

**New York City Department of Transportation  
Office of School Safety Engineering**



**School Safety Engineering Project**

**FINAL REPORT: P.S. 384, Frances Carter School, Brooklyn**



Prepared by  
The RBA Group/Urbitrans Associates



**NOVEMBER 10, 2006**

**School Safety Engineering Project**  
**P.S. 384, Frances Carter 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 600 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. 384, Frances Carter School, in Brooklyn is one of the 135 priority schools.

## 2. BACKGROUND—EXISTING CONDITIONS AND ANALYSIS

### 2.2 NEIGHBORHOOD DESCRIPTION

Located at 242 Cooper Street in Brooklyn, P.S. 384 occupies the entire city block bounded by Wilson Avenue, Knickerbocker Avenue, Cooper Street and Moffat Street. The surrounding area is primarily residential with private homes and 2-3 story buildings (See Exhibit 1 for Aerial Photograph and Exhibit 2 for the Catchment Area). The Cemetery of the Evergreens is located one block south of P.S. 384.

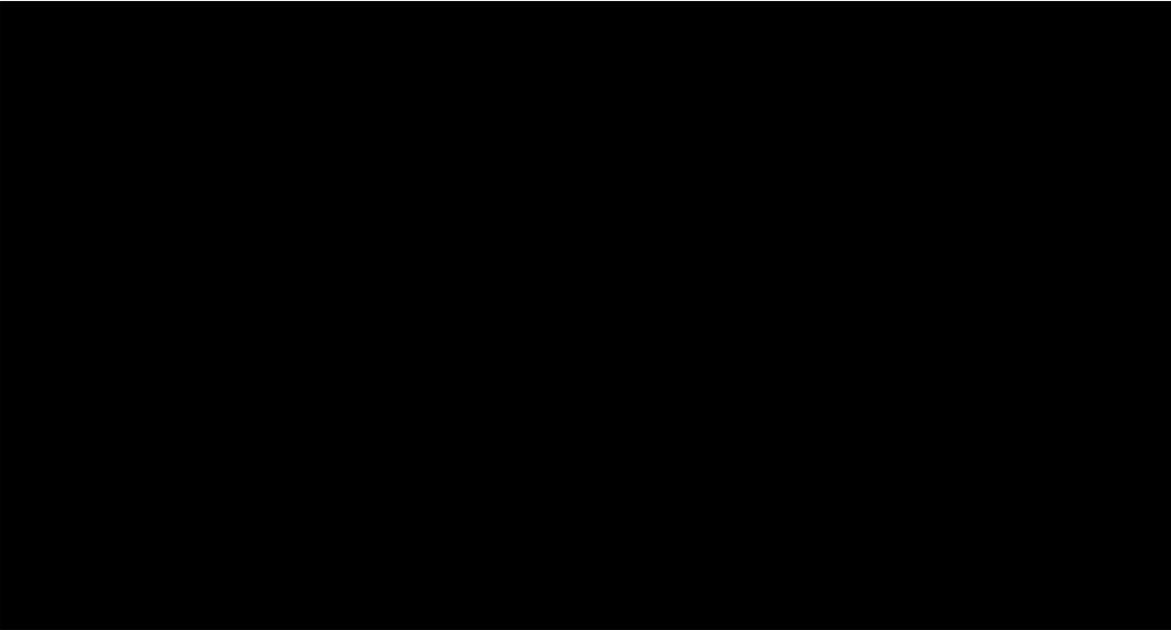


*Figure 1 – Looking west on Cooper Street with P.S. 384 on the left.*

### 2.3 MEETING WITH SCHOOL REPRESENTATIVES

The consultant team and representatives from P.S. 384 met at the school on the afternoon of June 17, 2004 (See the Appendix for a list of attendees). According to school representatives, the identifiable problems that student pedestrians encounter on a regular basis include the following:

- Vehicles speeding on Cooper Street
- Vehicles by-passing school buses while buses load and unload students
- Children crossing at mid-block locations on Cooper Street



## 2.6 PRIMARY MODES OF TRANSPORT TO AND FROM SCHOOL

According to school officials, 80% of students walk to P.S. 384, 12% ride school buses, six percent are driven by parents or guardians and the remaining two percent of students arrive via public transportation. See Table 1 for the school’s estimate of the modes of travel.

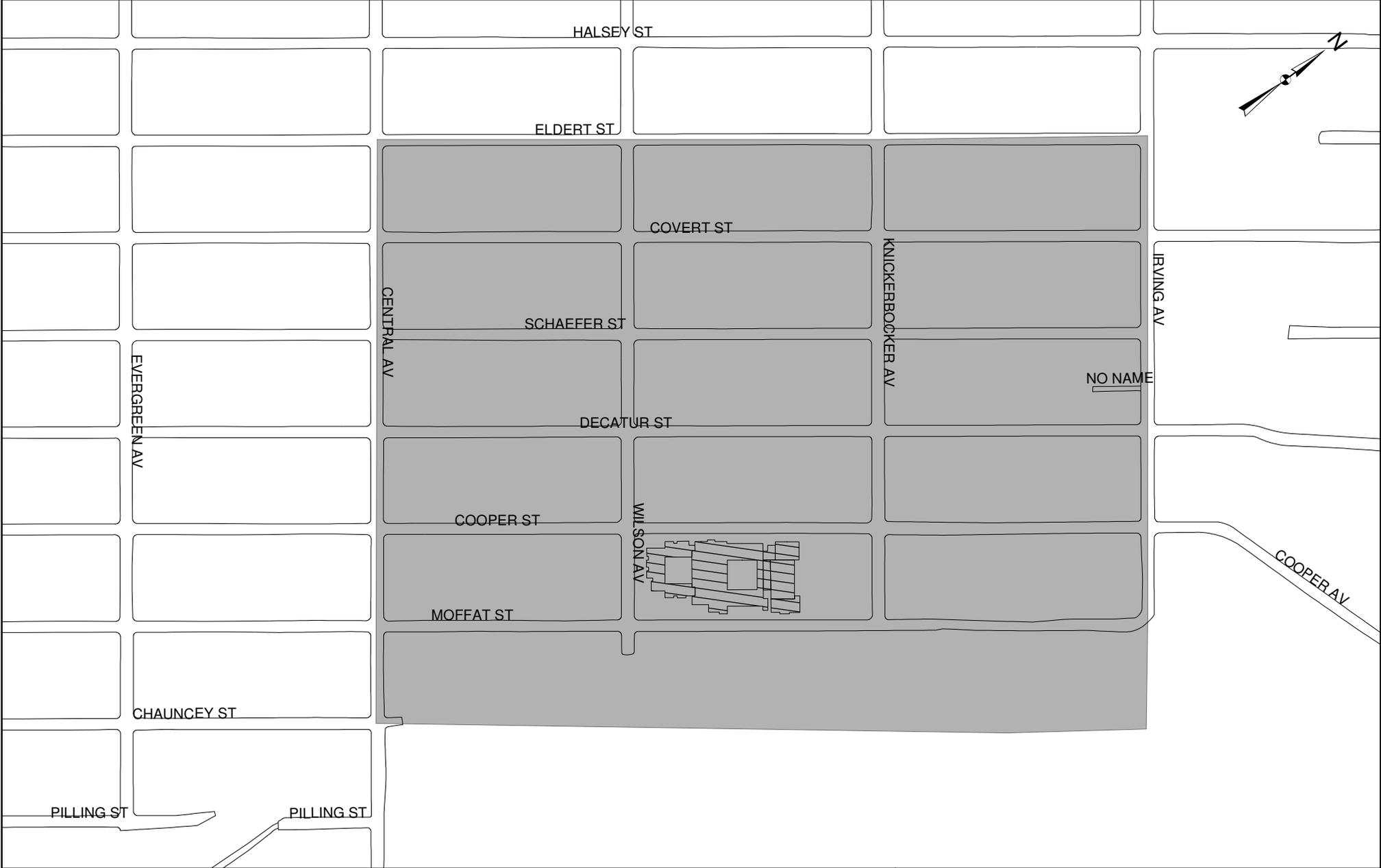
All P.S. 53 students arrive by school bus.

