least 250 students. The safety plans include the designation of official school crosswalks, identified by prominent warning signs and roadway markings. DOT also designates curbside locations for school bus loading and unloading and other parking controls to improve conditions for students. In addition, nearly 350 speed reducers (humps) have been installed in the immediate vicinity of schools.

Under this consultant study, the School Safety Engineering Project, crash data in the vicinity of all program schools was reviewed. As a result, schools were ranked in terms of pedestrian safety, and 135 “priority” schools were identified Citywide. At each of these priority schools safety improvements are being recommended (e.g., new school crosswalks, new traffic signals and signal timing modifications, new speed reducers). In addition, 32 of these schools will receive further investigation to design physical improvements (e.g., raised center medians, widened sidewalks, “neckdowns” or “bulbouts” at intersections). P.S. 116 (The Elizabeth Farrell School) in Brooklyn is one of the 135 priority schools.

2. BACKGROUND—EXISTING CONDITIONS AND ANALYSIS





1 inch equals 200 feet

EXHIBIT 1

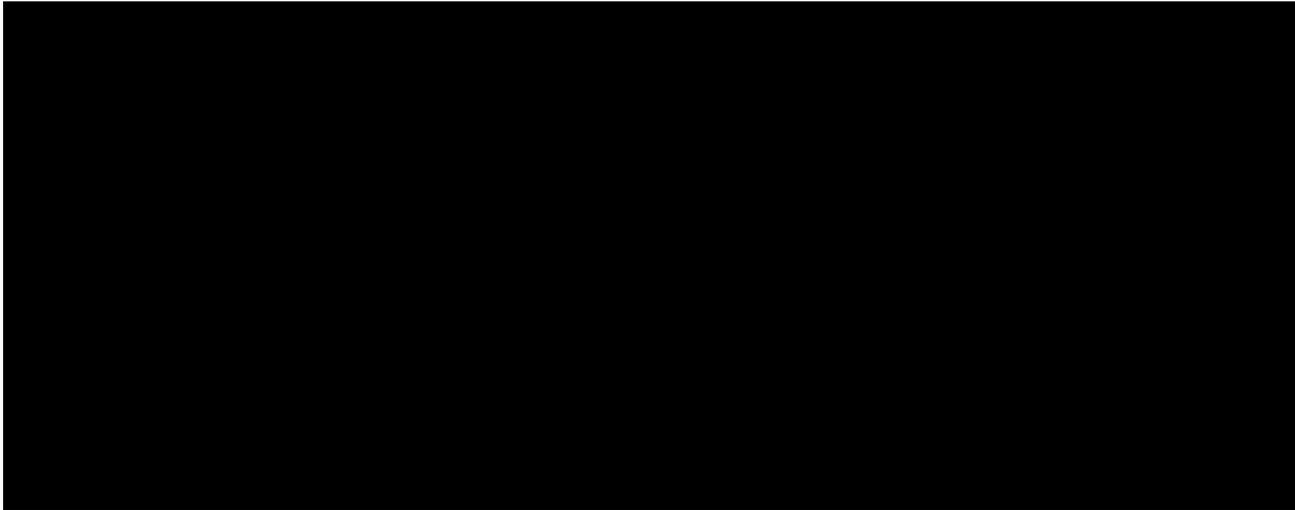
P.S. 116, BROOKLYN
ELIZABETH L. FARRELL SCHOOL
AERIAL PHOTOGRAPH

2.3 MEETING WITH SCHOOL REPRESENTATIVES

The consultant team and the school principal from P.S. 116 met at the school on May 26, 2004. According to the principal, the identifiable problems that student pedestrians encounter on a regular basis include the following:

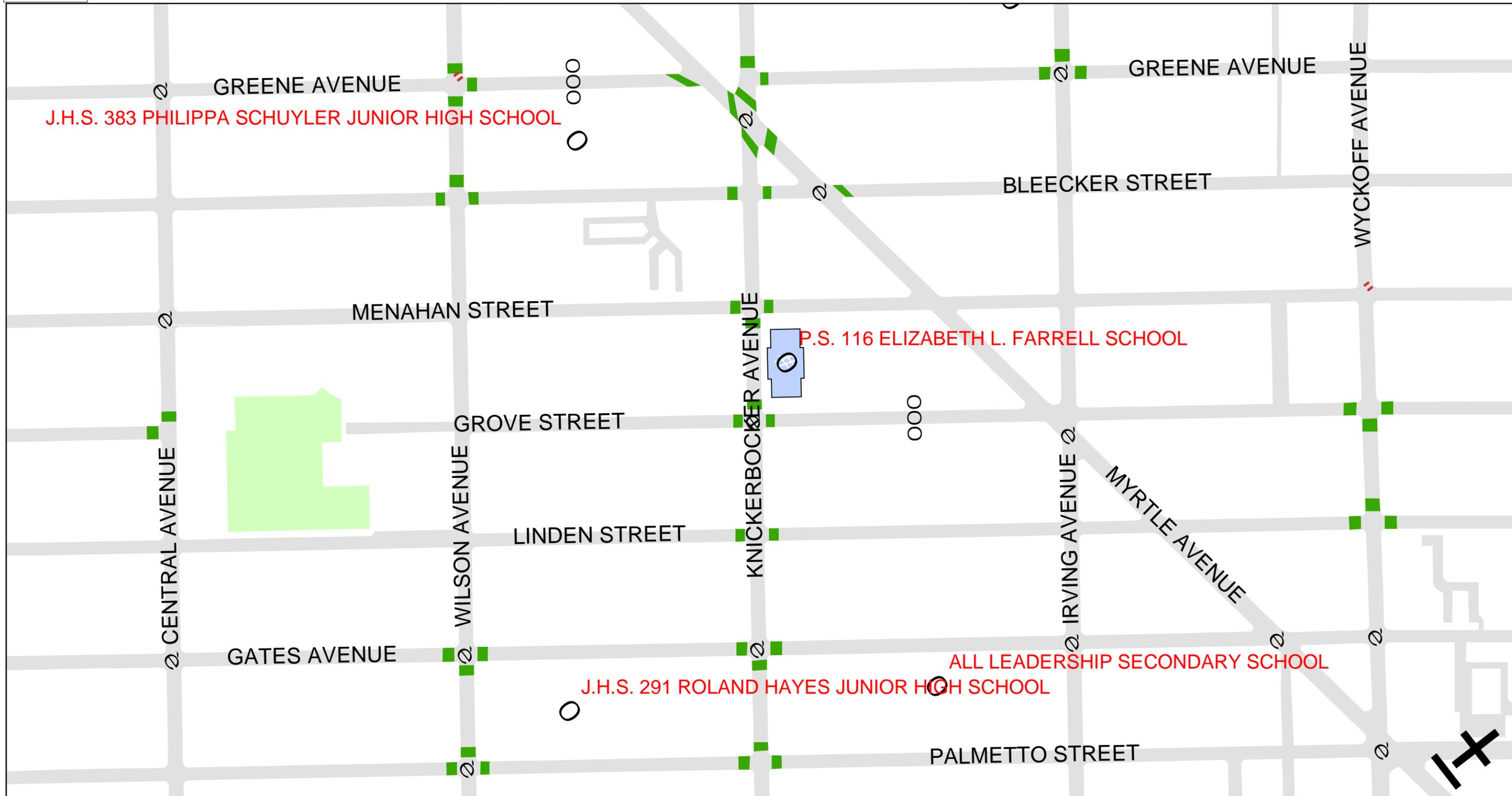
- Vehicles speeding on Knickerbocker Avenue
- Request for a crossing guard at Grove Street and Knickerbocker Avenue
- There are no school crosswalks at Myrtle Avenue and Irving Avenue

(See Appendix for a summary of school concerns, and the school's survey response).





School Traffic Safety Map



The School Traffic Safety Map was established to help provide the maximum degree of safety for children going to and from school - by indicating the location of advance warning signs, speed reducers, school crosswalks and some traffic control devices. (While virtually all intersections in NYC benefit from traffic control devices - such as stop signs, traffic signals, yield signs, and all way stop signs - this map only shows traffic signals and all way stop signs.) The school crosswalks that are shown are ladder striped and make the crosswalk more visible to drivers and help make the intersection safer. These crosswalks are where school children are recommended to cross.

Note: Every attempt has been made to provide complete and accurate information that is updated regularly. The City's streets are constantly changing and it is not always possible to present information without error.

LEGEND:

- SCHOOL LOCATION
- SCHOOL CROSSWALK
- TRAFFIC SIGNAL
- ALL - WAY STOP
- SPEED REDUCER

PS 116 Brooklyn ELIZABETH L. FARRELL SCHOOL

Prepared by the NEW YORK CITY DEPARTMENT OF TRANSPORTATION, Iris Weinsall, COMMISSIONER.

Map created on 7/13/2006

EXHIBIT 2

COMM. BOARD: 304
PRECINCT: 83

1.3.1

2.6 PRIMARY MODES OF TRANSPORT TO AND FROM SCHOOL

According to the principal, approximately 70% of students walk to school, 18% ride school buses, 8% arrive by public buses or subway service, and the remaining 4% are driven to school by parents or guardians. See Table 1 for the school’s estimate of the modes of travel.

