

NEW YORK CITY DEPARTMENT OF TRANSPORTATION
Office of School Safety Engineering



School Safety Engineering Project
FINAL REPORT: Holy Cross School, Manhattan



Prepared by
The RBA Group/Urbitran Associates



NOVEMBER 3, 2006



**School Safety Engineering Project
Holy Cross 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 600 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). Holy Cross in Manhattan is one of the 135 priority schools.

2. BACKGROUND—EXISTING CONDITIONS AND ANALYSIS

2.2 NEIGHBORHOOD DESCRIPTION

Holy Cross School is located at 332 West 43rd Street, between Eighth Avenue and Ninth Avenue (see Exhibit 1, Aerial Photograph). The school building is on the south side of the street, incorporated into an apartment and commercial complex (Figure 1). McCaffrey playground, which Holy Cross utilizes for Physical Education classes, is on the north side of West 43rd Street.

The surrounding land use is commercial with mixed use residential. West 43rd Street is mostly a residential roadway with apartment buildings. West 42nd Street is a densely commercial roadway with many theaters and retail stores. The Port Authority Bus Terminal is at the southwest corner of West 42nd Street and Eighth Avenue. Times Square is located on West 42nd Street between Broadway and Seventh Avenue. Immediately to the south of West 41st Street is the Lincoln Tunnel bus entrance and a large parking lot, which passes over Ninth Avenue.



Figure 1: Looking east on 43rd Street, Holy Cross is to the right

There are several bus routes operating in the vicinity of Holy Cross: M16, M10, M20, M11, and M42. In addition, a subway station for the A, C, and E lines is located on Eighth Avenue with entrances on West 43rd Street and West 42nd Street. A second subway station for the 1,2, 3, N, R, and Q lines and W is on Seventh Avenue with entrances on West 42nd Street.

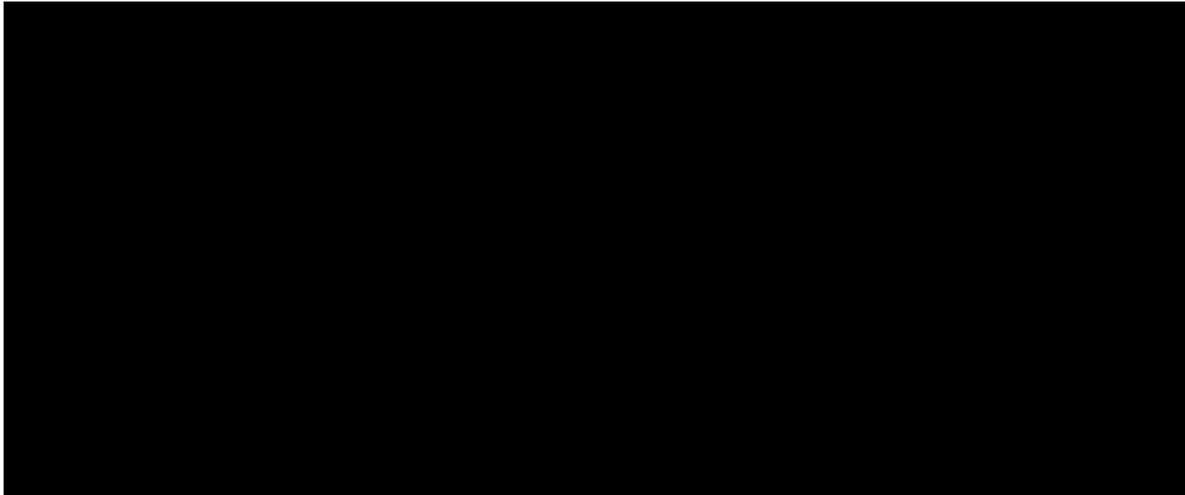
2.3 MEETING WITH SCHOOL REPRESENTATIVES

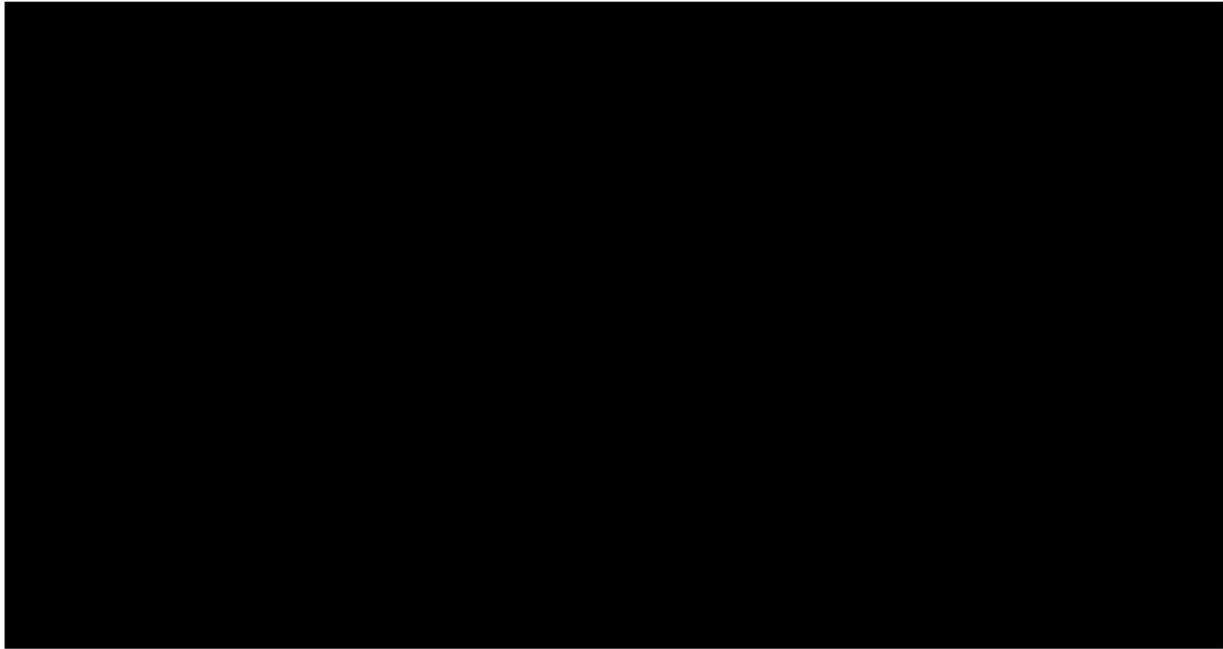
Representatives from the consultant team, the Midtown Traffic Safety Precinct, and the principal of the Holy Cross School met at the school on the morning of June 2, 2004 (see the Appendix for a list of attendees).

According to the school officials, the identifiable problems that student pedestrians encounter on a regular basis include the following:

- Vehicles speeding on West 43rd Street
- Children crossing mid-block on West 43rd Street
- The McCaffrey playground is across West 43rd Street from the school building. Students cross mid-block to the playground.
- Too much traffic on West 43rd Street, many people use it as a “through” street
- Drivers ignore traffic signals and do not yield at crosswalks on West 43rd Street
- There is a parking/bus garage west of the school building. Some minivans from New Jersey utilize this parking garage, creating more mid-block turning traffic. In addition, the minivans sometimes double park, or back up on West 43rd Street

(See the Appendix school’s survey response)

