New York City Department of Transportation
Office of School Safety Engineering

School Safety Engineering Project

FINAL REPORT: P.S. 21 (Philip H. Sheridan School), Bronx

Prepared by
The RBA Group/Urbitran Associates

August 23, 2006

School Safety Engineering Project
Final Report: P.S. 21, Bronx

TABLE OF CONTENTS

EXHIBITS

TABLES

APPENDIX

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

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

Under this consultant study, the School Safety Engineering Project, crash data in the vicinity of all program schools was reviewed. As a result, schools were ranked in terms of pedestrian safety, and 135 "priority" schools were identified Citywide. At each of these priority schools, safety improvements are being recommended (e.g., new school crosswalks, new traffic signals and signal timing modifications, new speed reducers). In addition, 32 of these schools will receive further investigation to design physical improvements (e.g., raised center medians, widened sidewalks, "neckdowns" or "bulbouts" at intersections). P.S. 21 (Philip H. Sheridan School) in the Bronx is one of the 135 "priority" schools identified by the New York City Department of Transportation, Office of School Safety Engineering.

2. BACKGROUND—EXISTING CONDITIONS AND ANALYSIS

[redacted]

2.2 NEIGHBORHOOD DESCRIPTION

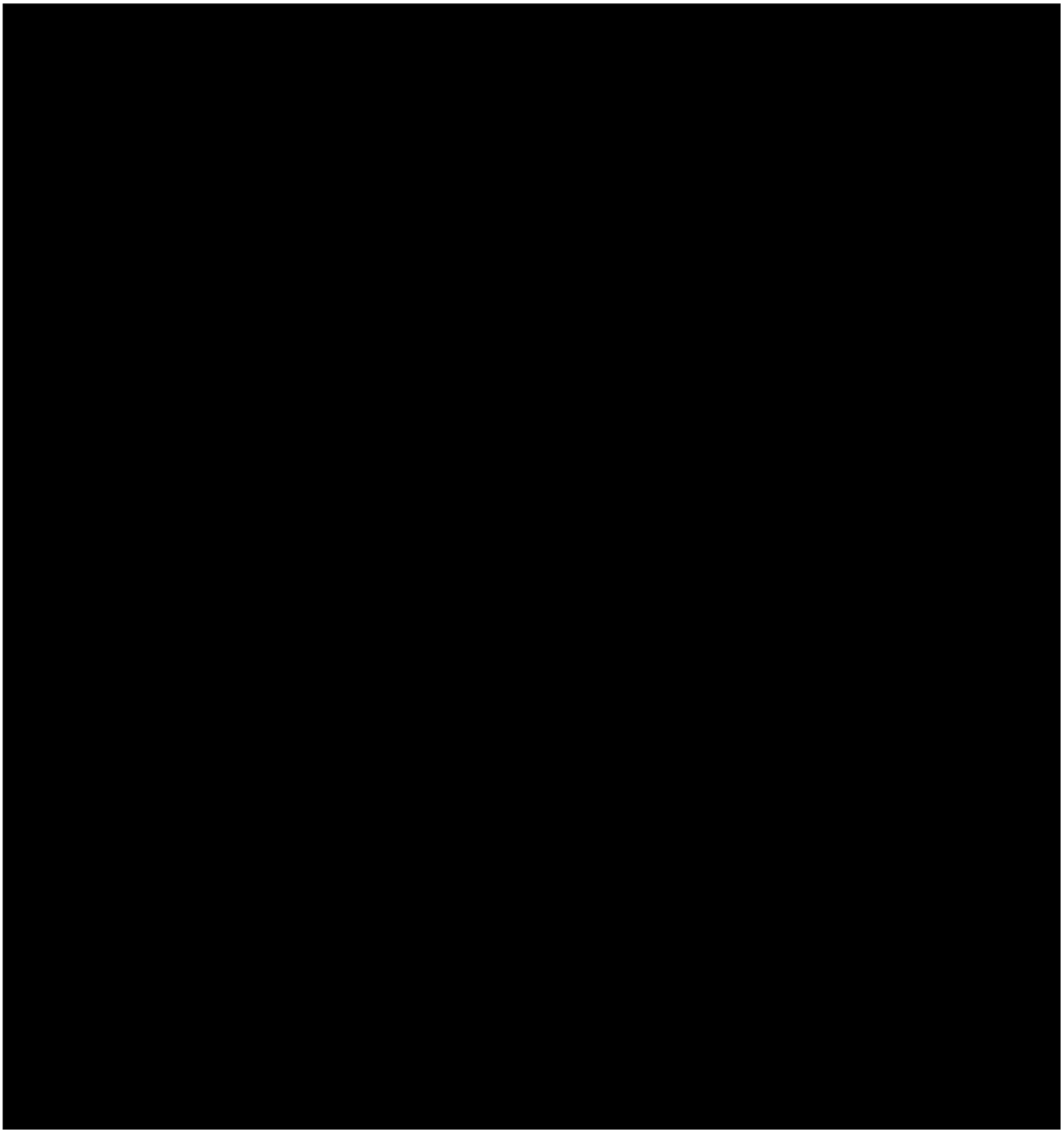
Exhibit 1 shows an aerial view of the neighborhood surrounding the school. P.S. 21 is bounded by White Plains Road to the west, East 226th Street to the north, Barnes Avenue to the east, and East 225th Street to the south. The area surrounding the school is primarily residential in character, with a mix of one- and two-family residences and medium- to high-density apartment buildings. White Plains Road has commercial uses and carries significant traffic volumes. A park is adjacent to the schoolyard to the east.

Figure 1: Looking east on East 225th Street across White Plains Road

2.3 MEETING WITH SCHOOL REPRESENTATIVES

Consultant staff, the principal of P.S. 21, and the Deputy Chief of New York City Department of Transportation School Safety Engineering met at the school on the morning of May 6, 2004. According to the principal of the school, the problems facing P.S. 21 school pedestrians are as follows:

- The staff parking situation was described as "problematic" because there is only a small area available for staff parking.
- Traffic volumes in the street surrounding the school were described as high at various times.
- Speeding was reported as a problem in the vicinity of the school, especially along Barnes Avenue. A prior speeding problem on East 225th Street was abated by the installation of the existing speed reducer (hump). A speeding problem on East 226th Street is somewhat controlled by the bus stop near White Plains Road.
- Congestion is a problem at dismissal times.



2.6 PRIMARY MODES OF TRANSPORT TO AND FROM SCHOOL

The school's "catchment area" as defined by the Department of Education is shown in Exhibit 2. The school's catchment area, confirmed by the school principal, varies, somewhat irregular and is different from what was defined by the Department of Education The area is approximately bounded by: White Plains Road from East 216th Street to Neried Avenue (western boundary); Neried Avenue, between White Plains Road and Barnes Avenue (northern boundary); then southwesterly along Barnes Avenue to Pitman Avenue and Bronxwood Avenue, then southerly along Bronxwood Avenue to East 231st Street; then southeasterly along East 231st Street to Paulding Avenue; then southwesterly along Paulding Avenue to East 224th Street; then northwesterly along East 224th Street back to Bronxwood Avenue; then southwesterly again along Bronxwood Avenue to East 216th Street; then northwesterly along East 216th Street to return to White Plains Road.

Table 1 presents the modes of travel for P.S. 21 as identified by school representatives.

TABLE 1: MODES OF TRAVEL (AS ESTIMATED BY THE SCHOOL OFFICIALS)	**STUDENTS (Percentage)**
Walk	76%
Driven by car	5%
School bus	10%
MTA Bus/ Subway	9%
Bicycle	0%
TOTAL	**100%**

2.7 ADDITIONAL STUDENT PEDESTRIAN TRAFFIC GENERATORS

In addition to a deli on the northeast corner of East 225th Street and White Plains Road (see Figure 1), there is continuous commercial activity located along White Plains Road just west of the school (see Figure 3). In addition, there are various stores and restaurants along White Plains Road that generate pedestrian and vehicular traffic in the vicinity of the school. A park is also located on the same block as the school, immediately adjacent to the schoolyard to the east.

Figure 3: Looking north along White Plains Road, showing stores adjacent to P.S. 21

2.8 CROSSING GUARD LOCATIONS

According to the school principal, there are two crossing guards assigned to P.S. 21. They are situated at the following locations:

- East 225th Street and White Plains Road
- East 226th Street and Barnes Avenue

The crossing guard locations are shown in Exhibit 4.

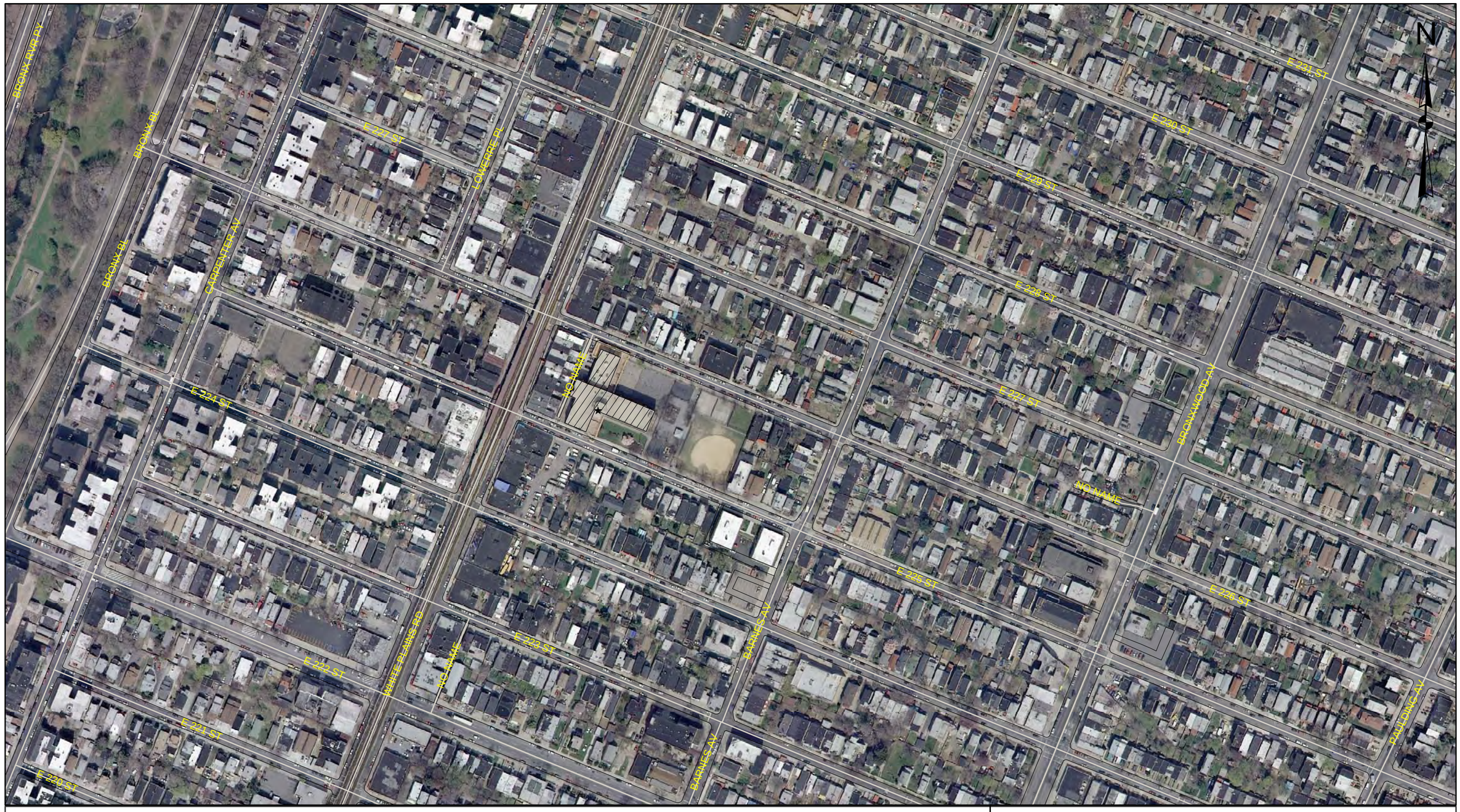


EXHIBIT 1

P.S. 21 BRONX

PHILIP H. SHERIDAN SCHOOL

AERIAL PHOTOGRAPH

LEGEND:

CATCHMENT AREA, (DEPARTMENT OF EDUCATION DESIGNATED AREA FROM WITHIN WHICH STUDENTS ARE ENTITLED TO ATTEND P.S. 21)

0 750 1,500 3,000 Feet

9

EXHIBIT 2

P.S. 21 BRONX

PHILIP H. SHERIDAN SCHOOL

CATCHMENT AREA

New York City
Department of Transportation

School Traffic Safety Map

Traffic Operations Division

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 21 Bronx
PHILIP H. SHERIDAN SCHOOL

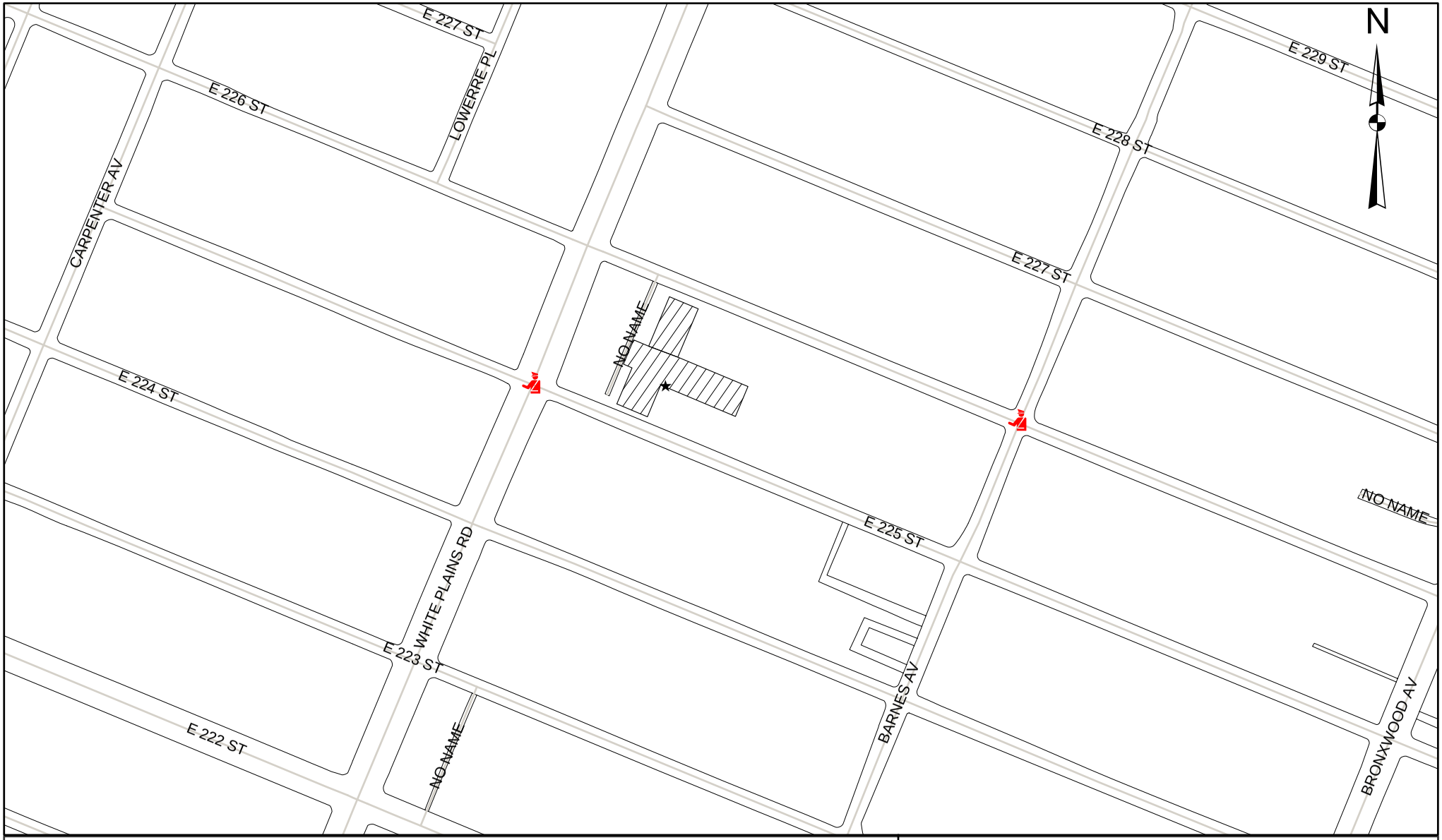
Prepared by the NEW YORK CITY DEPARTMENT OF TRANSPORTATION, Iris Weinshall, COMMISSIONER.

Map created on 11/16/2006

EXHIBIT 3

COMM. BOARD: 212
PRECINCT: 47

1.5.1



LEGEND:

CROSSING GUARD LOCATION

11

0 250 500 1,000 Feet

EXHIBIT 4

P.S. 21 BRONX

PHILIP H. SHERIDAN SCHOOL

CROSSING GUARDS LOCATIONS

3. TRAFFIC OPERATIONS

3.1 SCHOOL BUS OPERATIONS

According to school representatives, approximately 80 students ride an MTA bus to school and approximately 90 students ride yellow school buses to school. Yellow bus transportation for the students consists of two school buses for Grade K-2 students and five special education buses, each carrying approximately eleven students. All yellow school buses stop on East 225th Street in front of the school.

3.2 PARENT DROP-OFF OPERATIONS

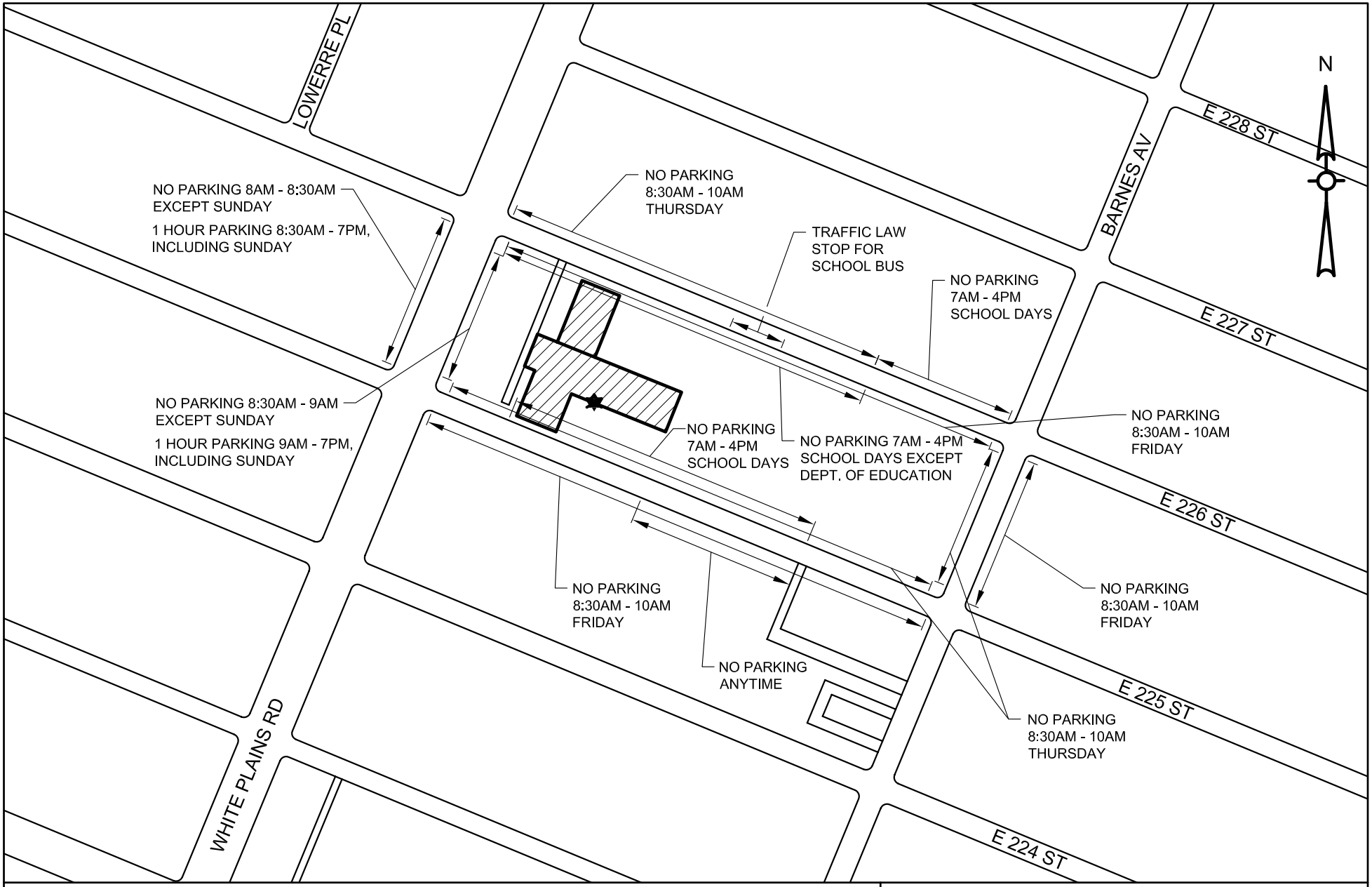
According to school representatives, approximately 5% of the students are currently being dropped off. Because the number of students being dropped off is relatively small, there are no problems associated with drop offs.

3.3 PARKING REGULATIONS

Parking regulations around the school block are shown in Exhibit 5.