TABLE 1: MODES OF TRAVEL (AS ESTIMATED BY SCHOOL OFFICIALS)	
Description	Percentage
Walk	70%
Driven by parent or guardian	4%
School bus	18%
MTA bus or subway	8%
TOTAL	100%

2.7 ADDITIONAL STUDENT PEDESTRIAN TRAFFIC GENERATORS

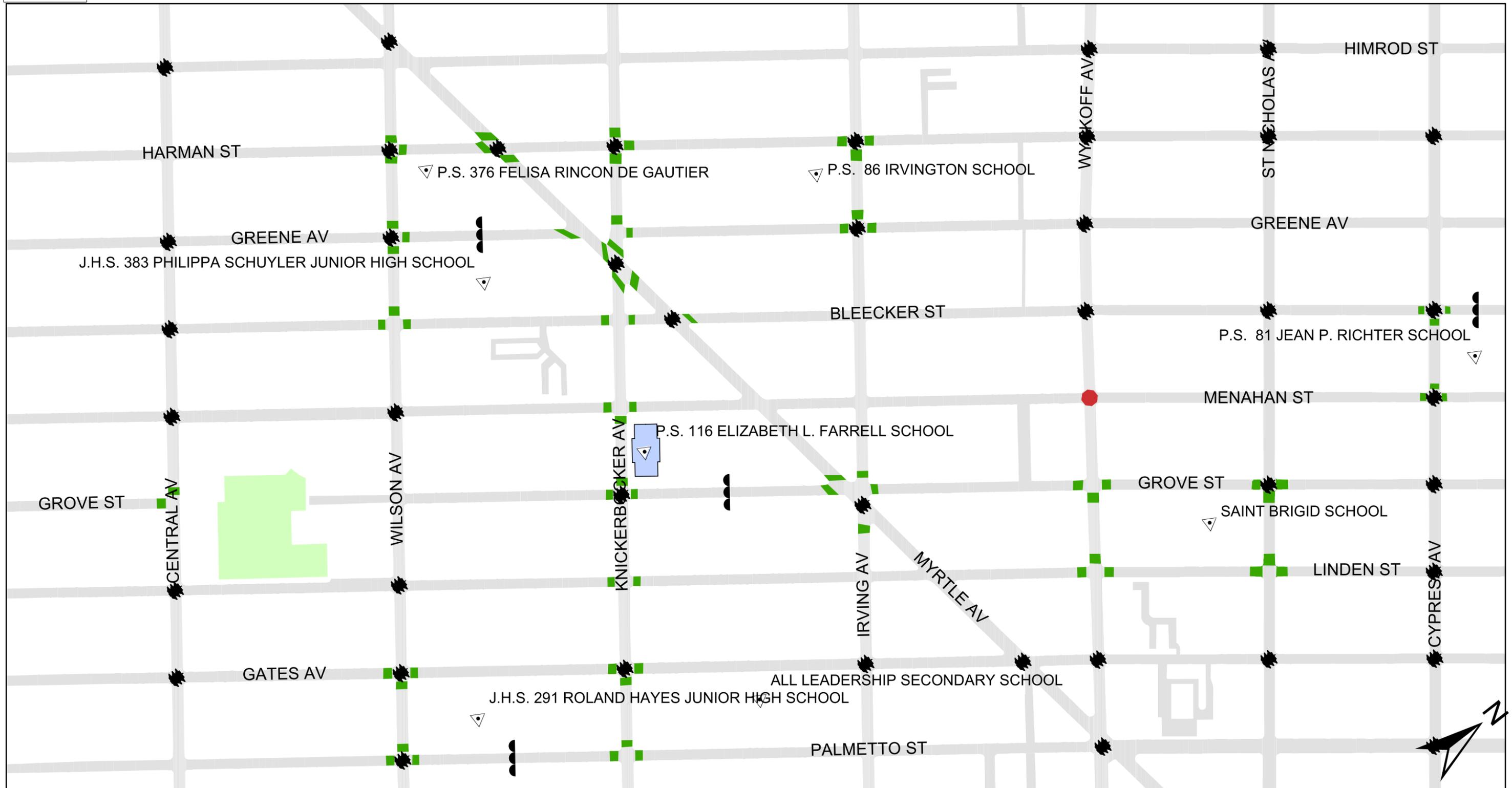
Bushwick High School, P.S. 377, I.S. 383, P.S. 376, P.S. 86, and J.H.S. 291 are located within a few city blocks of P.S. 116. Approximately 5200 students attend these schools. The Hope ball field directly across Knickerbocker Avenue is a major attraction for area youths (Figure 3). I.S. 383, P.S. 86, P.S. 106, and J.H.S. 291 are also priority schools.



Figure 3 – Hope ball field across Knickerbocker Avenue from school



School Traffic Safety Map



The School Traffic Safety Map was established to help provide the maximum degree of safety for children going to and from school - by indicating the location of speed reducers, school crosswalks and some traffic control devices. (While virtually all intersections in NYC benefit from traffic control devices - such as stop signs, traffic signals, yield signs, and all way stop signs - this map shows only traffic signals and all way stop signs.) The school crosswalks that are shown are ladder striped and make the crosswalk more visible to drivers and help make the intersection safer. These crosswalks are where school children are recommended to cross.

Note: Every attempt has been made to provide complete and accurate information that is updated regularly. The City's streets are constantly changing and it is not always possible to present information without error.

LEGEND:

SCHOOL LOCATION		TRAFFIC SIGNAL	
SCHOOL CROSSWALK		ALL - WAY STOP	
		SPEED REDUCER	

**PS 116 Brooklyn
ELIZABETH L. FARRELL SCHOOL**

Prepared by the NEW YORK CITY DEPARTMENT OF TRANSPORTATION, Iris Weinsahl, COMMISSIONER.

EXHIBIT 3

Map created on 11/16/2006

1.5.1

COMM. BOARD:	304
PRECINCT:	83

2.8 CROSSING GUARD LOCATIONS

According to field observations and as confirmed by the school principal, there are two crossing guards assigned to P.S. 116. They are stationed at the following intersections:

- Knickerbocker Avenue and Menahan Street (Figure 4)
- Myrtle Avenue and Grove Street (Figure 5)

There are also three crossing guards assigned to other schools that were observed during the field visit. Exhibit 4 shows the crossing guard locations.



Figure 4 – Crossing guard at Knickerbocker Avenue and Menahan Street



Figure 5 – Crossing guard at Myrtle Avenue and Grove Street

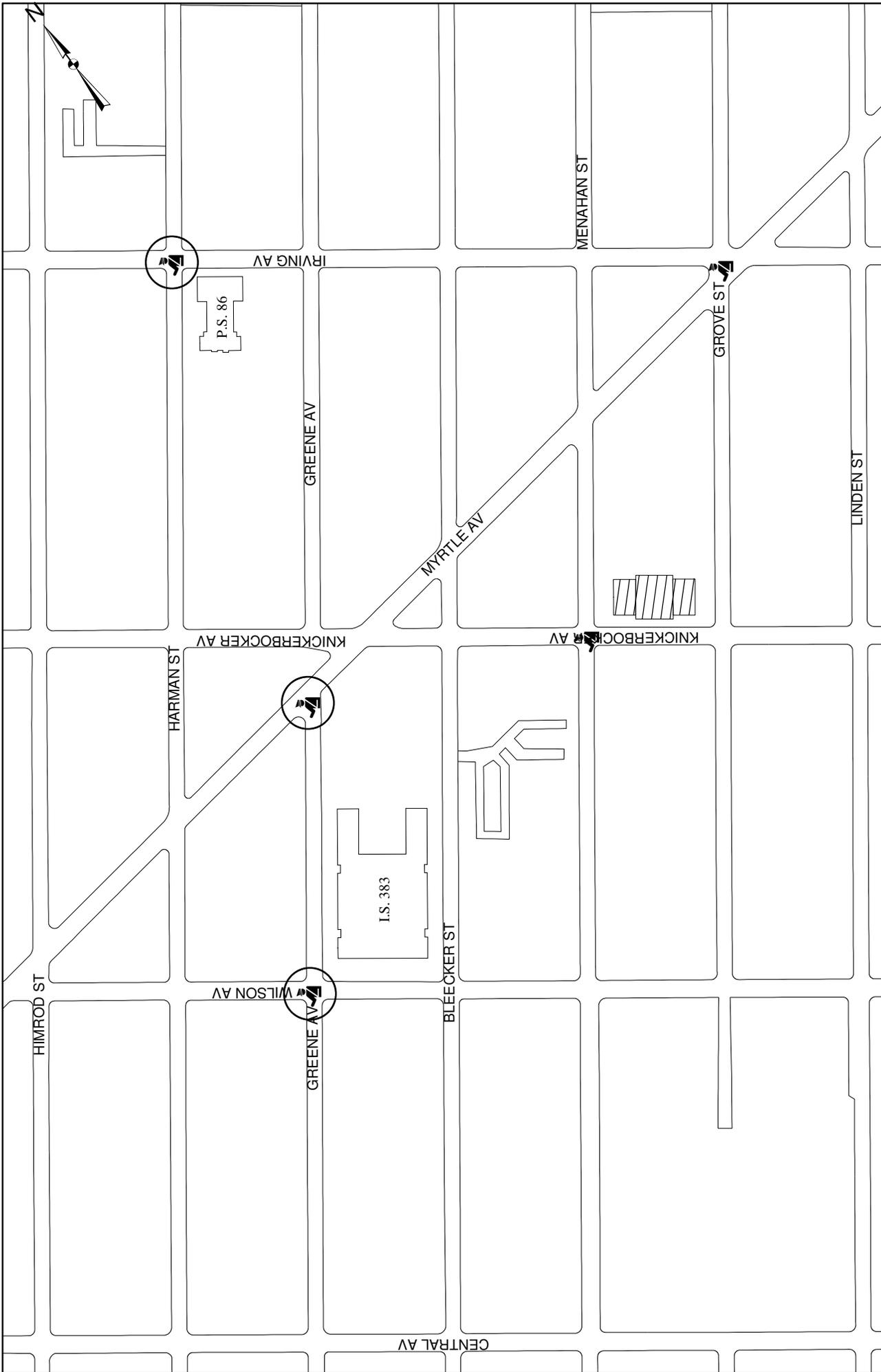


EXHIBIT 4
P.S. 116, BROOKLYN
ELIZABETH L. FARRELL SCHOOL
CROSSING GUARDS

1 inch equals 250 feet

 Crossing Guard assigned to P.S. 116

 Crossing Guard assigned to another school

3. TRAFFIC OPERATIONS

3.1 SCHOOL BUS OPERATIONS

According to the school principal, school buses transport approximately 90 students to and from school. The special needs students riding school buses enter the school through the school's main entrance on Knickerbocker Avenue (Figure 6). The kindergarten students who arrive by school bus use the secondary entrance on Menahan Street. School buses double-park at both locations when loading and unloading students.