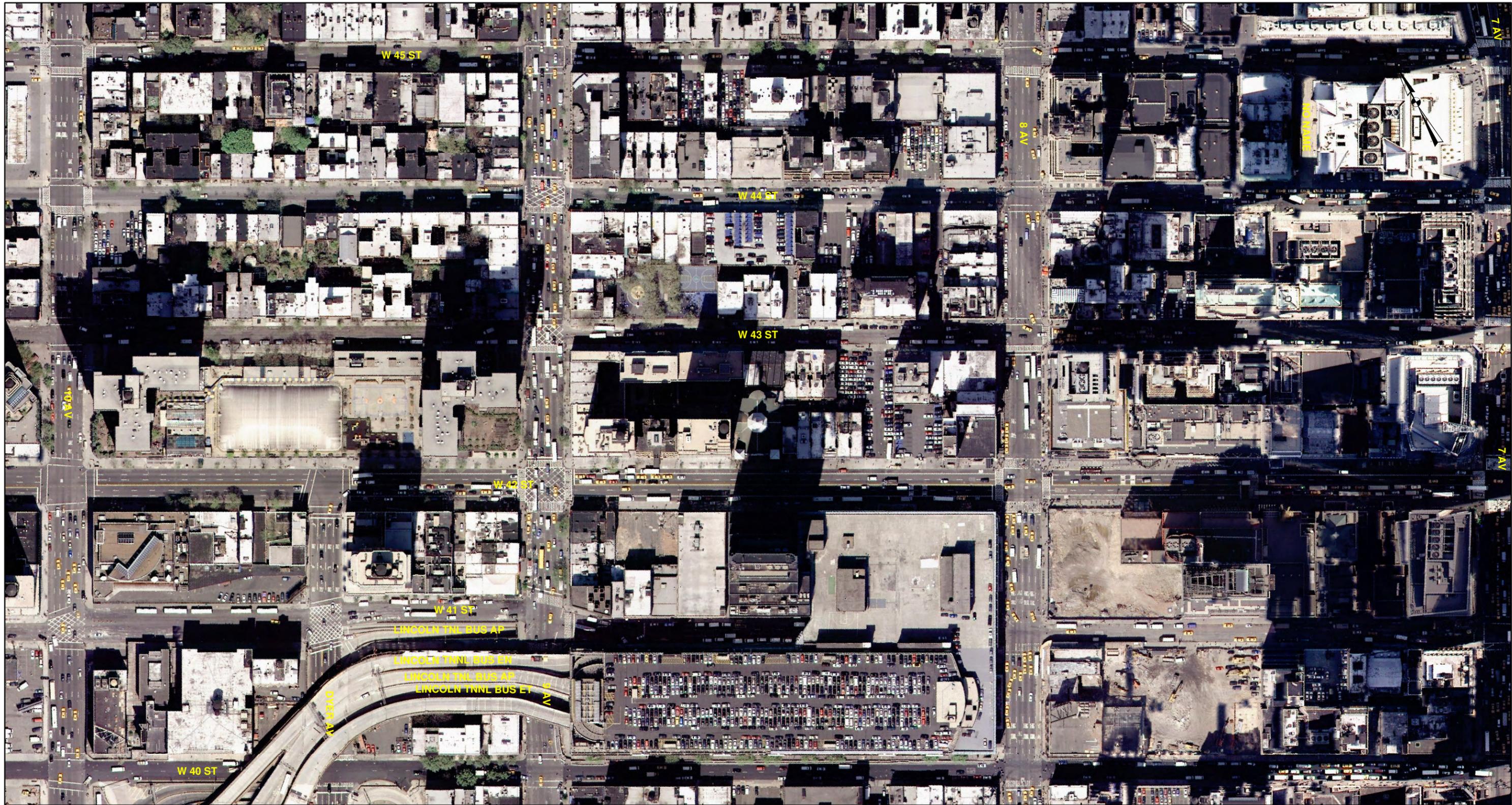




2.6 PRIMARY MODES OF TRANSPORT TO AND FROM SCHOOL

According to the principal, approximately 50% of students walk to Holy Cross, 25% are driven by parents or guardians and the remaining 25% of students utilize public transportation. See Table 1 for the school’s estimate of the modes of travel.

TABLE 1: MODES OF TRAVEL (As estimated by school officials)	
DESCRIPTION	PERCENTAGE
Walk	50%
Driven by parents or guardians	25%
School bus	0%
MTA bus or subway	25%
TOTAL	100%



1 inch equals 175 feet

EXHIBIT 1
HOLY CROSS SCHOOL, MANHATTAN
AERIAL PHOTOGRAPH

2.7 ADDITIONAL STUDENT PEDESTRIAN TRAFFIC GENERATORS

There is a public school, P.S./I.S. 51, located in the vicinity of Holy Cross. P.S./I.S. 51 is on West 45th Street between Tenth Avenue and the Eleventh Avenue, three blocks away from Holy Cross.

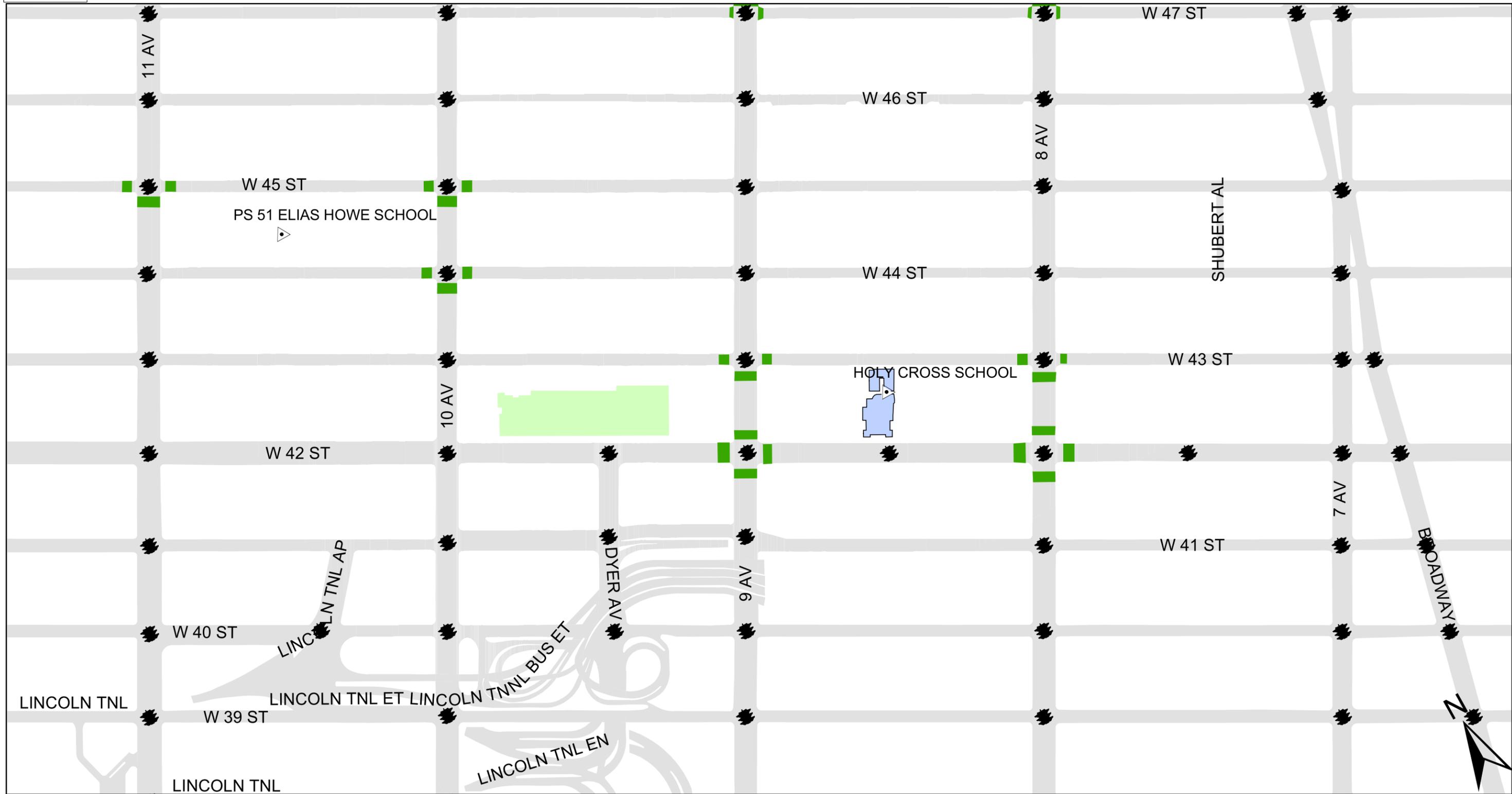
The streets surrounding Holy Cross are utilized by large numbers of pedestrians. Entrances for the subway servicing the A, C, and E lines are on Eighth Avenue at West 43rd Street and West 42nd Street. Entrances for the subway servicing the 1,2, 3, N, R, Q, and W lines are located at Seventh Avenue and West 42nd Street. In addition, there are two bus stops for the M16 bus route on West 43rd Street, between Eighth Avenue and Ninth Avenue.

2.8 CROSSING GUARD LOCATIONS

According to school officials, there are no crossing guards assigned to Holy Cross. However, there is one traffic police officer assigned to Eighth Avenue and West 42nd Street, and one traffic police officer assigned to Ninth Avenue and West 42nd Street.



School Traffic Safety Map



0 270 540 1,080 Feet

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 HOLY CROSS SCHOOL

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

Map created on 11/16/2006

EXHIBIT 2

COMM. BOARD: 104
PRECINCT: 14

3. TRAFFIC OPERATIONS

3.1 SCHOOL BUS OPERATIONS

According to the school principal, there are no school bus operations for Holy Cross.

3.2 PARENT DROP-OFF OPERATIONS

The principal indicated that approximately 25 percent of Holy Cross students are driven to and from school by parents or guardians. Parents typically stop their vehicles on the south side of West 43rd Street to pick up or drop off students. Parents park their vehicles in available spots or they double-park their vehicles depending on traffic conditions (Figure 5).

