

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



**School Safety Engineering Project
FINAL REPORT: P.S. 8, LOUIS BELLIARD SCHOOL, Manhattan**



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



OCTOBER 6, 2006

**School Safety Engineering Project
P.S. 8, Louis Belliard School, Manhattan**

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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, accident 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. 8 (Louis Belliard School) in Manhattan is one of the 135 priority schools.

2. BACKGROUND—EXISTING CONDITIONS AND ANALYSIS



2.2 NEIGHBORHOOD DESCRIPTION

P.S. 8 is located at 465 West 167th Street. The surrounding area is generally a mix of residential buildings and commercial establishments. West 167th Street and West 168th Street are primarily residential roadways, with multi-story residential buildings on both sides of the street. Amsterdam Avenue is lined with residential buildings with numerous first floor storefronts. Edgecombe Avenue is primarily a residential roadway, with a large park along the east side. (see Exhibit 1 for Aerial Photograph).



Figure 1: Looking east on West 167th Street, P.S. 8 is on the left side

Amsterdam Avenue is a bus route for the M101 bus line. In addition, a subway station for the A, C, and 1 lines is located on St. Nicholas Avenue with entrances at West 168th Street.

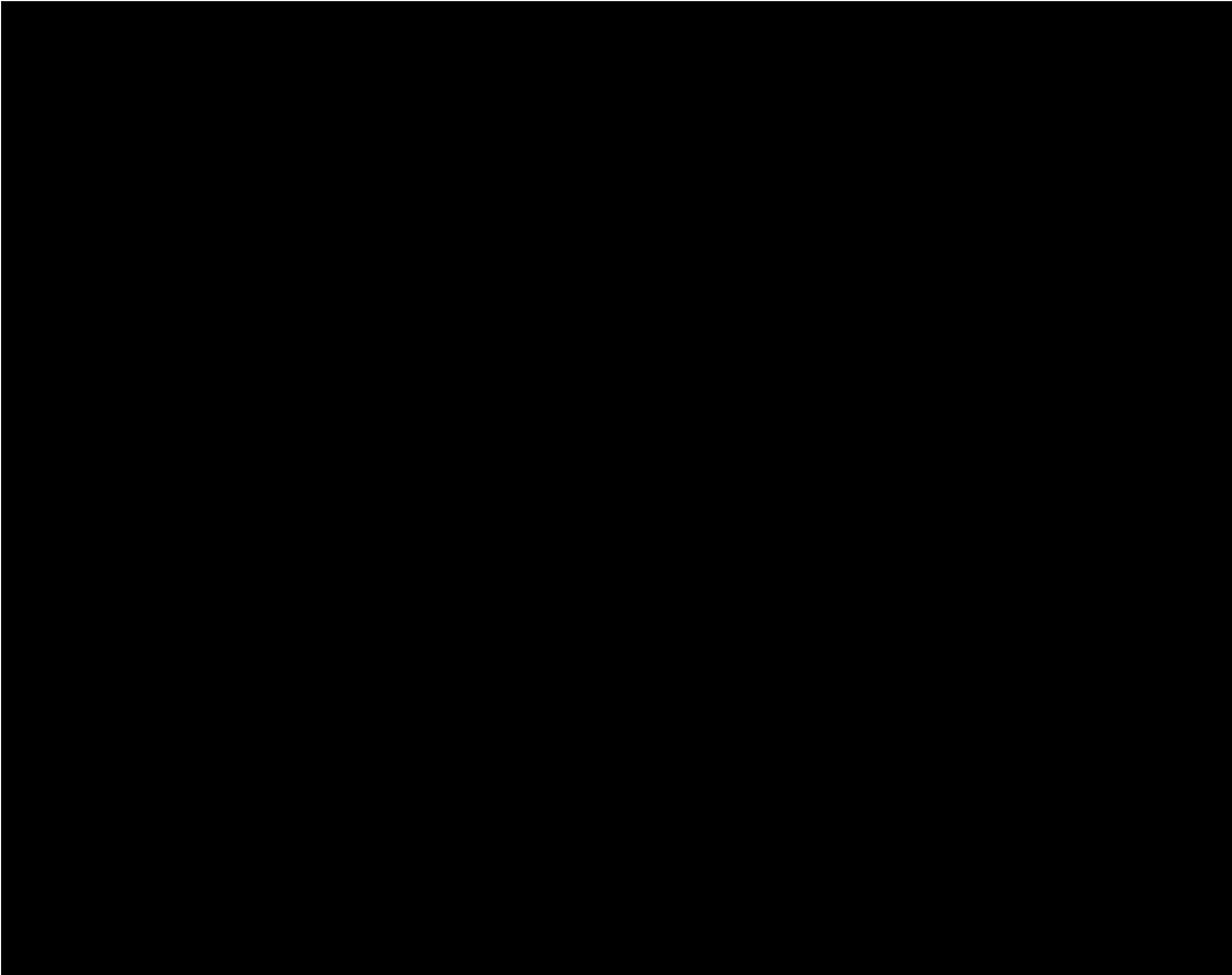
2.3 MEETING WITH SCHOOL REPRESENTATIVES

Representatives from P.S. 8 were not able to meet with the consultant team at the school. The site assessment of the school and surrounding area was completed independently, with the benefit of the detailed survey form completed by the school principal in advance of the site visit.

According to the survey completed by the school, the problems that students encounter on a regular basis include the following:

- Vehicle speeding along Amsterdam Avenue, West 167th Street, West 168th Street, and Jumel Place
- School buses double park on West 168th Street
- Heavy traffic at the intersection of West 167th Street and Amsterdam Avenue
- Drivers do not yield to crossing pedestrians at the intersection of Jumel Place and West 168th Street

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

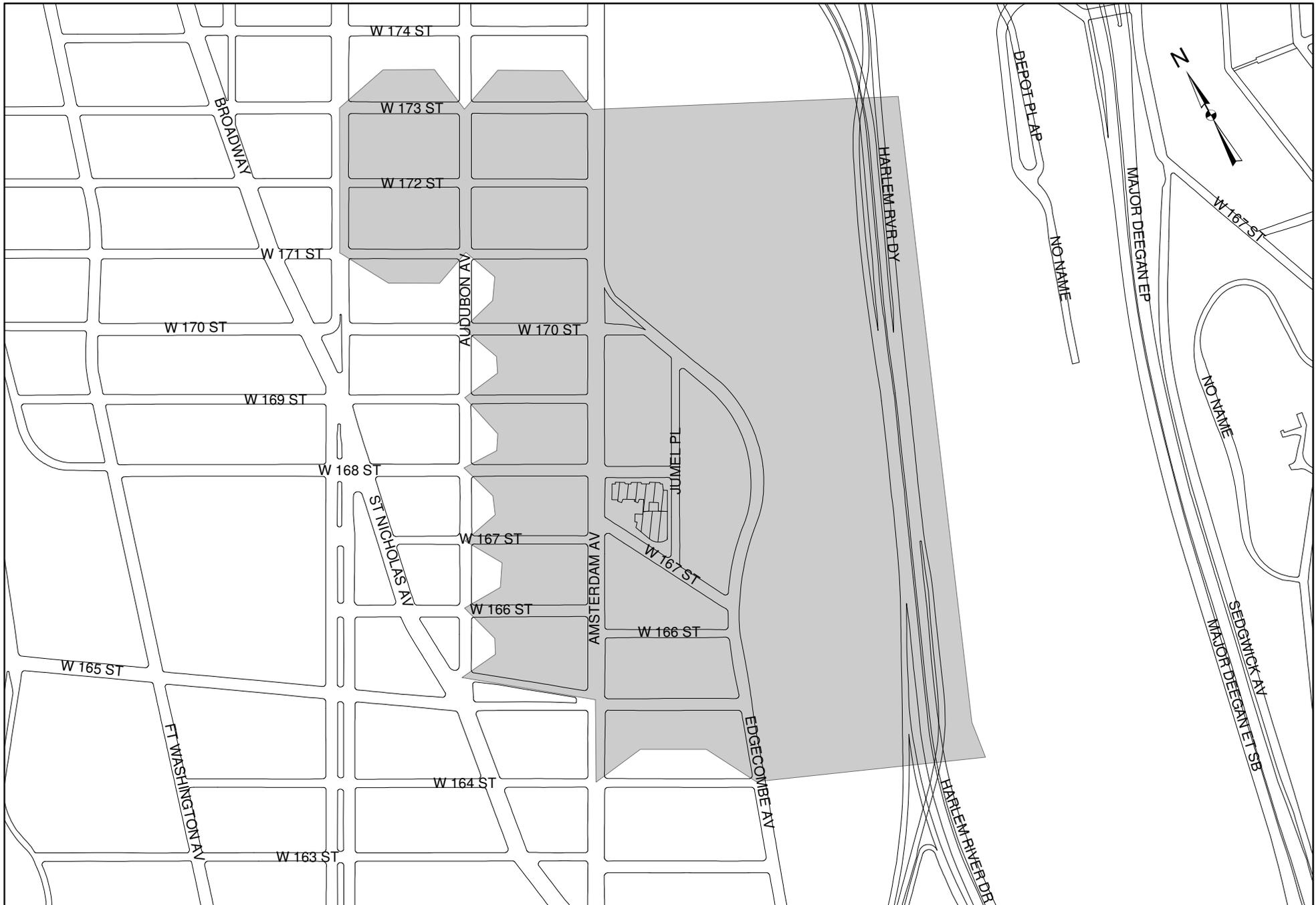




1 inch equals 200 feet

EXHIBIT 1
P.S. 8, MANHATTAN
LOUIS BELLIARD SCHOOL

AERIAL PHOTOGRAPH



CATCHMENT AREA

1 inch equals 450 feet

EXHIBIT 2
P.S. 8, MANHATTAN
LOUIS BELLIARD SCHOOL
CATCHMENT AREA

2.6 PRIMARY MODE OF TRANSPORT TO AND FROM SCHOOL

According to the school survey, 90% of students walk to P.S. 8, 5% are driven by a parent or guardian, 4% are transported by school buses, and the remaining 1% by public transportation. See Table 1 for school’s estimate of the modes of travel.

TABLE 1: MODES OF TRAVEL	
(AS ESTIMATED BY SCHOOL OFFICIALS)	
Description	Percentage
Walk	90%
Driven by a parent or guardian	5%
School bus	4%
MTA bus or subway	1%
TOTAL	100%

2.7 ADDITIONAL STUDENT PEDESTRIAN TRAFFIC GENERATORS

There are three public schools in the vicinity of P.S. 8. I.S. 90 is directly across Jumel Place from P.S. 8. P.S. 128 is located on West 169th Street between Saint Nicholas Avenue and Audubon Avenue. I.S. 164 is located on Edgecombe Avenue between West 165th Street and West 166th Street. In addition, there is a private school, St. Rose of Lima School, which is located also on West 164th Street, west of Amsterdam Avenue.

Amsterdam Avenue is a major pedestrian walking route. Numerous stores, restaurants, and other commercial businesses are located along this street. A large city park (High Bridge Park) is located along the east side of Edgecombe Avenue, one block east of P.S. 8. There is a bus stop on Amsterdam Avenue at West 168th Street, servicing the northbound M101.

2.8 CROSSING GUARD LOCATIONS

According to field observations, there is one school crossing guard assigned to P.S. 8. The crossing guard is stationed at the intersection of West 168th Street and Amsterdam Avenue (see Figure 3).

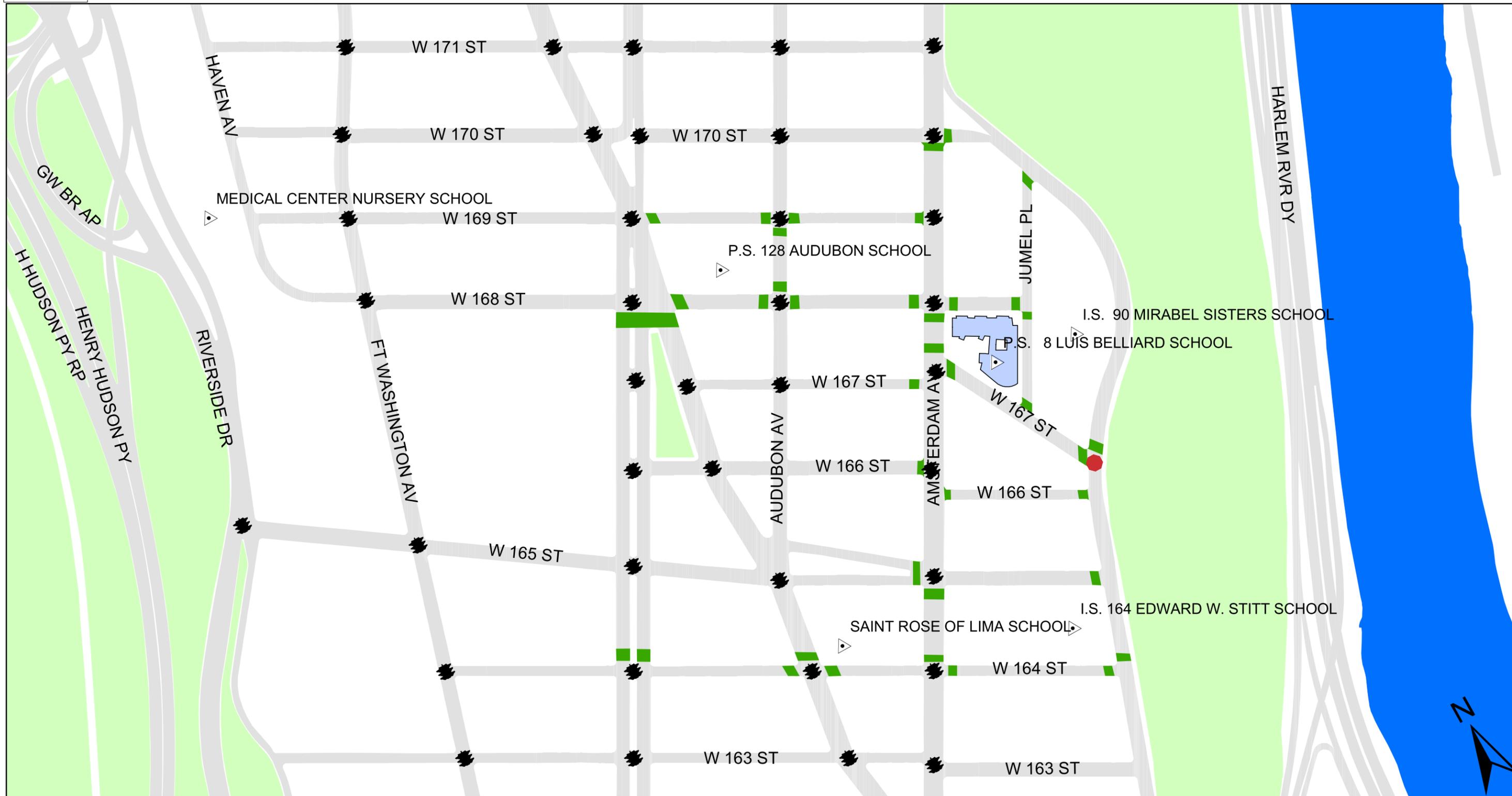
See Exhibit 4 for a map of crossing guard locations.