| <b>TABLE 1: MODES OF TRAVEL</b><br>(AS ESTIMATED BY SCHOOL OFFICIALS) |                   |
|---|-------------------|
| <b>DESCRIPTION</b>  | <b>PERCENTAGE</b> |
| Walk  | 80%               |
| Driven by parent or guardian  | 6%                |
| School bus  | 12%               |
| MTA bus   | 2%                |
| <b>TOTAL</b>  | <b>100%</b>       |



1 inch equals 200 feet

**EXHIBIT 1  
P.S. 384, BROOKLYN  
FRANCES CARTER SCHOOL  
AERIAL PHOTOGRAPH**



1 inch equals 350 feet

 **CATCHMENT AREA**

**EXHIBIT 2**  
**P.S. 384, BROOKLYN**  
**FRANCES CARTER SCHOOL**  
**CATCHMENT AREA**

## 2.7 OTHER PEDESTRIAN TRAFFIC GENERATORS

A supermarket frequently visited by P.S. 384 students is located at Cooper Street and Wilson Avenue. P.S.45 is located two blocks to the west on Evergreen Avenue and P.S. 296 is located a few blocks to the northwest of P.S. 384. P.S. 296 is also a priority school.

There are two bus routes in the vicinity of P.S. 384. The K20 bus line runs along Schaefer Street and Decatur Street. The K60 line runs on Decatur Street, Cooper Street and Wilson Avenue. A subway station for the L line is located at Wilson Avenue and Moffat Street.

## 2.8 CROSSING GUARD LOCATIONS

According to field observations, there are two crossing guards assigned to P.S. 384. They are stationed at the following intersections:

- Wilson Avenue and Cooper Street (Figure 2)
- Knickerbocker Avenue and Cooper Street

See Exhibit 4 for a map of crossing guard locations.



*Figure 2 – Crossing guard on duty at Wilson Avenue and Cooper Street*



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

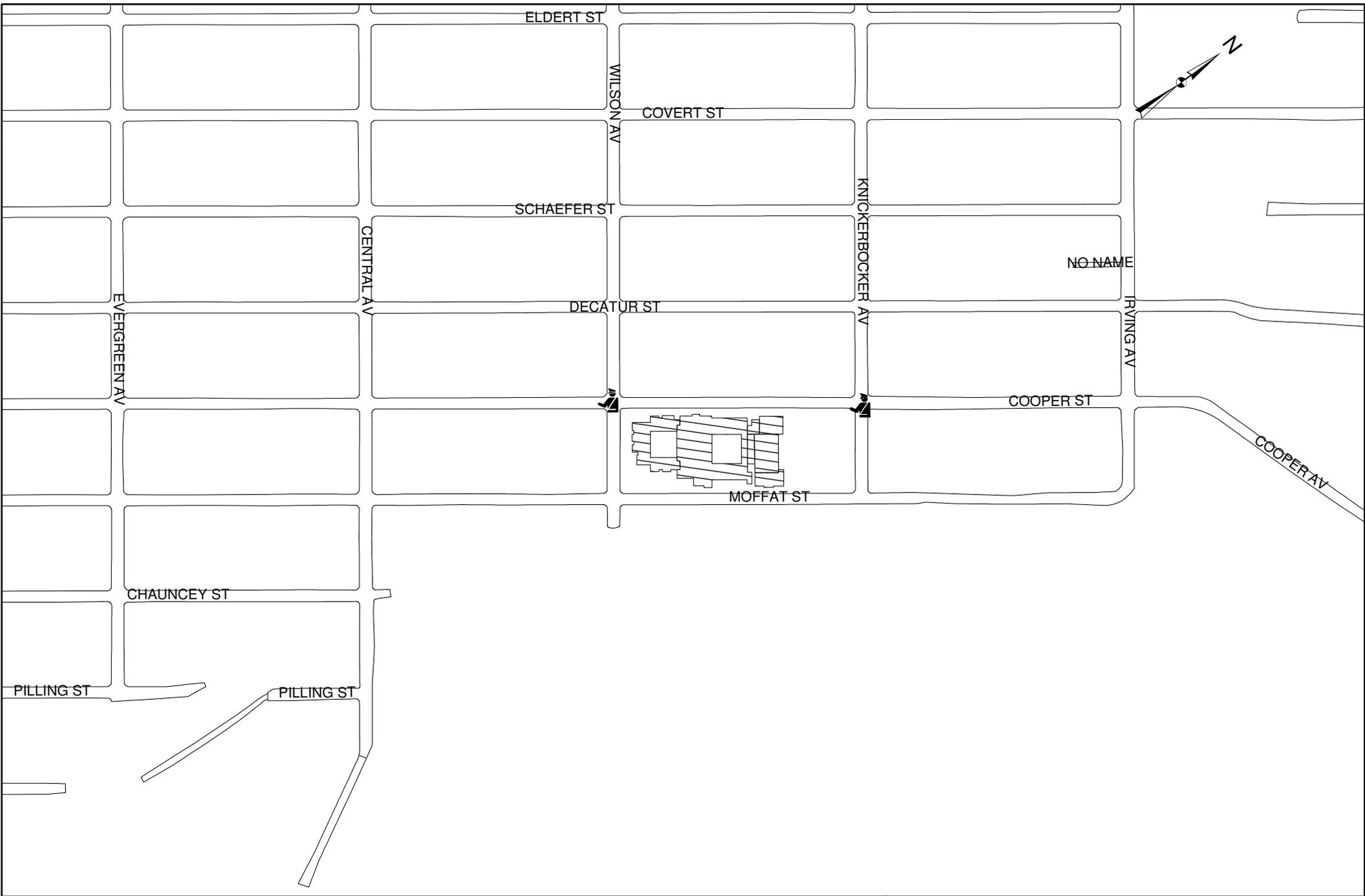
**PS 384 Brooklyn  
FRANCES CARTER SCHOOL**