Figure 6: School buses double-parked on Knickerbocker Avenue during arrival and dismissal time

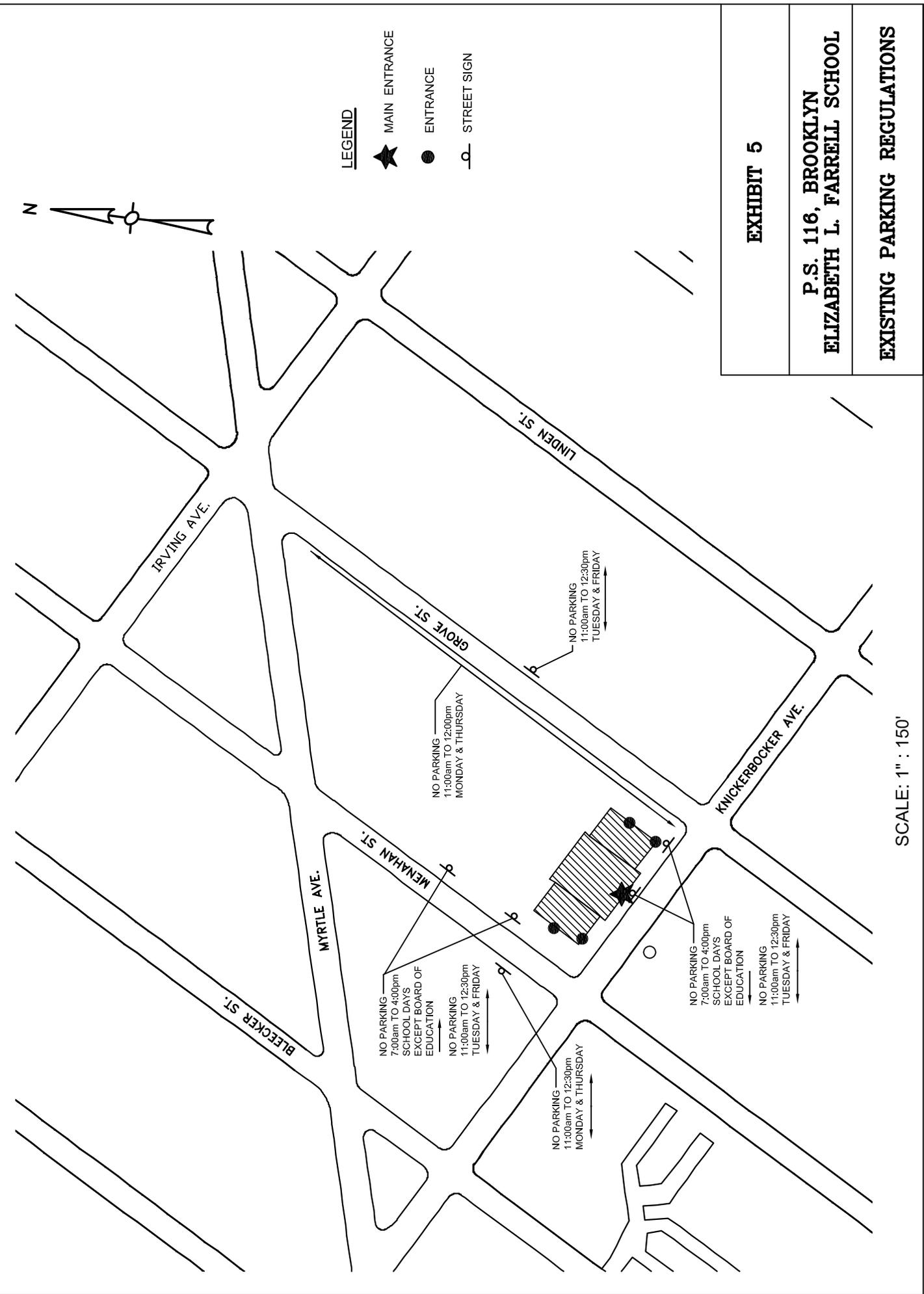
3.3 PARKING REGULATIONS

“NO PARKING 7 AM – 4 PM SCHOOL DAYS EXCEPT BOARD OF EDUCATION” parking regulations are posted in front of the school on Knickerbocker Avenue and Menahan Street. Alternate parking regulations are in effect 11:00 am – 12:30 pm.

Exhibit 5 displays parking regulations on the roadways surrounding the school.

3.4 EXISTING SCHOOL SIGNS AND MARKINGS

The Traffic Safety Plan, Exhibit 2, shows existing crosswalk pavement markings in the vicinity of the school. It is noted that a citywide signage program is currently underway to upgrade school signage to current Federal Manual of Uniform Traffic Control (MUTCD) standards of fluorescent yellow-green signs accompanied by downward pointing arrows. Signs scheduled to be installed under this program are shown as "existing" on Exhibit 7. All crosswalks in Community Board 4 were upgraded and refurbished in August 2005.



LEGEND

- ★ MAIN ENTRANCE
- ENTRANCE
- ⊖ STREET SIGN

EXHIBIT 5
P.S. 116, BROOKLYN ELIZABETH L. FARRELL SCHOOL
EXISTING PARKING REGULATIONS

SCALE: 1" : 150'

3.5 ACCIDENT SUMMARY

Exhibit 6 and Table 2 show a summary of accidents, as obtained from the New York State Department of Motor Vehicles (DMV), in the vicinity of P.S. 116 for the three-year period from January 1, 1998 through December 31, 2000. The DMV data provides some detail relating to the circumstances and cause of the accident. Table 3 is a summary of more recent accident data obtained from the NYC Police Department (NYPD). Though current through 2004, the NYPD data does not provide the same level of detail as the DMV data.

This report targets intersections closest to the school where the highest concentrations of student pedestrians occur. Intersections that are farther from the school, which did not have detailed data available at the time of this study, will be addressed with DOT's School Safety Engineering Program's ongoing work. DMV accident data is discussed in Section 3.6, Traffic Operations and Issues.

TABLE 2: DMV THREE-YEAR ACCIDENT SUMMARY (1998-2000)				
INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED ACCIDENTS*
Knickerbocker Ave. and Menahan St.	9	1	0	0
Knickerbocker Ave. and Grove St.	7	0	0	0
Knickerbocker Ave. and Linden St.	15	0	0	0
Myrtle Ave. and Menahan St.	17	3	0	1
Myrtle Ave. and Grove St.	20	3	0	0
Myrtle Ave. and Knickerbocker Ave.	47	9	0	2
Myrtle Ave. and Greene Ave.	20	2	0	1
TOTAL	135	18	0	4

TABLE 3: NYPD FOUR-YEAR ACCIDENT SUMMARY (2001-2004)				
INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED ACCIDENTS*
Knickerbocker Ave. and Menahan St.	16	0	0	0
Knickerbocker Ave. and Grove St.	15	3	0	1
Knickerbocker Ave. and Linden St.	30	2	0	0
Myrtle Ave. and Menahan St.	26	11	0	2
Myrtle Ave. and Grove St.	39	10	0	3
Myrtle Ave. and Knickerbocker Ave.	55	5	0	1
Myrtle Ave. and Greene Ave.	21	5	0	2
TOTAL	202	36	0	9

* School-Related Accidents are defined as accidents involving school-age pedestrians (age 4 – 14), occurring weekdays during the school year.

3.6 TRAFFIC OPERATIONS AND ISSUES

The following outlines the traffic accident and operational issues in the vicinity of P.S. 116:

3.6.1 Knickerbocker Avenue and Menahan Street

Knickerbocker Avenue is a 35-foot wide, one-way westbound street with one travel lane and parking on both sides. Menahan Street is a 30-foot wide, one-way northbound street with one travel lane and parking on both sides of the street (Figure 8). At this intersection, northbound traffic on Menahan Street is controlled by a stop sign. School crosswalks are on the south, east, and north legs. The school crosswalk on the east leg of the intersection is uncontrolled. This is one of the two intersections that have an assigned crossing guard.

This intersection had nine accidents during the 1998-2000 study period. One accident involved a pedestrian, which was not school-related. The pedestrian was struck by a right turn vehicle.

A school related accident occurred on Menahan Street between Knickerbocker Avenue and Wilson Avenue. A nine-year old student was struck while crossing in the mid-block of Menahan Avenue. No further detail is available regarding this accident.



Figure 8: Knickerbocker Avenue at Menahan Street, looking west

A one-hour traffic count was performed on July 26, 2006 from 4:30 pm to 5:30 pm (Exhibit 7). A one-hour gap study was conducted on July 27, 2006 from 8:00 am to 9:00 am. A total of 79 pedestrians crossed uncontrolled Knickerbocker Avenue during this hour, while conflicting with 361 vehicles traveling on Knickerbocker Avenue. Based on MUTCD Section 4C.05 Signal Warrant 4 (Pedestrian Volume) the need for a traffic control signal at an intersection shall be considered if an engineering study finds that the pedestrian volume crossing the major street at an intersection during an average day is 190 or more during any one hour. The gap study also shows that more than 60 gaps of 15 seconds (the time required to cross a 35-foot wide street at three feet per second plus three seconds of reaction time) were available for pedestrians to cross Knickerbocker

Avenue during one hour. Therefore, the existing conditions do not meet warrants for the installation of a traffic signal at this time.

A spot speed study was conducted on Knickerbocker Avenue between Menahan Street and Grove Street on September 7, 2005. The 85th percentile speed was found to be 29 mph, which is below the legal speed limit of 30 mph. See Table 4 for a summary of the results and the Appendix for further detail.