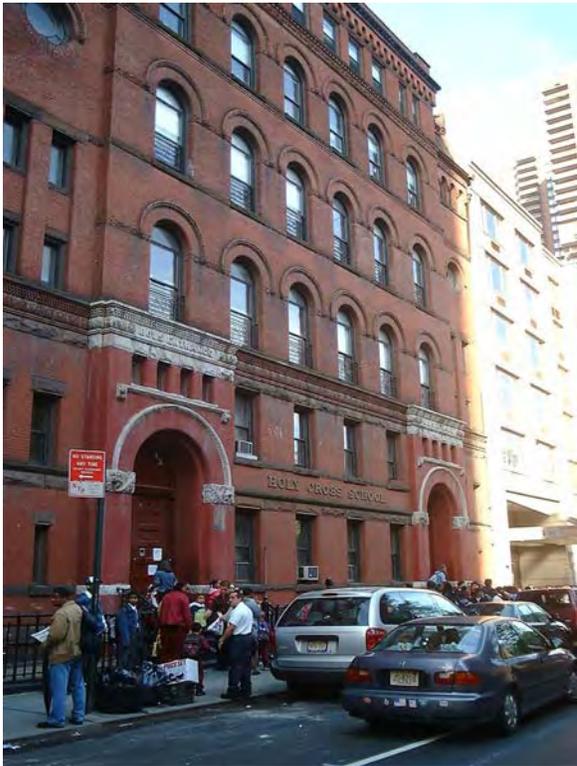


Figure 5: Parents drop off students on West 43rd Street

3.3 PARKING REGULATIONS

On the south side of West 43rd Street, “NO STANDING ANY TIME EXCEPT AUTHORIZED VEHICLES” and a separate placard reading “EXCEPT FACULTY VEHICLES” parking regulations are posted in front of the Holy Cross School building.

East of Holy Cross, “NO STANDING ANY TIME EXCEPT AUTHORIZED VEHICLES” regulations are posted and west of Holy Cross, “2-HOUR PARKING 7:00 AM - 7:00 PM MONDAY TO FRIDAY” regulations are posted. “BUS LAYOVER” signs are posted in the vicinity of the intersection with Ninth Avenue and the intersection with Eighth Avenue.

On the north side of West 43rd Street, parking regulations are posted as “NO PARKING 8:00 AM - 6:00 PM EXCEPT SUNDAY”. “NO STANDING ANY TIME EXCEPT AUTHORIZED VEHICLES” regulations are posted further east next to the intersection of West 43rd Street and Eighth Avenue.

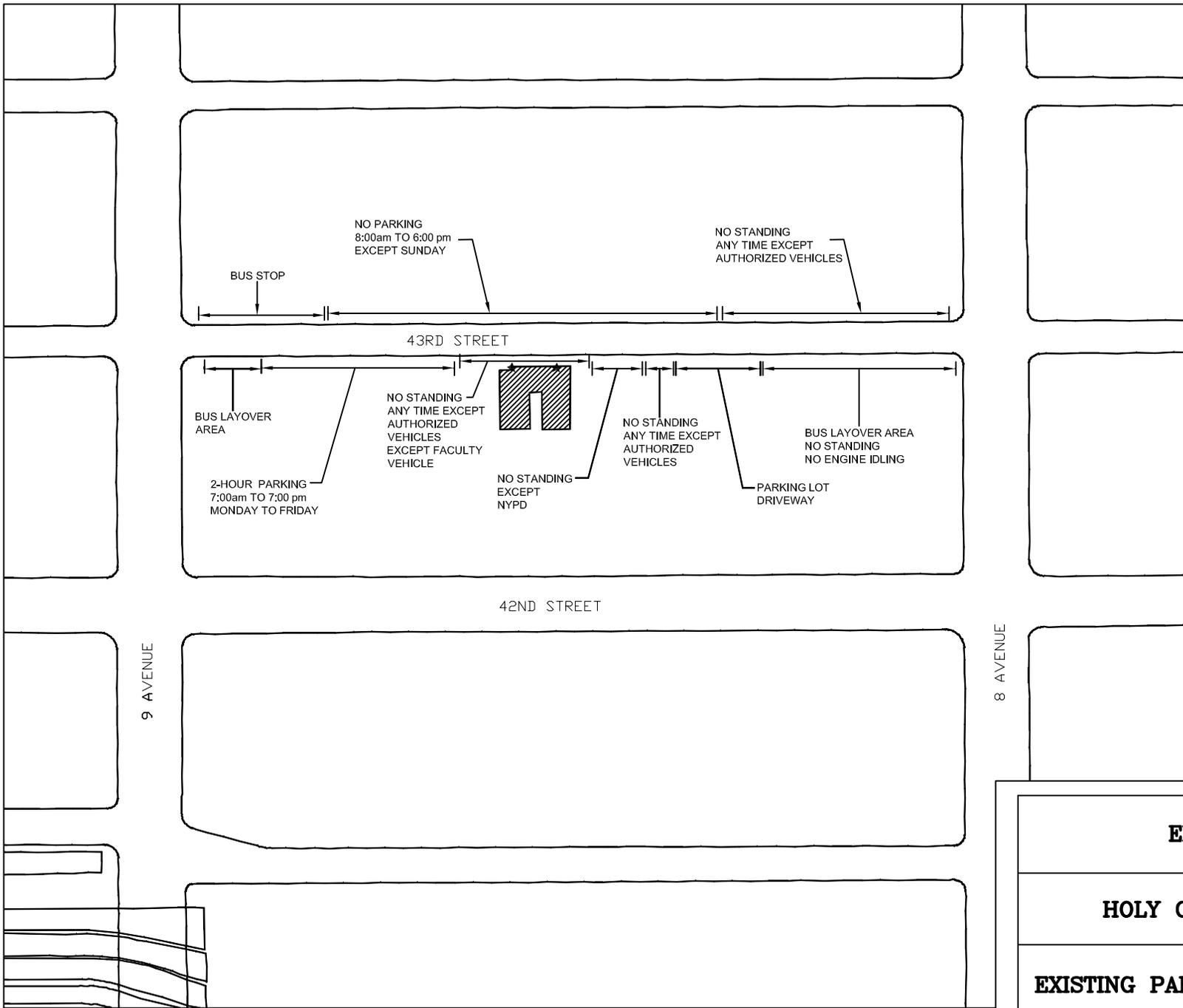
See Exhibit 3 for parking regulations.



Figure 6: Parking regulations on West 43rd Street in front of Holy Cross

3.4 EXISTING SCHOOL SIGNS AND MARKINGS

The Traffic Safety Plan, Exhibit 2, shows existing signals and school crosswalk pavement markings. It is noted that a citywide signage program is currently underway to upgrade school signage to current Federal Manual of Uniform Traffic Control (MUTCD) standards of fluorescent yellow-green signs accompanied by downward pointing arrows. Signs scheduled to be installed under this program are shown as "existing" on Exhibit 6.



LEGEND

- ★ MAIN ENTRANCE
- ENTRANCE

SCALE 1" : 150'

EXHIBIT 3
HOLY CROSS SCHOOL
EXISTING PARKING REGULATIONS

3.5 ACCIDENT SUMMARY

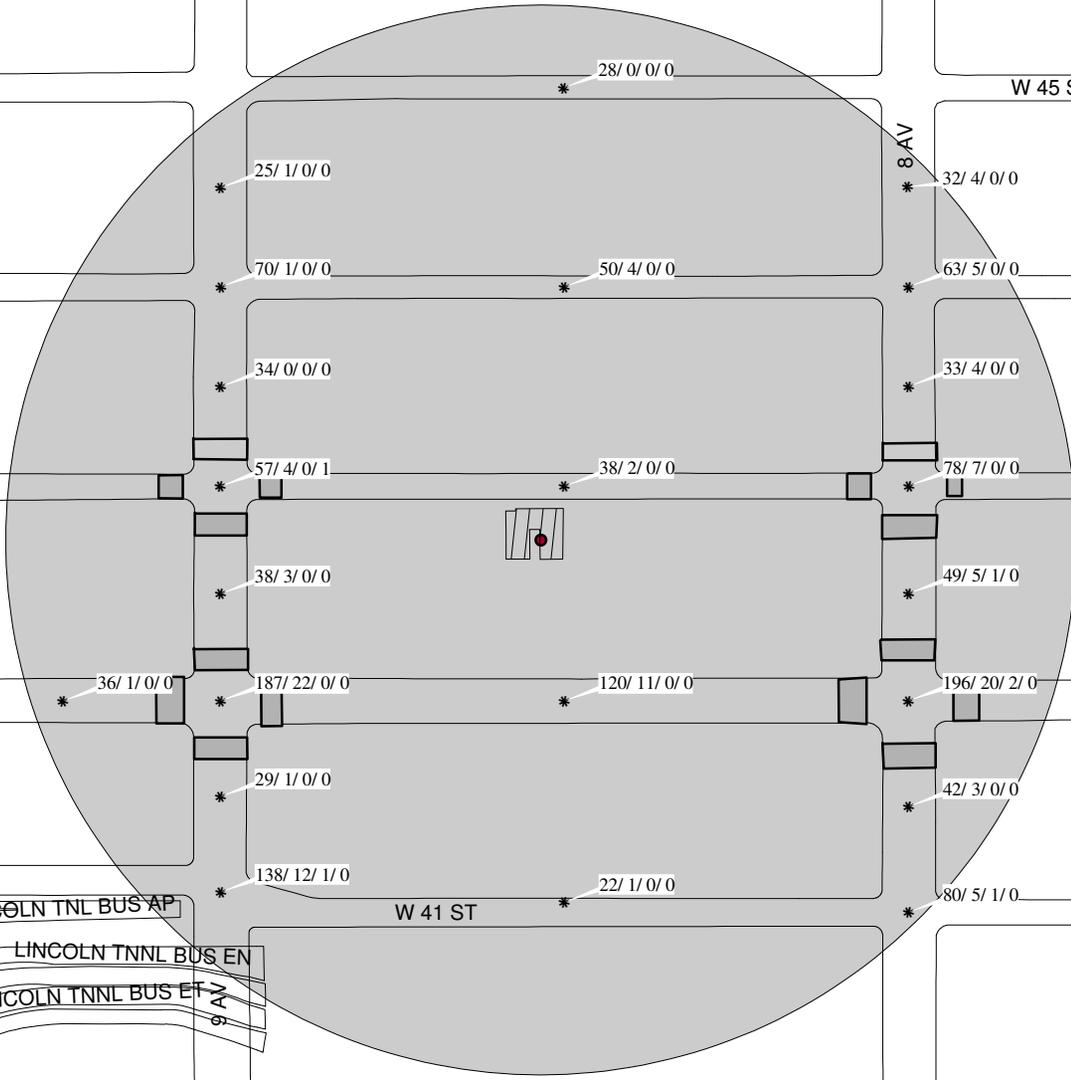
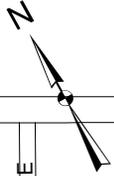
Exhibit 4 and Table 2 show a summary of accidents, as obtained from the New York State Department of Motor Vehicles (DMV), in the vicinity of Holy Cross for the three-year period from January 1, 1998 through December 31, 2000. The DMV data provides some detail relating to the circumstances and cause of the accident. Table 3 is a summary of more recent accident data obtained from the NYC Police Department (NYPD). Though current through 2004, the NYPD data does not provide the same level of detail as the DMV data.