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

Map created on 11/16/2006

**EXHIBIT 3**

COMM. BOARD: 304  
PRECINCT: 83



1 inch equals 350 feet



**CROSSING GUARDS ASSIGNED TO P.S. 384**

**EXHIBIT 4**

**P.S. 384, BROOKLYN  
FRANCES CARTER SCHOOL**

**CROSSING GUARD**

### 3. TRAFFIC OPERATIONS

#### 3.1 SCHOOL BUS OPERATIONS

According to school officials, ten school buses transport P.S. 384 students to and from school. Nine buses pick up and drop off students on Moffat Street and typically have to double-park. An additional school bus picks up and drops off students on Cooper Street.

#### 3.2 PARENT DROP-OFF OPERATIONS

School officials have indicated that approximately 6% of P.S. 384 students are driven to and from school by a parent or a guardian. Field observations taken on June 17, 2004 indicated that parents drop off students on both Moffat Street and Cooper Street. Cooper Street is a 28-foot wide, two-way roadway. Since parking is prohibited on the south side of the block due to the narrow roadway width, vehicles were observed parking on the sidewalk in order not to block eastbound moving traffic (see Figure 3).



*Figure 3 – Cars parked on the sidewalk along Cooper Street during dismissal time*

#### 3.3 PARKING REGULATIONS

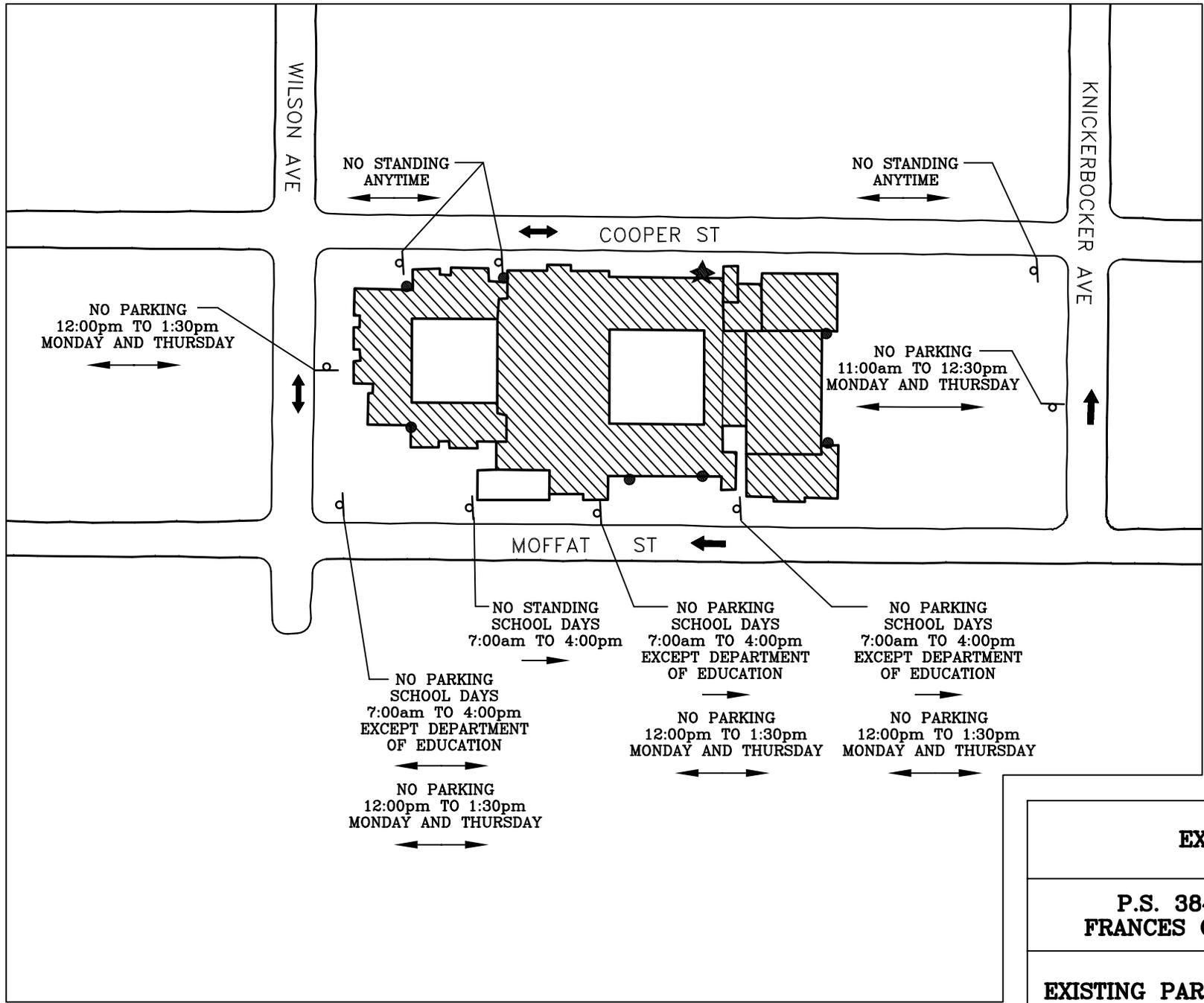
“NO STANDING ANYTIME” parking regulations are posted on the south side of Cooper Street (school side) between Wilson Avenue and Knickerbocker Avenue.