Figure 3: Crossing Guard at West 168th Street and Amsterdam Avenue.



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

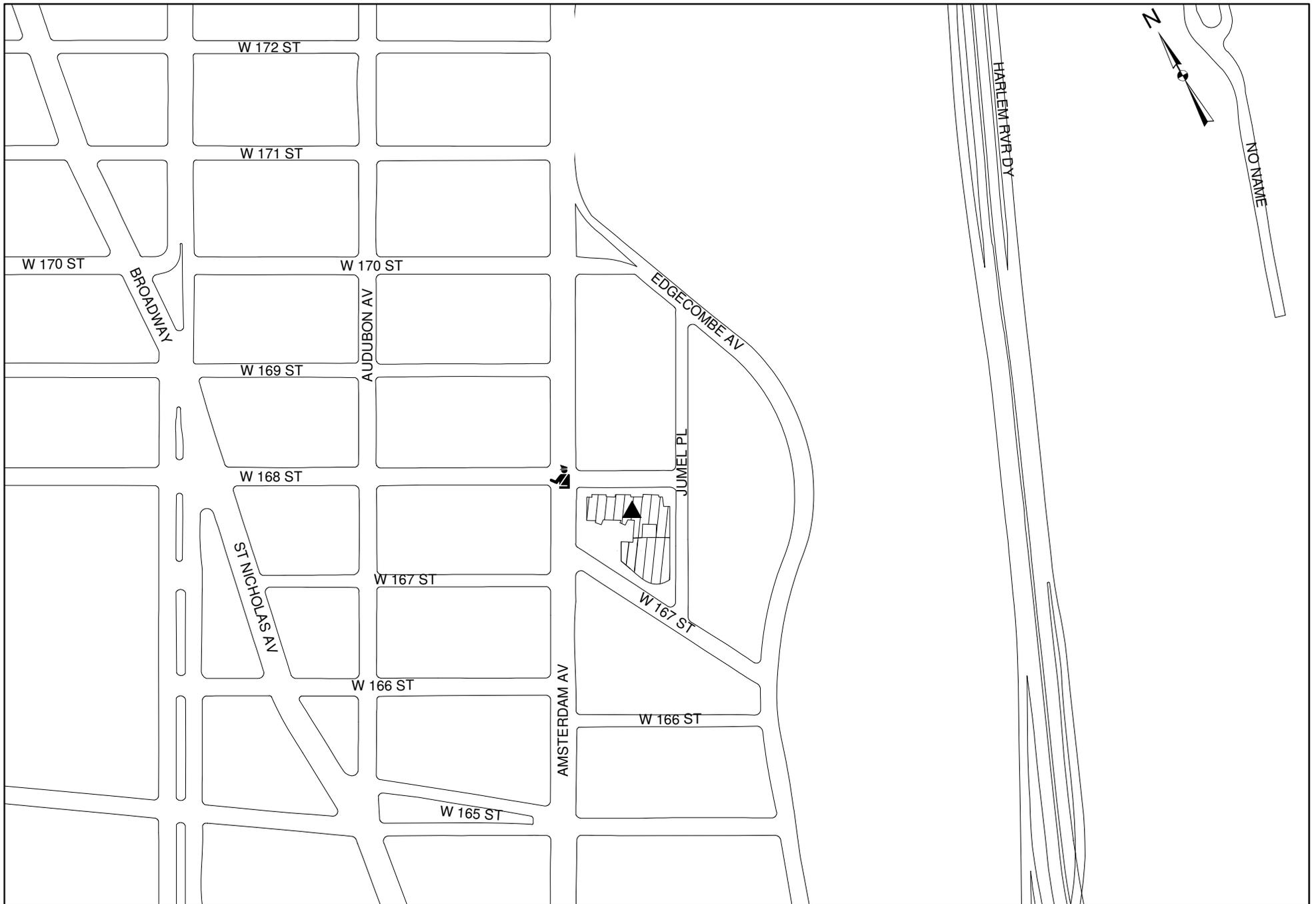
**Manhattan
[P.S. 8]**

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

Map created on 11/16/2006

EXHIBIT 3

COMM. BOARD: 112
PRECINCT: 33



CROSSING GUARD ASSIGNED TO P.S. 8

1 inch equals 300 feet

EXHIBIT 4
P.S. 8, MANHATTAN
LOUIS BELLARD SCHOOL
CROSSING GUARDS

3. TRAFFIC OPERATIONS

3.1 SCHOOL BUS OPERATIONS

According to the school survey, approximately 4% of students are transported to and from school by school buses. At P.S. 8 the school buses exclusively transport students with special needs. School buses park along the curb or double-park on West 168th Street, depending on traffic conditions, while dropping off or picking up students.

3.2 PARENT DROP-OFF OPERATIONS

According to school survey, approximately 5% of P.S. 8 students are driven to and from school by a parent or guardian. The parents park, or double-park, to drop off and pick up students at any street in the vicinity of school (see Figure 4).



Figure 4: West 167th Street in front of the main entrance of P.S. 8, during dismissal time

3.3 PARKING REGULATIONS

On the south side of West 168th Street, parking regulations are posted as “NO STANDING ANY TIME, 7 AM – 5 PM, SCHOOL DAYS”.

On the north side of West 168th Street, parking regulations are posted as “BACK-IN PARKING ONLY” (see Figure 5), which is allowed only on the north side of West 168th Street between Amsterdam Avenue and Jumel Place.

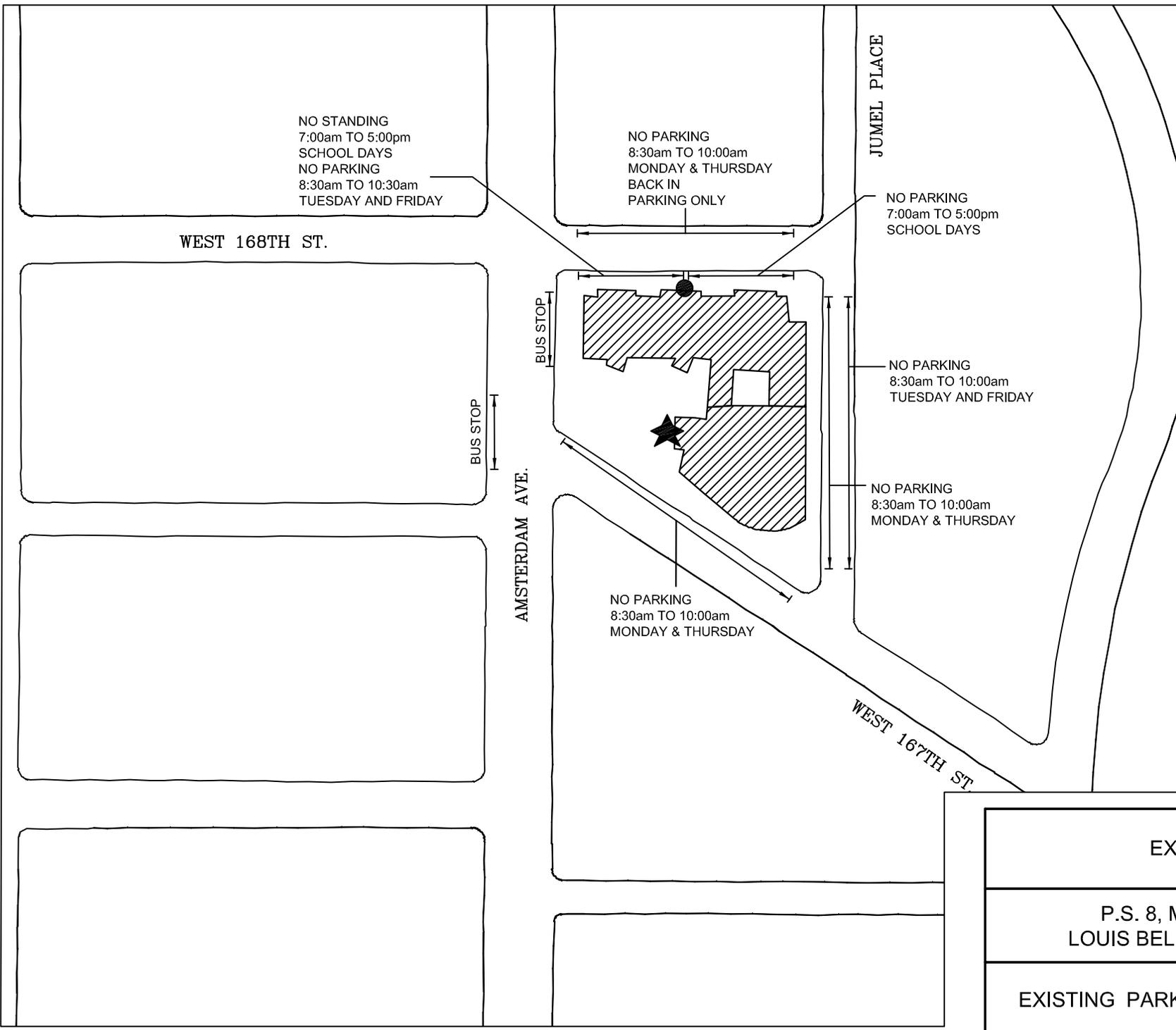
Street cleaning regulations, which prohibit parking on alternating sides of the roadway, are in place near the school. Exhibit 5 shows existing parking regulations on the roadways surrounding the school.



Figure 5: Parking regulations on West 168th Street

3.4 EXISTING SCHOOL SIGNS AND MARKINGS

The Traffic Safety Map, Exhibit 3, shows existing 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 Devices (MUTCD) standards of fluorescent yellow-green signs with downward pointing arrows. Signs scheduled to be installed under this program are shown as “existing” on Exhibit 8.



LEGEND

- ★ MAIN ENTRANCE
- ENTRANCE

SCALE 1" : 120'

EXHIBIT 5
P.S. 8, MANHATTAN LOUIS BELLIARD SCHOOL
EXISTING PARKING REGULATIONS

3.5 ACCIDENT SUMMARY

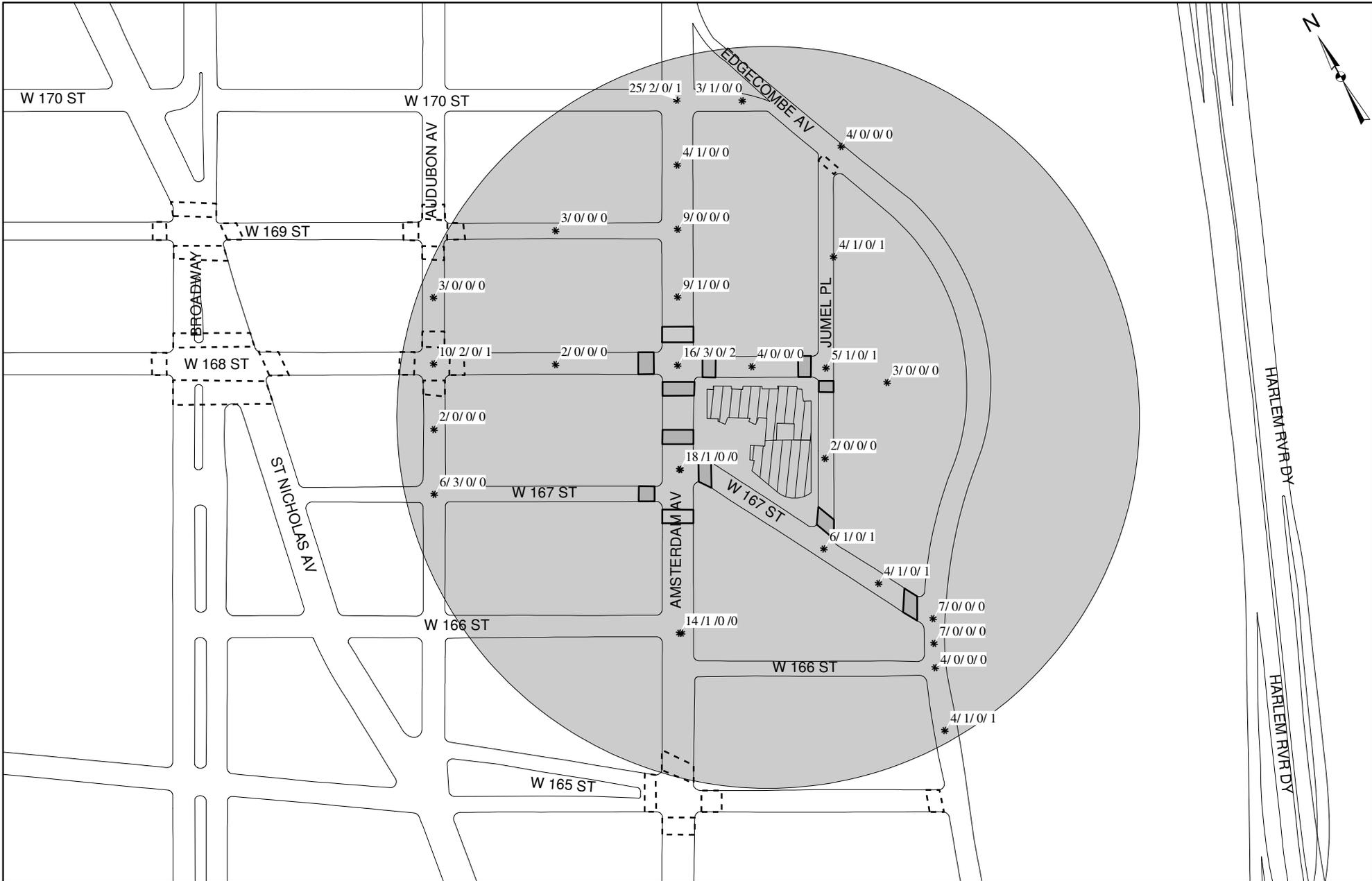
Exhibit 6 and Table 2 show a summary of accidents, as obtained from the New York State Department of Motor Vehicles (DMV), in the vicinity of P.S. 8 for the three-year period from January 1, 1998 through December 31, 2000. The DMV data provides some detail relating to the circumstances and cause of the 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.

INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED* ACCIDENTS
West 167 th Street and Amsterdam Avenue	18	1	0	0
West 168 th Street and Amsterdam Avenue	16	3	0	2
West 169 th Street and Amsterdam Avenue	9	0	0	0
West 170 th Street and Amsterdam Avenue	25	2	0	1
West 166 th Street and Amsterdam Avenue	14	1	0	0
West 168 th Street and Jumel Place	5	1	0	1
West 167 th Street and Jumel Place	6	1	0	1
West 167 th Street and Edgecombe Avenue	7	0	0	0
West 168 th Street and Audubon Avenue	10	2	0	1
TOTAL	110	11	0	6

INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED* ACCIDENTS
West 167 th Street and Amsterdam Avenue	31	2	0	1
West 168 th Street and Amsterdam Avenue	27	5	0	1
West 169 th Street and Amsterdam Avenue	19	5	0	0
West 170 th Street and Amsterdam Avenue	31	6	0	0
West 166 th Street and Amsterdam Avenue	27	3	0	0
West 168 th Street and Jumel Place	4	0	0	0
West 167 th Street and Jumel Place	4	0	0	0
West 167 th Street and Edgecombe Avenue	13	0	0	0
West 168 th Street and Audubon Avenue	19	4	0	1
TOTAL	175	25	0	3

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



ACCIDENT LOCATION *

SCHOOL CROSSWALK ASSIGNED TO P.S. 8

SCHOOL CROSSWALK ASSIGNED TO ANOTHER SCHOOL

CROSSWALK

X/X/X/X

TOTAL ACCIDENTS	PED ACCIDENTS	PED FATAL	SCHOOL PED ACCIDENTS
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1 inch equals 250 feet

EXHIBIT 6

P.S. 8, MANHATTAN
LOUIS BELLARD SCHOOL

ACCIDENT SUMMARY
THREE YEAR PERIOD
(1998-2000)

3.6 TRAFFIC OPERATIONS AND ISSUES

The following describes traffic accidents and operational issues at intersections in the vicinity of P.S. 8. It should be noted that school safety improvements were implemented in April 2004 around IS 90/PS 79, PS 8 and PS 164. The major components of the improvements were

- One way conversion on Edgecombe Avenue between Jumel Place and 167th Street
- One way conversion on 168th Street between Jumel Place and Amsterdam Avenue
- Angled parking on 168th Street between Jumel Place and Amsterdam Avenue
- Guard Rail on Edgecombe Avenue and 167th Street
- Channelization on Edgecombe Avenue and on 167th Street
- Upgraded signs, and pavement marking in the vicinity of the school

3.6.1 West 167th Street and Amsterdam Avenue

This is an offset signalized intersection. Amsterdam Avenue is a 60-foot wide, two-way (north-south) roadway with two travel lanes in each direction and parking on both sides (see Figure 6). East of Amsterdam Avenue, West 167th Street is a 48-foot wide, two-way street with one travel lane in each direction and parking on both sides. West of Amsterdam Avenue, West 167th Street is a 30-foot wide one-way westbound roadway with one travel lane and parking on both sides. There are school crosswalks on the east, west and north legs of the intersection. All four corners have standard pedestrian ramps. There is a bus stop for the southbound M101 on Amsterdam Avenue, north of West 167th Street. Traffic counts were performed at this intersection on November 17, 2005 to better understand pedestrian/vehicle conflicts at the intersection (see Exhibit 7B).



Figure 6: West 167th Street and Amsterdam Avenue (looking east on West 167th Street)

A total of 18 accidents occurred at this intersection between the 1998-2000 study period. One accident involved a 15-year-old pedestrian, who was crossing Amsterdam Avenue against the signal when struck by a southbound vehicle.

3.6.2 West 168th Street and Amsterdam Avenue

West 168th Street is a 42-foot wide, one-way (eastbound) roadway between Amsterdam Avenue and Jumel Place with one travel lane, curbside parking along the south curb, and angled parking on the north side of the street. West of Amsterdam Avenue, West 168th Street is a 42-foot wide, two-way (east-west) roadway with one travel lane in each direction and parking on both sides (see Figure 7). There are school crosswalks on the east, west and south legs of the intersection.

A crossing guard is assigned to this intersection. There is a bus stop for the northbound M101 at the southeast corner on Amsterdam Avenue.



Figure 7: West 168th Street and Amsterdam Avenue (looking west on West 168th Street)

A total of 16 accidents occurred at this intersection in the 1998-2000 study period. Three accidents involved pedestrians, two of which were school-related. According to the accident data, an 11-year-old student was struck by a southbound vehicle while crossing Amsterdam Avenue against the signal. Another 11-year-old student was crossing with the signal when struck by a vehicle making a right turn. The third pedestrian was crossing with the signal when struck by a vehicle making a left turn.

3.6.3 West 169th Street and Amsterdam Avenue

West 169th Street is a 30-foot wide, one-way (westbound) street with one travel lane and parking on both sides. West 169th Street begins at Amsterdam Avenue; therefore, there is no approaching eastbound or westbound traffic at this intersection. This T-intersection is

controlled by a two-phase traffic signal (see Figure 8). There is a school crosswalk on the west leg of the intersection. According to the signal timing data, one signal phase is assigned exclusively for pedestrians.



Figure 8: Amsterdam Avenue and West 169th Street (looking south)

Nine accidents occurred at this intersection in the 1998-2000 study period. There were no pedestrians involved.

3.6.4 West 170th Street and Amsterdam Avenue

This is a signalized intersection. West 170th Street is a 42-foot wide, one-way (eastbound) roadway between Amsterdam Avenue and Edgecombe Avenue. West of Amsterdam Avenue, West 170th Street is a two-way roadway with two travel lanes and parking on both sides of the street. Angled parking is allowed on the south side of West 170th Street between Amsterdam Avenue and Edgecombe Avenue. There are school crosswalks on the south and east legs of the intersection.



Figure 9: West 170th Street and Amsterdam Avenue (looking east)

A total of 25 accidents occurred at this location in the 1998-2000 study period. Two accidents involved pedestrians. One was school-related. According to the accident data, a 12-year-old pedestrian was crossing Amsterdam Avenue against the signal, when struck by a northbound vehicle. The second pedestrian was also struck while crossing Amsterdam Avenue against the signal.

3.6.5 West 166th Street and Amsterdam Avenue

West 166th Street is a one-way (eastbound) roadway with parking along both sides of the street. The roadway is 42-foot wide west of Amsterdam Avenue and 30-foot wide east of Amsterdam Avenue. The intersection of West 166th Street and Amsterdam Avenue is controlled by a traffic signal (see Figure 10). There are school crosswalks on the east and west legs. There is no pedestrian ramp on the north leg crosswalk at the east side of the intersection. All other corners have standard pedestrian ramps. This is an offset intersection with West 166th Street not aligned across Amsterdam Avenue.



Figure 10: West 166th Street and Amsterdam Avenue (looking south on Amsterdam Avenue)

A total of 14 accidents occurred at this intersection in the 1998-2000 study period. One accident involved a 45-year old pedestrian, who was crossing with the signal when struck by a vehicle making a right turn and failed to yield.

3.6.6 West 168th Street and Jumel Place

This is a stop controlled T-intersection, with a stop sign on West 168th Street. Jumel Place is a 28-foot wide, one-way (northbound) street with one travel lane and parking on both sides. West 168th Street is a one-way eastbound Street and ends at Jumel Place.

I.S. 90 is located at the east side of Jumel Place (see Figure 11); therefore, the students from both P.S. 8 and I.S. 90 utilize this intersection to and from school. There are crosswalks on the east and south legs of the intersection. Since Jumel Place is not controlled, the school crosswalk at the south leg is uncontrolled. A one-hour traffic count was performed on Tuesday, May 17, 2005 from 7:30 am to 8:30 am (see Exhibit 7A). The results show that there were 390 pedestrians crossing Jumel Place during the one-hour count. The number of pedestrians crossing Jumel Place meets the required signal warrant (190 or more pedestrians per hour), however a gap study conducted at this location shows that the number of available gaps of 13 or more seconds was over 100 for the study hour. Therefore, the MUTCD Section 4C.05 Signal Warrant 4 (Pedestrian Volume) does not satisfy criteria of 190 pedestrians/hour and less than 60 gaps per study hour.



Figure 11: Jumel Place at West 168th Street (looking east)

Five accidents occurred at this intersection in the 1998-2000 study period. One accident involved a 12-year-old student who was playing in the roadway when struck by a northbound vehicle. In addition, an 11-year-old student was struck in the mid-block of Jumel Place between West 168th Street and Edgecombe Avenue. No further details are available.

3.6.7 West 167th Street and Jumel Place

This is an un-controlled T-intersection. Jumel Place is a northbound roadway and starts from West 167th Street (see Figure 12). There is a school crosswalk on the north leg.

A one-hour traffic count was performed on Wednesday, May 18, 2005 from 7:30 am to 8:30 am (see Exhibit 7A). The results show that 95 pedestrians utilized the uncontrolled school crosswalk and 92 vehicles turned left or right onto Jumel Place during the one-hour count.

A stop control was considered on West 167th Street to increase student pedestrian safety from turning vehicles. However, the moderate vehicle and pedestrian volumes do not meet the required stop control warrants.



Figure 12: West 167th Street and Jumel Place (looking north on Jumel Place)

Six accidents occurred at this intersection in the 1998 and 2000 study period. One accident involved a 10-year-old student who was struck while crossing West 167th Street against the signal. Also, an 11-year-old student was struck in the mid-block of West 167th Street between Jumel Place and Edgecombe Avenue. According to the accident data, this student was struck while getting off the school bus. No further information is available.

3.6.8 West 167th Street and Edgecombe Avenue

Edgecombe Avenue is a 38-foot wide, two-way street with one travel lane in each direction south of West 167th Street. North of West 167th Street, Edgecombe Avenue is a one-way southbound roadway with two travel lanes and parking on both sides (see Figure 13). The southbound approach on Edgecombe Avenue is striped on the east side to reduce southbound approach lanes from two to one lane. This is an un-signalized, all-way stop controlled intersection. There are school crosswalks on the north and west legs of the intersection.

A one-hour traffic count was performed at this intersection on Thursday, May 19, 2005 from 7:30 am to 8:30 am (see Exhibit 7B). The count results show that 48 pedestrians utilized the west leg crosswalk to cross West 167th Street, and none utilized the north crosswalk to cross Edgecombe Avenue during the one-hour count. A signal control was considered at this intersection. However, the moderate vehicle and pedestrian volumes do not meet the required warrants.

A signal warrants study was also conducted by NYCDOT for this intersection in November 2002. According to the study results, traffic signal controls were not warranted at that time either.

This intersection had seven accidents in the 1998-2000 study period. None involved pedestrians.



Figure 13: Edgcombe Avenue and West 167th Street (looking south on Edgcombe Avenue)

3.6.9 West 167th Street and Audubon Avenue

Audubon Avenue is a 42-foot wide, two-way (north-south) roadway with one travel lane in each direction and parking on both sides. There are school crosswalks across the west, east and north legs of the intersection.

Ten accidents occurred at this intersection. Two accidents involved pedestrians. One was a school-related accident. According to the accident data, both pedestrians were struck by southbound vehicles while crossing against the signal.