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

TABLE 2: DMV THREE-YEAR ACCIDENT SUMMARY (1998-2000)				
INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED ACCIDENTS*
West 43 rd Street and Eighth Avenue	78	7	0	0
West 43 rd Street and Ninth Avenue	57	4	0	1
West 42 nd Street and Eighth Avenue	196	20	2	0
West 42 nd Street and Ninth Avenue	187	22	0	0
West 41 st Street and Eighth Avenue	80	5	1	0
West 41 st Street and Ninth Avenue	138	12	1	0
TOTAL	736	70	4	1

TABLE 3: NYPD FOUR-YEAR ACCIDENT SUMMARY (2001-2004)				
INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED ACCIDENTS*
West 43 rd Street and Eighth Avenue	168	13	0	0
West 43 rd Street and Ninth Avenue	143	9	0	0
West 42 nd Street and Eighth Avenue	478	53	1	0
West 42 nd Street and Ninth Avenue	299	28	1	0
West 41 st Street and Eighth Avenue	133	7	0	0
West 41 st Street and Ninth Avenue	218	18	1	0
TOTAL	1439	128	3	0

* 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 HOLY CROSS

SCHOOL CROSSWALK ASSIGNED TO ANOTHER SCHOOL

CROSSWALK

X/X/X/X

* 1 inch equals 250 feet



TOTAL ACCIDENTS	PED ACCIDENTS	PED FATAL	SCHOOL_PED ACCIDENTS
X	X	X	X

**EXHIBIT 4
HOLY CROSS SCHOOL
MANHATTAN**

**ACCIDENT SUMMARY
THREE YEAR PERIOD
(1998-2000)**

3.6 TRAFFIC OPERATIONS AND ISSUES

The following outlines the traffic accident and operational issues in the vicinity of Holy Cross.

3.6.1 West 43rd Street and Eighth Avenue

Eighth Avenue is a 70-foot wide, one-way northbound street with four moving lanes and one bus lane. West 43rd Street is a 34-foot wide, one-way westbound street with restricted parking on both sides of the roadway (Figure 7). West 43rd Street and Eighth Avenue is a signalized intersection with school crosswalks on the south, east and west legs.



Figure 7: Looking south on Eighth Avenue at West 43rd Street

This intersection is utilized by a large number of Holy Cross students en route to school. A subway station is located at the southwest corner and a bus stop for the M16 line is located at the northwest corner of the intersection. There is a bus layover area along the south curb west of the intersection. In addition, a public parking lot has its entrance and exit on the south side of West 43rd Street west of the intersection.

There were 78 accidents at this intersection during the 1998-2000 study period. Seven accidents involved pedestrians, none of which were school-related. Four pedestrians were struck while crossing against the signal or crossing outside the crosswalk. Three other pedestrians were crossing with the signal when struck by vehicles failing to yield or turning improperly.

An 87-year-old pedestrian was struck and killed while crossing mid-block on Eighth Avenue between 42nd Street and 43rd Street.

3.6.2 West 43rd Street and Ninth Avenue

Ninth Avenue is a 70-foot wide, one-way southbound street with four moving lanes and one bus lane (Figure 8). West 43rd Street and Ninth Avenue is a signalized intersection with school crosswalks on the south, east and west legs.



Figure 8: Looking east on West 43rd Street at Ninth Avenue

This intersection is also utilized by a large number of Holy Cross students en route to school. On West 43rd Street, there is a bus layover area next to the south curb line east of the intersection. In addition, a public parking garage in a residential building has its entrance and exit on West 43rd Street east of the intersection. There is a bus stop for the M16 line on West 43rd Street at the northeast corner of the intersection.

There is only one apex pedestrian ramp at the northeast corner of this intersection due to the presence of a signal pole.

There were 57 accidents at this intersection during the 1998-2000 study period. Four accidents involved pedestrians, one of which was school-related. A ten-year-old child was struck while crossing with the signal. This accident was due to driver error. The second pedestrian was struck while walking along the roadway. The third pedestrian was struck by a right turning vehicle. There was no further information for the fourth pedestrian accident.

3.6.3 West 42nd Street and Eighth Avenue

West 42nd Street is a 60-foot wide, two-way street with two moving lanes in each direction. Eighth Avenue and West 42nd Street is a three-phase signalized intersection. There is an exclusive phase for West 42nd Street eastbound through and left turn traffic. There are school crosswalks on all four legs of the intersection.



Figure 9: Looking west on West 42nd Street at Eighth Avenue



Figure 10: Looking east on Eighth Avenue at West 42nd Street

There are numerous retail stores, theaters, and business along West 42nd Street and Eighth Avenue. The Port Authority Bus Terminal is also located at the southwest corner of the intersection. Therefore, this intersection is utilized by a large number of vehicles and pedestrians at all approaches. In addition, many taxis load and unload passengers at the

Port Authority Bus Terminal along Eighth Avenue south of the intersection (Figure 10). There are four bus stops at this intersection, as well as entrances to a subway station servicing the A, C, and E lines. All four corners have pedestrian ramps.

As mentioned previously, the eastbound traffic on West 42nd Street has a left turn signal to northbound Eighth Avenue. Therefore, pedestrians crossing Eighth Avenue at the north leg have a delayed pedestrian walk signal. Some pedestrians were observed crossing against the signal in advance of receiving the “Walk” signal.

There is a mid-block pedestrian signal and a high visibility pedestrian crosswalk on West 42nd Street between Eighth Avenue and Ninth Avenue. Pedestrians are permitted to cross West 42nd Street with the pedestrian signal.

Traffic counts were performed on October 5, 2005 to better understand the pedestrian and vehicle conflicts at the intersection (Exhibit 5).

There were 196 accidents at this intersection during the 1998-2000 study period. Twenty accidents involved pedestrians, two of which were fatal. None of the pedestrian accidents were school-related. An 80-year-old pedestrian was struck and killed while crossing against the signal by an eastbound vehicle. Another pedestrian was struck and killed by a northbound vehicle. The primary cause of this accident was cited as driver’s inattention.

Two pedestrians were struck while crossing against the signal. Two other accidents were also due to pedestrian’s error; however, further details were not reported. Six accidents involved turning vehicles. Eight accidents were attributed to driver’s error, due to driver’s inattention, or backing up unsafely, or other non-specific reasons.

3.6.4 West 42nd Street and Ninth Avenue

West 42nd Street and Ninth Avenue is a three-phase signalized intersection. There are school crosswalks on all four legs of this intersection.

An existing seven-second LPI is installed for pedestrians crossing the west leg of West 42nd Street. There is an exclusive phase for West 42nd Street westbound through and left turning traffic. Therefore, pedestrians utilizing the south leg to cross Ninth Avenue have a delayed pedestrian walk signal. Some pedestrians were observed crossing against the signal in advance of receiving the “Walk” signal

There are two bus stops at this intersection, one on West 42nd Street and the other one on Ninth Avenue. The existing graphic “Yield to Pedestrian” signs are installed at this intersection to remind the drivers that pedestrians have right of way within the crosswalk.



Figure 11: Looking north on West 42nd Street, at Ninth Avenue



Figure 12: Looking west on West 42nd Street, at Ninth Avenue

There were 187 accidents at this intersection during the 1998-2000 study period. Twenty-two accidents involved pedestrians, none of which were school-related. Thirteen pedestrians were struck by turning vehicles at the crosswalk while crossing with the signal. Four pedestrians were struck while crossing against the signal. Four other accidents were caused by driver error, due to backing up unsafely or other non-specific reasons. The information for the last pedestrian accident was not reported.