“NO STANDING SCHOOL DAYS 7 AM – 4 PM” parking regulations are posted on the north side of Moffat Street in front of the school’s entrance. “NO PARKING SCHOOL DAYS 7 AM – 4 PM, EXCEPT DEPARTMENT OF EDUCATION” regulations are posted for the rest of the block on Moffat Street.

Alternate side street parking regulations are in effect 12:00 pm – 1:30 pm or 11:00 am – 12:30 pm on the roadways surrounding the school. See Exhibit 5 for parking regulations.

### **3.4 EXISTING SCHOOL SIGNS AND MARKINGS**

The Traffic Safety Plan, Exhibit 3, shows existing signals and crosswalk pavement markings. 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 8.



- LEGEND**
- ★ MAIN ENTRANCE
  - ENTRANCE
  - STREET SIGN

SCALE: 1" : 120'

**EXHIBIT 5**

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**P.S. 384, BROOKLYN  
FRANCES CARTER SCHOOL**

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**EXISTING PARKING REGULATIONS**

### 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. 384 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.

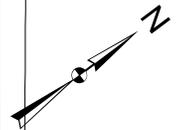
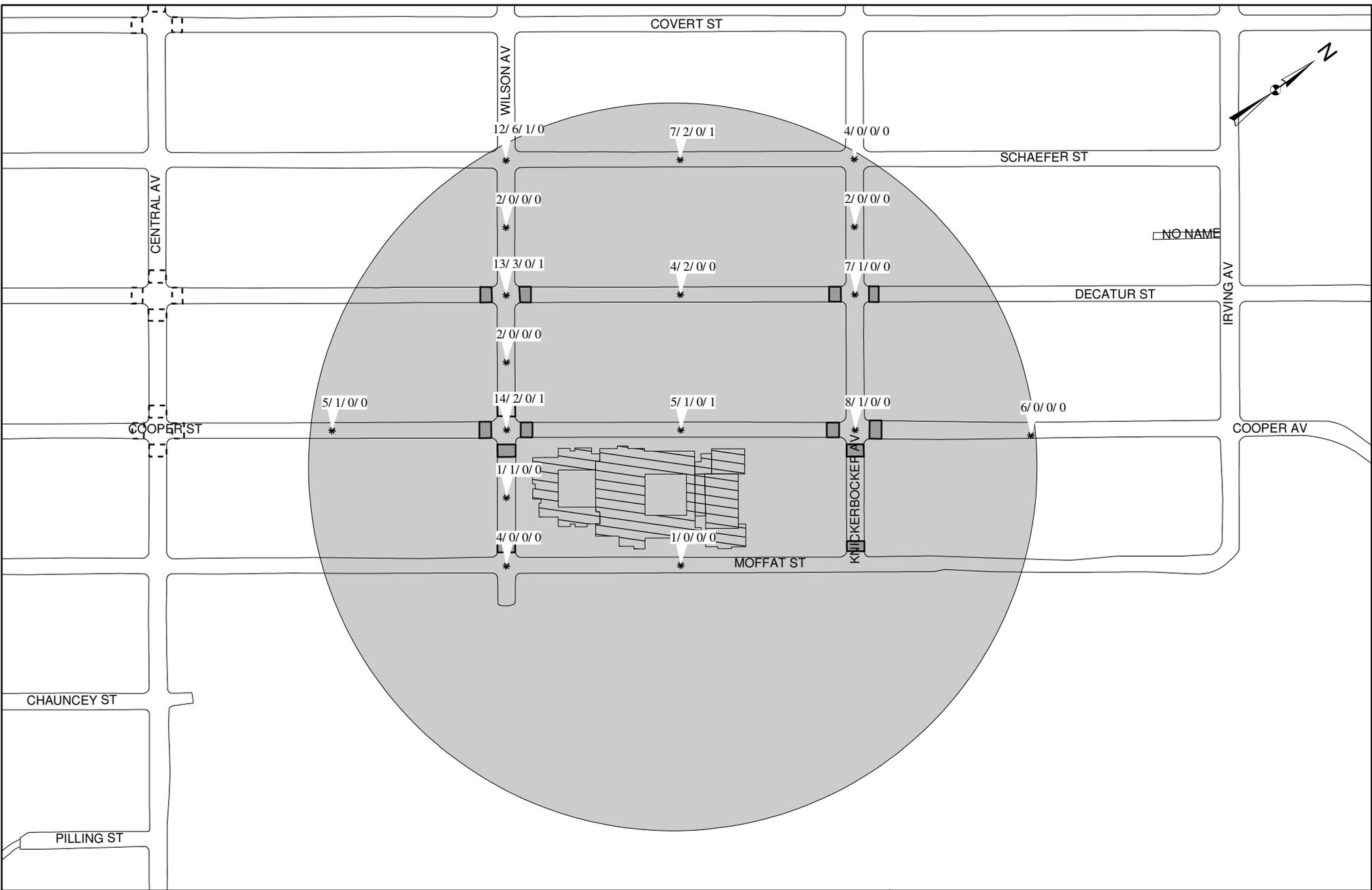
This report targets intersections closest to the school where the highest concentrations of student pedestrians occur. Intersections that are farther from the school and locations for which detailed data was not available at the time of this study will be addressed with DOT’s School Safety Engineering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

| <b>INTERSECTION</b>                    | <b>TOTAL ACCIDENTS</b> | <b>PEDESTRIAN ACCIDENTS</b> | <b>PEDESTRIAN FATALITIES</b> | <b>SCHOOL-RELATED ACCIDENTS*</b> |
|--|------------------------|-----------------------------|------------------------------|----------------------------------|
| Knickerbocker Avenue & Decatur Street  | 7                      | 1                           | 0                            | 0                                |
| Knickerbocker Avenue & Cooper Street   | 8                      | 1                           | 0                            | 0                                |
| Knickerbocker Avenue and Moffat Street | 1                      | 0                           | 0                            | 0                                |
| Wilson Avenue and Decatur Street       | 13                     | 3                           | 0                            | 1                                |
| Wilson Avenue and Cooper Street        | 14                     | 2                           | 0                            | 1                                |
| Wilson Avenue and Moffat Street        | 4                      | 0                           | 0                            | 0                                |
| Wilson Avenue and Schaefer Street      | 12                     | 6                           | 1                            | 0                                |
| <b>Total</b>                           | <b>59</b>              | <b>15</b>                   | <b>1</b>                     | <b>2</b>                         |