3.4 EXISTING SCHOOL SIGNS AND MARKINGS

Exhibit 3 shows the existing school signals and pavement markings around P.S. 21. It should be noted that a citywide signage program is currently underway to upgrade school signage to current Federal Manual on Uniform Traffic Control Devices (MUTCD) standards of fluorescent yellow-green signs accompanied by downward pointing arrows. (Signs scheduled to be installed under this program are shown as “existing” in Exhibit 8.)



LEGEND:

MAIN ENTRANCE

0 200 400 FEET

EXHIBIT 5

P.S. 21 BRONX
PHILIP H. SHERIDAN 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. 21 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 concentration of student pedestrians occurs. Intersections farther from the school and locations for which detailed data was not available at the time of this study will be addressed with the ongoing work of DOT's School Safety Engineering Program. DMV accident data is discussed in Section 3.6, Traffic Operations and Issues.

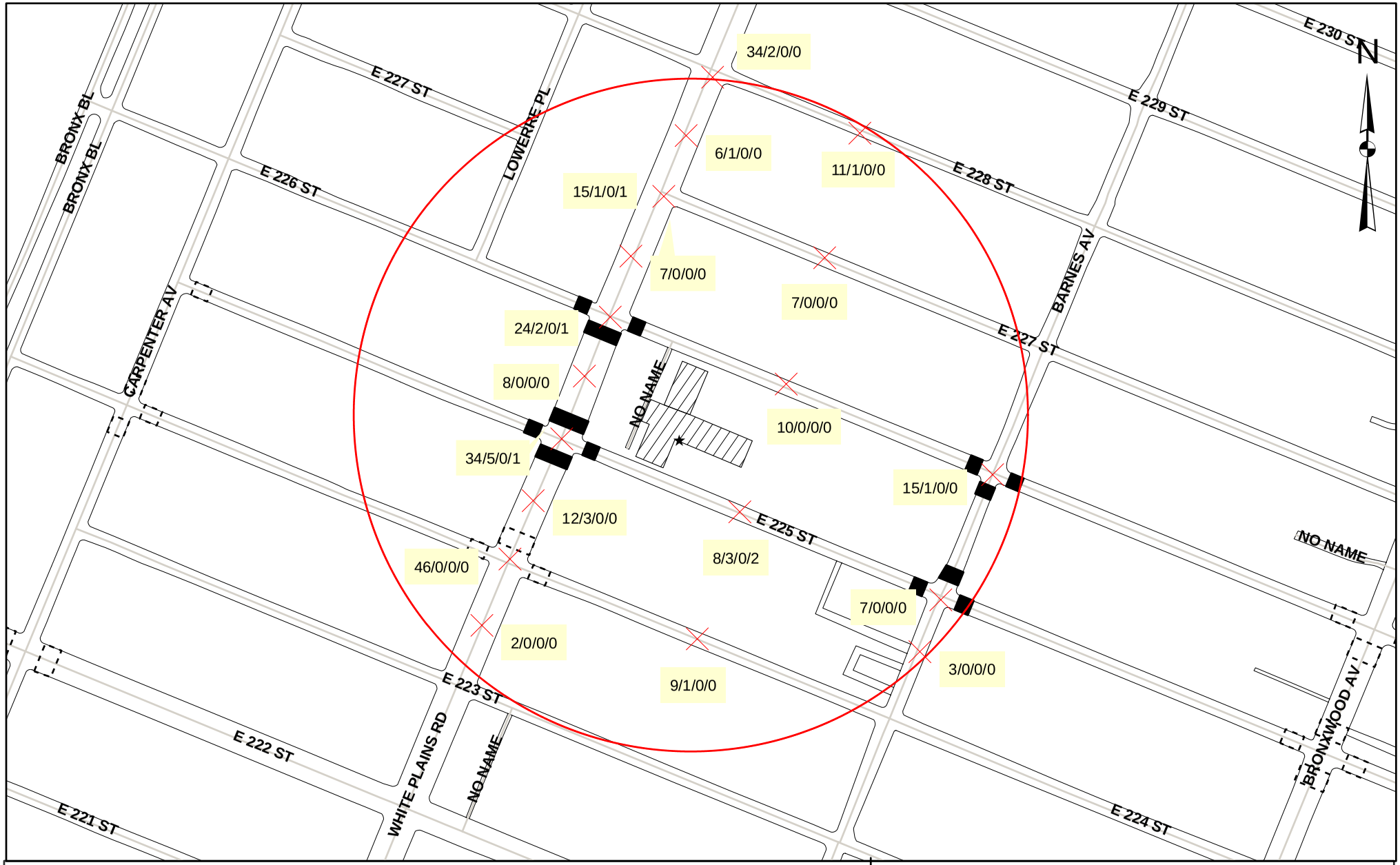
TABLE 2: ACCIDENT SUMMARY OF NYS DMV DATA (1998-2000)

INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED ACCIDENTS*
East 224th Street and White Plains Road	46	0	0	0
East 225th Street and White Plains Road	34	5	0	1
East 225th Street and Barnes Avenue	7	0	0	0
East 226th Street and White Plains Road	24	2	0	1
East 226th Street and Barnes Avenue	15	1	0	0
East 227th Street and White Plains Road	15	1	0	1
East 228th Street and White Plains Road	34	2	0	0
TOTAL	**175**	**11**	**0**	**3**

TABLE 3: ACCIDENT SUMMARY OF NYPD DATA (2001-2004)

INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED ACCIDENTS*
East 224th Street and White Plains Road	66	4	0	2
East 225th Street and White Plains Road	50	7	0	4
East 225th Street and Barnes Avenue	20	4	0	2
East 226th Street and White Plains Road	46	5	0	1
East 226th Street and Barnes Avenue	16	1	0	0
East 227th Street and White Plains Road	23	4	0	0
East 228th Street and White Plains Road	47	7	0	2
TOTAL	**268**	**32**	**0**	**11**

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



LEGEND:

ACCIDENT LOCATION

SCHOOL CROSSWALK

SCHOOL CROSSWALK ASSIGNED TO ANOTHER SCHOOL

BORDER OF 700 FEET

X/X/X/X

TOTAL ACCD / PED ACCD / PED FATAL / SCHOOL_PED ACCD

EXHIBIT 6

P.S. 21 BRONX

PHILIP H. SHERIDAN SCHOOL

ACCIDENT SUMMARY (1998-2000)

3.6 TRAFFIC OPERATIONS AND ISSUES

The specific roadway-related physical conditions for each location within the school's vicinity directly affect the safety and efficiency of operations for both pedestrian and vehicular traffic. These conditions are required information when analyzing a location, and are the starting point for any revisions that may be considered to improve safety and/or efficiency.

The following sub-sections outline the physical conditions and issues concerning traffic operations and accidents at the intersections in the vicinity of P.S. 21.

3.6.1 East 224th Street and White Plains Road

This is a stop-controlled intersection with school crosswalks located across the north, west, and east legs. East 224th Street is a one-way westbound street with one travel lane and parking on both sides of the roadway. East 224th Street is stop-controlled at its intersection with White Plains Road. White Plains Road is a two-way street with two travel lanes and a parking lane on each side of the roadway. White Plains Road also has an elevated train running over the center of the roadway. The supports for the train are located so that they provide an inner and an outer lane for each direction of travel (see Figures 3 and 5).

This intersection was the site of 46 accidents between 1998 and 2000, none of which were pedestrian accidents (Table 2). There were no pedestrian fatalities during this time period.

3.6.2 East 225th Street and White Plains Road

This is a signalized intersection, with school crosswalks located across all four legs. East 225th Street is a one-way eastbound street with one travel lane and parking on both sides of the roadway. White Plains Road is a two-way street with two travel lanes and a parking lane on each side of the roadway. White Plains Road also has an elevated train running over the center of the roadway. The supports for the train are located so that they provide an inner and an outer lane for each direction of travel (see Figures 3 and 5). There is a station for the trains located at this intersection.

According to school representatives, a speeding problem has been abated by the installation of a speed reducer (hump) on East 225th Street.

This intersection was the site of 34 total accidents between 1998 and 2000, five of which involved pedestrians, and one of which was a school-related accident (Table 2). In the school-related accident, a nine-year-old pedestrian sustained a "possible injury" while crossing with the signal at the intersection on Friday, January 14, 2000 at 8:00 a.m. The road was dry and the weather was clear. In addition, there were a total of eight accidents along East 225th Street between White Plains Road and Barnes Avenue between 1998 and 2000, including three pedestrian accidents which were all school related. The first school-related pedestrian accident occurred at an unspecified time on Friday, February 27, 1998 when a nine-year old pedestrian sustained a "possible injury". The accident location and the pedestrian's actions were unreported. The road surface was dry and the

accident occurred during clear, daylight weather conditions. The second school-related pedestrian accident occurred at 3:00 pm on Thursday, March 26, 1998 when an 11-year-old sustained a "possible injury" while crossing mid-block. The road surface was dry and the accident occurred during clear, daylight weather conditions. The third school-related pedestrian accident occurred at 8:00 am on Tuesday, February 9, 1999 when a nine-year-old pedestrian sustained a "possible injury" while crossing mid-block. The road surface was dry and the accident occurred during clear, daylight weather conditions. There were no pedestrian fatalities during this time period.

Figure 4: Looking south along White Plains Road across East 225th Street

Figure 5: Looking west along East 225th Street from White Plains Road

3.6.3 East 225th Street and Barnes Avenue

This is a four-leg, stop-controlled intersection with school crosswalks located across the north, east, and west legs. A stop sign exists on the eastbound approach of East 225th Street. East 225th Street is a one-way eastbound street with one travel lane and parking on both sides of the roadway. Barnes Avenue is a one-way northbound street with one very wide travel lane and parking on both sides of the roadway (see Figures 4 and 7).

This intersection was the site of seven total accidents between 1998 and 2000, none of which involved pedestrians (Table 2). There were no pedestrian fatalities during this time period.

The school principal reported a speeding problem on Barnes Avenue in the vicinity of the school. Therefore, a speed survey was conducted on Barnes Avenue between East 225th Street and East 226th Street in order to verify the existence of a speeding problem and to determine its extent.

The 85th percentile speed for northbound vehicles on Barnes Avenue between East 225th Street and East 226th Street was found to be 30 mph. The 85th percentile speed is considered to be the representative speed for the street segment. Speeds above the 30 mph threshold would indicate a speeding problem and may require appropriate traffic calming measures.

The detailed results of the spot speed survey on Barnes Avenue between East 225th Street and East 226th Street are shown in the Appendix at the end of the document.

There is an uncontrolled school crosswalk across the north leg of Barnes Avenue at the intersection with East 225th Street. In order to determine the appropriate traffic control for

the school crosswalks, a preliminary traffic signal warrant assessment was performed to assess the traffic situation and determine what type of traffic control devices would be appropriate. A traffic count was at the intersection of Barnes Avenue and East 225th Street from 8:0 to 9:00 am on Wednesday, June 8, 2005. The results of the peak hour (8:00 am to 9:00 am) count are shown in Tables 4, 5, and 6 and in Exhibit 7A at the end of this section.