3.6.5 West 41st Street and Eighth Avenue

West 41st Street is a 36-foot wide, one-way westbound street with two moving lanes and restricted parking on the north side. West 41st Street and Eighth Avenue is a two-phase signalized intersection with high visibility pedestrian crosswalks on all four legs.

A total of 80 accidents occurred at this intersection during the 1998-2000 study period. Five accidents involved pedestrians, one of which was fatal. There were no school-related accidents. A pedestrian was struck and killed while crossing Eighth Avenue against the signal. A pedestrian was struck while crossing with the signal by a left turning vehicle. Two other accidents were due to pedestrian error and the last accident was due to driver error.

3.6.6 West 41st Street and Ninth Avenue

West 41st Street and Ninth Avenue is a two-phase signalized intersection. There are high visibility pedestrian crosswalks on the north and east legs of the intersection.

A total of 138 accidents occurred at this intersection during the 1998-2000 study period. Twelve accidents involved pedestrians, one of which was fatal. There were no school-related accidents. A 70-year-old pedestrian was struck and killed by a vehicle turning left onto Ninth Avenue. Two pedestrians were struck while crossing Ninth Avenue against the signal. One accident involved a driver under the influence of alcohol. The other eight accidents involved vehicles making left turns or right turns.

3.6.7 West 43rd Street between Eighth Avenue and Ninth Avenue

Holy Cross School is located on West 43rd Street between Eighth Avenue and Ninth Avenue. As described previously, buses lay over on the south side of West 43rd Street, adjacent to the intersections with Eighth Avenue and Ninth Avenue. Immediately to the west of the school, is a residential four-story building with a public parking garage on the ground floor. A vehicle exiting the garage may block the sidewalk as pedestrians and schoolchildren are going to or from Holy Cross. Some minivans from New Jersey also utilize this parking lot, creating more mid-block turning traffic.

McCaffrey playground is located directly across West 43rd Street from the Holy Cross school building. The students cross mid-block to and from the playground. However, they were observed to be accompanied by schoolteachers, parents, or guardians (Figure 1).

According to the school principal, there is too much traffic on West 43rd Street, since numerous vehicles use West 43rd Street as a “through” street rather than West 42nd Street. At arrival and dismissal time, if parking spots are not available, parents typically double park in front of the school when dropping-off or picking-up students, thereby blocking moving traffic.

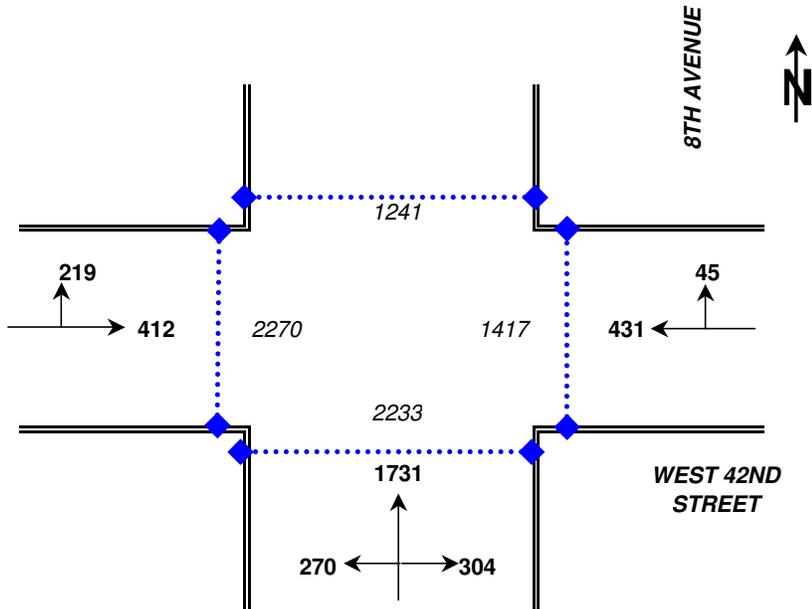
The principal also noted that vehicles speed on West 43rd Street in the vicinity of the school. A spot speed study was conducted on West 43rd Street between Eighth Avenue and Ninth Avenue on Tuesday, October 4, 2005 between 11:00 am and 11:30 am. The

spot speed study showed that the 85th percentile speed was 28 mph, which is below the statutory speed limit of 30 mph. See Table 4 for a summary of the results and the Appendix for further detail.

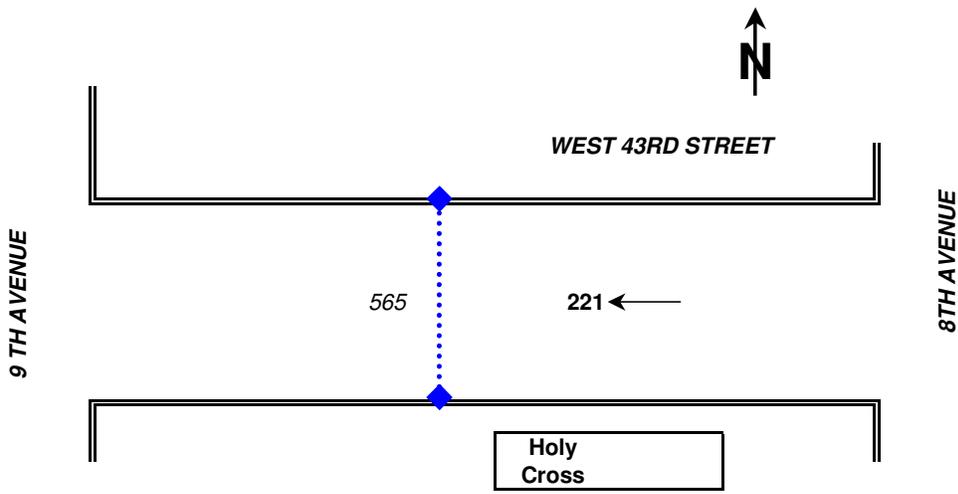
TABLE 4: SPOT SPEED STUDY		
(Tuesday, October 4, 2005)		
LOCATION	MEDIAN SPEED (MPH)	85TH PERCENTILE SPEED (MPH)
West 43 rd Street between Eighth Avenue and Ninth Avenue	24	28

There were 38 accidents on this roadway segment during the 1998-2000 study period. Two accidents involved pedestrians, none of which were school-related. Two pedestrians were struck while crossing mid-block on West 43rd Street.

One Hour Traffic Count Volumes



Intersection of 8th Avenue and West 42nd Street
(2:30 PM - 3:30 PM OCTOBER 5, 2005)



West 43rd Street between 8th Avenue and 9th Avenue
(7:30 AM - 8:30 AM SEPTEMBER 20, 2006)

- 62 (arrow pointing to a blue diamond) Number of Pedestrians
- ◆◆ (two blue diamonds connected by a dotted line) Pedestrian Crossing
- 53 (arrow pointing to a solid line) Vehicle Movement
- ← (arrow pointing to a solid line) Number of Vehicles

EXHIBIT 5
HOLY CROSS, MANHATTAN
TRAFFIC COUNTS

3.7 SIGNAL TIMING: PEDESTRIAN PHASE

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

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 43rd Street and Eighth Avenue				
Crossing West 43 rd Street	34	45	15	NO
Crossing Eighth Avenue	70	45	27	NO
West 43rd Street and Ninth Avenue				
Crossing West 43 rd Street	34	45	15	NO
Crossing Ninth Avenue	70	45	27	NO
West 42nd Street and Eighth Avenue				
Crossing West 42 nd Street	60	41	23	NO
Crossing Eighth Avenue	70	30(North Leg)**	27	NO
		49(South Leg)		NO
West 42nd Street and Ninth Avenue				
Crossing West 42 nd Street	60	46 (with LPI)	23	NO
Crossing Ninth Avenue	70	30(South Leg)***	27	NO
		44(North Leg)		NO

Note:

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

** There is an exclusive signal phase for West 42nd Street eastbound through and left turning traffic. Pedestrians have a delayed walk signal to cross the north leg of Eighth Avenue.

*** There is an exclusive signal phase for West 42nd Street westbound through and left turning traffic. Pedestrians have a delayed walk signal to cross the south leg of Ninth Avenue.

3.8 PHYSICAL CONDITIONS (ROADWAYS AND SIDEWALKS)

The roadways and sidewalks were found to be in fair condition, with the exception of the following:

- The curbs and part of the sidewalk along the north side of West 43rd Street in the vicinity of the school were found to be in poor condition (Figure 14).

Pedestrian ramps that are missing or not positioned correctly have been noted in Section 3.6.