| <b>INTERSECTION</b>                    | <b>TOTAL ACCIDENTS</b> | <b>PEDESTRIAN ACCIDENTS</b> | <b>PEDESTRIAN FATALITIES</b> | <b>SCHOOL-RELATED ACCIDENTS*</b> |
|--|------------------------|-----------------------------|------------------------------|----------------------------------|
| Knickerbocker Avenue & Decatur Street  | 11                     | 2                           | 0                            | 1                                |
| Knickerbocker Avenue & Cooper Street   | 14                     | 0                           | 0                            | 0                                |
| Knickerbocker Avenue and Moffat Street | 5                      | 0                           | 0                            | 0                                |
| Wilson Avenue and Decatur Street       | 28                     | 4                           | 0                            | 2                                |
| Wilson Avenue and Cooper Street        | 17                     | 5                           | 0                            | N/A**                            |
| Wilson Avenue and Moffat Street        | 9                      | 0                           | 0                            | 0                                |
| Wilson Avenue and Schaefer Street      | 21                     | 6                           | 0                            | 0                                |
| <b>Total</b>                           | <b>105</b>             | <b>17</b>                   | <b>0</b>                     | <b>3</b>                         |

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

\*\* *Pedestrian age was not reported.*



ACCIDENT LOCATION \* 1 inch equals 250 feet

SCHOOL CROSSWALK ASSIGNED TO P.S.384

SCHOOL CROSSWALK ASSIGNED TO ANOTHER SCHOOL

CROSSWALK

| X/X/X/X | TOTAL ACCIDENTS | PED ACCIDENTS | PED FATAL | SCHOOL_PED ACCIDENTS |
|---------|-----------------|---------------|-----------|----------------------|
|         |                 |               |           |                      |

**EXHIBIT 6**

**P.S. 384, BROOKLYN**

**FRANCES CARTER SCHOOL**

**ACCIDENT SUMMARY**

**THREE YEAR PERIOD**

**1998-2000**

### 3.6 TRAFFIC OPERATIONS AND ISSUES

The following sections outline the traffic accidents and operational issues in the vicinity of P.S. 384.

#### 3.6.1 Knickerbocker Avenue and Decatur Street

Knickerbocker Avenue is a 34-foot wide, one-way northbound street with one travel lane and parking on both sides. Decatur Street is a 30-foot wide, one-way eastbound street with one travel lane and parking on both sides. Knickerbocker Avenue and Decatur Street is an all-way stop controlled intersection with school crosswalks on the west and east legs (See Figure 4).

There were seven accidents during the 1998-2000 study period, one of which was a non school-related pedestrian accident. A pedestrian was struck while crossing Knickerbocker Avenue without a crosswalk. The report indicates the driver was in error and was backing up at the time of the incident.



*Figure 4 – Knickerbocker Avenue and Decatur Street, looking east*

#### 3.6.2 Knickerbocker Avenue and Cooper Street

Knickerbocker Avenue and Cooper Street is a signalized intersection. Cooper Street is a 28-foot wide, two-way roadway with one travel lane in each direction and parking on the north side of the street. There are school crosswalks in place on the south, east and west legs. The northeast quadrant does not have standard pedestrian ramps due to the presence of a traffic pole (see Figure 5).

This intersection had eight accidents during the 1998-2000 study period, one of which was a non school-related pedestrian accident. A 13-year-old child was struck while crossing with the signal. The accident, which occurred out of school time, was attributed to both pedestrian and driver error. There are no further details for this accident.



*Figure 5 – Northeast quadrant of Knickerbocker Avenue and Cooper Street, which is missing pedestrian ramps*

### 3.6.3 Knickerbocker Avenue and Moffat Street

Knickerbocker Avenue and Moffat Street is an un-signalized T-intersection. Moffat Street is a 30-foot wide, one-way westbound roadway with one travel lane and parking on both sides of the street. Knickerbocker Avenue is a two-way street between Moffat Street and Cooper Street. There is an uncontrolled school crosswalk on the north leg of the intersection.

A one-hour traffic count was performed on Monday, September 18, 2006 from 2:30 pm to 3:30 pm to determine traffic conditions at this intersection (Exhibit 7). The results indicated that during the study hour, a total of 43 vehicles (24 in the southbound direction that make a right turn to Moffat Street) utilized this intersection. 8 pedestrians crossed the north leg, which is currently an uncontrolled school crosswalk. Based on MUTCD Section 4C.05 Signal Warrant 4 (Pedestrian Volume) the need for a traffic 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. Therefore existing conditions do not meet the criteria for signalizing the intersection at this time.

There is no curb or sidewalk on the south side of Moffat Street at this intersection. The pedestrian ramps on the northwest and northeast quadrants are substandard and not properly aligned (See Figure 6).

This intersection had one accident during the 1998-2000 study period which was not a pedestrian accident.



*Figure 6 –Looking east at Knickerbocker Avenue and Moffat Street*

#### 3.6.4 Wilson Avenue and Decatur Street

Wilson Avenue and Decatur Street is an un-signalized intersection with a stop sign on Decatur Street for eastbound traffic. Wilson Avenue is a 35-foot wide, two-way street with one travel lane in each direction and parking on both sides of the street. There are school crosswalks in place on the west and east legs. The existing pedestrian ramps at all quadrants of this intersection are substandard.

There were thirteen accidents at this intersection during the 1998-2000 study period. Three accidents involved pedestrians, one of which was school-related. Three pedestrians, including a seven-year-old student, were struck while crossing without a pedestrian crosswalk.

#### 3.6.5 Wilson Avenue and Cooper Street

Wilson Avenue and Cooper Street is a signalized intersection. There are school crosswalks in place on the south, east and west legs of the intersection.

There were fourteen accidents at this intersection during the 1998-2000 study period. Two accidents involved pedestrians, one of which was school-related. A vehicle traveling northbound struck an eight-year old pedestrian. The accident was attributed to pedestrian error but no further information was available. The second accident involved a driver who struck a pedestrian while making a left turn.

A school child was struck at a mid-block location on Cooper Street between Knickerbocker Avenue and Wilson Avenue. The accident was due to driver error.

School representatives indicated that vehicles were speeding on Cooper Street in the vicinity of the school. A speed study was performed on Cooper Street between Knickerbocker Avenue and Wilson Avenue on Monday March 14, 2005 between 11:00 am and 12:00 pm.

The spot speed study confirmed that the 85<sup>th</sup> percentile speed was 34 mph, which exceeds the statutory speed limit of 30 mph. See Table 5 for a summary of the results and the Appendix for further detail.