In addition, a traffic signal warrant analysis was performed to determine the need for a traffic signal control at this intersection. The results of the preliminary assessment based on traffic signal warrant 4 (Pedestrian Volumes) of the Federal MUTCD are presented in Table 6. As can be seen in Table 13, the Gaps are more than 60 per hour and the pedestrians crossing the intersection are less than 190 per hour. Based on this assessment, an installation of a traffic signal is not warranted.

TABLE 4: VEHICLE VOLUMES (8:00-9:00 AM)

INTERSECTION	Barnes Avenue NORTHBOUND		East 225th Street EASTBOUND	
Barnes Avenue and East 225th Street	Straight	Right	Straight	Left
	304	44	122	75
TOTAL	348		197	

TABLE 5: PEDESTRIAN VOLUMES (8:00-9:00 AM)

INTERSECTION	Crossing Barnes Avenue SOUTH-LEG CROSSWALK	Crossing Barnes Avenue NORTH-LEG CROSSWALK	Crossing East 225th Street WEST-LEG CROSSWALK	Crossing East 225th Street EAST-LEG CROSSWALK
Barnes Avenue and East 225th Street	91	81	133	27

TABLE 6: TRAFFIC SIGNAL WARRANT4 ANALYSIS (PEDESTRIAN VOLUMES)

Intersection	Total Hourly (8:00-9:00 am) Pedestrian Volumes			Criteria		Traffic Signal Warranted
	Crossing Street			Gap	Crossing Major Street	
	Major	Minor	Total	Fewer than 60 gaps / hour*	Greater than 190 pedestrians / hour	
Barnes Avenue and East 225th Street	172	160	332	No	No	No

* The available gap is based on the time need for a pedestrian to walk across the street. The analysis assumed 12 seconds.

Figure 6: Looking west along East 225th Street across Barnes Avenue

Figure 7: Students crossing the north leg of Barnes Avenue and East 225th Street

3.6.4 East 226th Street and White Plains Road

This is a four-leg, stop-controlled intersection with school crosswalks located across the south, west, and east legs and a pedestrian crosswalk located across the north leg. A stop sign exists on the westbound approach of East 226th Street. East 226th Street is a one-way westbound street with one travel lane and parking on both sides of the roadway. White Plains Road is a two-way street with two travel lanes and a parking lane on each side of the roadway. White Plains Road also has an elevated train running over the center of the roadway. The supports for the train are located so that they provide an inner and an outer lane for each direction of travel (see Figures 3 and 5). Most of the time, the outer lanes are blocked by parked vehicles and remain effectively unused as travel lanes.

According to school representatives, speeding on East 226th Street is somewhat controlled by the presence of the bus stop on the north side of East 226th Street, east of White Plains Road.

This intersection was the site of 24 total accidents between 1998 and 2000, including two pedestrian accidents, one of which was school-related (Table 2). In the school-related accident, a nine-year-old pedestrian sustained a "non-incapacitating injury" while crossing at a marked crosswalk at the intersection on Friday, November 20, 1998 at 3:00 pm. The road was dry and the weather was clear. There were no pedestrian fatalities during this time period.

There is an uncontrolled school crosswalk across the south leg of White Plains Road at the intersection with East 226th Street. In order to determine what type of traffic control device would be appropriate, vehicle and pedestrian counts were conducted at this intersection from 7:45 to 8:45 am on Thursday, January 26, 2006. The results of the vehicle and pedestrian counts are shown in Tables 7 and 8, respectively, and in Exhibit 7B at the end of this section. Tables 9 and 10 identify the results of the traffic signal warrant analysis based on the count data. It should be noted that the NYCDOT recently conducted an independent traffic signal warrant analysis for the White Plains Road and East 226th Street intersection. A traffic signal was found to be warranted and NYCDOT currently plans to install a signal at this intersection.

TABLE 7: VEHICLE VOLUMES (7:45-8:45 AM)

INTERSECTION	White Plains Road NORTHBOUND		White Plains Road SOUTHBOUND		East 226th Street WESTBOUND		
White Plains Rd and East 226th Street	Straight	Left	Straight	Right	Left	Thru	Right
	150	42	136	21	102	122	44
TOTAL	192		157		268		

TABLE 8: PEDESTRIAN VOLUMES (7:45-8:45 AM)				
INTERSECTION	Crossing White Plains Rd SOUTH-LEG CROSSWALK	Crossing White Plains Rd NORTH-LEG CROSSWALK	Crossing East 226th Street WEST-LEG CROSSWALK	Crossing East 226th Street EAST-LEG CROSSWALK
White Plains Rd and East 226th Street	128	37	169	158

TABLE 9: TRAFFIC SIGNAL WARRANT4 ANALYSIS (PEDESTRIAN VOLUMES)						
Intersection	Total Hourly (7:45-8:45 AM) Pedestrian Volumes			Criteria		Traffic Signal Warranted
	Crossing Street			Gap	Crossing Major Street	
	Major	Minor	Total	Fewer than 60 gaps / hour*	Greater than 190 pedestrians / hour	
White Plains Rd and East 226th Street	165	327	492	Yes	No	No
* The available gap is based on the time need for a pedestrian to walk across the street. The analysis assumed 12 seconds.						

TABLE 10: TRAFFIC SIGNAL WARRANT 5 ANALYSIS (STUDENT CROSSING)						
Intersection	Total Hourly (7:45-8:45 AM) Student Volumes			Criteria		Traffic Signal Warranted
	Crossing Street			Gap	Crossing Major Street	
	Major	Minor	Total	Fewer than 60 gaps / hour(1)	Greater than 20 Students / hour	
White Plains Rd and East 226th Street	48	110	158	Yes	Yes	Yes
(1) The available gap is based on the time need for a pedestrian to walk across the major street. The analysis assumed 20 seconds.						

3.6.5 East 226th Street and Barnes Avenue

This is a four-leg, stop-controlled intersection with school crosswalks located across the south, west, and east legs. A stop sign exists on the westbound approach of East 226th Street. East 226th Street is a one-way westbound street with one travel lane and parking on both sides of the roadway. Barnes Avenue is a one-way northbound street with one very wide travel lane and parking on both sides of the roadway (see Figures 8 and 9).

This intersection was the site of 15 total accidents between 1998 and 2000, including one pedestrian accident that was not school-related (Table 2). There were no pedestrian fatalities during this time period.

There is an uncontrolled school crosswalk across the south leg of Barnes Avenue at the intersection with East 226th Street. In order to determine the appropriate traffic control for

the school crosswalks, a preliminary traffic signal warrant assessment was performed to assess the traffic situation and determine what type of traffic control devices would be appropriate. A traffic count was at the intersection of Barnes Avenue and East 226th Street from 7:30 to 8:30 am on Thursday, June 9, 2005. The results of the peak hour (7:30 am to 8:30 am) count are shown in Tables 11, 12, and 13 and in Exhibit 7C at the end of this section.

In addition, a traffic signal warrant analysis was performed to determine the need for a traffic signal control at this intersection. The results of the preliminary assessment based on traffic signal warrant 4 (Pedestrian Volumes) of the Federal MUTCD are presented in Table 13. As can be seen in Table 13, the Gaps are more than 60 per hour and the pedestrians crossing the intersection are less than 190 per hour. Based on this assessment, an installation of a traffic signal is not warranted.

TABLE 11: VEHICLE VOLUMES (7:30-8:30 AM)

INTESECTION	Barnes AVENUE NORTHBOUND		East 226th STREET WESTBOUND	
Barnes Avenue and East 226th Street	Straight	Left	Straight	Right
	329	69	126	43
TOTAL	398		169	

TABLE 12: PEDESTRIAN VOLUMES (7:30-8:30 AM)

INTERSECTION	CROSSING BARNES AVENUE SOUTH-LEG CROSSWALK	CROSSING BARNES AVENUE NORTH-LEG CROSSWALK	CROSSING East 226th STREET WEST-LEG CROSSWALK	CROSSING East 226th STREET EAST-LEG CROSSWALK
Barnes Avenue and East 226th Street	39	42	92	63

TABLE 13: TRAFFIC SIGNAL WARRANT 4 ANALYSIS (PEDESTRIAN VOLUMES)

Intersection	Total Hourly (7:30-8:30 am) Pedestrian Volumes			Criteria		Traffic Signal Warranted
	Crossing Street			Gap	Crossing Major Street	
	Major	Minor	Total	Fewer than 60 gaps / hour*	Greater than 190 pedestrians / hour	
Barnes Avenue and East 226th Street	81	155	236	No	No	No

* The available gap is based on the time need for a pedestrian to walk across the street. The analysis assumed 12 seconds.

Figure 8: Looking north along Barnes Avenue across East 226th Street

3.6.6 East 227th Street and White Plains Road

This is a three-leg intersection with no crosswalks located across the any legs. East 227th Street is a one-way eastbound street with one travel lane and parking on both sides of the roadway. White Plains Road is a two-way street with two travel lanes and a parking lane on each side of the roadway. White Plains Road also has an elevated train running over the center of the roadway. The supports for the train are located so that they provide an inner and an outer lane for each direction of travel (see Figures 3 and 5). Most of the time, the outer lanes are blocked by parked vehicles and remain effectively unused as travel lanes.

This intersection was the site of 15 total accidents between 1998 and 2000, including one pedestrian accident that was also school-related (Table 2). In the school-related accident, a 12-year-old pedestrian sustained a "possible injury" while performing "other actions in the roadway" on Tuesday, May 19, 1998 at 3:00 pm. The road surface was dry and the accident occurred under clear, daylight weather conditions.

3.6.7 East 228th Street and White Plains Road

This is a four-leg, stop-controlled intersection with no school crosswalks and a pedestrian crosswalk located across the west leg. A stop sign exists on the westbound approach of East 228th Street. East 228th Street is a one-way westbound street with one travel lane and parking on both sides of the roadway. White Plains Road is a two-way street with two travel lanes and a parking lane on each side of the roadway. White Plains Road also has an elevated train running over the center of the roadway. The supports for the train are located so that they provide an inner and an outer lane for each direction of travel (see

Figures 3 and 5). Most of the time, the outer lanes are blocked by parked vehicles and remain effectively unused as travel lanes.

This intersection was the site of 34 total accidents between 1998 and 2000, including two pedestrian accidents that were not school-related (Table 2). There were no pedestrian fatalities during this time period.

3.7 SIGNAL TIMING

Pedestrian crossing times for crosswalks at signalized intersections in the vicinity of P.S. 21 were field-verified and found to be adequate based upon a child pedestrian walking at a rate of 3 feet per second. The signal timings are shown in Table 14.

TABLE 14: PEDESTRIAN CROSSING TIMES AT SIGNALIZED INTERSECTIONS

INTERSECTION	CROSSWALK LENGTH (FEET)	PEDESTRIAN TIME ACTUAL (SECONDS)	PEDESTRIAN TIME REQUIRED (SECONDS)	TIMING ADJUSTMENT REQUIRED?
White Plains Road and East 225th Street				
crossing White Plains Road	61	24	23	NO
crossing East 225th Street	34	35	15	NO

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

3.8 PHYSICAL CONDITIONS

3.8.1 Roadways and Sidewalks

The roadways and sidewalks in the vicinity of P.S. 21 are generally in fair condition.