Figure 14: Poor sidewalk on West 43rd Street

4. POTENTIAL MEASURES TO IMPROVE STUDENT PEDESTRIAN SAFETY

4.1 SHORT-TERM MEASURES

- No Standing Zone on West 43rd Street

“NO STANDING 7 AM – 4 PM, SCHOOL DAYS” parking regulations should be considered on both the north and south curbs of West 43rd Street directly in front of the school’s entrances for a length of 30ft. This will allow parents a place to load and unload students at the curb, and to improve visibility of students arriving to and leaving the school.

The existing teacher parking and authorized parking should be relocated further west towards the metered parking area.

- Install Warning Signs on West 43rd Street mid-block between Eighth Avenue and Ninth Avenue

McCaffrey playground is located directly across West 43rd Street from the Holy Cross school building. The principal indicated that many Holy Cross students cross mid-block to and from the playground.

A one-hour traffic count and a gap study were performed on Wednesday, September 20, 2006 from 7:30 am to 8:30 am to determine traffic conditions on West 43rd Street between 8th Avenue and 9th Avenue (Exhibit 5). The results indicated that during the study hour, approximately 565 pedestrians crossed mid-block on West 43rd Street and 221 vehicles traveled westbound on West 43rd Street. During the study hour, it was observed that most of pedestrians crossing mid-block were Holy Cross students. They gathered at the McCaffrey playground and then walked to the school building. In addition, the McCaffrey playground is utilized for physical education class of Holy Cross during the day.

The number of pedestrians per hour crossing West 43rd Street exceeds the required MUTCD Warrant 4 – Pedestrian Volume requirement of a minimum of 190 pedestrians of any given hour. However, the gap study shows that more than 60 gaps of 14 seconds (the time required to cross a 34-foot wide street at three feet per second plus three seconds of reaction time) were available for pedestrians to cross West 43rd Street. Therefore, a mid-block pedestrian actuated signal would not be warranted at this time.

As an alternative, it is recommended that "pedestrian crossing" warning signage be installed in conjunction with the "No Standing 7AM-4PM, School Days" regulations described above. The clear curb and signage will help increase sight-distance visibility and alert drivers to the presence of pedestrians crossing mid-block.

- Administer student pedestrian safety education program

It is recommended that the NYCDOT Safety Education Program work with the school to educate the students on pedestrian safety, including crossing the street with the WALK phase, and the meaning of WALK - FLASHING DON'T WALK -

DON'T WALK pedestrian signal sequence. It is also recommended that the students be educated not to cross at mid-block locations and to wait for the "WALK" phase.

▪ Install new school crosswalks at the following intersections:

- Eighth Avenue and West 44th Street - west and south leg
- Ninth Avenue and West 44th Street - east leg

Providing a new school crosswalk at these two locations will facilitate students en route to school. Therefore, it is recommended that school crosswalks and associated signs be installed at these two intersections.

▪ Place stop bars ten feet in advance of school crosswalks

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

▪ Submit Request to Police Department for Crossing Guards

It is recommended that crossing guards be requested for the following intersections:

- West 43rd Street and Eighth Avenue
- West 43rd Street and Ninth Avenue

▪ Install "STOP" sign for vehicles exiting the parking garage on West 43rd Street

It is recommended that the owners of the parking garage at the residential building west of Holy Cross be requested to install a mirror and stop sign so that vehicles exiting the parking garage on West 43rd Street are required to stop before driving onto the sidewalk.

4.2 LONG-TERM MEASURES

- Installation/replacement of Complex pedestrian ramps

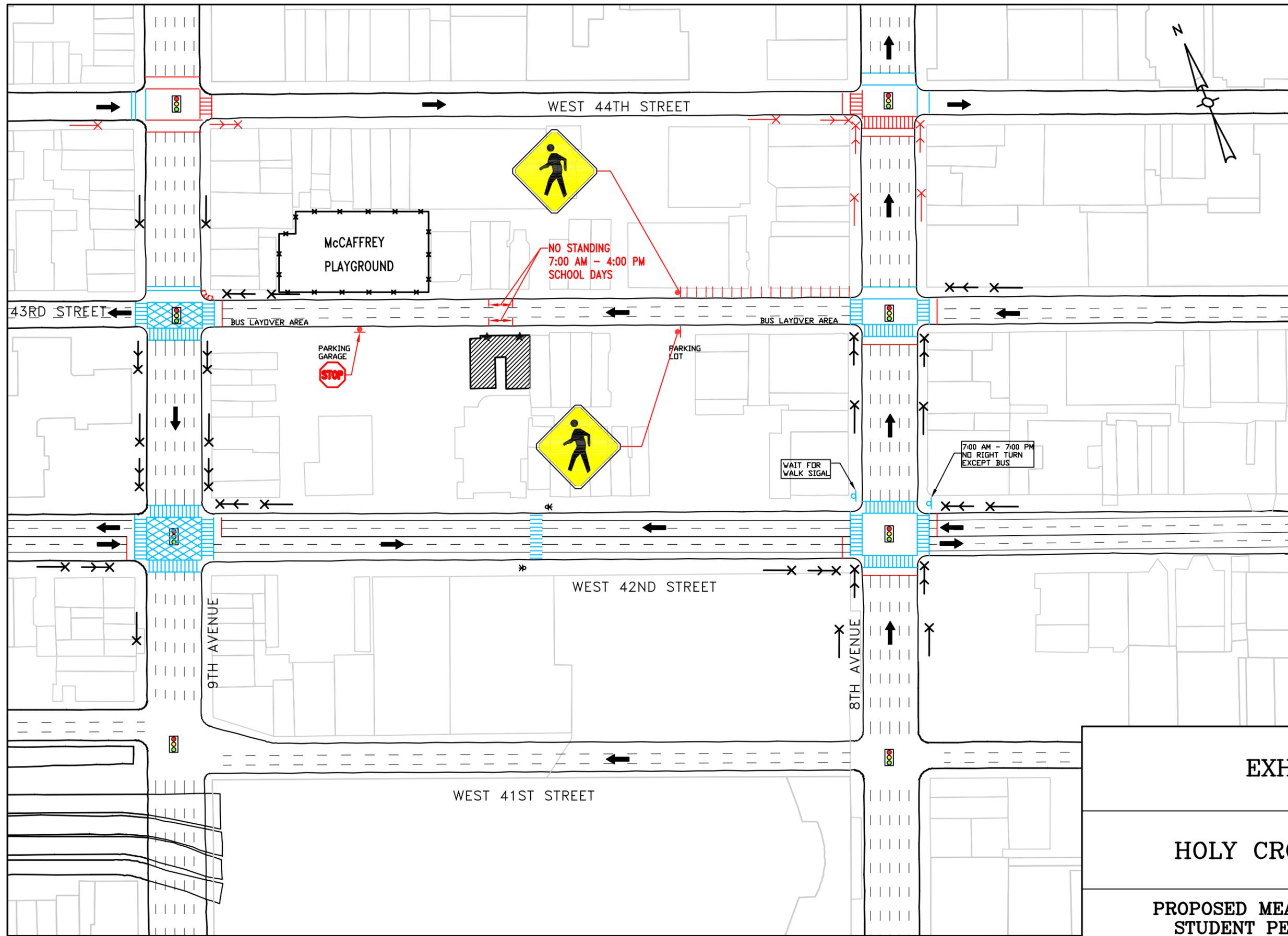
Due to existing utility conflicts, the following pedestrian ramp is considered complex and will require relocation of utility poles or drainage structures. Consideration should be given to the installation of pedestrian ramps per NYCDOT standards at the following location:

- West 43rd Street and Ninth Avenue—northeast corner

- Install new sidewalk and curbs at the following location:

- West 43rd Street between Eighth Avenue and Ninth Avenue

It is recommended to install new sidewalk and curbs on the north side of West 43rd Street between Eighth Avenue and Ninth Avenue to correct poor curb and sidewalk conditions.



LEGEND

- ★ MAIN ENTRANCE
- X EXISTING ADVANCE WARNING SIGN WITH ARROW
- X EXISTING ADVANCE WARNING SIGN
- ↔ EXISTING TRAVEL DIRECTION
- 🚦 EXISTING SIGNALIZED INTERSECTION
- ▬ EXISTING SCHOOL CROSSWALK
- EXISTING STOP BAR
- ▬ EXISTING PEDESTRIAN CROSSWALK
- ⚡ EXISTING PEDESTRIAN ACTIVATED SIGNAL
- ⤴ PROPOSED CURB EXTENSION (NECKDOWN)
- ↔ PROPOSED PARKING REGULATIONS
- ▬ PROPOSED SIDEWALK
- PROPOSED STOP BAR
- ▬ PROPOSED CROSSWALK
- ▬ PROPOSED SCHOOL CROSSWALK
- PROPOSED TRAFFIC SIGN