A speed reducer is not feasible since Cooper Street is a truck route, however see Section 4 for alternate recommendations.

| <b>TABLE 4: SPOT SPEED STUDY</b><br>(Monday, March 14, 2005 11:00 am – 12:00 pm) |                               |  |
|--|-------------------------------|--|
| <b>LOCATION</b>  | <b>MEDIAN SPEED<br/>(MPH)</b> | <b>85TH PERCENTILE SPEED<br/>(MPH)</b> |
| Cooper Street between Knickerbocker Avenue and Wilson Avenue                     | 28                            | 34                                     |



*Figure 7—Looking west at Wilson Avenue and Cooper Street*

### 3.6.6 Wilson Avenue and Moffat Street

Wilson Avenue and Moffat Street is an un-signalized intersection with a stop sign on Moffat Street for westbound traffic. There is an uncontrolled school crosswalk on the north leg at this intersection.

There were four accidents at this intersection during the 1998-2000 study period, none of which involved pedestrians.

A one-hour traffic count was performed on Wednesday, September 13, 2006 from 2:30 pm to 3:30 pm to determine traffic conditions at this intersection (Exhibit 7). The results indicated that during the study hour, a total of 105 vehicles (50 in the southbound direction that make a right turn to Moffat Street) and 434 pedestrians utilized this intersection. Approximately 71 pedestrians crossed the north leg, which is currently an uncontrolled school crosswalk. Based on MUTCD Section 4C.05 Signal Warrant 4 (Pedestrian Volume) the need for a traffic 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. Therefore existing conditions do not meet the criteria for signaling the intersection at this time.

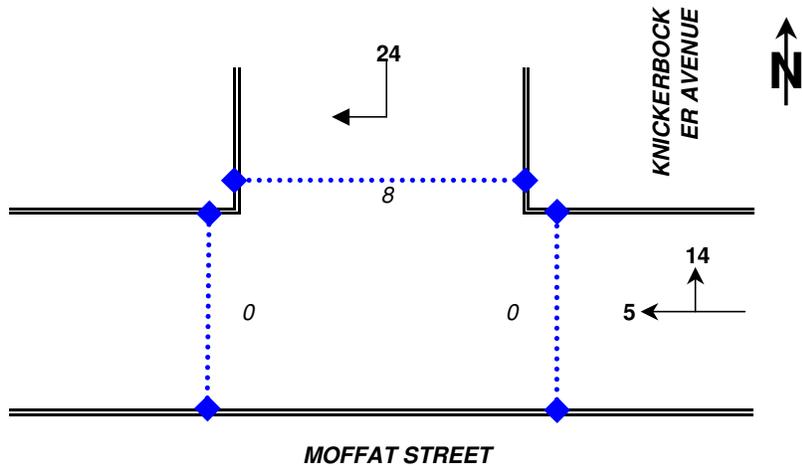
### 3.6.7 Wilson Avenue and Schaefer Street

Wilson Avenue and Schaefer Street is an un-signalized intersection with a stop sign on Schaefer Street for westbound traffic. Schaefer Street is a 30-foot wide, one-way westbound street with one travel lane and parking on both sides. There are school crosswalks on the east and west legs of this intersection.

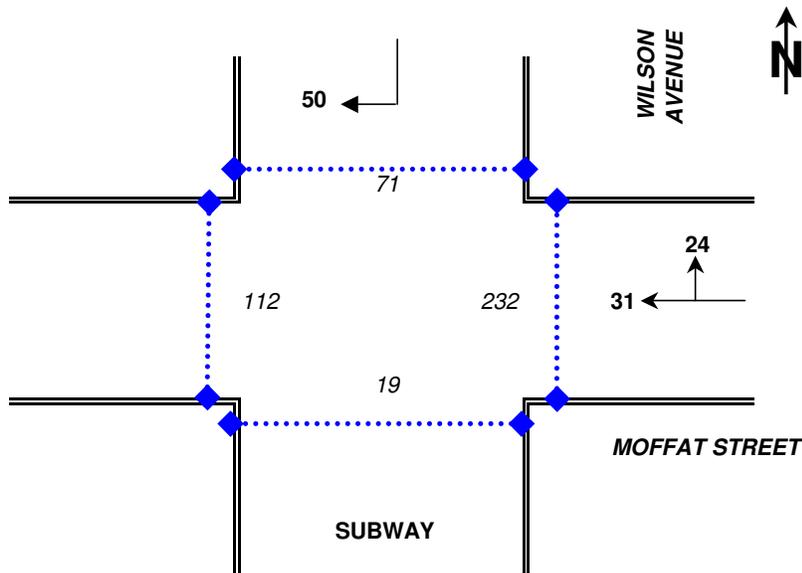
There were twelve accidents at this intersection during the 1998-2000 study period. Six accidents involved pedestrians, one of which was fatal. There were no school-related accidents. A pedestrian was struck and killed while crossing Wilson Avenue with no controlled crosswalks. Five pedestrians were struck while crossing without controlled crosswalks or while emerging from between parked vehicles.

Two school children were struck while crossing mid-block on Schaefer Street between Knickerbocker Avenue and Wilson Avenue. One of these accidents occurred outside of school hours.

**One Hour Traffic Count Volumes**



**Intersection of Knickerbocker Avenue and Moffat Street**  
(2:30 PM - 3:30 PM September 18, 2006)



**Intersection of Wilson Avenue and Moffat Street**  
(2:30 PM - 3:30 PM September 13, 2006)

- 62 ——— Number of Pedestrians
- ◆····◆ Pedestrian Crossing
- 53 ←—— Vehicle Movement
- ←—— Number of Vehicles

|                     |
|---------------------|
| EXHIBIT 7           |
| P.S. 384 , BROOKLYN |
| TRAFFIC COUNTS      |

### 3.7 SIGNAL TIMING: PEDESTRIAN PHASE

Pedestrian crossing time was field verified at all signalized intersections in the vicinity of P.S. 384 and found to be adequate for a child pedestrian walking rate of three feet per second in all directions and approaches.

| <b>TABLE 4: PEDESTRIAN CROSSING TIME AT SIGNALIZED INTERSECTIONS</b> |                        |                             |                            |                             |
|--|------------------------|-----------------------------|----------------------------|-----------------------------|
| Intersection Name  | Crosswalk Width (Feet) | Ped. Phase Actual (Seconds) | Ped. Phase Req'd (Seconds) | Timing Adjustment? (Yes/No) |
| <b>Wilson Avenue and Cooper Street</b>                               |                        |                             |                            |                             |
| Crossing Wilson Avenue   | 35                     | 27                          | 15                         | NO                          |
| Crossing Cooper Street   | 30                     | 33                          | 13                         | NO                          |
| <b>Knickerbocker Avenue and Cooper Street</b>                        |                        |                             |                            |                             |
| Crossing Knickerbocker Avenue  | 34                     | 25                          | 15                         | NO                          |
| Crossing Cooper Street   | 30                     | 35                          | 13                         | NO                          |

*Notes – A rate of 3 ft/sec plus 3 seconds reaction time was utilized as the child pedestrian walking rate*

### 3.8 PHYSICAL CONDITIONS (ROADWAYS AND SIDEWALKS)

The roadways and sidewalks in the vicinity of P.S. 384 were observed to be in fair to good condition. Some of the corner quadrants and some sidewalks are missing or have substandard pedestrian ramps as noted in Section 3.6.