TABLE 4: SPOT SPEED STUDY		
LOCATION	MEDIAN SPEED (MPH)	85TH PERCENTILE SPEED (MPH)
Knickerbocker Av. between Grove St. and Menahan St.	25	29

3.6.2 Knickerbocker Avenue and Grove Street

This is a signalized intersection. Grove Street is a 30-foot wide, one-way southbound street with one travel lane and parking on both sides. School crosswalks are in place on the north, south and west legs of the intersection. There are no pedestrian ramps at the northeast and northwest corners.

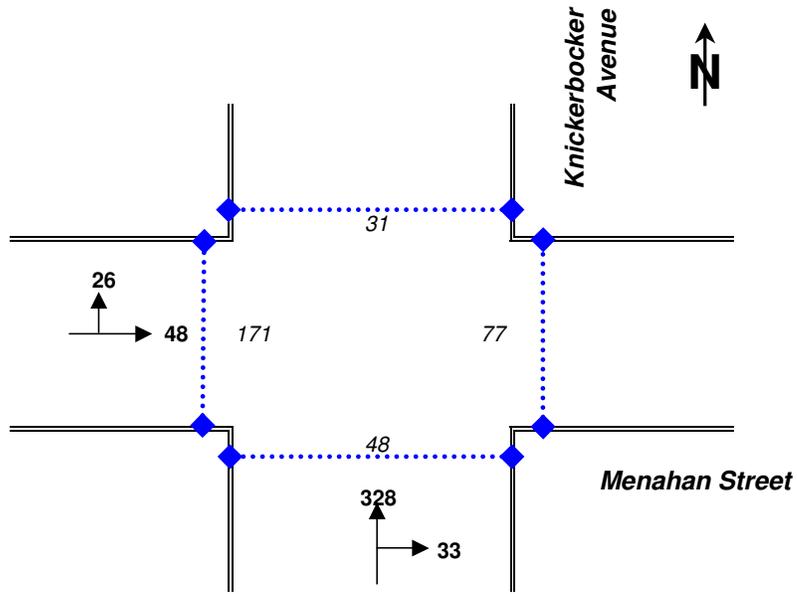
There were seven accidents at this intersection during the 1998-2000 study period. None of these accidents involved pedestrians.

An existing speed reducer (hump) is located on Grove Street between Myrtle Avenue and Knickerbocker Avenue (Figure 9).



Figure 9: Speed reducer on Grove Street approaching Knickerbocker Avenue

One Hour Traffic Count Volumes
 (4:30 PM - 5:30 PM JULY 26, 2006)



Menahan Street and Knickerbocker Avenue

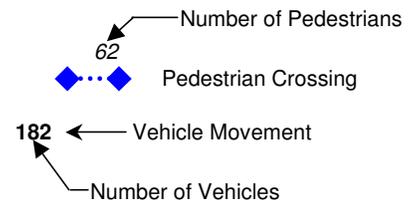


EXHIBIT 7
P.S. 116
TRAFFIC COUNTS

3.6.3 Knickerbocker Avenue and Linden Street

This is a four-leg intersection with a stop control on Linden Street. Linden Street is a 30-foot wide, one-way northbound street with one travel lane and parking on both sides of the street (Figures 10 and 11). School crosswalks are in place on the north and south legs of the intersection.



Figure 10: Linden Street looking north, at Knickerbocker Avenue



Figure 11: Knickerbocker Avenue looking east, across Linden Street

There were fifteen accidents at this intersection during the 1998-2000 study period. None of these involved pedestrians.

3.6.4 Myrtle Avenue and Menahan Street

Menahan Street has a stop control at the approach to Myrtle Avenue. Myrtle Avenue is a 35-foot wide, two-way street with one travel lane in each direction and parking on both sides, under the elevated MTA subway line (Figures 12 and 13). The support columns for the railroad are located along the curb line of Myrtle Avenue. There are no school crosswalks at this intersection.

A total of seventeen accidents occurred at this intersection during the 1998-2000 study period. Three accidents involved pedestrians, one of which was school related. All three pedestrians, including a 10-year-old child, were struck while crossing without a crosswalk.



Figure 12: Myrtle Avenue at Menahan Street, looking southwest



Figure 13: Myrtle Avenue at Menahan Street, looking west

A spot speed study was conducted on Myrtle Avenue between Menahan Street and Grove Street on September 7, 2005. The objective of the survey was to confirm the speeding problem indicated by the school principal. The 85th percentile speed was found to be 26

mph, which is below the legal speed limit of 30 mph. See Table 5 for a summary of the results and the Appendix for further detail.

TABLE 5: SPOT SPEED STUDY		
LOCATION	MEDIAN SPEED (MPH)	85TH PERCENTILE SPEED (MPH)
Myrtle Avenue between Grove Street and Menahan Street	23	26

School officials requested that the intersection of Myrtle Avenue and Menahan Street be considered for a signal installation. In response, NYCDOT has initiated an analysis of this intersection, and a signal will be installed if warrants are met.

3.6.5 Myrtle Avenue, Irving Avenue and Grove Street

This is a six-leg signalized intersection. Irving Avenue is a two-way street with one travel lane and parking on both sides. There are no school crosswalks at this intersection. This is one of the two intersections that have an assigned crossing guard.

Twenty accidents occurred at this intersection during the 1998-2000 study period. Three accidents involved pedestrians, one of which was school related. There was no detailed information for these three pedestrian accidents.

3.6.6 Myrtle Avenue and Knickerbocker Avenue

Myrtle Avenue is a highly commercialized roadway and is the southern border of the Bushwick Shopping District. It is a two-way street with one travel lane in each direction and parking on both sides. The M train is elevated through this section of Brooklyn and runs directly above Myrtle Avenue. Columns for the overhead structure are located on raised islands in the center of the street. The center islands have at-grade cut-throughs for pedestrians. There is only one pedestrian ramp at northeast, northwest, and southwest corners of the intersection due to the obstruction of various utilities and subway supports.



Figure 14: On Myrtle Avenue looking northeast at the raised island at the intersection with Knickerbocker Avenue

There were 47 accidents at this signalized intersection during the 1998-2000 study period (including all sides of the intersection). Nine accidents involved pedestrians, two of which were school related. An eight-year-old student was crossing with the signal when struck by a vehicle attempting to make a left turn. Another 12-year-old student was struck due to a driver's failure to yield. Two pedestrians were struck while crossing against the signal or crossing outside of the crosswalks. Four other accidents were attributed to drivers' failure to yield or inattention. The last pedestrian was struck while getting out of a vehicle.

3.6.7 Myrtle Avenue and Greene Avenue

Greene Avenue is a one-way northbound street with parking on both sides of the roadway. Myrtle Avenue is a highly commercialized roadway and is the border of the Bushwick Shopping District. It is a two-way street with parking permitted on both sides. The M train is elevated through this section of Brooklyn running directly above Myrtle Avenue. Myrtle Avenue and Greene Avenue is a stop controlled T-intersection, with a stop sign on Greene Avenue. There is a school crosswalk on the south leg.

There were twenty accidents at this intersection during the 1998-2000 study period. Two accidents involved pedestrians and one accident was school related. An 11-year-old child and a six-year-old child were struck when crossing Myrtle Avenue. No further details were reported for these two accidents.

3.7 SIGNAL TIMING: PEDESTRIAN PHASE

Pedestrian crossing time was field verified at all signalized intersections in the vicinity of P.S. 116, and found to be adequate for a child pedestrian walking rate of three feet per second in all directions and approaches (see Table 6).

TABLE 6: PEDESTRIAN CROSSING TIME AT SIGNALIZED INTERSECTIONS				
Intersection Name	Crosswalk Width (Feet)	Ped. Phase Actual (Seconds)	Ped. Phase Req'd (Seconds)	Timing Adjustment? (Yes/No)
Knickerbocker Av. & Grove St.				
Crossing Knickerbocker Av.	34	25	15	NO
Crossing Grove St.	30	25	13	NO
Myrtle Av. & Grove St.				
Crossing Myrtle Av.	45	38*	18	NO
Crossing Grove St.	45	37	18	NO
Crossing Irving Av.	54	37	21	NO

Note – A rate of three feet per second plus three seconds reaction time was utilized as the child pedestrian walking rate.

** The actual pedestrian phase available for crossing Myrtle Avenue is assumed to be the sum of the green times for both Grove Street and Irving Avenue.*

3.8 PHYSICAL CONDITIONS (ROADWAYS AND SIDEWALKS)

The roadways and sidewalks in the vicinity of P.S. 116 were generally observed to be in good condition. There was minor ponding observed on Grove Street, south of Knickerbocker Avenue.

4. POTENTIAL MEASURE TO IMPROVE STUDENT PEDESTRIAN SAFETY

4.1 SHORT-TERM MEASURES

- No-Standing Zones

It is recommended that “NO STANDING 7 AM – 4 PM, SCHOOL DAYS” parking regulations be posted in front of P.S. 116 for a length of 60 feet on Knickerbocker Avenue and on Menahan Street. This will provide a place for school buses to drop off and pick up students at the curb, and also improve visibility of students arriving to and leaving the school. The lost teacher parking should be relocated to Grove Street.

- Install new school crosswalks at the following intersections:

- Irving Avenue and Grove Street – west and north legs
- Myrtle Avenue and Grove Street – west and south legs
- Menahan Street and Myrtle Avenue – south leg

Providing a school crosswalk at these locations will complete a network of contiguous school crosswalks in the immediate vicinity of the school.

- Submit a request to the Police Department for a crossing guard

It is recommended that a crossing guard be requested for the intersection of Knickerbocker Avenue and Grove Street.

- Administer student pedestrian safety education program

It is recommended that the NYCDOT Safety Education Program work with the school to educate students on pedestrian safety, including crossing the street with the WALK phase, and the meaning of WALK - FLASHING DON'T WALK - DON'T WALK pedestrian signal sequence. It is also recommended that the students be educated not to cross at mid-block locations.