3.6.10 Speed Studies in the vicinity of P.S. 8

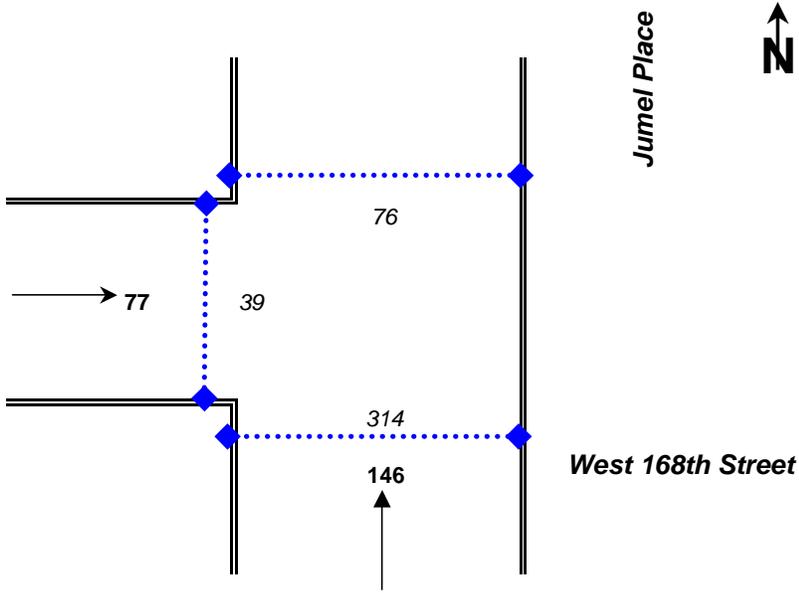
As noted in Section 2.3, the school indicated that vehicles travel at excessive speeds in the vicinity of the school. To verify vehicular speeds along these streets, spot speed studies were conducted at the following locations:

- On West 167th Street between Amsterdam Avenue and Jumel Place, on November 14, 2005 between 1:00 pm and 2:00 pm.
- On West 168th Street between Amsterdam Avenue and Jumel Place, on November 14, 2005 between 11:00 am and 12:00 pm.
- On Jumel Place between West 167th Street and West 168th Street on November 14, 2005 between 12:00 pm and 1:00 pm.

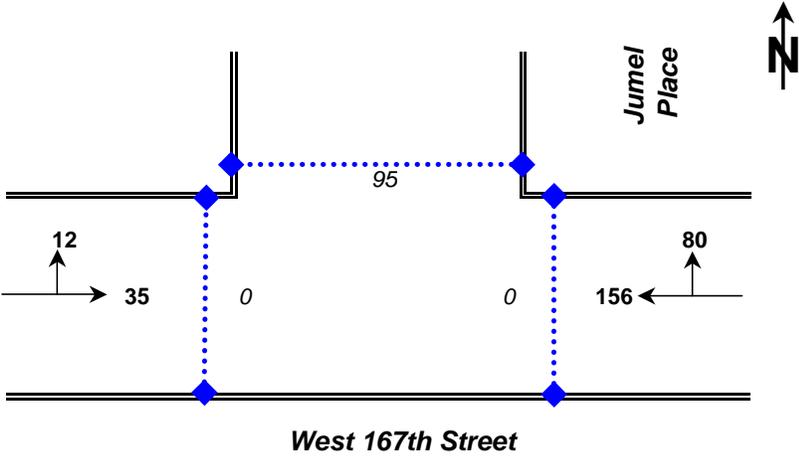
The 85th percentile speeds on all three streets were found to be below the legal speed limit of 30 mph. See Table 4 for a summary of the results and the Appendix for further detail.

TABLE 4: SPOT SPEED STUDIES		
LOCATION	MEDIAN SPEED (MPH)	85TH PERCENTILE SPEED (MPH)
West 167 th Street btw. Amsterdam Avenue and Jumel Place	22	25
West 168 th Street btw. Amsterdam Avenue and Jumel Place	16	18
Jumel Place btw. West 167 th Street and West 168 th Street	19	21

One Hour Traffic Count Volumes



Intersection of West 168th Street and Jumel Place
(7:30 AM - 8:30 AM MAY 17, 2005)

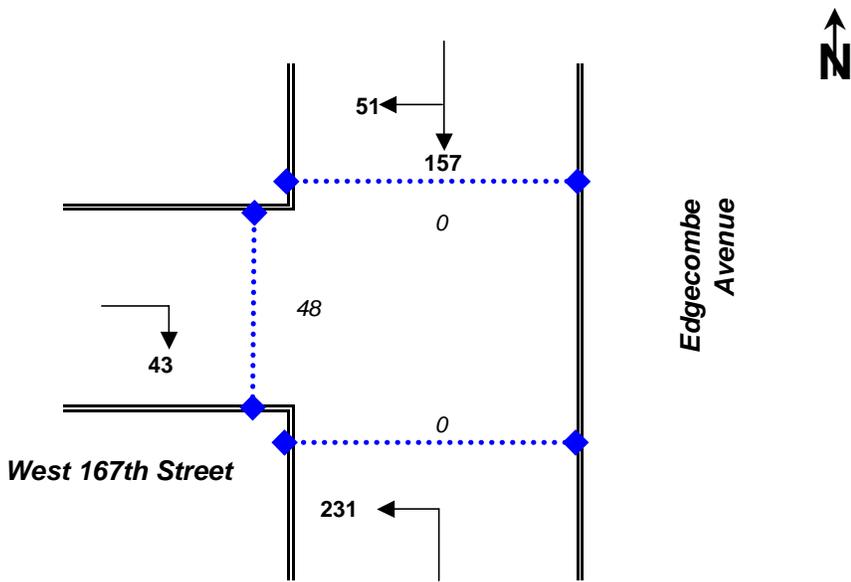


Intersection of West 167th Street and Jumel Place
(7:30 AM - 8:30 AM MAY 18, 2005)

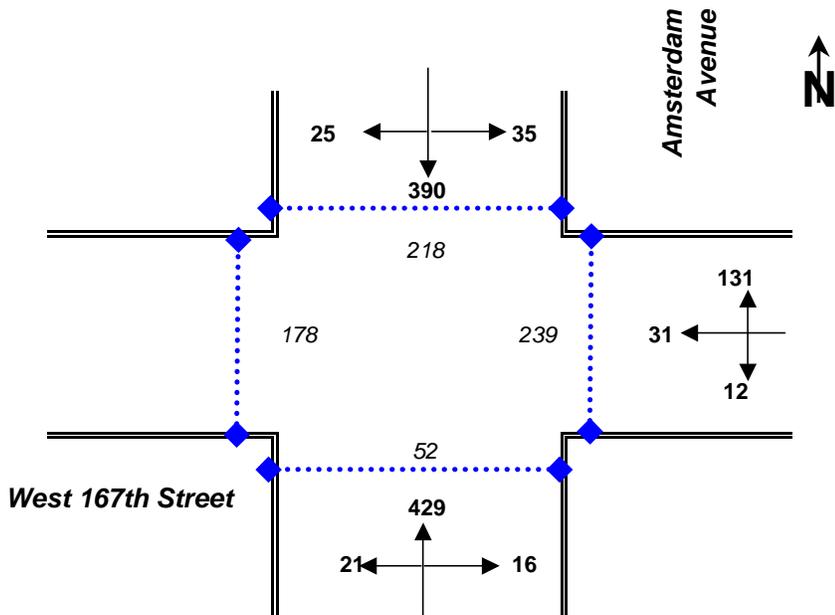
- Number of Pedestrians
- 62 Pedestrian Crossing
- Vehicle Movement
- Number of Vehicles

EXHIBIT 7A
P.S. 8, MANHATTAN LOUIS BELLiard SCHOOL
TRAFFIC COUNTS

One Hour Traffic Count Volumes



Intersection of West 167th Street and Edgecombe Avenue
(7:30 AM - 8:30 AM MAY 19, 2005)



Intersection of West 167th Street and Amsterdam Avenue
(2:30 PM - 3:30 PM NOVEMBER 17, 2005)

- Number of Pedestrians
- Pedestrian Crossing
- Vehicle Movement
- Number of Vehicles

EXHIBIT 7B
P.S. 8, MANHATTAN LOUIS BELLARD SCHOOL
TRAFFIC COUNTS

3.7 SIGNAL TIMING: PEDESTRIAN PHASE

Pedestrian crossing time was field-verified at all signalized intersections in the vicinity of P.S. 8. The crossing time was found to be inadequate for a child pedestrian walking rate of three feet per second at several locations as shown in Table 5.

TABLE 5: PEDESTRIAN CROSSING TIME AT SIGNALIZED INTERSECTIONS				
Intersection Name	Crosswalk Length (Feet)	Ped. Phase Actual (Seconds)	Ped. Phase Req'd (Seconds)*	Timing Adjustment? (Yes/No)
West 167th Street and Amsterdam Avenue				
Crossing West 167 th Street	West Leg – 30 East Leg – 48	58	West Leg – 13 East Leg – 19	NO
Crossing Amsterdam Avenue	60	20	23	YES
West 168th Street and Amsterdam Avenue				
Crossing West 168 th Street	42	58	17	NO
Crossing Amsterdam Avenue	60	20	23	YES
West 169th Street and Amsterdam Avenue				
Crossing West 169 th Street	30	20	13	NO
Crossing Amsterdam Avenue	60	20	18**	NO
West 170th Street and Amsterdam Avenue				
Crossing West 170 th Street	42	58	17	NO
Crossing Amsterdam Avenue	60	20	23	YES
West 166th Street and Amsterdam Avenue				
Crossing West 166 th Street	West Leg – 42 East Leg – 30	58	West Leg – 17 East Leg – 13	NO
Crossing Amsterdam Avenue	60	20	18**	NO

Notes:

* *A rate of 3 feet per second plus 3 seconds reaction time was utilized as the child pedestrian walking rate*

** *A rate of 4 feet per second plus 3 seconds reaction time was utilized as the pedestrian walking rate since this is not a school crosswalk*

3.8 PHYSICAL CONDITIONS (ROADWAYS AND SIDEWALKS)

The roadways and sidewalks in the vicinity of the school were generally observed to be in good condition, with the exception of the following:

- There are asphalt patches and potholes on the west and east crosswalks at the intersection of Amsterdam Avenue and West 168th Street (see Figure 14).
- There are asphalt patches and potholes on the west crosswalk at the intersection of Amsterdam Avenue and West 166th Street.
- The part of curb and sidewalk on the east side of Amsterdam Avenue close to West 166th Street are in poor condition.
- Pedestrian ramps that are not positioned correctly have been noted in Section 3.6.



Figure 14: The east crosswalk at Amsterdam Avenue and West 168th Street

4. PROPOSED MEASURES TO IMPROVE STUDENT PEDESTRIAN SAFETY

This section describes potential countermeasures. Recommendations 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 capital improvements.

4.1 SHORT-TERM MEASURES

- *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 the 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.

- *Install No Standing Zone on West 168th Street*

Existing “NO STANDING, 7:00 AM TO 5:00 PM, SCHOOL DAYS” parking regulations in front of P.S. 8 on West 168th Street should be extended for approximately 30 feet eastward to provide curb space in front of school entrance. In addition, a “NO STANDING, 7:00 AM TO 5:00 PM, SCHOOL DAYS” parking regulation is recommended on West 167th Street in front of school’s main entrance.

- *Place advanced stop bars ten feet before 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 information sign that explains the signal phases*

Installation of a pedestrian information sign on Amsterdam Avenue at West 167th Street and West 168th Street is recommended. Most students utilize these two intersections walking to and from school. Amsterdam Avenue is a wide, high volume roadway. Therefore, pedestrians will benefit from the proposed informational signage.

- *Submit Request to Police Department for Crossing Guard*

It is recommended that a crossing guard be requested for this intersection of West 167th Street and Amsterdam Avenue to help students cross the street.

▪ Adjust signal timing at the following intersections

Review of the existing signal timing indicates the current signal timing provides 20 seconds for pedestrians to cross Amsterdam Avenue, which is less than the required 23 seconds for pedestrians to cross the street in one cycle at a walking rate of three feet per second plus a three second reaction time at the following locations:

- Pedestrian phase to cross Amsterdam Avenue at West 167th Street
- Pedestrian phase to cross Amsterdam Avenue at West 168th Street
- Pedestrian phase to cross Amsterdam Avenue at West 170th Street

Therefore, it is recommended that DOT-Signals Division add an additional five seconds to the “Walk” phase for pedestrians crossing Amsterdam at all three intersections.

Impacts to vehicular level of service need to be assessed when considering signal-timing changes. West 167th Street and Amsterdam Avenue was selected as the typical intersection to perform the one-hour traffic counts. The counts were conducted from 2:30 pm to 3:30 pm on Thursday, November 17, 2005 (see Exhibit 7B).

These counts were utilized to calculate level of service with existing and adjusted signal timing. HCS analysis confirmed that the signal timing changes would not affect the Level of Service (LOS) at these intersections.

Since Amsterdam Avenue is a progressive arterial, the revised signal timing may affect traffic patterns. This work is to be coordinated with the NYCDOT, Bureau of Traffic.

4.2 LONG-TERM MEASURES

▪ 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.

- West 170th Street and Amsterdam Avenue – southeast corner
- West 168th Street and Amsterdam Avenue – southwest corner
- West 167th Street and Amsterdam Avenue –northeast corner
- West 168th Street and Jumel Place – southwest corner
- West 167th Street and Jumel Place– northwest and northeast corners
- Edgecombe Avenue and West 167th Street - east curb (Note: This location has existing channelized pavement markings and a quick-curb median barrier.)

Curb extensions should be installed at the corners as shown in Exhibit 7.