3.8.2 Pedestrian Ramps

Overall, pedestrian ramps in the area of the school were observed to be standard, except for the following locations:

- A utility pole on the northeast corner of the East 226th Street and Barnes Avenue intersection is obstructing the crosswalk path for the crosswalk located across the east leg of East 226th Street (see Figure 10).
- The crosswalk located across the west leg of East 225th Street at Barnes Avenue is missing a pedestrian ramp on the northwest corner (see Figure 11).

Figure 9: Looking east along East 226th Street across Barnes Avenue (note pole obstruction on left)

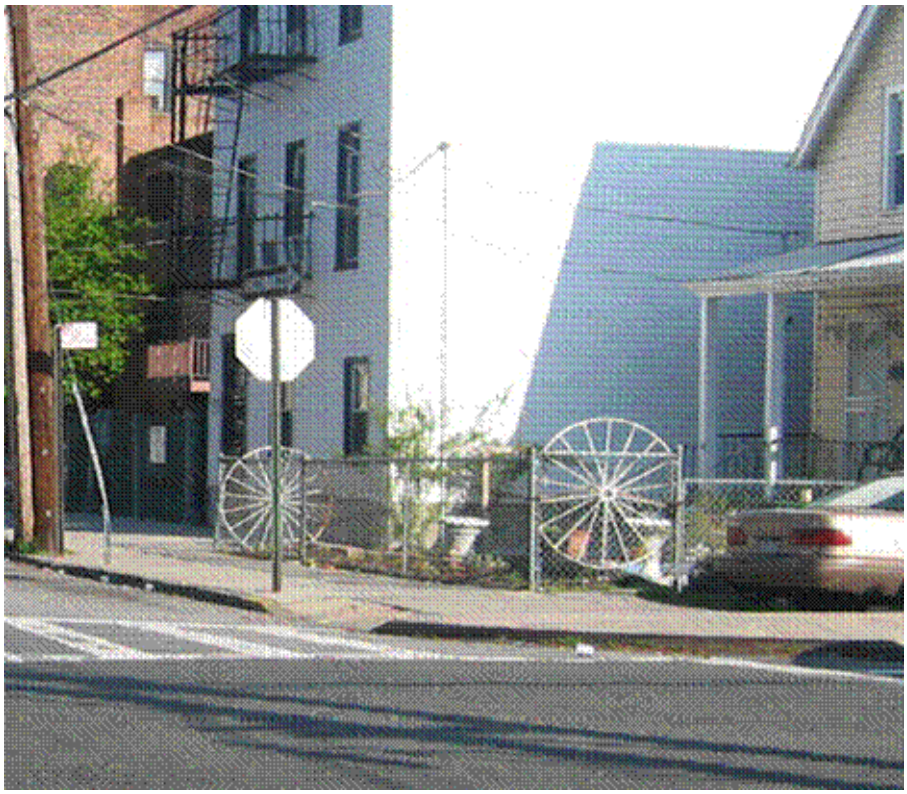
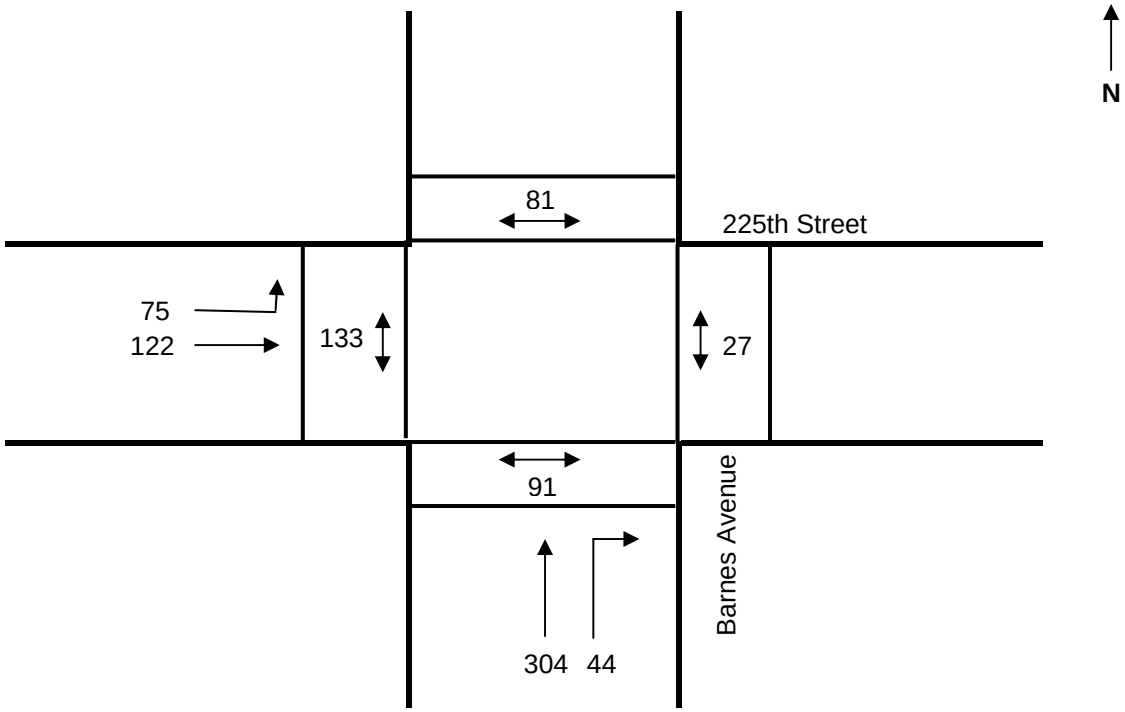


Figure 10: Looking west along East 225th Street across Barnes Avenue (note missing pedestrian ramp on right)

One Hour Traffic Volumes
Wednesday, June 8th, 2005 8:00am - 9:00am



Intersection of 225th Street and Barnes Avenue

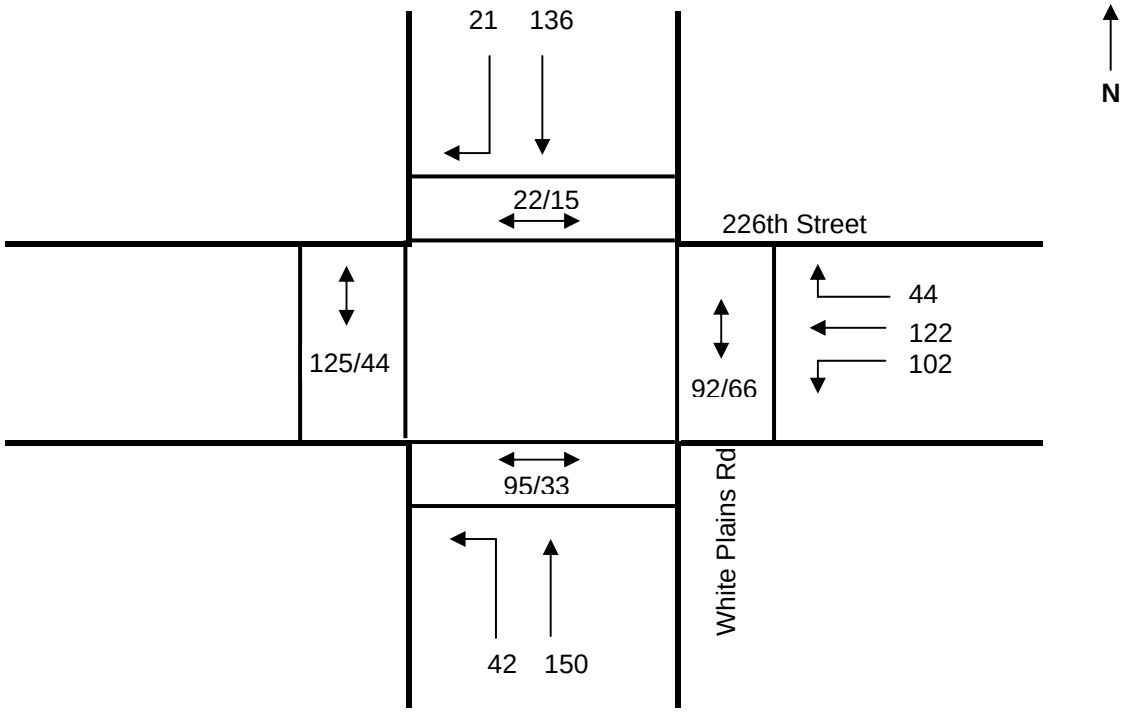
Table of Content:

Pedestrian Counts

Vehicle Movement

EXHIBIT 7A
P.S. 21 **PHILIP H. SHERIDAN SCHOOL**
TRAFFIC AND PEDESTRIAN COUNTS

One Hour Traffic Volumes
Thursday, January 26, 2006 7:45am - 8:45am



Intersection of 226th Street and White Plains Rd

Table of Content:

XX / XX Adult / Child
Pedestrian Counts

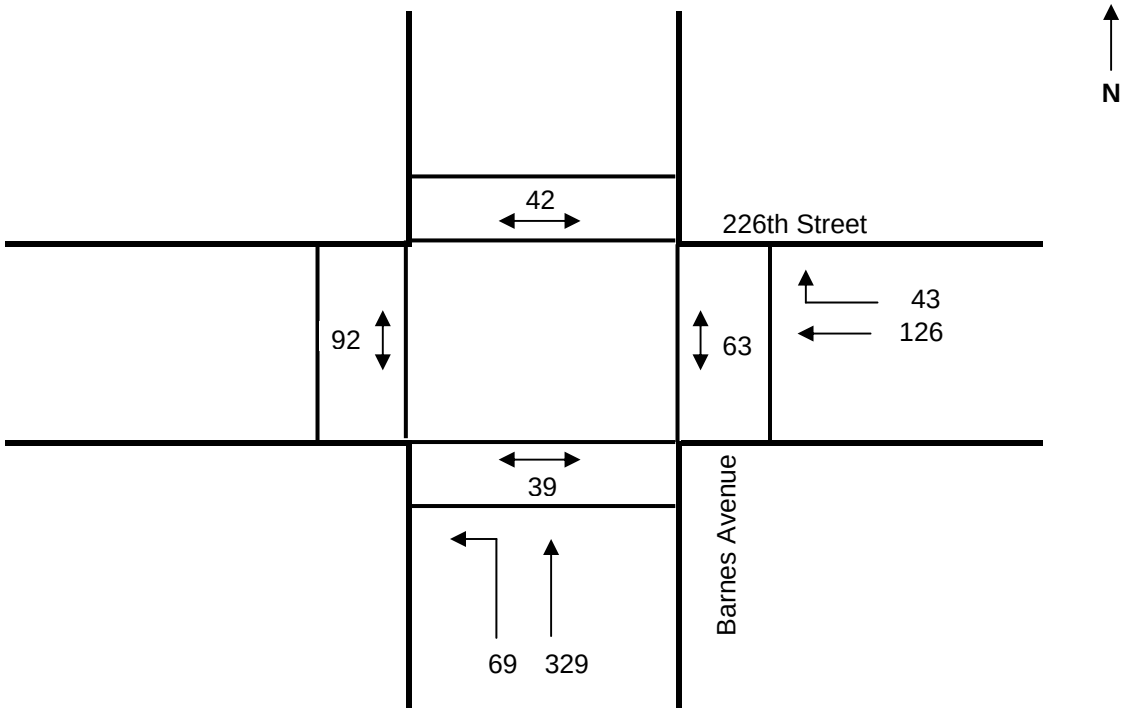
Vehicle Movement

EXHIBIT 7B

P.S. 21
PHILIP H. SHERIDAN SCHOOL

TRAFFIC AND PEDESTRIAN COUNTS

One Hour Traffic Volumes
Thursday, June 9th, 2005 7:30am - 8:30am



Intersection of 226th Street and Barnes Avenue

Table of Content:

Pedestrian Counts

Vehicle Movement

EXHIBIT 7C
P.S. 21 **PHILIP H. SHERIDAN SCHOOL**
TRAFFIC AND PEDESTRIAN COUNTS

4. POTENTIAL MEASURES TO IMPROVE STUDENT PEDESTRIAN SAFETY

This section describes proposed measures to improve school pedestrian safety around P.S. 21. The proposed 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 involve capital improvements. Each of the short- and long-term measures recommended for P.S. 21 is discussed as follows, and is shown in more detail in Exhibit 8 at the end of this section.

4.1 SHORT-TERM MEASURES

- *Install "NO STANDING 7AM - 4PM SCHOOL DAYS" signs*

  Replace the existing "NO PARKING 7AM – 4PM SCHOOL DAYS" signs with "NO STANDING 7AM – 4 PM SCHOOL DAYS" signs or a distance of 240 feet in front of the school main entrance to accommodate the seven school yellow buses. (This is a typical requirement for all NYC schools in order to provide for emergency access to and from the school.)

- *Request for school buses with left side doors*

  As the school building is located on the east side of White Plains Road and the school buses stop, in front of the school, at the left side of the roadway, students who exit a school bus with a right side door will be exiting into White Plain Road. It is therefore recommended that:

  - School officials will request yellow school buses with left side doors.

- *Place advanced stop bars 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.

- *Assign crossing guard to Barnes Avenue and East 225th Street intersection*

  P.S. 21 students were observed crossing Barnes Avenue at East 225th Street. There is crosswalk located across the north leg of Barnes Avenue, which is an uncontrolled location. A preliminary warrant study was performed to assess the situation and determine what type of control would be appropriate. This included pedestrian and vehicle counts, and a pedestrian gap study. The results of this data were inconclusive as to the installation of a traffic signal. The data is shown in Tables 4, 5 and 6 and in Exhibit 7A. The need for the crosswalk appears to exist, and we therefore recommend the following:

  - Assign a crossing guard to the Barnes Avenue and East 225th Street intersection.

- *Install traffic signal at the intersection of White Plains Road and East 226th Street*

  P.S. 21 students were observed crossing White Plains Road at East 226th Street. There is school crosswalk located across the west leg of White Plains Road, which is an uncontrolled location. A preliminary warrant study was performed to assess the situation and determine what type of control would be appropriate. This included pedestrian and vehicle counts and a pedestrian gap study. The results of this data indicated the installation of a traffic signal is warranted. The data is shown in Tables 7 and 8, and in Exhibit 7B. Tables 9 and 10 show the results of the preliminary warrant analysis. The need for the traffic control appears to exist, and we therefore recommend to:

  - Install a traffic signal at the intersection of White Plains Road and East 226th Street. (It should be noted that the NYCDOT recently conducted an independent traffic signal warrant analysis for the White Plains Road and East 226th Street intersection. A traffic signal was found to be warranted and NYCDOT currently plans to install a signal at this intersection on November 2006.)

4.2 LONG-TERM MEASURES

- *Relocate Utility Pole*

  A utility pole on the northeast corner of the East 226th Street and Barnes Avenue intersection is obstructing the crosswalk path (see Figure 10).

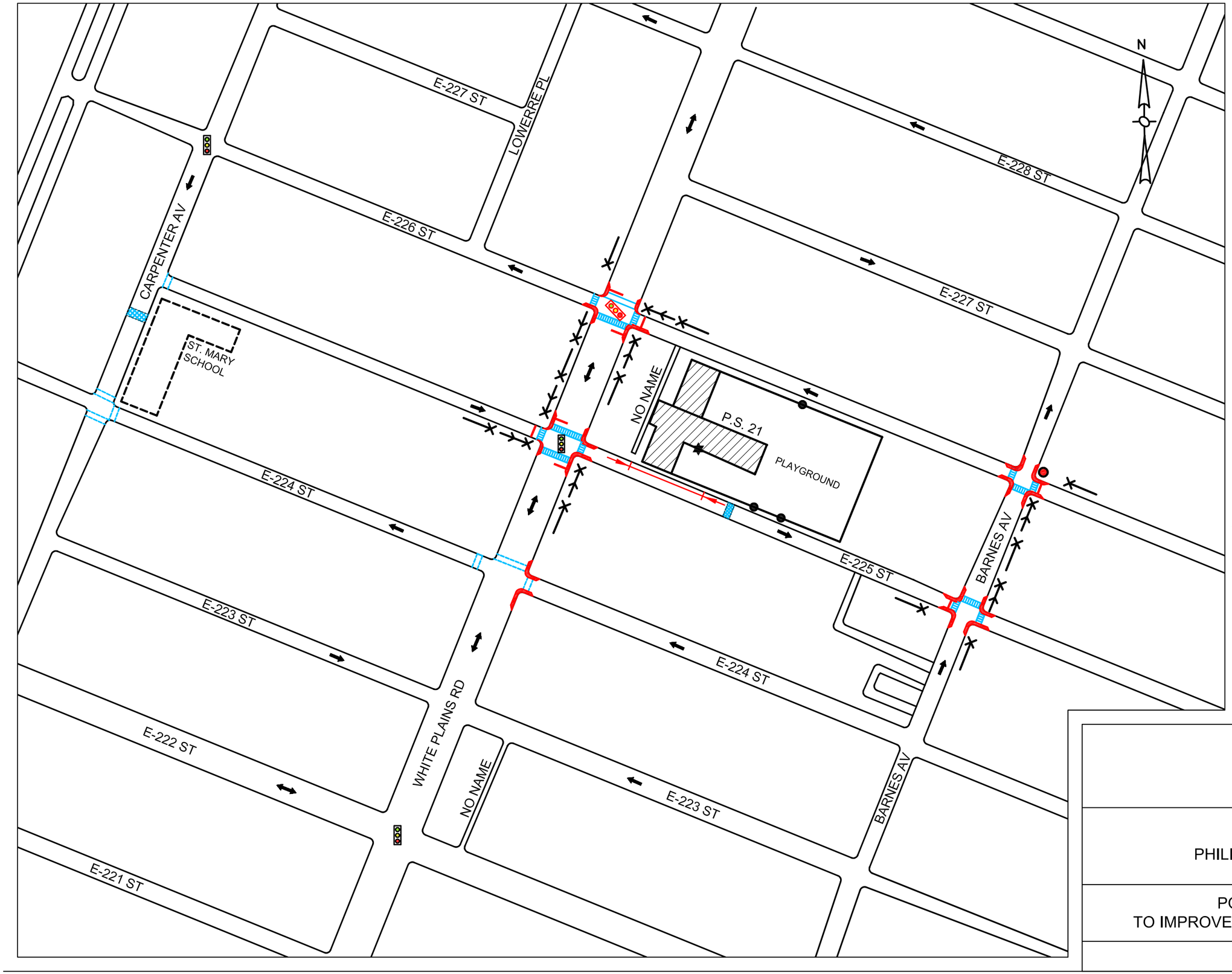
  The following is therefore recommended:

  - Relocate the utility pole on the northeast corner of the East 226th Street and Barnes Avenue intersection out of the crosswalk path.

- *Install curb extensions at the following intersections*

  - At all four corners of the Barnes Avenue and East 225th Street intersection.
  - At all four corners of the Barnes Avenue and East 226th Street intersection.
  - At all four corners of the White Plains Road and East 225th Street intersection.
  - At all four corners of the White Plains Road and East 226th Street intersection.
  - At the northeast and southeast corners of the White Plains Road and East 224th Street intersection.

  Curb extensions (neckdowns) should be installed at the corners shown in Exhibit 8. The purpose of the curb extensions is to provide additional refuge space for pedestrians, to shorten the crossing distance for pedestrians, and to reduce the speed of vehicles approaching and turning on school crosswalks. The curb extensions will not eliminate or reduce the width of any travel lanes. Curb extensions are not proposed where they would hinder the ability of a vehicle to turn. The construction of curb extensions also includes the installation of pedestrian ramps.



LEGEND

- MAIN ENTRANCE
- OTHER ENTRANCES
- EXISTING TRAVEL DIRECTION
- EXISTING ADVANCE WARNING SIGN OR SCHEDULED TO BE INSTALLED
- EXISTING SCHOOL CROSSWALK WARNING ASSEMBLY OR SCHEDULED TO BE INSTALLED
- EXISTING SIGNALIZED LOCATION
- EXISTING SCHOOL CROSSWALK
- EXISTING PEDESTRIAN CROSSWALK
- EXISTING SCHOOL CROSSWALK ASSOCIATED WITH ANOTHER SCHOOL
- EXISTING SPEED REDUCERS
- PROPOSED STOP LINE IN ADVANCE OF SCHOOL CROSSWALK
- PROPOSED "NO STANDING 7:OOAM - 4:00PM SCHOOL DAYS"
- POLE TO BE RELOCATED
- PROPOSED SIGNALIZED LOCATION
- PROPOSED CURB EXTENSION (NECKDOWN)