- Place stop bars ten feet in advance of school crosswalks.

The MUTCD and New York City DOT standard for placement of a stop bar is four feet in advance of a marked crosswalk. At signalized (or stop controlled) crosswalks, the vehicle stop line can be placed farther back from the crosswalk in order to maximize visibility of pedestrians and to minimize the potential for pedestrian/vehicle conflicts. Therefore, it is recommended that stop bars be placed ten feet in advance of all school crosswalks.

- Install pedestrian ramp

Considerations shall be given to the installation of pedestrian ramps per NYCDOT standards at the following locations:

- Knickerbocker Avenue and Grove Street - northwest corner
- Knickerbocker Avenue and Menahan Street - southwest corner

- Resurface Grove Street, west of Knickerbocker Avenue

It is recommended to resurface and re-grade pavement on Grove Street just west of Knickerbocker Avenue to correct ponding.

4.2 LONG-TERM MEASURES

- Improve lighting beneath the elevated railroad at Myrtle Avenue, Grove Street and Irving Avenue

Additional lighting should be considered beneath the elevated railroad at Myrtle Avenue, Grove Street and Irving Avenue. This is a complex three-leg intersection with multiple crossings. Enhancing the lighting of the crosswalk areas will improve visibility for pedestrians, and make them more visible to motorists.

- Consider curb extensions at the following intersections

Consideration should be given to installing a curb extension at the following locations, provided that the Final Design confirms that construction of the recommended curb extension would be feasible and would not interfere with traffic operations. Final details pertaining to the number, location and geometry of curb extensions will be developed during the Final Design/Contract Document preparation.

- Knickerbocker Avenue and Grove Street
- Knickerbocker Avenue and Menahan Street
- Myrtle Avenue and Grove Street
- Myrtle Avenue and Menahan Street

Curb extensions should be considered at the corners as shown in Exhibit 8.

The purpose of the curb extensions is to shorten the crossing distance for pedestrians, and to reduce speeds of vehicles approaching and turning at these heavily utilized school crosswalks (or intersections). These curb extensions would not eliminate or reduce the width of any moving lanes.

4.3 ADDITIONAL RECOMMENDATIONS FOR PRIORITY SCHOOLS IN THE VICINITY

4.3.1 RECOMMENDATIONS FOR I.S. 383

The following actions are recommended as part of proposed measures to improve student pedestrian safety around I.S. 383, which is a nearby Priority School.

- Submit a request to the NYPD to assign crossing guards at the following intersections:

- Myrtle Avenue and Knickerbocker Avenue
- Myrtle Avenue and Greene Avenue*
- Wilson Avenue and Greene Avenue*
- Wilson Avenue and Bleecker Street

*Crossing guards are currently assigned to these two intersections but were not present during field observations. It is recommended that one crossing guard be reinstated at each of these intersections.

- Install new school crosswalk at Myrtle Avenue and Greene Avenue

According to the principal, a crossing guard is assigned here, and students utilize this intersection en route to I.S. 383. Providing a new school crosswalk at this intersection will complete a network of contiguous school crosswalks in the immediate school vicinity. Therefore, it is recommended that a school crosswalk be installed at this intersection.

- Install pedestrian ramps

Due to existing conflicts with utility and overhead subway structures, the following pedestrian ramps are considered complex. Considerations should be given to the installation of pedestrian ramps per NYCDOT standards.

- Myrtle Avenue and Knickerbocker Avenue – northeast, northwest, and southwest corners
- Myrtle Avenue and Bleecker Street – all four corners
- Wilson Avenue and Greene Avenue – southwest corner

- Install a curb extension at the intersection of Myrtle Avenue and Greene Avenue

Curb extensions should be installed at the corners as shown in Exhibit 8.

Consideration should be given to installing a curb extension at the following locations, provided that the Final Design confirms that construction of the recommended curb extension would be feasible and would not interfere with traffic operations. Final details pertaining to the number, location and geometry of curb extensions will be developed during the Final Design/Contract Document preparation.

The purpose of the curb extensions is to shorten the crossing distance for pedestrians, and to reduce speeds of vehicles approaching and turning at these heavily utilized school crosswalks (or intersections). These curb extensions would not eliminate or reduce the width of any moving lanes.

- Widen curbed medians at the intersection of Knickerbocker Avenue and Myrtle Avenue

The curbed medians protecting the supports for the overhead subway should be widened by one foot on each side and also lengthened to increase the standing room for pedestrians (exact details will be determined during design). Bollards should also be placed on these medians.

- Improve lighting beneath the elevated railroad on Myrtle Avenue at Greene Avenue and Knickerbocker Avenue

Additional lighting should be considered beneath the elevated railroad at Myrtle Avenue, Greene Avenue and Knickerbocker Avenue. Enhancing the lighting of the crosswalk areas will improve visibility for pedestrians, and make them more visible to motorists.

4.3.2 RECOMMENDATIONS FOR P.S. 86

The following actions are recommended as part of proposed measures to improve student pedestrian safety around P.S. 86, which is a nearby Priority School.

- Submit Request to Police Department for Crossing Guard

There were eighteen accidents at the intersection of Irving Avenue and Greene Avenue during the 1998-2000 study period, three of which were pedestrian accidents. It is recommended that a crossing guard be requested for the intersection of Irving Avenue and Greene Avenue.

- Install new school crosswalks at the following locations:

- Irving Avenue and Himrod Street – south leg
- Irving Avenue and Bleecker Street – south leg
- Irving Avenue and Menahan Street – south leg

The installation of new school crosswalks at these locations will facilitate students walking to P.S. 86 (see Exhibit 8). These intersections are signal controlled.

- Irving Avenue and Harman Street

School officials noted a concern with the high number of trucks turning left from Irving Avenue onto Harman Street. It is therefore recommended that NYCDOT reach out to nearby truck generators to request that their truck drivers be especially careful at school crosswalks and yield to students and other pedestrians.

The truck drivers should also be reminded to follow all posted truck routes to the extent required

- *Install curb extensions at the following intersections:*

Consideration should be given to installing a curb extension at the following locations, provided that the Final Design confirms that construction of the recommended curb extension would be feasible and would not interfere with traffic operations. Final details pertaining to the number, location and geometry of curb extensions will be developed during the Final Design/Contract Document preparation.

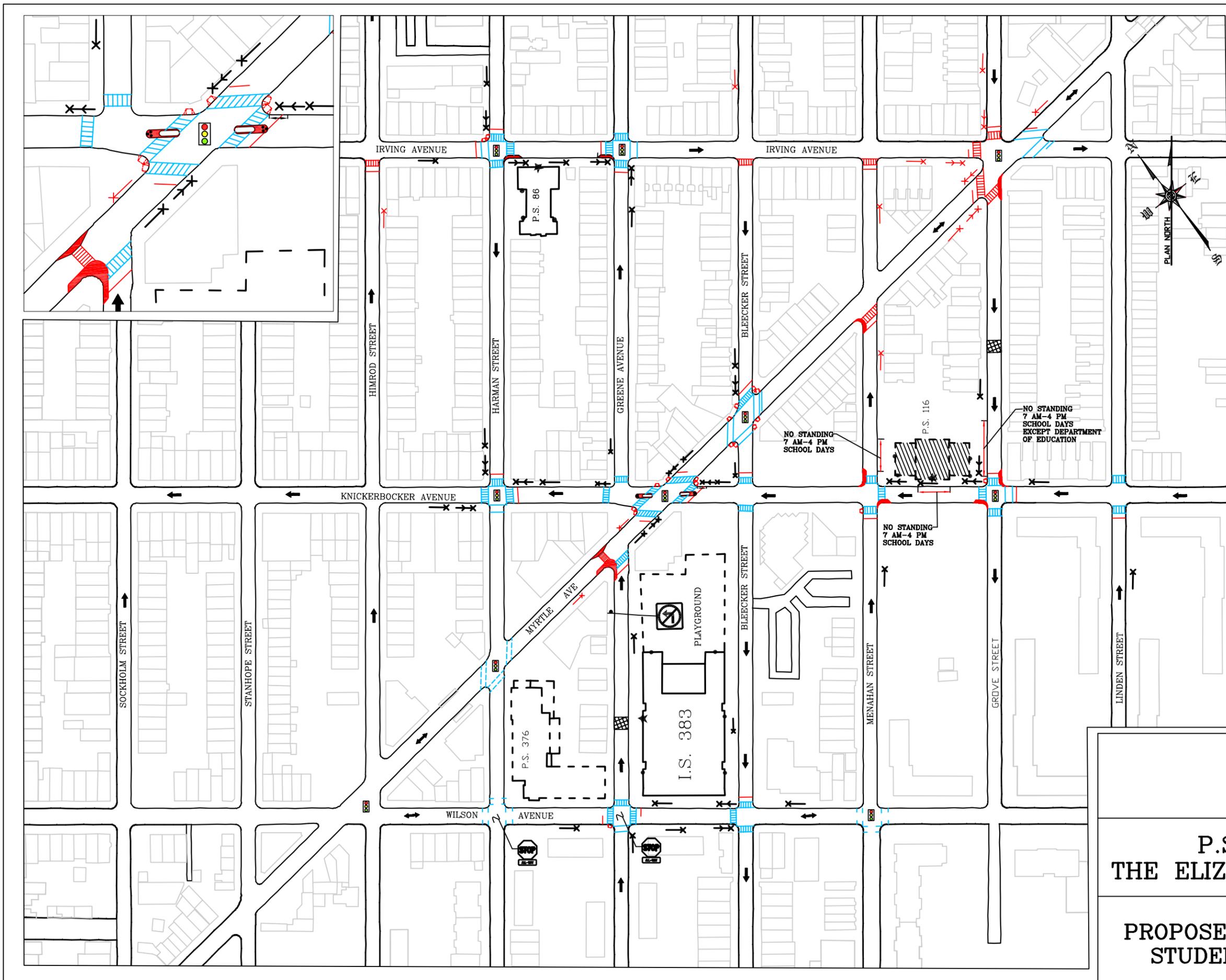
- Irving Avenue and Harman Street – southeast corner
- Irving Avenue and Greene Avenue – southwest corner

Curb extensions should be considered at the corners as shown in Exhibit 8.