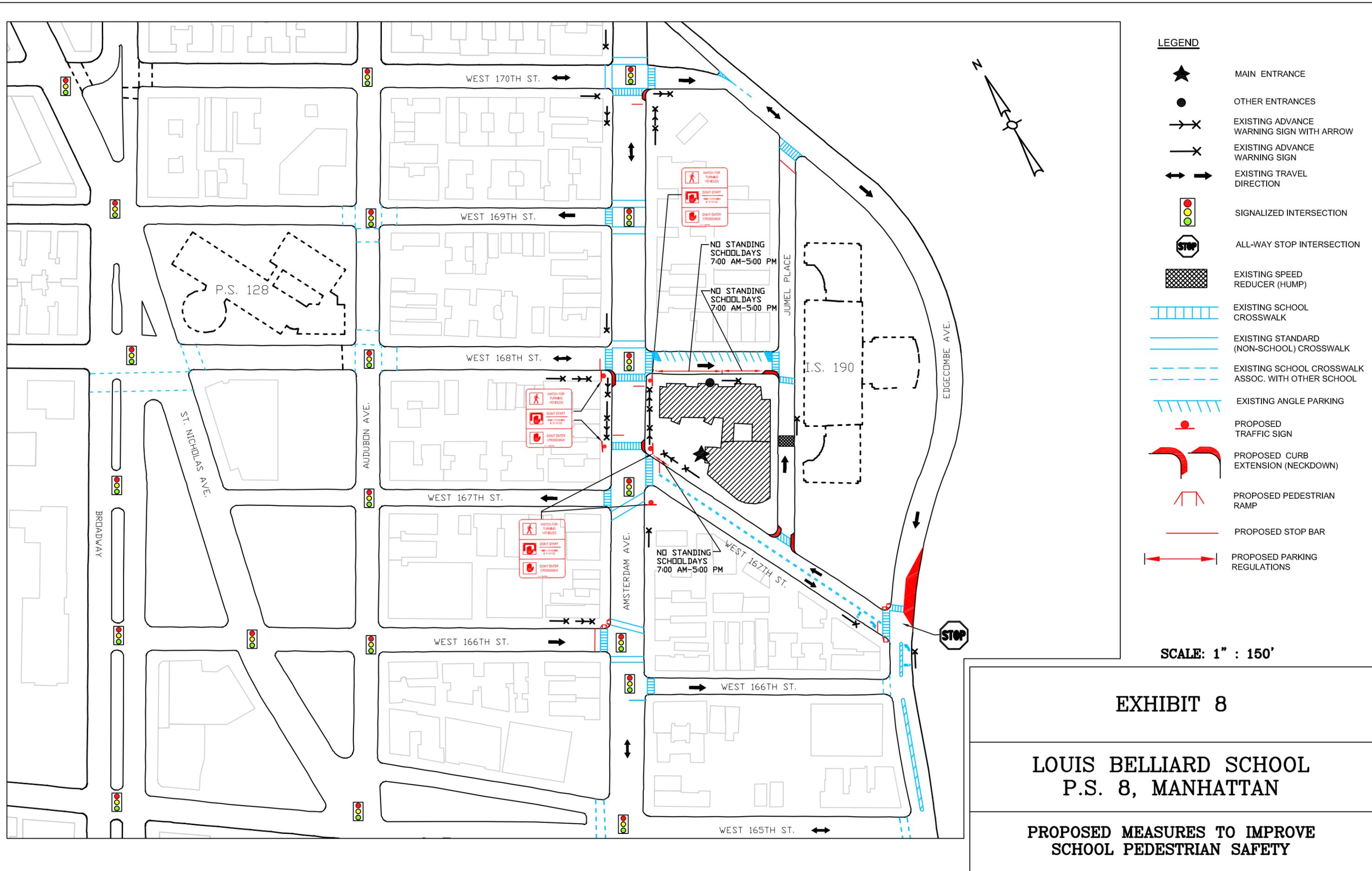
The purpose of the curb extensions is to shorten the crossing distance for pedestrians, and to reduce speeds of vehicles approaching and turning at these heavily utilized school crosswalks (or intersections). These curb extensions would not eliminate or reduce the width of any moving lanes.

▪ Install/replace pedestrian ramps

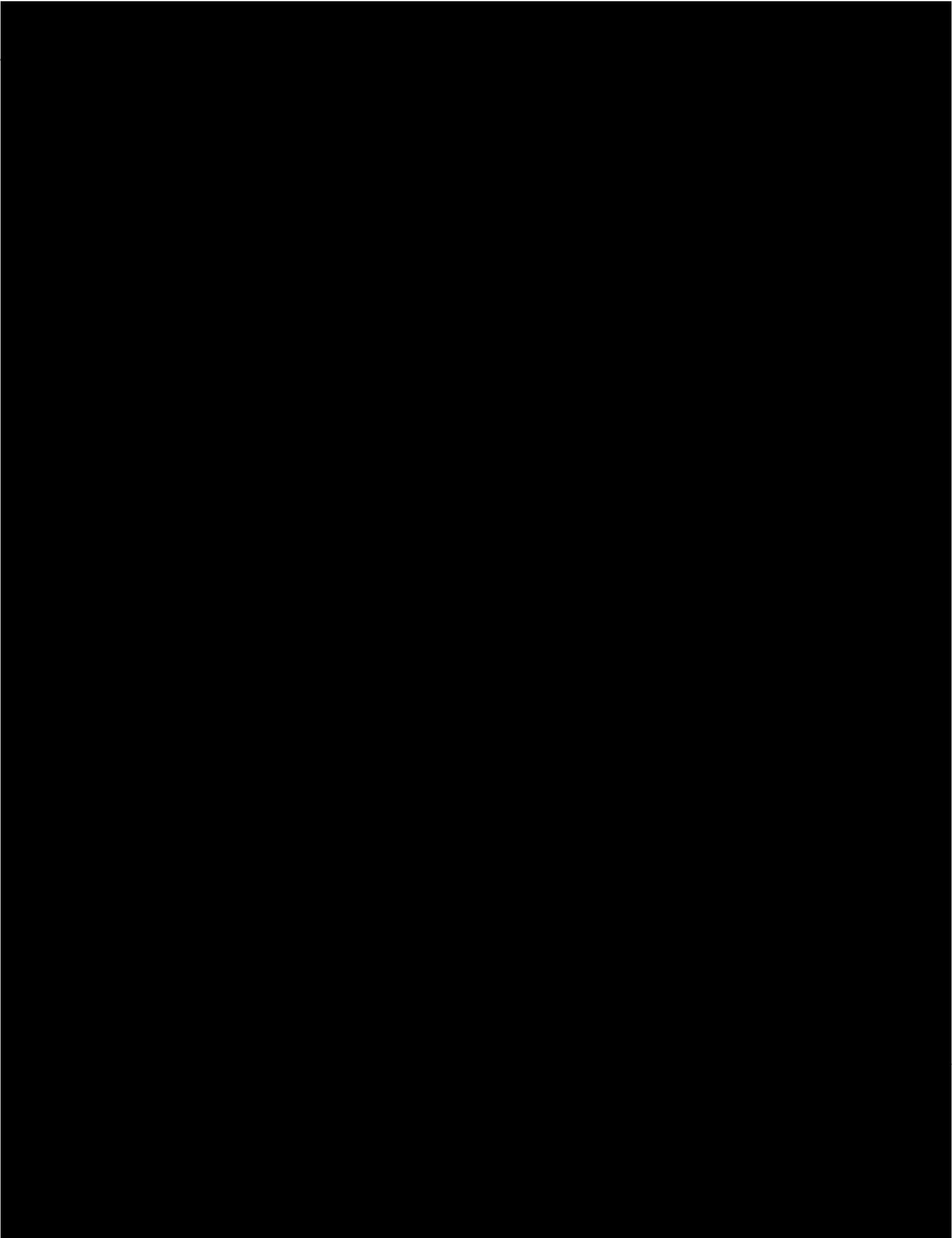
Consideration should be given to the installation and/or replacement of pedestrian ramps per NYCDOT standards at the following locations:

- West 167th Street and Edgecombe Avenue – all four corners
- West 166th Street and Amsterdam Avenue – northeast corner

(New standard pedestrian ramps would be installed with new curb extensions)



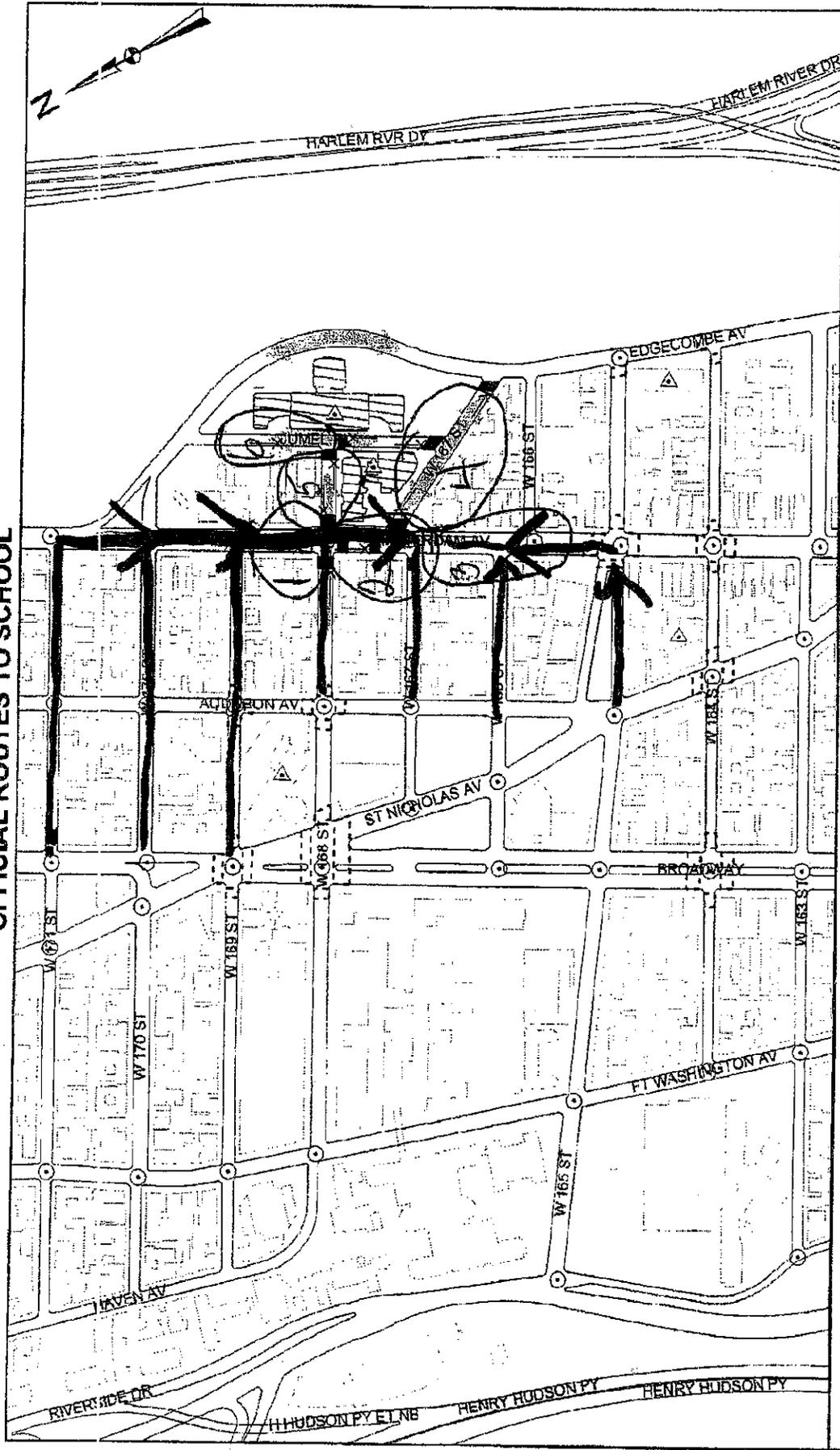
APPENDIX



NEW YORK CITY
DEPT. OF TRANSPORTATION

**TRAFFIC SAFETY PLAN
OFFICIAL ROUTES TO SCHOOL**

BUREAU OF TRAFFIC



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.

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

**LUBELLIARD SCHOOL
P.S. 8 & I.S. 90**

Prepared by the NEW YORK CITY DEPARTMENT OF TRANSPORTATION,
ITS VICEPRESIDENT, COMMISSIONER, in cooperation with SCHOOL and
POLICE OFFICIALS

ORIG. DATE: 03/19/87
GIS CONVIRT: 04/2002
DRAWING NO. MS-5636
COMMA BOARD MEMBER PRECINCT: 12 MANHATTAN

SPOT SPEED STUDY

Date: **November 14, 2005** Time: **1:00 pm - 2:00 pm**
 Location: **West 167th Street between Amsterdam Avenue and Jumel Place**
 Surveyor:

School: **P.S. 8**
 Direction:
 Comments:

Speed S (mph)	No. of Vehicles in Group n	% of Vehicles in Group	% Cumulative Vehicles	nS	nS ²
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	1	1.4%	1.4%	15	225
16	2	2.8%	4.2%	32	512
17	1	1.4%	5.6%	17	289
18	6	8.3%	13.9%	108	1944
19	3	4.2%	18.1%	57	1083
20	9	12.5%	30.6%	180	3600
21	6	8.3%	38.9%	126	2646
22	8	11.1%	50.0%	176	3872
23	16	22.2%	72.2%	368	8464
24	13	18.1%	90.3%	312	7488
25	4	5.6%	95.8%	100	2500
26	1	1.4%	97.2%	26	676
27	2	2.8%	100.0%	54	1458
28	0	0.0%	100.0%	0	0
29	0	0.0%	100.0%	0	0
30	0	0.0%	100.0%	0	0
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
	72	100.0%		1571	34757