#### **4. POTENTIAL MEASURES TO IMPROVE STUDENT PEDESTRIAN SAFETY**

This section describes potential countermeasures. These countermeasures are divided into short-term and long-term measures. Short-term measures are those that potentially can be performed in-house, long term measures are proposed capital improvements.

##### **4.1 SHORT-TERM MEASURES**

- *Install No Standing Zone*

“NO STANDING 7:00 AM – 4:00 PM, SCHOOL DAYS” parking regulations should be extended in front of the school building on Moffat Street to provide sufficient clear frontage for school buses to drop off and pick up students and to improve visibility of students arriving to and leaving the school. The existing teacher parking should be relocated to Knickerbocker Avenue.

Currently, there is one school bus that loads and unloads students on Cooper Street. It is recommended that all school buses load and unload students on Moffat Street.

- *Administer student pedestrian safety education program*

It is recommended that the NYCDOT Safety Education Program work with the school to educate the 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 mid-block.

- *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/replace pedestrian ramps*

Consideration should be given to the installation and /or replacement of pedestrian ramps per NYCDOT standards at the following locations:

- Wilson Avenue and Decatur Street - all quadrants
- Knickerbocker Avenue and Moffat Street - northeast and northwest quadrants
- Knickerbocker and Cooper - northeast quadrant

- Install new school crosswalks at the following location:
  - Knickerbocker and Schaefer Street – east and west legs
  - Knickerbocker Avenue and Decatur Street – south leg
  - Wilson Avenue and Moffat Street – east leg
  - Wilson Avenue and Schaefer Street – east and west legs

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

## 4.2 LONG-TERM MEASURES

- *Install Bollards on Cooper Street*

Vehicles were observed parking on the south sidewalk during arrival and dismissal. The current roadway configuration does not provide a parking lane along the south curb. It is recommended that bollards be provided along the south curb to prevent vehicles from parking on the sidewalk.

The exact spacing and configuration of the bollards will be determined during the final design in accordance with DOT standards and AASHTO Guidelines.

- *Installation/replacement of complex pedestrian ramps*

Due to existing utility conflicts, the following pedestrian ramps are considered complex and will require relocation of utility poles or drainage structures. Consideration should be given to the installation of pedestrian ramps per NYCDOT standards at the following location:

- Knickerbocker Avenue and Cooper Street - northeast quadrant

- *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.

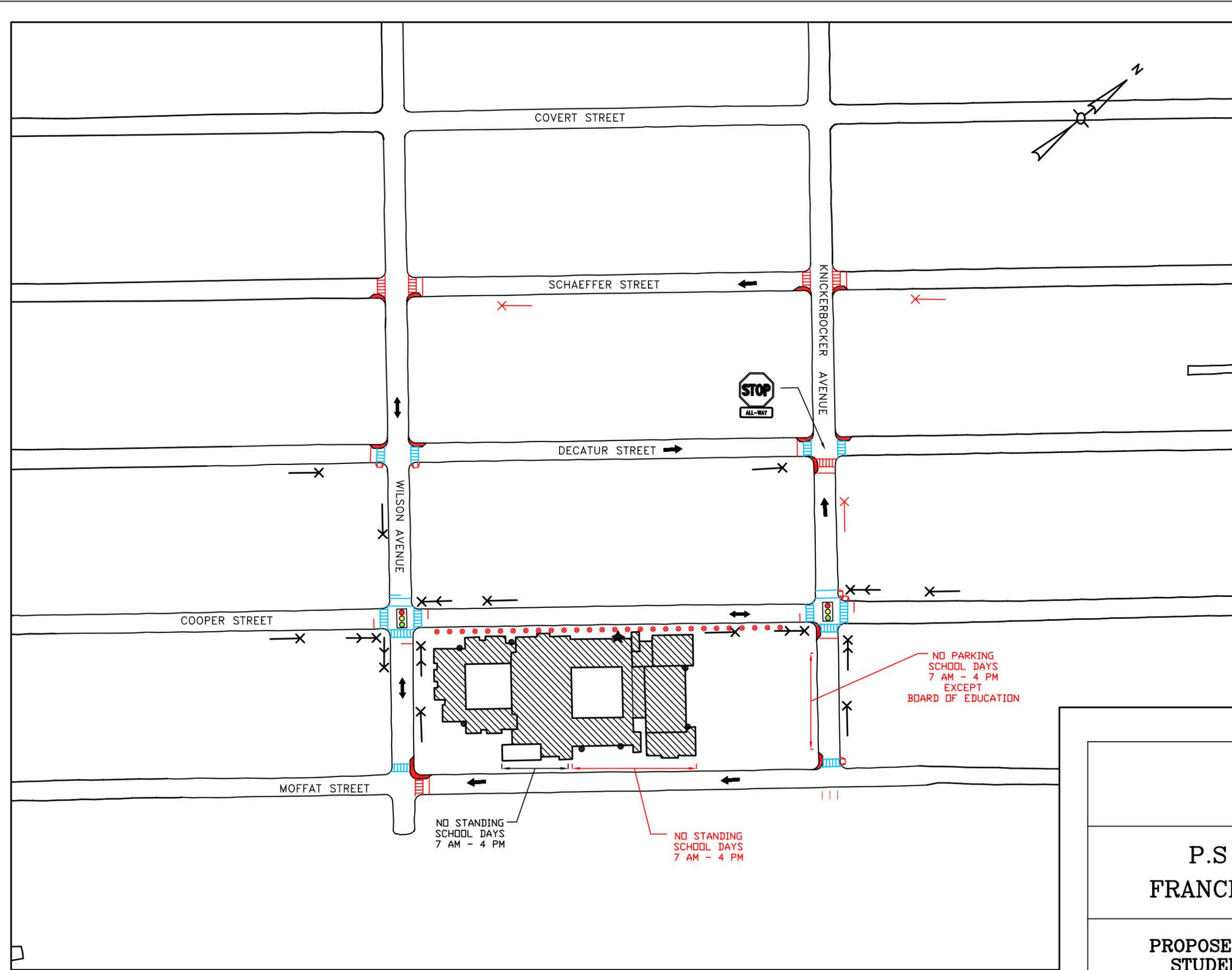
- Wilson Avenue and Moffat Street
- Knickerbocker Avenue and Moffat Street
- Knickerbocker Avenue and Cooper Street
- Wilson Avenue and Decatur Street
- Knickerbocker Avenue and Decatur Street
- Wilson Avenue and Schaefer Street
- Knickerbocker Avenue and Schaefer Street

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.