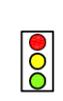
The purpose of the curb extensions is to shorten the crossing distance for pedestrians, and to reduce speeds of vehicles approaching and turning at these heavily utilized school crosswalks (or intersections). These curb extensions would not eliminate or reduce the width of any moving lanes.

- *Installation/replacement of complex pedestrian ramps*

Due to presence existing traffic signal pole, the installation of pedestrian ramps on the northeast corner of Irving Avenue and Harman Street is considered complex. Consideration should be given to the installation of pedestrian ramps per NYCDOT standards at this location.



LEGEND

-  MAIN ENTRANCE
-  OTHER ENTRANCES
-  EXISTING ADVANCE WARNING SIGN
-  EXISTING (OR SCHEDULED TO BE INSTALLED BY DOT) ADVANCE WARNING SIGN WITH ARROW
-  EXISTING TRAVEL DIRECTION
-  SIGNALIZED INTERSECTION
-  EXISTING SCHOOL CROSSWALK
-  EXISTING STANDARD (NON-SCHOOL) CROSSWALK
-  EXISTING SCHOOL CROSSWALK ASSOC. WITH OTHER SCHOOL
-  EXISTING ALL-WAY STOP
-  EXISTING SPEED REDUCER
-  PROPOSED ADVANCE WARNING SIGN
-  PROPOSED STOP LINE
-  PROPOSED STANDARD CROSSWALK
-  PROPOSED SCHOOL CROSSWALK
-  PROPOSED TRAFFIC SIGN
-  PROPOSED CURB EXTENSION (NECKDOWN)
-  PROPOSED PARKING REGULATIONS
-  PROPOSED WIDENING OF CENTER MEDIANS(WITH BOLLARDS)
-  PROPOSED PEDESTRIAN RAMP

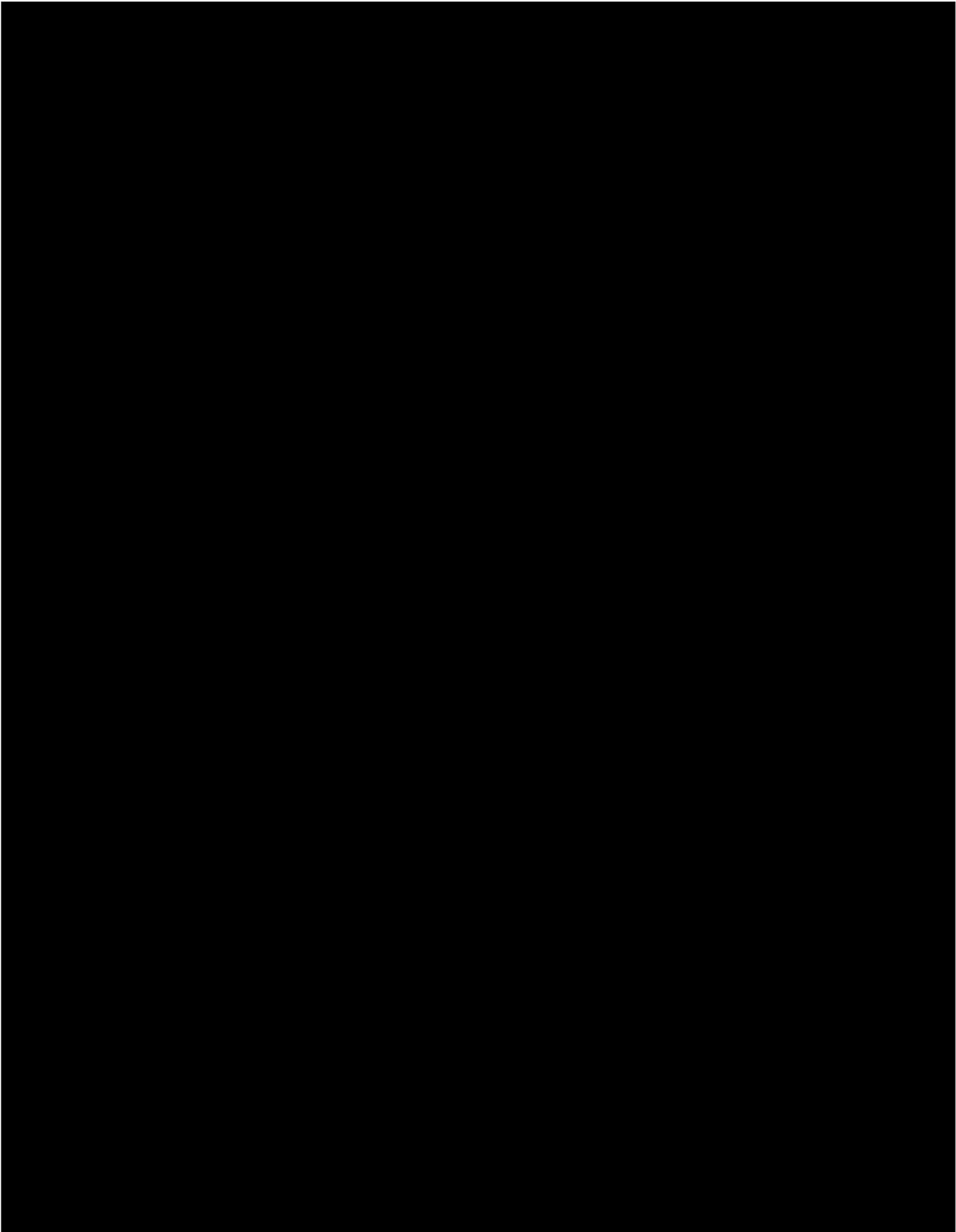
SCALE: 1" : 200'

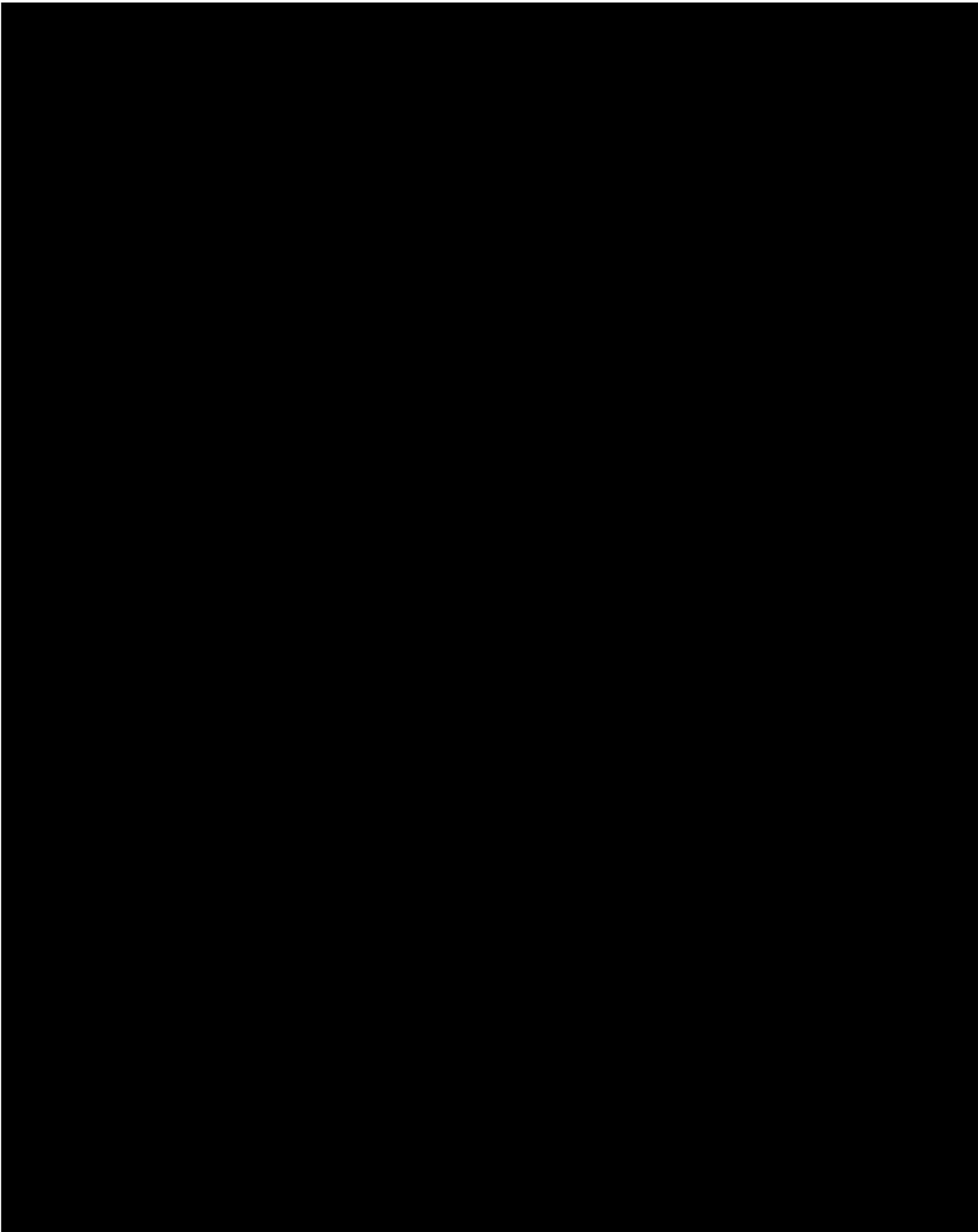
EXHIBIT 8

**P.S. 116, BROOKLYN
THE ELIZABETH FARRELL SCHOOL**

**PROPOSED MEASURES TO IMPROVE
STUDENT PEDESTRIAN SAFETY**

APPENDIX





**TRAFFIC SAFETY PLAN
OFFICIAL ROUTES TO SCHOOL**



**ELIZABETH L. FARRELL SCHOOL
P.S. 116**

Prepared by the NEW YORK CITY DEPARTMENT OF TRANSPORTATION,
Iris Weinstahl, COMMISSIONER, in cooperation with SCHOOL, and
POLICE OFFICIALS.