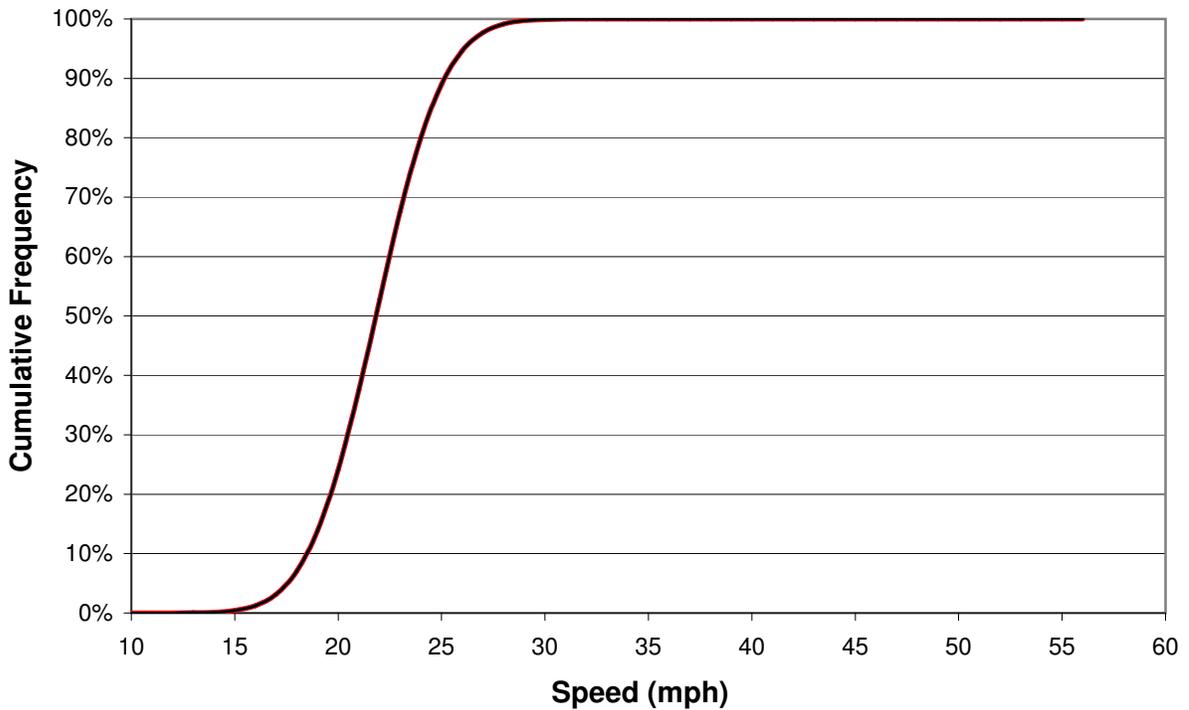
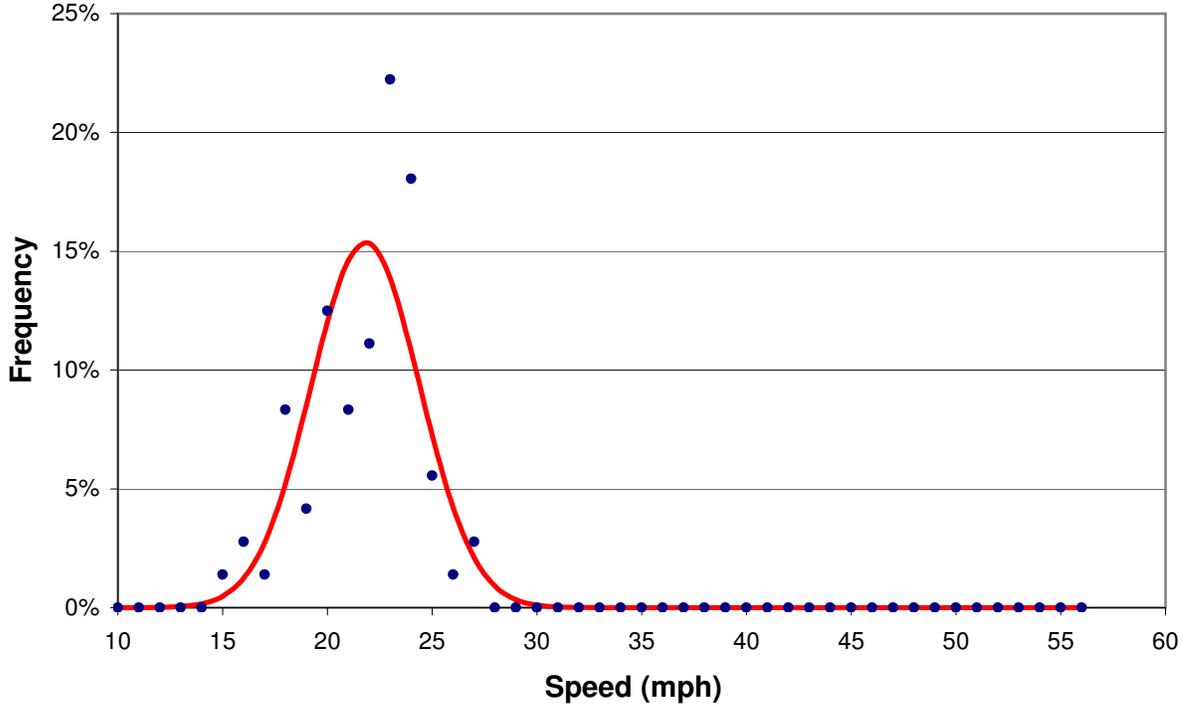
Mean Speed = 21.8 mph Median Speed = 21.8 mph
 Standard Deviation = 2.6 mph 15th Percentile Speed = 19.1 mph
 Margin of Error (95% Confidence) = ± 0.6 mph 85th Percentile Speed = 24.5 mph

SPOT SPEED STUDY

Date: **November 14, 2005** Time: **1:00 pm - 2:00 pm**
Location: **West 167th Street between Amsterdam Avenue and Jumel Place**
Surveyor:

School: **P.S. 8**
Direction:
Comments:

Mean Speed = 21.8 mph Median Speed = 21.8 mph
Standard Deviation = 2.6 mph 15th Percentile Speed = 19.1 mph
Margin of Error (95% Confidence) = ± 0.6 mph 85th Percentile Speed = 24.5 mph



SPOT SPEED STUDY

Date: **November 14, 2005** Time: **11:00 am - 12:00 pm**
 Location: **West 168th Street between Jumel Place and Amsterdam Avenue**
 Surveyor:

School: **P.S. 8**
 Direction: **East**
 Comments:

Speed S (mph)	No. of Vehicles in Group n	% of Vehicles in Group	% Cumulative Vehicles	nS	nS ²
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	8	36.4%	36.4%	120	1800
16	3	13.6%	50.0%	48	768
17	8	36.4%	86.4%	136	2312
18	2	9.1%	95.5%	36	648
19	1	4.5%	100.0%	19	361
20	0	0.0%	100.0%	0	0
21	0	0.0%	100.0%	0	0
22	0	0.0%	100.0%	0	0
23	0	0.0%	100.0%	0	0
24	0	0.0%	100.0%	0	0
25	0	0.0%	100.0%	0	0
26	0	0.0%	100.0%	0	0
27	0	0.0%	100.0%	0	0
28	0	0.0%	100.0%	0	0
29	0	0.0%	100.0%	0	0
30	0	0.0%	100.0%	0	0
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
	22	100.0%		359	5889

Mean Speed = 16.3 mph Median Speed = 16.3 mph
 Standard Deviation = 1.2 mph 15th Percentile Speed = 15.1 mph
 Margin of Error (95% Confidence) = ± 0.5 mph 85th Percentile Speed = 17.6 mph

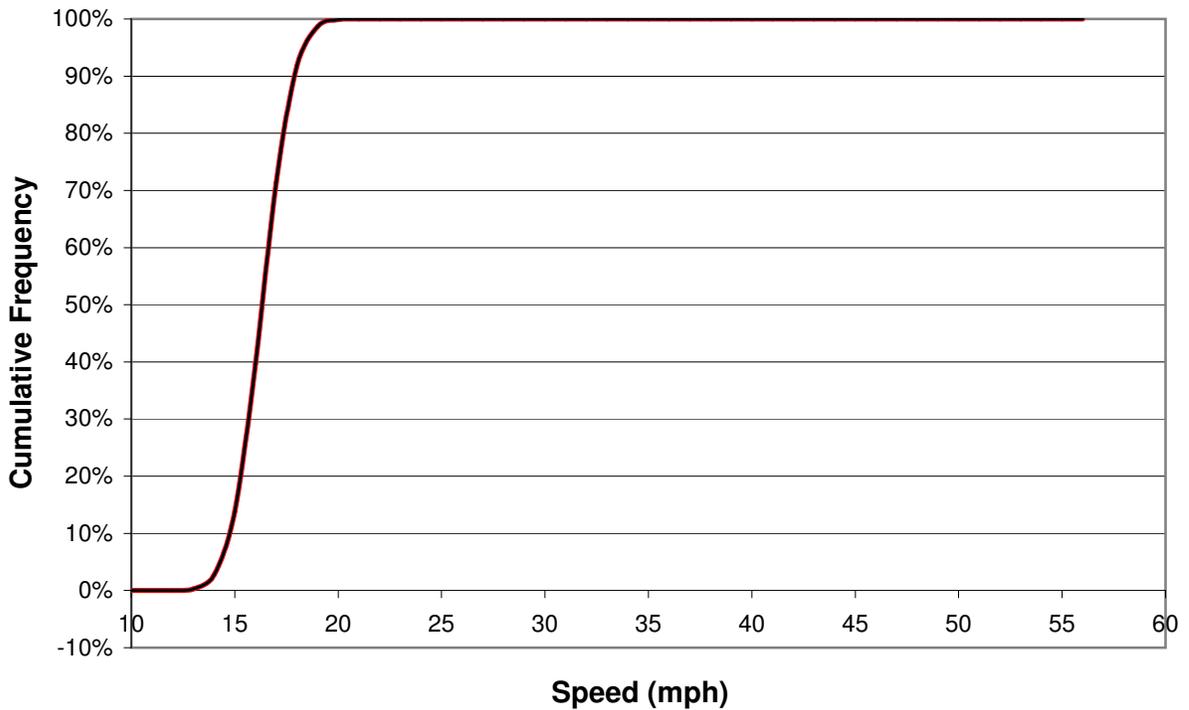
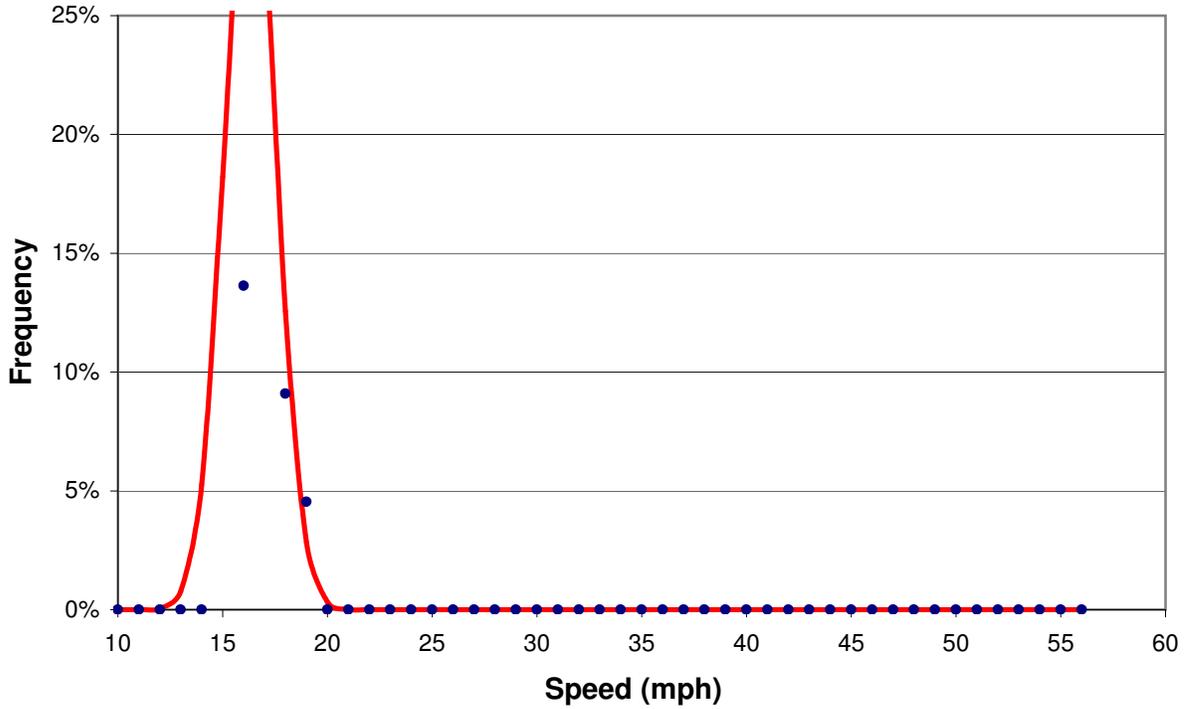
SPOT SPEED STUDY

Date: **November 14, 2005** Time: **11:00 am - 12:00 pm**
Location: **West 168th Street between Jumel Place and Amsterdam Avenue**
Surveyor:

School: **P.S. 8**
Direction: **East**
Comments:

Mean Speed = 16.3 mph
Standard Deviation = 1.2 mph
Margin of Error (95% Confidence) = ± 0.5 mph

Median Speed = 16.3 mph
15th Percentile Speed = 15.1 mph
85th Percentile Speed = 17.6 mph



SPOT SPEED STUDY

Date: **November 14, 2005** Time: **12:00 pm - 1:00 pm**
 Location: **Jumel Place between West 167th Street and West 168th Street**
 Surveyor:

School: **P.S. 8**
 Direction: **North**
 Comments:

Speed S (mph)	No. of Vehicles in Group n	% of Vehicles in Group	% Cumulative Vehicles	nS	nS ²
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	3	6.5%	6.5%	45	675
16	8	17.4%	23.9%	128	2048
17	4	8.7%	32.6%	68	1156
18	3	6.5%	39.1%	54	972
19	12	26.1%	65.2%	228	4332
20	7	15.2%	80.4%	140	2800
21	4	8.7%	89.1%	84	1764
22	3	6.5%	95.7%	66	1452
23	1	2.2%	97.8%	23	529
24	1	2.2%	100.0%	24	576
25	0	0.0%	100.0%	0	0
26	0	0.0%	100.0%	0	0
27	0	0.0%	100.0%	0	0
28	0	0.0%	100.0%	0	0
29	0	0.0%	100.0%	0	0
30	0	0.0%	100.0%	0	0
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
	46	100.0%		860	16304

Mean Speed = 18.7 mph
 Standard Deviation = 2.2 mph
 Margin of Error (95% Confidence) = ± 0.6 mph