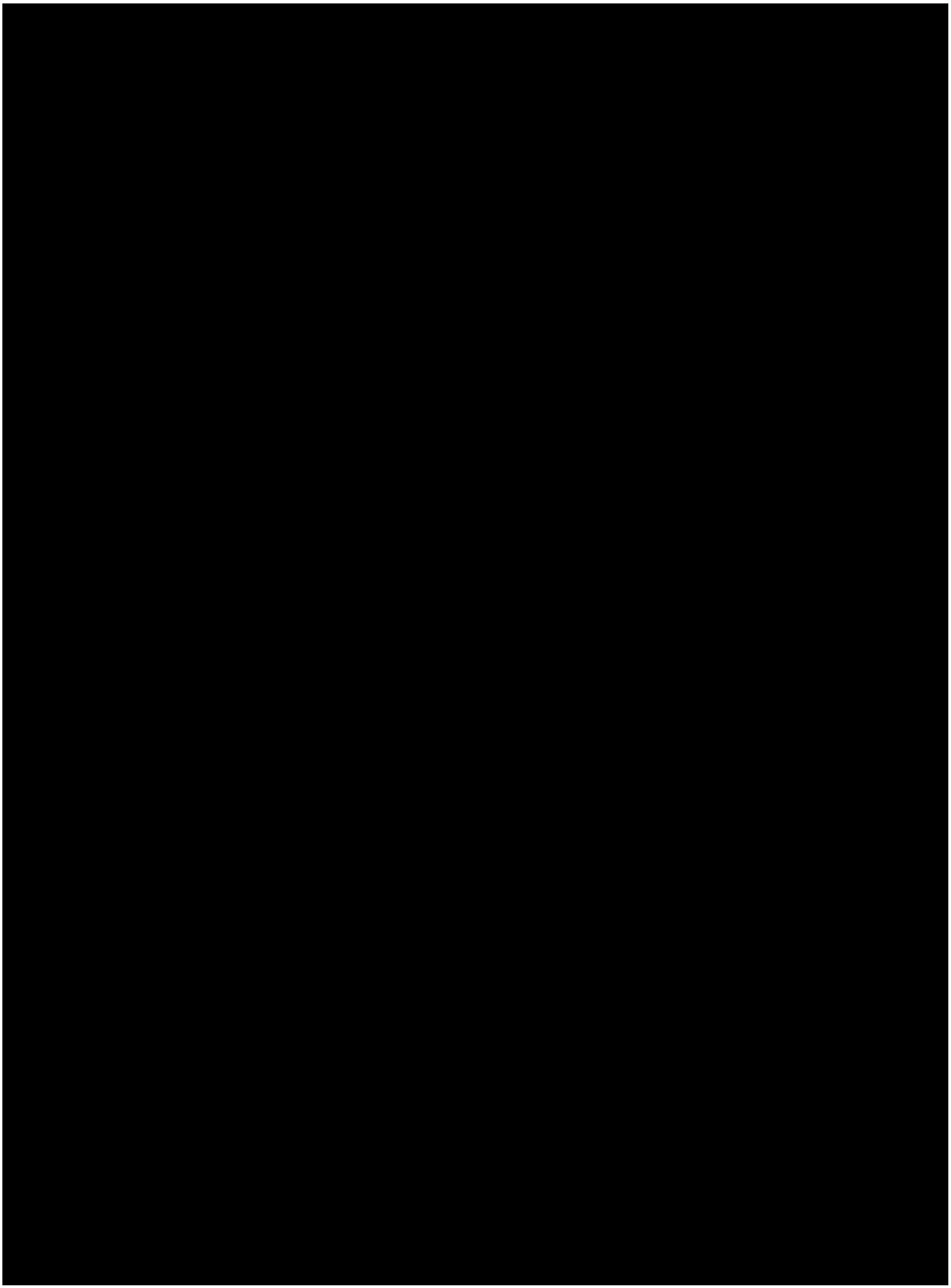
1" = 200'