ORIG. DATE: 6/14/1972
GIS CONVRT: 04/2002
REVISIONS: _____

DRAWING NO. _____
QC: 260
MS- 5838

COMM. BOARD: _____
BOROUGH: BROOKLYN
PRECINCT: 83

- LEGEND:**
- TRAFFIC FLOW
 - ROUTE TO SCHOOL
 - ADV. WARNING SIGN
 - SCHOOL LOCATION
 - MAIN SCHOOL ENTRANCE
 - OTHER SCHOOL ENTRANCES
 - SCHOOL X-WALK
 - PED. X-WALK
 - STOP LINE
 - X-WALKS ASSOCIATED WITH OTHER SCHOOLS
 - SPEED HUMP
 - TRAFFIC SIGNAL
 - ALL - WAY STOP
 - 2 - WAY STOP

The TRAFFIC SAFETY PLAN shown on this map was established to provide the maximum degree of safety for children going to and from school. It is required that all children follow the prescribed routes and use the designated crosswalks.

SPOT SPEED STUDY

Date: **September 7, 2005** Time: **12:30 pm - 1:30 pm**
 Location: **Myrtle Avenue between Grove Street and Menahan Street**
 Surveyor: **Eyad Yousef**

School: **PS 116**
 Direction: **East-West**
 Comments: **Clear and dry**

Speed S (mph)	No. of Vehicles in		% Cumulative Vehicles	nS	nS ²
	Group	% of Vehicles in Group			
8	0	0.0%	0.0%	0	0
9	0	0.0%	0.0%	0	0
10	0	0.0%	0.0%	0	0
11	0	0.0%	0.0%	0	0
12	0	0.0%	0.0%	0	0
13	0	0.0%	0.0%	0	0
14	0	0.0%	0.0%	0	0
15	0	0.0%	0.0%	0	0
16	0	0.0%	0.0%	0	0
17	3	4.9%	4.9%	51	867
18	4	6.6%	11.5%	72	1296
19	0	0.0%	11.5%	0	0
20	11	18.0%	29.5%	220	4400
21	3	4.9%	34.4%	63	1323
22	7	11.5%	45.9%	154	3388
23	15	24.6%	70.5%	345	7935
24	4	6.6%	77.0%	96	2304
25	2	3.3%	80.3%	50	1250
26	6	9.8%	90.2%	156	4056
27	2	3.3%	93.4%	54	1458
28	0	0.0%	93.4%	0	0
29	0	0.0%	93.4%	0	0
30	4	6.6%	100.0%	120	3600
31	0	0.0%	100.0%	0	0
32	0	0.0%	100.0%	0	0
33	0	0.0%	100.0%	0	0
34	0	0.0%	100.0%	0	0
35	0	0.0%	100.0%	0	0
36	0	0.0%	100.0%	0	0
37	0	0.0%	100.0%	0	0
38	0	0.0%	100.0%	0	0
39	0	0.0%	100.0%	0	0
40	0	0.0%	100.0%	0	0
41	0	0.0%	100.0%	0	0
42	0	0.0%	100.0%	0	0
43	0	0.0%	100.0%	0	0
44	0	0.0%	100.0%	0	0
45	0	0.0%	100.0%	0	0
46	0	0.0%	100.0%	0	0
47	0	0.0%	100.0%	0	0
48	0	0.0%	100.0%	0	0
49	0	0.0%	100.0%	0	0
50	0	0.0%	100.0%	0	0
51	0	0.0%	100.0%	0	0
52	0	0.0%	100.0%	0	0
53	0	0.0%	100.0%	0	0
54	0	0.0%	100.0%	0	0
55	0	0.0%	100.0%	0	0
56	0	0.0%	100.0%	0	0
	61	100.0%		1381	31877

Mean Speed = 22.6 mph
 Standard Deviation = 3.2 mph
 Margin of Error (95% Confidence) = ± 0.8 mph

Median Speed = 22.6 mph
 15th Percentile Speed = 19.3 mph
 85th Percentile Speed = 25.9 mph

SPOT SPEED STUDY

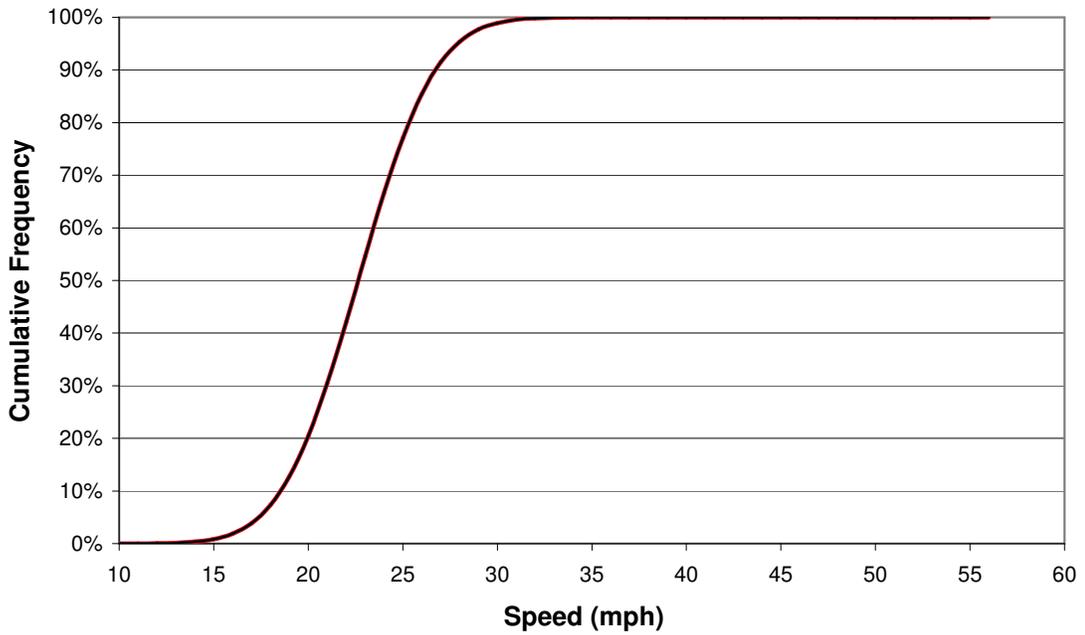
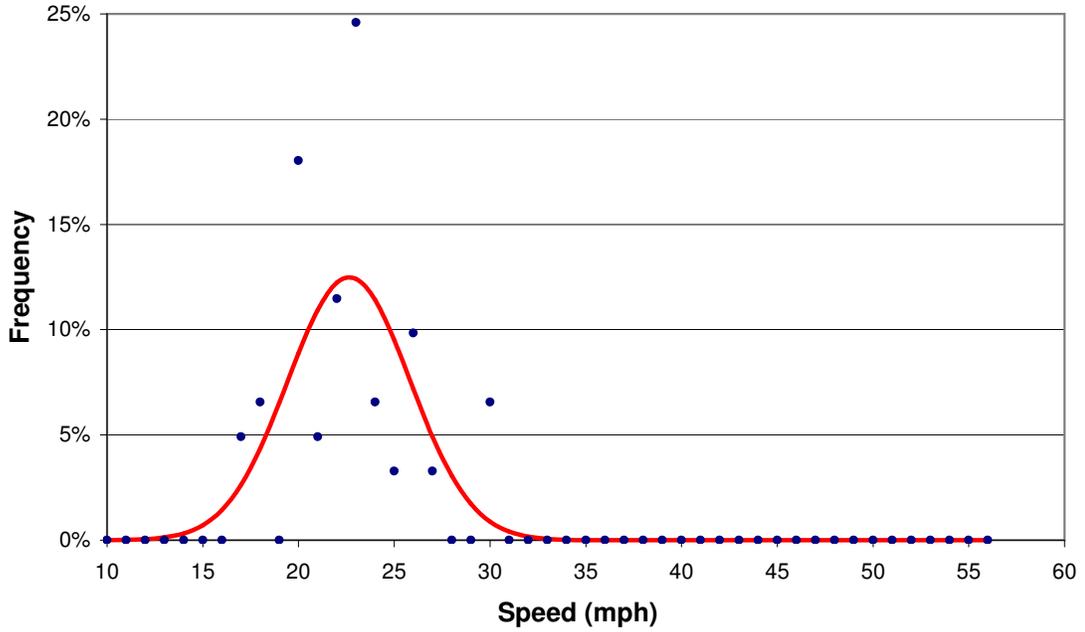
Date: **September 7, 2005**
Location: **Myrtle Avenue between Grove Street and Menahan Street**
Surveyor: **Eyad Yousef**

Time: **12:30 pm - 1:30 pm**

School: **PS 116**
Direction: **NE/SW**
Comments: **Clear and dry**

Mean Speed = 22.6 mph
Standard Deviation = 3.2 mph
Margin of Error (95% Confidence) = ± 0.8 mph

Median Speed = 22.6 mph
15th Percentile Speed = 19.3 mph
85th Percentile Speed = 25.9 mph



SPOT SPEED STUDY

Date: **September 7, 2005** Time: **11:30 am - 12:30 pm**
 Location: **Knickerbocker Avenue between Grove Street and Menahan Street**
 Surveyor: **Eyad Yousef**