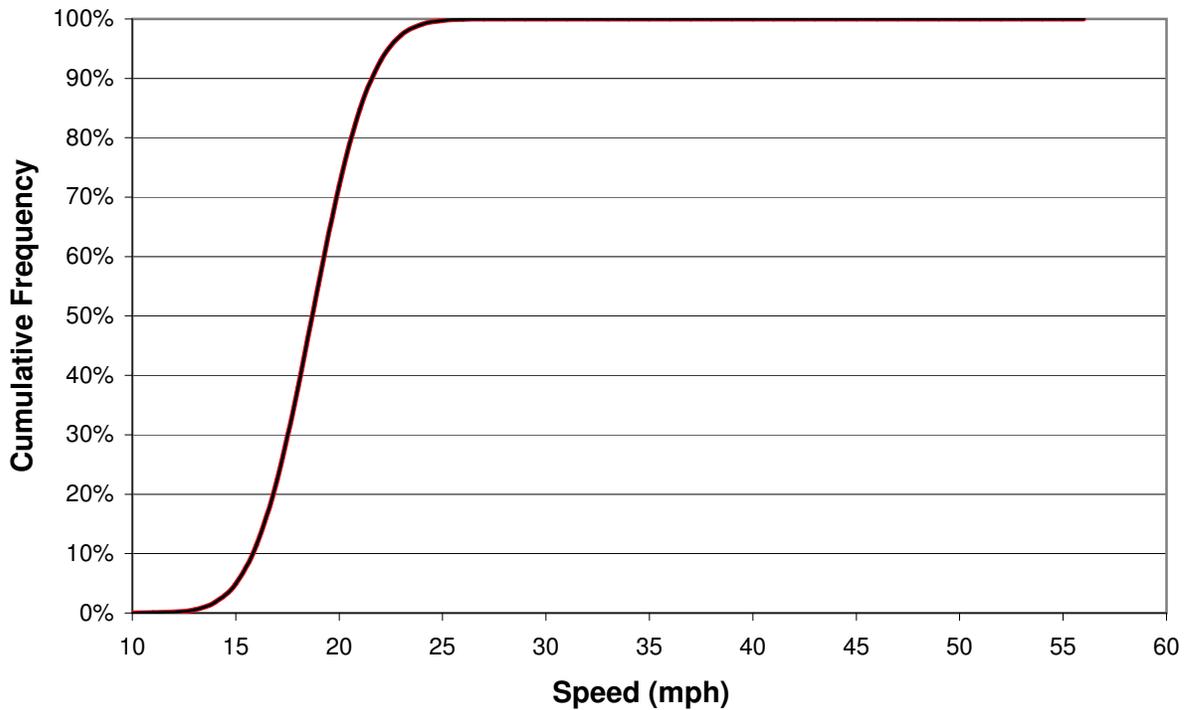
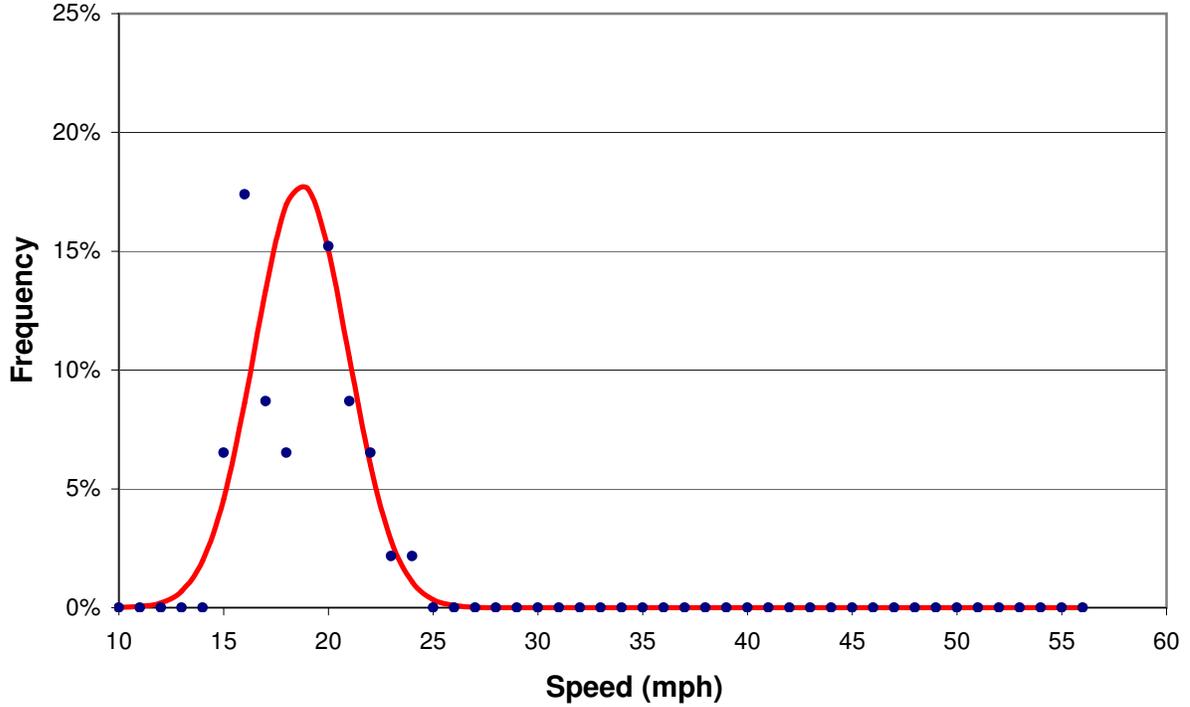
Median Speed = 18.7 mph
 15th Percentile Speed = 16.4 mph
 85th Percentile Speed = 21.0 mph

SPOT SPEED STUDY

Date: **November 14, 2005** Time: **12:00 pm - 1:00 pm**
Location: **Jumel Place between West 167th Street and West 168th Street**
Surveyor:

School: **P.S. 8**
Direction: **North**
Comments:

Mean Speed = 18.7 mph Median Speed = 18.7 mph
Standard Deviation = 2.2 mph 15th Percentile Speed = 16.4 mph
Margin of Error (95% Confidence) = ± 0.6 mph 85th Percentile Speed = 21.0 mph



SPOT SPEED STUDY

Date: **November 14, 2005** Time: **2:00 pm - 2:30 pm**
 Location: **Amsterdam Avenue between West 167th Street and West 168th Street**
 Surveyor:

School: **P.S. 8**
 Direction:
 Comments:

Speed S (mph)	No. of Vehicles in Group n	% of Vehicles in Group	% Cumulative Vehicles	nS	nS ²
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	1	1.0%	1.0%	18	324
19	0	0.0%	1.0%	0	0
20	3	3.0%	4.0%	60	1200
21	0	0.0%	4.0%	0	0
22	2	2.0%	6.0%	44	968
23	3	3.0%	9.0%	69	1587
24	7	7.0%	16.0%	168	4032
25	8	8.0%	24.0%	200	5000
26	9	9.0%	33.0%	234	6084
27	8	8.0%	41.0%	216	5832
28	18	18.0%	59.0%	504	14112
29	9	9.0%	68.0%	261	7569
30	8	8.0%	76.0%	240	7200
31	13	13.0%	89.0%	403	12493
32	3	3.0%	92.0%	96	3072
33	2	2.0%	94.0%	66	2178
34	1	1.0%	95.0%	34	1156
35	2	2.0%	97.0%	70	2450
36	1	1.0%	98.0%	36	1296
37	0	0.0%	98.0%	0	0
38	0	0.0%	98.0%	0	0
39	1	1.0%	99.0%	39	1521
40	1	1.0%	100.0%	40	1600
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
	100	100.0%		2798	79674

Mean Speed = 28.0 mph Median Speed = 28.0 mph
 Standard Deviation = 3.7 mph 15th Percentile Speed = 24.1 mph
 Margin of Error (95% Confidence) = ± 0.7 mph 85th Percentile Speed = 31.9 mph

SPOT SPEED STUDY

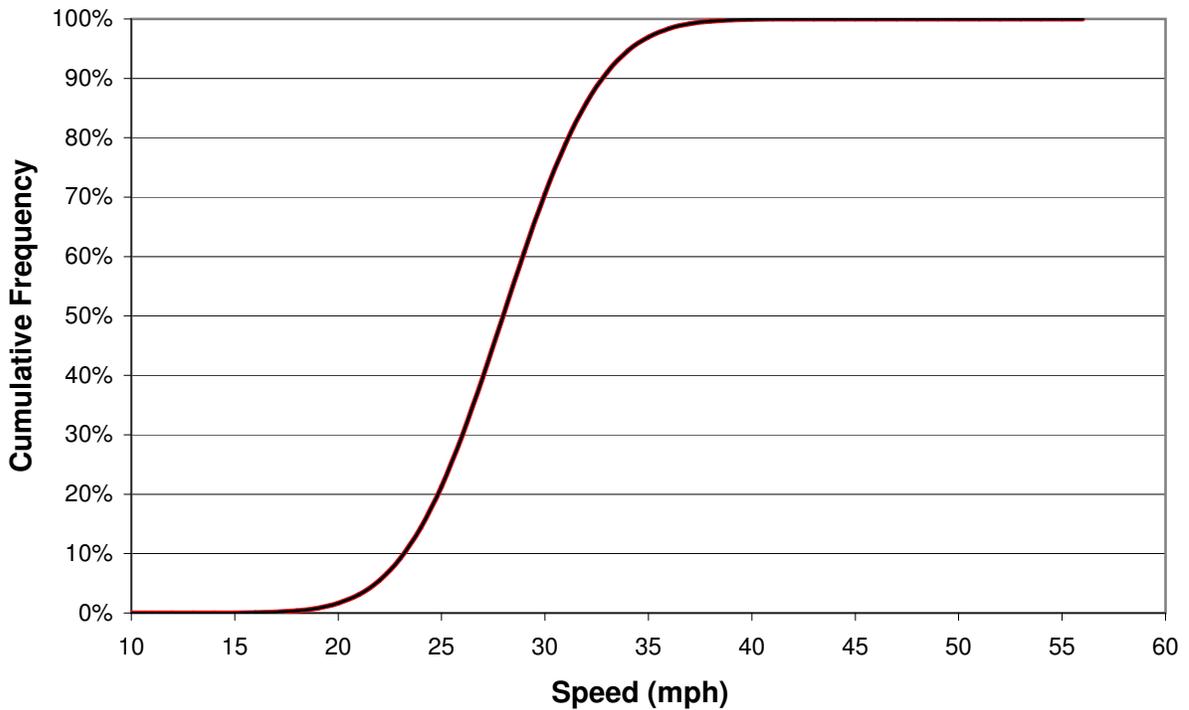
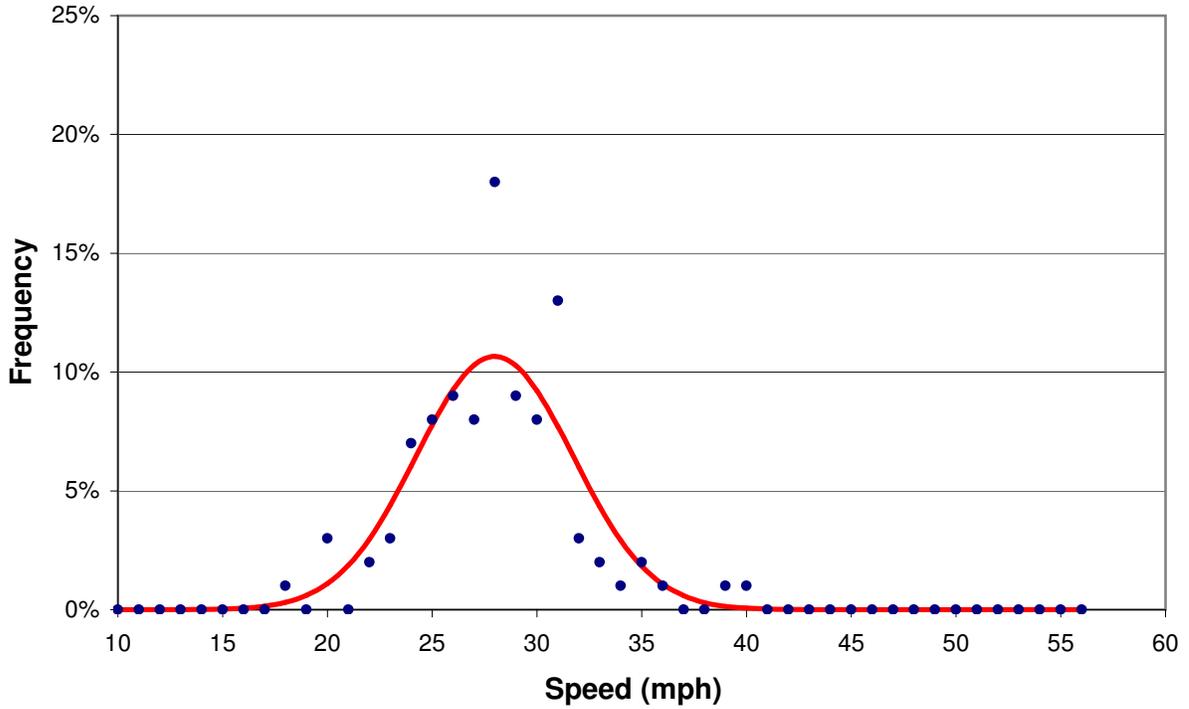
Date: **November 14, 2005**
Location: **Amsterdam Avenue between West 167th Street and West 168th Street**
Surveyor:

Time: **2:00 pm - 2:30 pm**

School: **P.S. 8**
Direction:
Comments:

Mean Speed = 28.0 mph
Standard Deviation = 3.7 mph
Margin of Error (95% Confidence) = ± 0.7 mph

Median Speed = 28.0 mph
15th Percentile Speed = 24.1 mph
85th Percentile Speed = 31.9 mph



P.S. 8

November 17, 2005
2:30 pm - 3:30 pm

Title1 : School Safety Engineering
Title2 : Borough of Manhattan
Title3 : NYC-DOT