- Install new sidewalks and curbs at the following location:
  - Moffat Street at Knickerbocker Avenue

It is recommended to install new sidewalks and curbs on the south side of Moffat Street at Knickerbocker Avenue.



- LEGEND**
- ★ MAIN ENTRANCE
  - OTHER ENTRANCES
  - X EXISTING ADVANCE WARNING SIGN WITH ARROW
  - X EXISTING ADVANCE WARNING SIGN
  - ↔ EXISTING TRAVEL DIRECTION
  - 🚦 SIGNALIZED INTERSECTION
  - ▬▬▬ EXISTING SCHOOL CROSSWALK
  - ▬▬▬ EXISTING STANDARD (NON-SCHOOL) CROSSWALK
  - - - - EXISTING SCHOOL CROSSWALK ASSOC. WITH OTHER SCHOOL
  - X PROPOSED ADVANCE WARNING SIGN
  - ▬▬▬ PROPOSED SCHOOL CROSSWALK
  - ▬▬▬ PROPOSED STANDARD (NON-SCHOOL) CROSSWALK
  - PROPOSED TRAFFIC SIGN
  - ⤴⤵ PROPOSED CURB EXTENSION (NECKDOWN)
  - ▨ PROPOSED SPEED REDUCERS (HUMPS)
  - ⤴⤵ PROPOSED PARKING REGULATIONS
  - ▬▬▬ PROPOSED SIDEWALK
  - ⊗ PROPOSED BOLLARD

SCALE: 1" : 150'

**EXHIBIT 8**

**P.S 384, BROOKLYN  
FRANCES CARTER SCHOOL**

**PROPOSED MEASURES TO IMPROVE  
STUDENT PEDESTRIAN SAFETY**

# APPENDIX



## SPOT SPEED STUDY

Date: **March 14, 2005**                      Time: **11:00 am - 12:00 pm**  
 Location: **Cooper Street between Wilson Avenue and Knickerbocker Avenue**  
 Surveyor: **Donnis**

School: **P.S. 384**  
 Direction:  
 Comments:

| Speed<br>S<br>(mph) | No. of Vehicles in<br>Group<br>n | % of Vehicles in<br>Group | % Cumulative<br>Vehicles | nS   | nS <sup>2</sup> |
|---------------------|----------------------------------|---------------------------|--------------------------|------|-----------------|
| 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                  | 0                                | 0.0%                      | 0.0%                     | 0    | 0               |
| 18                  | 0                                | 0.0%                      | 0.0%                     | 0    | 0               |
| 19                  | 0                                | 0.0%                      | 0.0%                     | 0    | 0               |
| 20                  | 3                                | 3.2%                      | 3.2%                     | 60   | 1200            |
| 21                  | 3                                | 3.2%                      | 6.5%                     | 63   | 1323            |
| 22                  | 8                                | 8.6%                      | 15.1%                    | 176  | 3872            |
| 23                  | 8                                | 8.6%                      | 23.7%                    | 184  | 4232            |
| 24                  | 2                                | 2.2%                      | 25.8%                    | 48   | 1152            |
| 25                  | 4                                | 4.3%                      | 30.1%                    | 100  | 2500            |
| 26                  | 3                                | 3.2%                      | 33.3%                    | 78   | 2028            |
| 27                  | 14                               | 15.1%                     | 48.4%                    | 378  | 10206           |
| 28                  | 4                                | 4.3%                      | 52.7%                    | 112  | 3136            |
| 29                  | 6                                | 6.5%                      | 59.1%                    | 174  | 5046            |
| 30                  | 12                               | 12.9%                     | 72.0%                    | 360  | 10800           |
| 31                  | 8                                | 8.6%                      | 80.6%                    | 248  | 7688            |
| 32                  | 4                                | 4.3%                      | 84.9%                    | 128  | 4096            |
| 33                  | 2                                | 2.2%                      | 87.1%                    | 66   | 2178            |
| 34                  | 3                                | 3.2%                      | 90.3%                    | 102  | 3468            |
| 35                  | 2                                | 2.2%                      | 92.5%                    | 70   | 2450            |
| 36                  | 4                                | 4.3%                      | 96.8%                    | 144  | 5184            |
| 37                  | 0                                | 0.0%                      | 96.8%                    | 0    | 0               |
| 38                  | 0                                | 0.0%                      | 96.8%                    | 0    | 0               |
| 39                  | 0                                | 0.0%                      | 96.8%                    | 0    | 0               |
| 40                  | 0                                | 0.0%                      | 96.8%                    | 0    | 0               |
| 41                  | 0                                | 0.0%                      | 96.8%                    | 0    | 0               |
| 42                  | 0                                | 0.0%                      | 96.8%                    | 0    | 0               |
| 43                  | 0                                | 0.0%                      | 96.8%                    | 0    | 0               |
| 44                  | 1                                | 1.1%                      | 97.8%                    | 44   | 1936            |
| 45                  | 0                                | 0.0%                      | 97.8%                    | 0    | 0               |
| 46                  | 0                                | 0.0%                      | 97.8%                    | 0    | 0               |
| 47                  | 2                                | 2.2%                      | 100.0%                   | 94   | 4418            |
| 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               |
|                     | 93                               | 100.0%                    |                          | 2629 | 76913           |

Mean Speed = 28.3 mph  
 Standard Deviation = 5.3 mph  
 Margin of Error (95% Confidence) = ± 1.1 mph

Median Speed = 28.3 mph  
 15th Percentile Speed = 22.8 mph  
 85th Percentile Speed = 33.8 mph

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