School: **PS 116**
 Direction: **West**
 Comments: **Clear and dry**

Speed S (mph)	No. of Vehicles in		% Cumulative	nS	nS ²
	Group	% of Vehicles in			
8	0	0.0%	0.0%	0	0
9	0	0.0%	0.0%	0	0
10	0	0.0%	0.0%	0	0
11	0	0.0%	0.0%	0	0
12	0	0.0%	0.0%	0	0
13	0	0.0%	0.0%	0	0
14	0	0.0%	0.0%	0	0
15	0	0.0%	0.0%	0	0
16	0	0.0%	0.0%	0	0
17	4	4.9%	4.9%	68	1156
18	0	0.0%	4.9%	0	0
19	0	0.0%	4.9%	0	0
20	6	7.4%	12.3%	120	2400
21	2	2.5%	14.8%	42	882
22	16	19.8%	34.6%	352	7744
23	6	7.4%	42.0%	138	3174
24	4	4.9%	46.9%	96	2304
25	3	3.7%	50.6%	75	1875
26	22	27.2%	77.8%	572	14872
27	6	7.4%	85.2%	162	4374
28	0	0.0%	85.2%	0	0
29	3	3.7%	88.9%	87	2523
30	0	0.0%	88.9%	0	0
31	7	8.6%	97.5%	217	6727
32	1	1.2%	98.8%	32	1024
33	0	0.0%	98.8%	0	0
34	0	0.0%	98.8%	0	0
35	1	1.2%	100.0%	35	1225
36	0	0.0%	100.0%	0	0
37	0	0.0%	100.0%	0	0
38	0	0.0%	100.0%	0	0
39	0	0.0%	100.0%	0	0
40	0	0.0%	100.0%	0	0
41	0	0.0%	100.0%	0	0
42	0	0.0%	100.0%	0	0
43	0	0.0%	100.0%	0	0
44	0	0.0%	100.0%	0	0
45	0	0.0%	100.0%	0	0
46	0	0.0%	100.0%	0	0
47	0	0.0%	100.0%	0	0
48	0	0.0%	100.0%	0	0
49	0	0.0%	100.0%	0	0
50	0	0.0%	100.0%	0	0
51	0	0.0%	100.0%	0	0
52	0	0.0%	100.0%	0	0
53	0	0.0%	100.0%	0	0
54	0	0.0%	100.0%	0	0
55	0	0.0%	100.0%	0	0
56	0	0.0%	100.0%	0	0
81		100.0%		1996 50280	

Mean Speed = 24.6 mph
 Standard Deviation = 3.7 mph
 Margin of Error (95% Confidence) = ± 0.8 mph

Median Speed = 24.6 mph
 15th Percentile Speed = 20.8 mph
 85th Percentile Speed = 28.5 mph

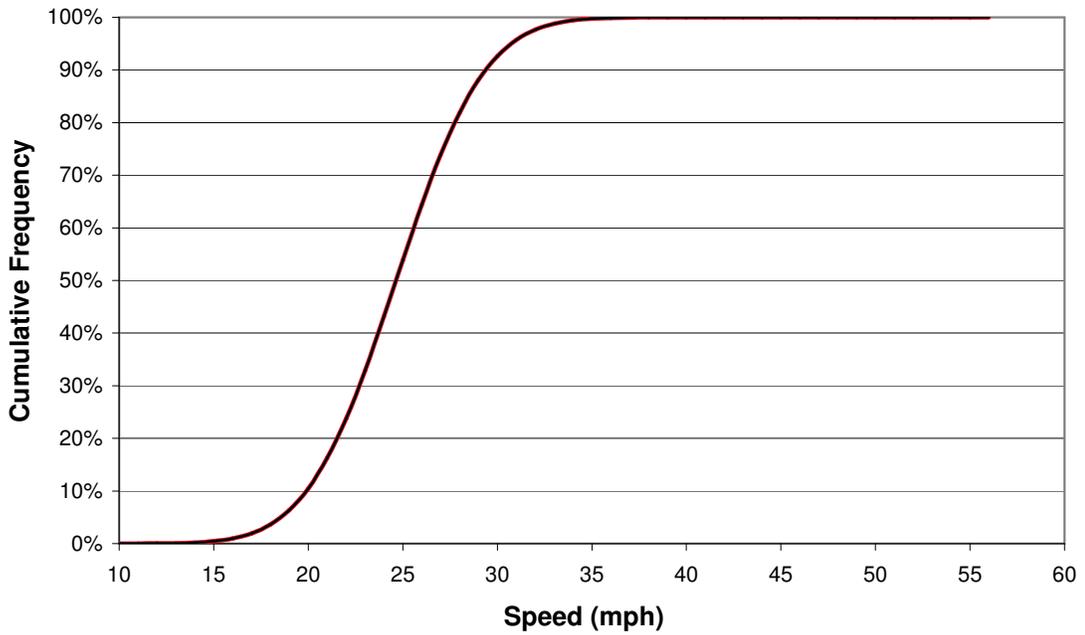
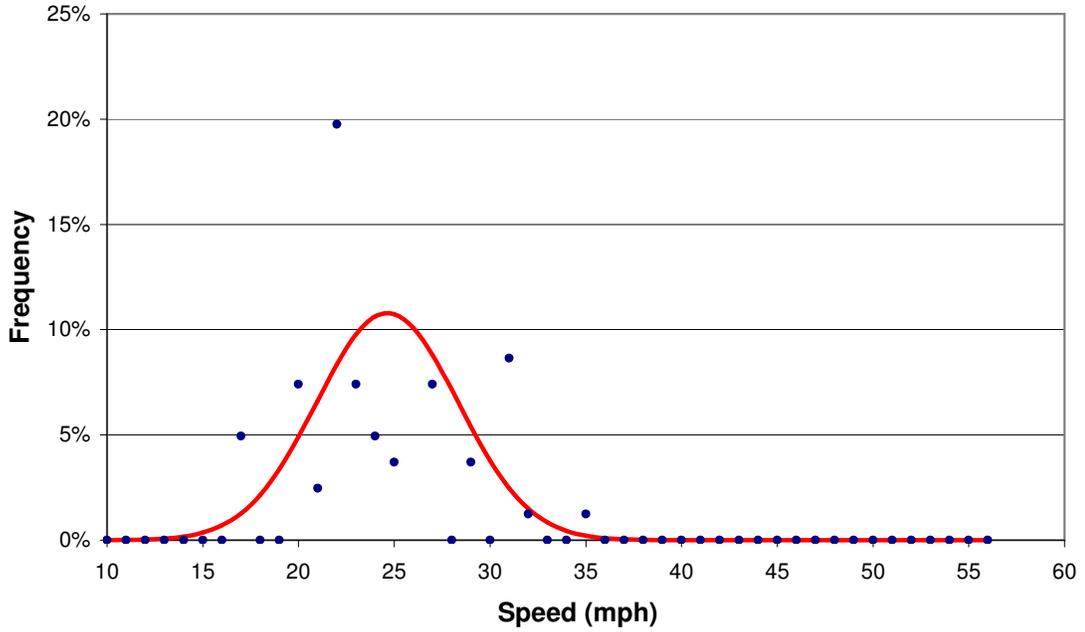
SPOT SPEED STUDY

Date: **September 7, 2005** Time: **11:30 am - 12:30 pm**
Location: **Knickerbocker Avenue between Grove Street and Menahan Street**
Surveyor: **Eyad Yousef**

School: **PS 116**
Direction: **WB**
Comments: **Clear and dry**

Mean Speed = 24.6 mph
Standard Deviation = 3.7 mph
Margin of Error (95% Confidence) = ± 0.8 mph

Median Speed = 24.6 mph
15th Percentile Speed = 20.8 mph
85th Percentile Speed = 28.5 mph



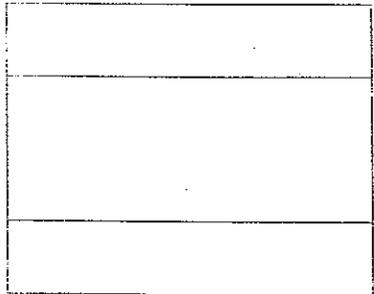
INTERSECTION: Knickerbocker & Menahan St
 TIME : 430-530 pm
 DATE : 7/27/06

↔
 Peds - 48

STREET NAME:
Menahan St

C - 254	HV - 7
C - 28	HV - 1

↔
 Peds - 77



C - 47	HV - 1
C - 26	HV - 0

↔
 Peds - 171

STREET NAME:
Knickerbocker Av.

↔
 Peds - 31

C - CARS
 T - TRUCKS
 B - BUSES
 P - PEDS

Traffic Gap Count

SCHOOL SAFETY ENGINEERING PROJECT

School: P.S. 116
 Location: Menahan St

Date: 7/27/06
 Time: 8-9AM

<i>seconds</i>	Gap Time	Veh #	<i>seconds-</i>	Gap Time	Veh #	<i>seconds-</i>	Gap Time	Veh #
1			41			81		
2			42			82		
3			43			83		
4			44			84		
5			45			85		
6	//		46	/		86		
7	//		47	/		87		
8	/		48			88		
9			49			89		
10	///		50	/		90		
11	//		51	/		91		
12	//		52	/		92		
13	/		53	//		93		
14	//		54			94		
15	///		55	/		95		
16	//		56	/		96		
17	/		57	//		97		
18			58			98		
19	//		59	/		99		
20	///		60			100		
21	//		61			101		
22	//		62			102		
23			63			103		
24			64			104		
25			65			105		
26	/		66			106		
27	///		67			107		
28	//		68			108		
29	/		69			109		
30	/		70			110		
31	//		71			111		
32			72			112		
33			73			113		
34			74			114		
35			75			115		
36			76			116		
37			77			117		
38			78			118		
39			79			119	//	
40			80			120	/	

157-1

103-1
 168-1
 143-1
 127-1