Site:
Date: 11/17/05

Combined

**Peds not included in table data*

Begin Time	Total	Amsterdam Ave.			West 167th Street			Amsterdam Ave.			West 167th Street		
		S-R	S-T	S-L	W-R	W-T	W-L	N-R	N-T	N-L			
15:30:00	216	3	73	6	34	3	4	2	85	6	0	0	0
15:45:00	289	10	98	10	31	6	1	2	125	6	0	0	0
16:00:00	310	5	108	12	36	14	5	5	121	4	0	0	0
16:15:00	275	7	111	7	30	8	2	7	98	5	0	0	0
1,090		25	390	35	131	31	12	16	429	21	0	0	0

Peak Volume Periods (1 hour Res:15 min.)					
Period			Peak Period		Volume
AM	05:00:00	To 10:00:00	NA	To NA	0
Noon	10:00:00	To 15:00:00	NA	To NA	0
PM	15:00:00	To 20:00:00	15:30:00	To 16:30:00	1,090

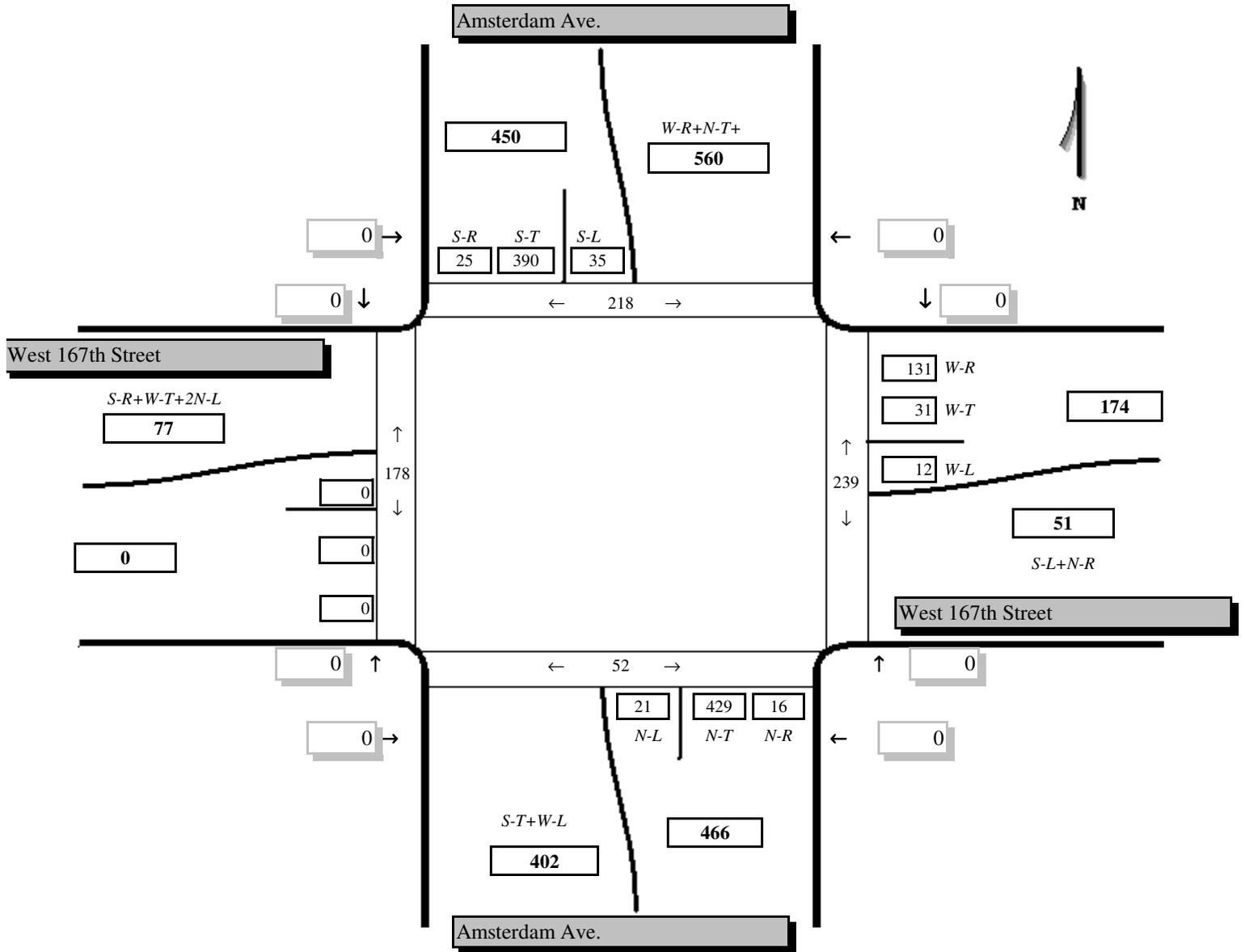
P.S. 8

November 17, 2005
2:30 pm - 3:30 pm

Title1 : School Safety Engineering
Title2 : Borough of Manhattan
Title3 : NYC-DOT

Site: 11/17/05
Date:

Combined
*Peds not included in table data



P.S. 8

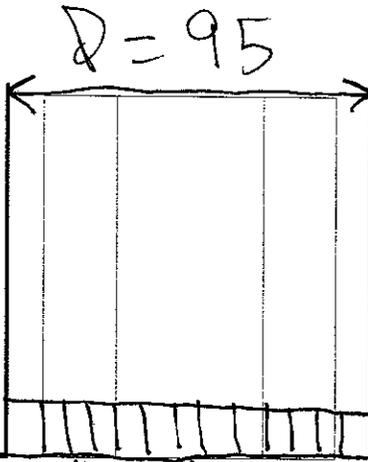
INTERSECTION: 167 & Junel pl.
TIME : 7:30 - 8:30
DATE : _____

(NO STOP SIGNS)



STREET NAME:
167 st.

ONE WAY ↑



C = 12
C = 33
H.V. = 2

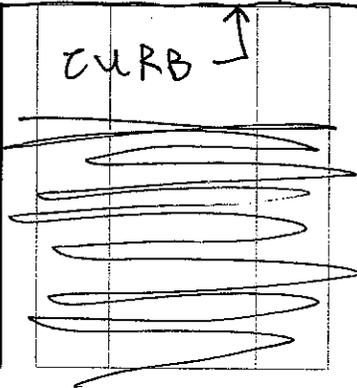
C = 78
H.V. = 2
C = 142
H.V. = 14

CURB ↑

CURB ↑

CURB ↑

STREET NAME: _____



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

INTERSECTION: 167 St & Edgecombe Ave
TIME : 7:30 - 8:30 (AM)
DATE : 5/19/05



STREET NAME:

167th St



z = 47 H.V. = 4

c = 144
H.V. = 13

CURB ↑

Thursday

P = 48

z = 42 H.V. = 1



STREET NAME:

Edgecombe Ave.

z = 207 H.V. = 14

CURB ↓



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

P.S. 8

INTERSECTION: 168TH STREET / JUMEL PLACE

TIME : 7:30 - 8:30

DATE : 5/17/2005

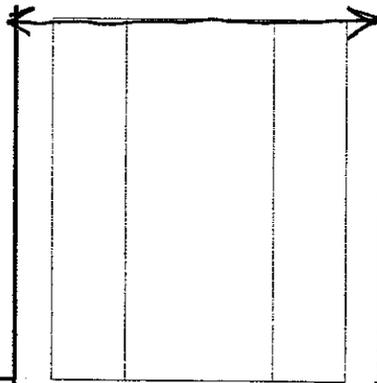


STREET NAME:

168th st



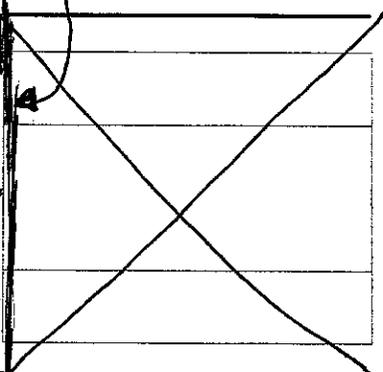
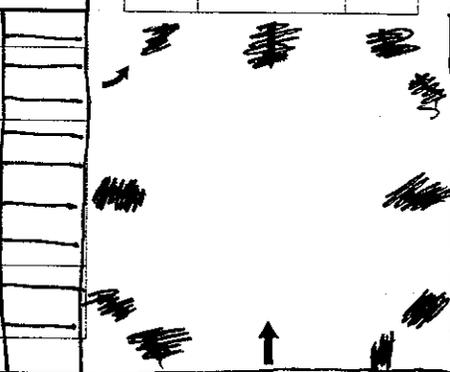
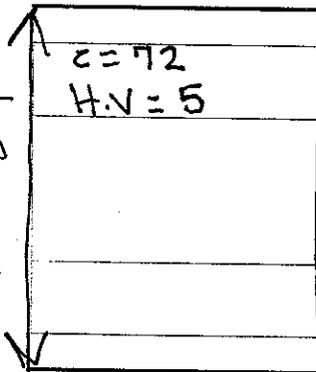
P = 76



CURB LINE

P = 39

C = 72
H.V = 5



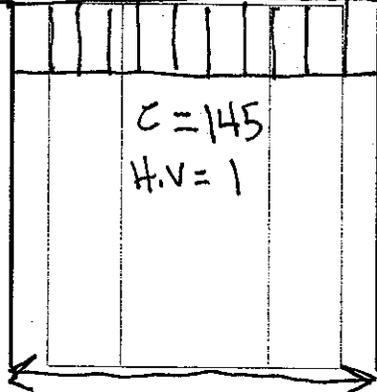
ONE WAY →



STREET NAME:

JUMEL PLACE

C = 145
H.V = 1



P = 314

← ONE WAY

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

SCHOOL
(P.S. 8)

SCHOOL (The Mirabal Sisters School)

Analyst: Inter.:
 Agency: Area Type: All other areas
 Date: 11/18/2005 Jurisd:
 Period: Year :
 Project ID: Existing Timing
 E/W St: West 167th Street N/S St: Amsterdam Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	1	0	0	2	0	0	2	0
LGConfig				LTR			LTR			LTR		
Volume				12	31	131	21	429	16	35	390	25
Lane Width				12.0			12.0			12.0		
RTOR Vol				0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left					NB Left	P		
Thru					Thru	P		
Right					Right	P		
Peds	X				Peds	X		
WB Left		P			SB Left	P		
Thru		P			Thru	P		
Right		P			Right	P		
Peds		X			Peds	X		
NB Right					EB Right			
SB Right					WB Right			
Green	20.0				58.0			
Yellow	4.0				4.0			
All Red	2.0				2.0			

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c g/C		Lane Group Delay LOS		Approach Delay LOS	
----------------------	---------------------------	-----------------------------	-------------------	--	-------------------------	--	-----------------------	--

Eastbound

Westbound

LTR 378 1700 0.51 0.22 35.6 D 35.6 D

Northbound

LTR 2136 3315 0.24 0.64 7.0 A 7.0 A

Southbound

LTR 2039 3164 0.25 0.64 7.0 A 7.0 A

Intersection Delay = 11.6 (sec/veh) Intersection LOS = B

Analyst: Inter.:
 Agency: Area Type: All other areas
 Date: 11/18/2005 Jurisd:
 Period: Year :
 Project ID: Adjusted Timing
 E/W St: West 167th Street N/S St: Amsterdam Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	1	0	0	2	0	0	2	0
LGConfig				LTR			LTR			LTR		
Volume				12	31	131	21	429	16	35	390	25
Lane Width				12.0			12.0			12.0		
RTOR Vol				0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left					NB Left	P		
Thru					Thru	P		
Right					Right	P		
Peds	X				Peds	X		
WB Left		P			SB Left	P		
Thru		P			Thru	P		
Right		P			Right	P		
Peds		X			Peds	X		
NB Right					EB Right			
SB Right					WB Right			
Green	23.0				55.0			
Yellow	4.0				4.0			
All Red	2.0				2.0			
								Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS

Eastbound

Westbound

LTR 434 1700 0.44 0.26 31.4 C 31.4 C

Northbound

LTR 2025 3314 0.26 0.61 8.4 A 8.4 A

Southbound

LTR 1932 3162 0.26 0.61 8.4 A 8.4 A

Intersection Delay = 12.1 (sec/veh) Intersection LOS = B

KGjelaj
The RBA Group

Phone:
E-Mail:

Fax:

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst:
Agency/Co.:
Date Performed: 11/18/2005
Analysis Time Period:
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year:
Project ID: All way stop control
East/West Street: W 168 Street
North/South Street: Jumel Place

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	77	0	0	0	0	0	0	146	0	0	0	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	L				T			
PHF	1.00				1.00			
Flow Rate	77				146			
% Heavy Veh	0				0			
No. Lanes	1				1			
Opposing-Lanes	0				0			
Conflicting-lanes	1				1			
Geometry group	1				1			
Duration, T	0.25 hrs.							

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	77				146			
Left-Turn	77				0			
Right-Turn	0				0			
Prop. Left-Turns	1.0				0.0			
Prop. Right-Turns	0.0				0.0			
Prop. Heavy Vehicle	0.0				0.0			
Geometry Group	1				1			
Adjustments Exhibit 17-33:								
hLT-adj	0.2				0.2			

hRT-adj	-0.6	-0.6
hHV-adj	1.7	1.7
hadj, computed	0.2	0.0

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	77				146			
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.07				0.13			
hd, final value	4.42				4.08			
x, final value	0.09				0.17			
Move-up time, m	2.0				2.0			
Service Time	2.4				2.1			

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	77				146			
Service Time	2.4				2.1			
Utilization, x	0.09				0.17			
Dep. headway, hd	4.42				4.08			
Capacity	327				396			
Delay	7.88				7.89			
LOS	A				A			
Approach:								
Delay	7.88				7.89			
LOS	A				A			
Intersection Delay	7.89				Intersection LOS A			