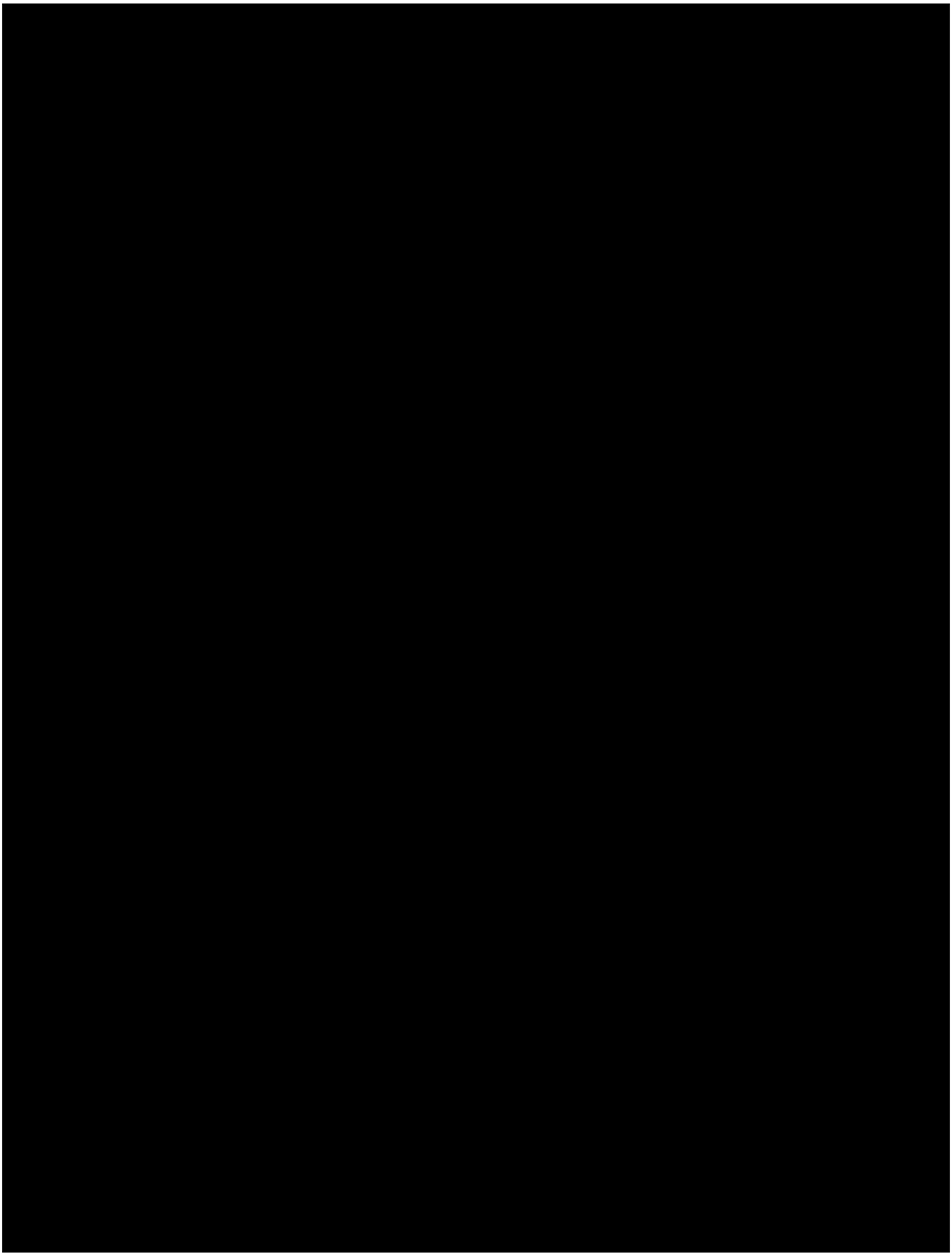
EXHIBIT 8

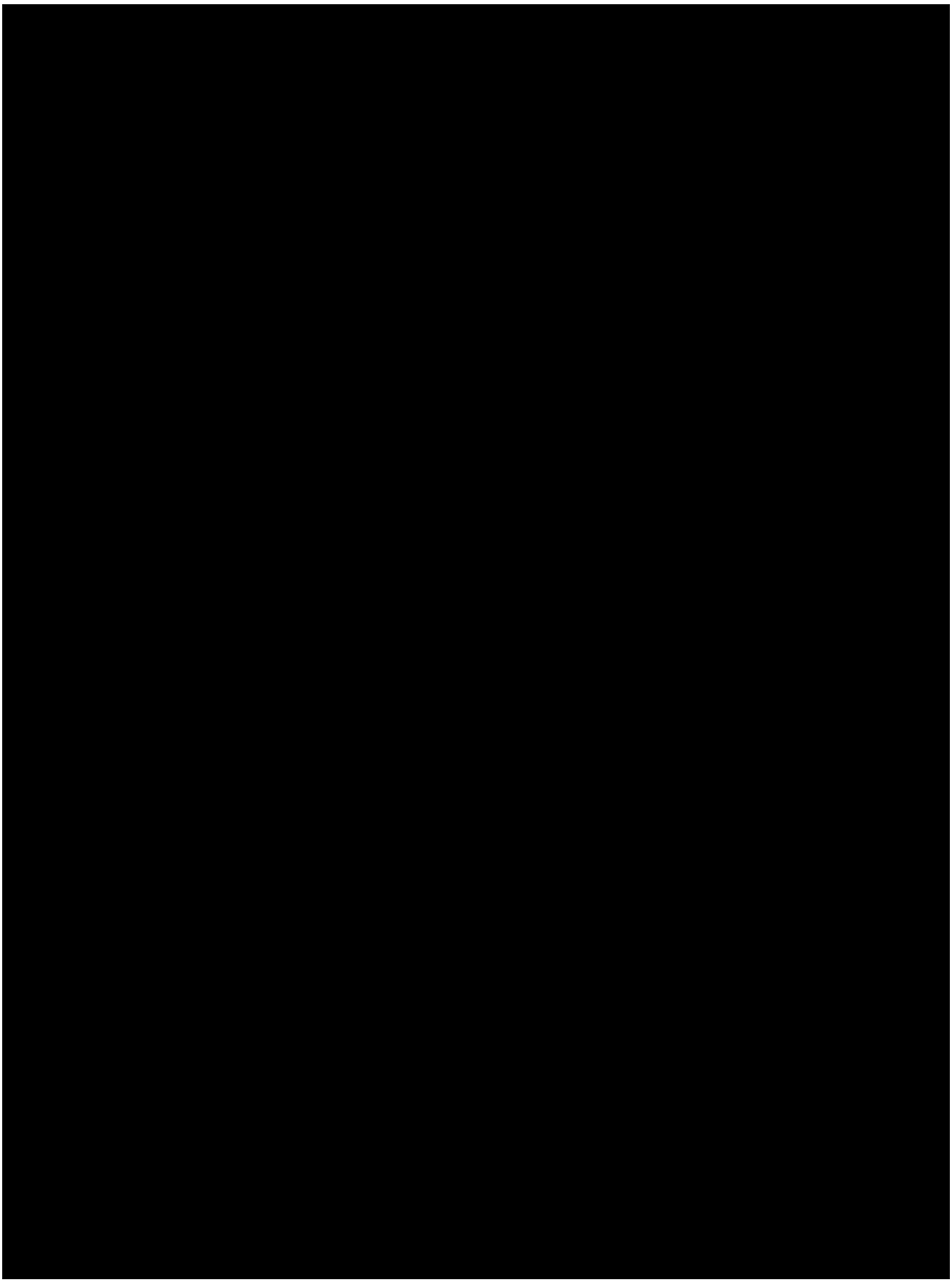
P.S. 21 BRONX
PHILIP H. SHERIDAN SCHOOL

POTENTIAL MEASURES
TO IMPROVE STUDENT PEDESTRIAN SAFETY

APPENDIX







SPOT SPEED STUDY

Date: **June 6, 2005** Time: **10:45 am** School: **P.S. 21**
Location: **Barnes Avenue between 225th Street & 226th Street** Direction: **Northbound**
Surveyor: **Richard Calvache & Hugo Salinas** 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	2	2.0%	2.0%	36	648
19	2	2.0%	4.0%	38	722
20	4	4.0%	8.0%	80	1600
21	5	5.0%	13.0%	105	2205
22	7	7.0%	20.0%	154	3388
23	13	13.0%	33.0%	299	6877
24	16	16.0%	49.0%	384	9216
25	16	16.0%	65.0%	400	10000
26	12	12.0%	77.0%	312	8112
27	5	5.0%	82.0%	135	3645
28	5	5.0%	87.0%	140	3920
29	3	3.0%	90.0%	87	2523
30	3	3.0%	93.0%	90	2700
31	2	2.0%	95.0%	62	1922
32	2	2.0%	97.0%	64	2048
33	1	1.0%	98.0%	33	1089
34	0	0.0%	98.0%	0	0
35	0	0.0%	98.0%	0	0
36	0	0.0%	98.0%	0	0
37	1	1.0%	99.0%	37	1369
38	0	0.0%	99.0%	0	0
39	0	0.0%	99.0%	0	0
40	0	0.0%	99.0%	0	0
41	0	0.0%	99.0%	0	0
42	0	0.0%	99.0%	0	0
43	0	0.0%	99.0%	0	0
44	0	0.0%	99.0%	0	0
45	0	0.0%	99.0%	0	0
46	0	0.0%	99.0%	0	0
47	0	0.0%	99.0%	0	0
48	0	0.0%	99.0%	0	0
49	0	0.0%	99.0%	0	0
50	0	0.0%	99.0%	0	0
51	0	0.0%	99.0%	0	0
52	0	0.0%	99.0%	0	0
53	0	0.0%	99.0%	0	0
54	1	1.0%	100.0%	54	2916
55	0	0.0%	100.0%	0	0
56	0	0.0%	100.0%	0	0
	100	100.0%		2510	64900

Mean Speed = 25.1 mph
Standard Deviation = 4.4 mph
Margin of Error (95% Confidence) = ± 0.9 mph

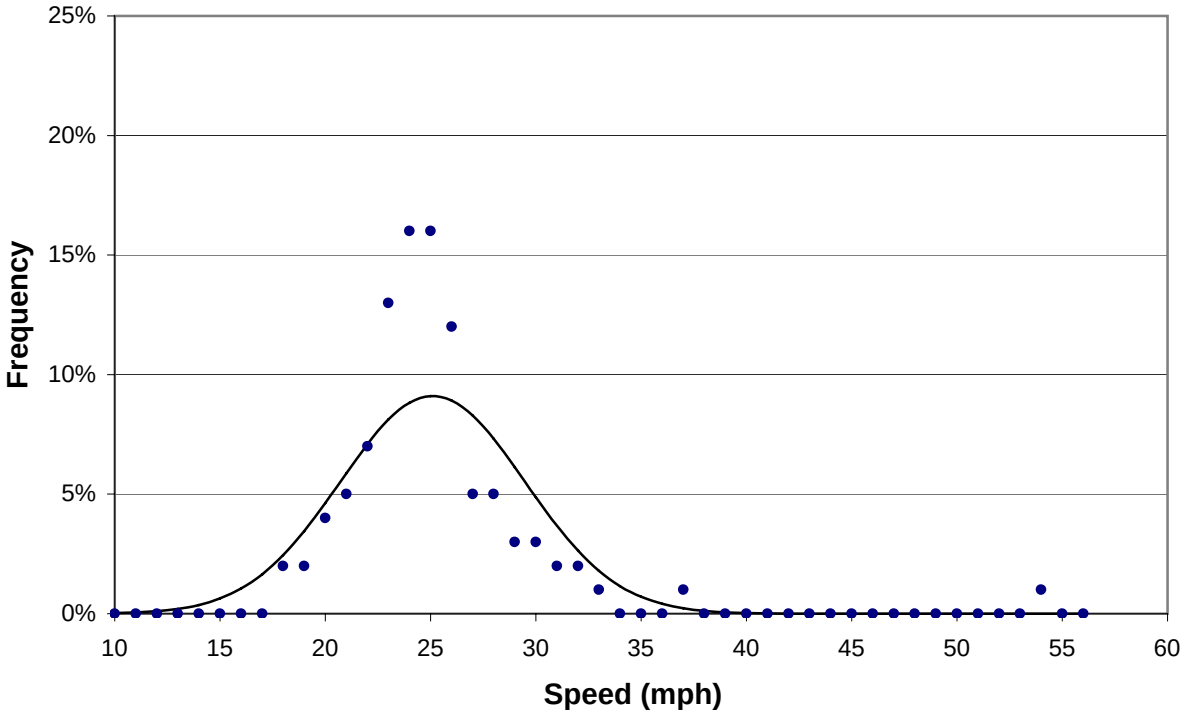
Median Speed = 25.1 mph
15th Percentile Speed = 20.6 mph
85th Percentile Speed = 29.6 mph

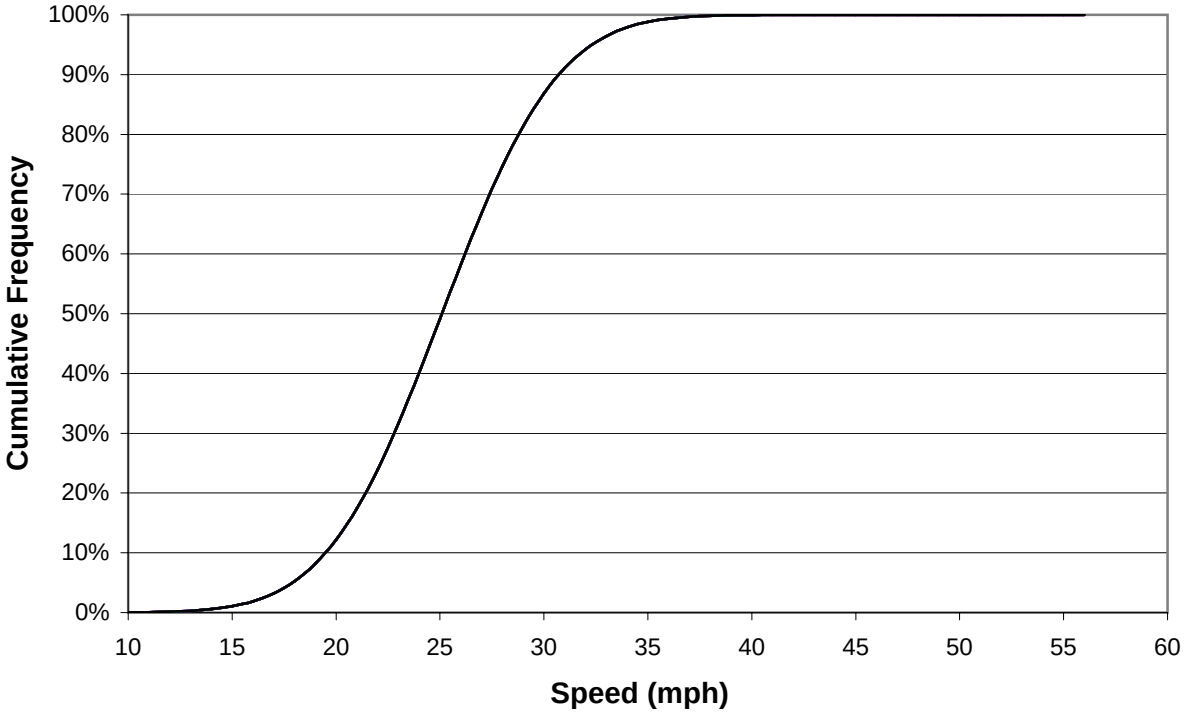
SPOT SPEED STUDY

Date: **June 6, 2005** Time: **10:45 am** School: **P.S. 21**
Location: **Barnes Avenue between 225th Street & 226th Street** Direction: **Northbound**
Surveyor: **Richard Calvache & Hugo Salinas** Comments:

Mean Speed = 25.1 mph
Standard Deviation = 4.4 mph
Margin of Error (95% Confidence) = ± 0.9 mph

Median Speed = 25.1 mph
15th Percentile Speed = 20.6 mph
85th Percentile Speed = 29.6 mph





GAP STUDY FIELD SHEET

Date: 6-8-05 **Location:** 225 St / Barnes Ave

Gap Information:

Crossing Distance	37	ft
Reaction Time	3	sec
Walking Speed	3	sec/ft
Minimum Acceptable Gap	15	sec

Gap Survey:

Time: From: 7:45 am To: 8:30

Gap (sec)	Tally	Total
10	𝍸 𝍸 II	12
11	𝍸 𝍸 III	13
12	𝍸	5
13	𝍸	5
14	𝍸 I	6
15	IIII	4
16	𝍸 III	8
17	IIII	4
18	𝍸 II	7
19	II	2
20	𝍸 II	6
21	I	1
22	III	3
23	I	1
24		
25		
26		
27		
28		
29		
30		
31	I	1
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		Total: 78

DISCARD GAPS LESS THAN 15 SEC

GAP STUDY FIELD SHEET

Date: 1-26-06 **Location:** 226 St/White Plains Rd

Gap Information:

Crossing Distance	68	ft
Reaction Time	3	sec
Walking Speed	3	sec/ft
Minimum Acceptable Gap	26	sec

Gap Survey:

Time: From: 7:45 am To: 8:15 am

Gap (sec)	Tally	Total
10	II	2
11		
12		
13		
14	II	2
15	II	2
16	I	1
17	III	3
18	II	2
19	II	2
20	IIII	5
21	I	1
22	II	2
23	II	2
24	I	1
25	II	2
26		
27		
28		
29		
30	II	2
31	I	1
32		
33	I	1
34		
35	I	1
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		Total: 32

DISCARD GAPS LESS THAN 26 SEC

GAP STUDY FIELD SHEET

Date: 6-9-05 **Location:** 226 St / Barnes Ave

Gap Information:

Crossing Distance	37	ft
Reaction Time	3	sec
Walking Speed	3	sec/ft
Minimum Acceptable Gap	13	sec

Gap Survey:

Time: From: 7:45 To: 8:30

Gap (sec)	Tally	Total
10	𝍸 𝍸 𝍸	15
11	𝍸 𝍸	10
12	𝍸 𝍸	10
13	𝍸 |||	8
14	𝍸 |	6
15	𝍸 |||	8
16	||||	4
17	𝍸 ||	7
18	𝍸 |	6
19	||	2
20	||	2
21	||||	4
22	|||	3
23	||	2
24		
25	||	2
26		
27		
28		
29	||	2
30		
31		
32	||	2
33	|	1
34		
35		
36		
37		
38		
39	|	1
40		
41		
42	|	1
43		
44		
45		Total: 96

DISCARD GAPS THAT ARE LESS THAN BSA