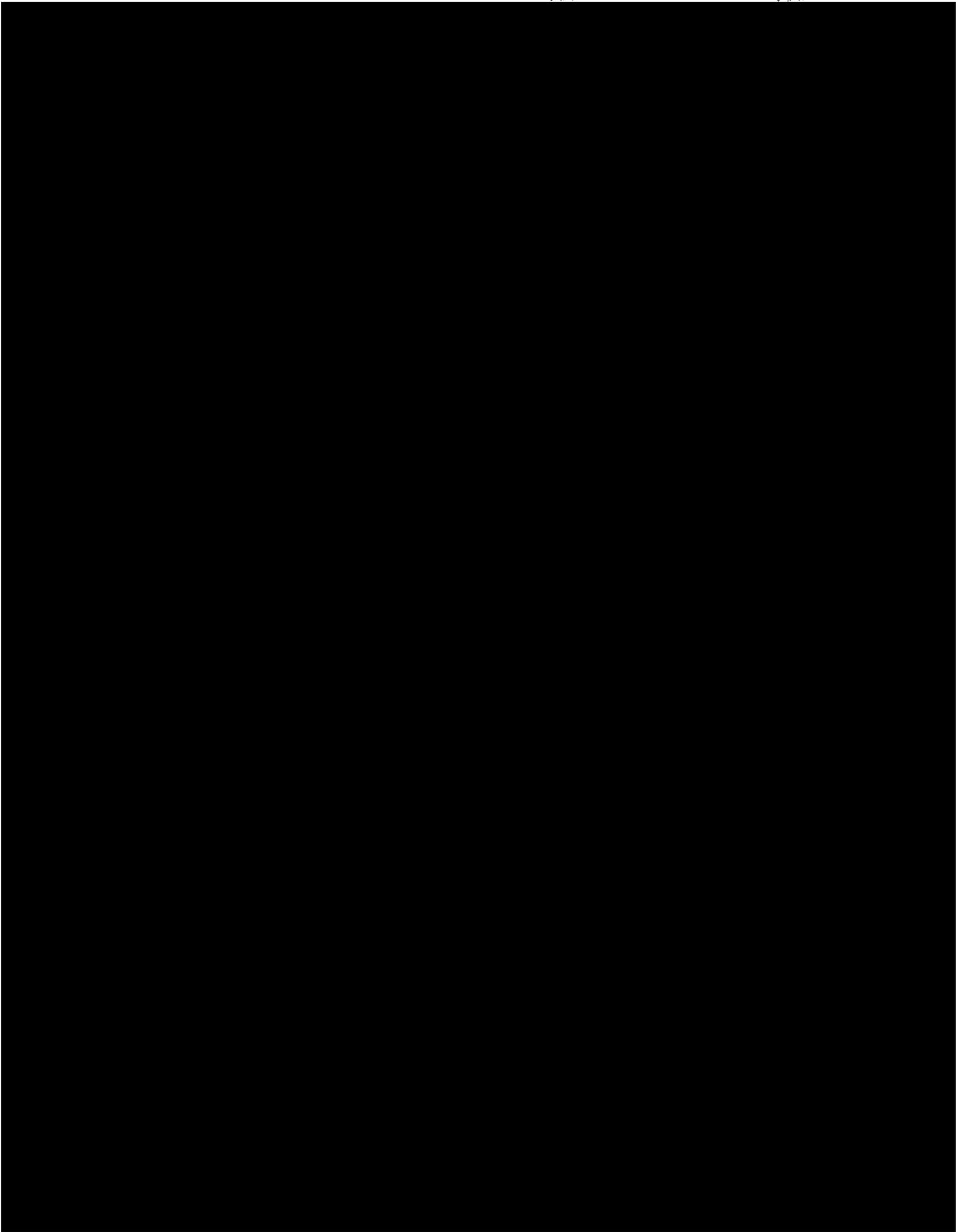
SCALE: 1" : 120'

EXHIBIT 6

HOLY CROSS SCHOOL

PROPOSED MEASURES TO IMPROVE STUDENT PEDESTRIAN SAFETY

APPENDIX



SPOT SPEED STUDY

Date: **October 4, 2005** Time: **11:00 am - 11:30 am**
 Location: **West 43rd Street between 8th Avenue and 9th Avenue**
 Surveyor:

School: **Holy Cross**
 Direction: **West**
 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	2	1.9%	1.9%	32	512
17	1	0.9%	2.8%	17	289
18	6	5.7%	8.5%	108	1944
19	5	4.7%	13.2%	95	1805
20	8	7.5%	20.8%	160	3200
21	12	11.3%	32.1%	252	5292
22	8	7.5%	39.6%	176	3872
23	11	10.4%	50.0%	253	5819
24	6	5.7%	55.7%	144	3456
25	10	9.4%	65.1%	250	6250
26	14	13.2%	78.3%	364	9464
27	8	7.5%	85.8%	216	5832
28	3	2.8%	88.7%	84	2352
29	3	2.8%	91.5%	87	2523
30	2	1.9%	93.4%	60	1800
31	3	2.8%	96.2%	93	2883
32	1	0.9%	97.2%	32	1024
33	2	1.9%	99.1%	66	2178
34	0	0.0%	99.1%	0	0
35	1	0.9%	100.0%	35	1225
36	0	0.0%	100.0%	0	0
37	0	0.0%	100.0%	0	0
38	0	0.0%	100.0%	0	0
39	0	0.0%	100.0%	0	0
40	0	0.0%	100.0%	0	0
41	0	0.0%	100.0%	0	0
42	0	0.0%	100.0%	0	0
43	0	0.0%	100.0%	0	0
44	0	0.0%	100.0%	0	0
45	0	0.0%	100.0%	0	0
46	0	0.0%	100.0%	0	0
47	0	0.0%	100.0%	0	0
48	0	0.0%	100.0%	0	0
49	0	0.0%	100.0%	0	0
50	0	0.0%	100.0%	0	0
51	0	0.0%	100.0%	0	0
52	0	0.0%	100.0%	0	0
53	0	0.0%	100.0%	0	0
54	0	0.0%	100.0%	0	0
55	0	0.0%	100.0%	0	0
56	0	0.0%	100.0%	0	0
	106	100.0%		2524	61720

Mean Speed = 23.8 mph Median Speed = 23.8 mph
 Standard Deviation = 3.9 mph 15th Percentile Speed = 19.7 mph
 Margin of Error (95% Confidence) = ± 0.7 mph 85th Percentile Speed = 27.9 mph

SPOT SPEED STUDY

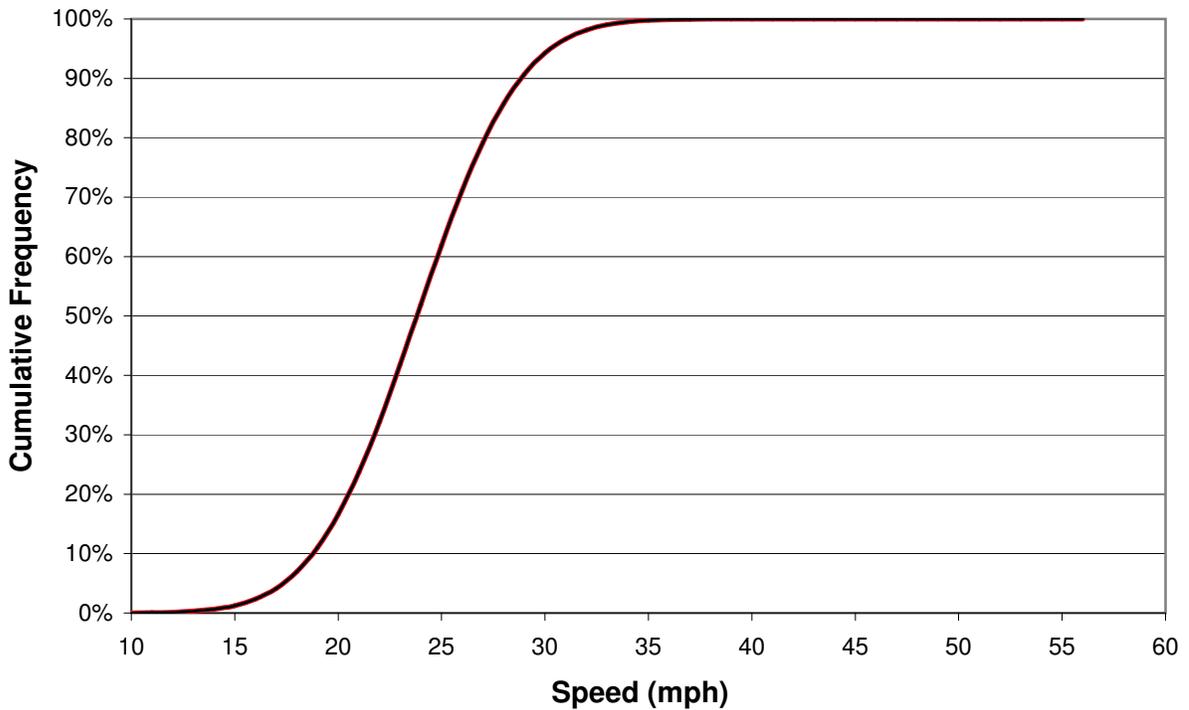
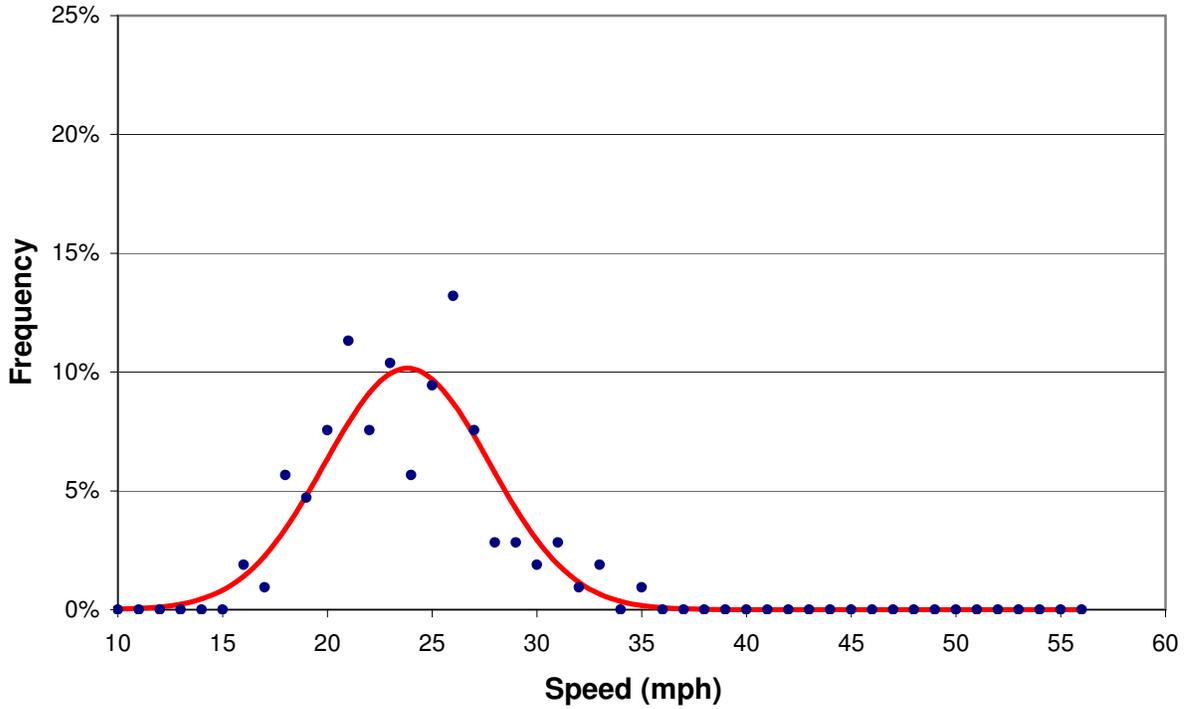
Date: **October 4, 2005**
Location: **West 43rd Street between 8th Avenue and 9th Avenue**
Surveyor:

Time: **11:00 am - 11:30 am**

School: **Holy Cross**
Direction: **West**
Comments:

Mean Speed = 23.8 mph
Standard Deviation = 3.9 mph
Margin of Error (95% Confidence) = ± 0.7 mph

Median Speed = 23.8 mph
15th Percentile Speed = 19.7 mph
85th Percentile Speed = 27.9 mph



HOLLY CROSS

OCTOBER 5, 2005

2:30 pm - 3:30 pm

Title1 : SCHOOL SAFETY ENGINEERING
 Title2 : BOROUGH OF MANHATTAN
 Title3 : NYC-DOT

Site:
 Date: 10/05/05

Combined

**Peds not included in table data*

Begin	8 AVENUE			42 STREET		8 AVENUE			42 STREET				
Time	Total				W-R	W-T		N-R	N-T	N-L		E-T	E-R
14:30:00	721	0	11	0	13	80	0	68	369	56	0	78	46
14:45:00	964	0	0	0	15	100	0	95	502	70	0	138	44
15:00:00	846	0	0	0	10	148	0	61	389	78	0	104	56
15:15:00	892	0	0	0	7	103	0	80	471	66	0	92	73
3,423		0	11	0	45	431	0	304	1,731	270	0	412	219

Peak Volume Periods <i>(1 hour Res:15 min.)</i>					
Period			Peak Period		Volume
AM	05:00:00	To 10:00:00	NA	To NA	0
Noon	10:00:00	To 15:00:00	14:00:00	To 15:00:00	1,686
PM	15:00:00	To 20:00:00	14:30:00	To 15:30:00	2,702

HOLLY CROSS

OCTOBER 5, 2005

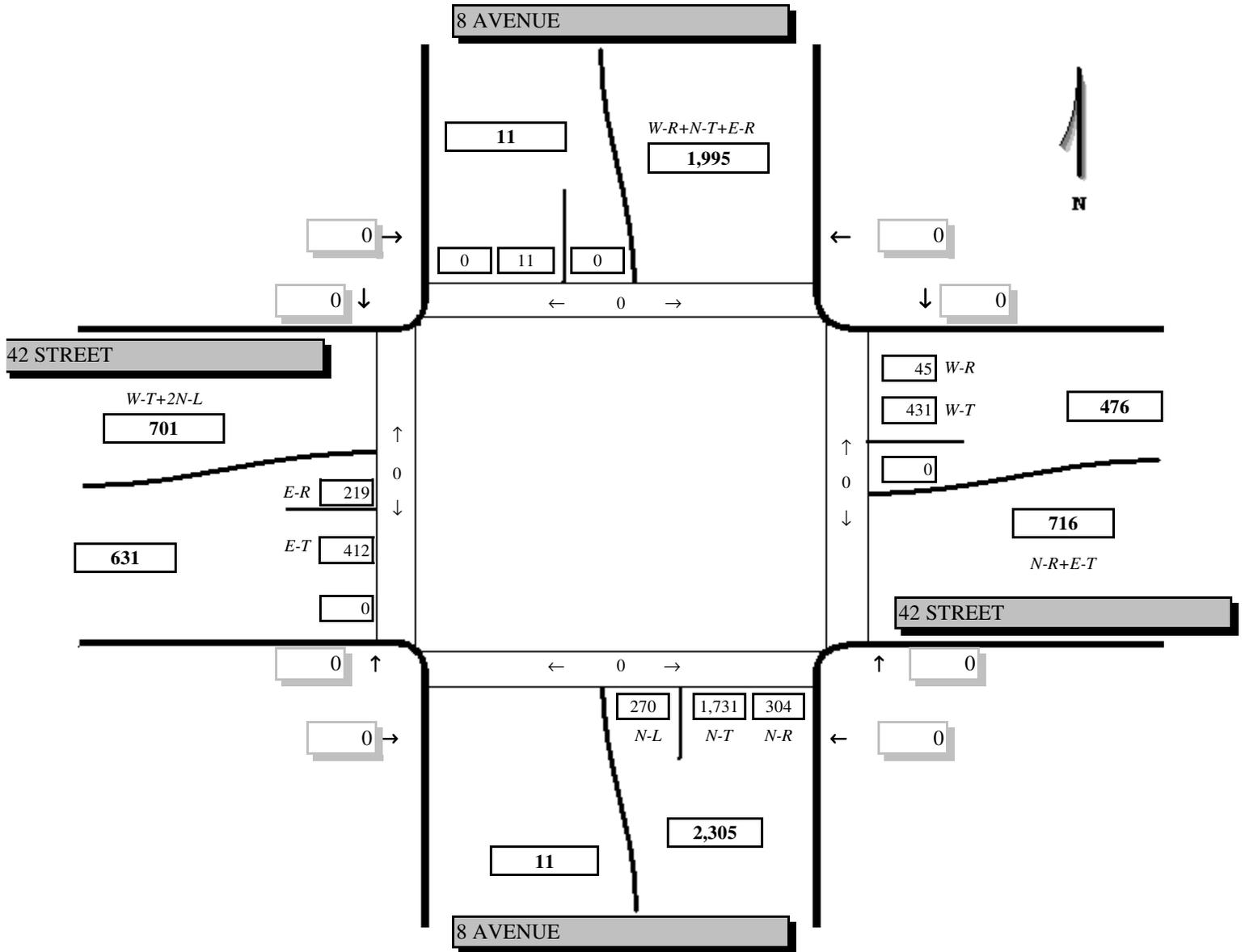
2:30 pm - 3:30 pm

Title1 : SCHOOL SAFETY ENGINEERING
Title2 : BOROUGH OF MANHATTAN
Title3 : NYC-DOT

Site: 10/05/05
Date:

Combined

*Peds not included in table data



HOLLY CROSS

OCTOBER 5, 2005

2:30 pm - 3:30 pm

Title1 : SCHOOL SAFETY ENGINEERING
 Title2 : BOROUGH OF MANHATTAN
 Title3 : NYC-DOT

Site:
 Date: 10/05/05

Shift B

Begin Time	Total	8 AVENUE			42 STREET			8 AVENUE			42 STREET		
		N	E	S	W								
14:30:00	552	0	96	0	0	106	0	0	210	0	0	140	0
14:35:00	694	0	141	0	0	107	0	0	219	0	0	227	0
14:40:00	685	0	97	0	0	133	0	0	194	0	0	261	0
14:45:00	698	0	116	0	0	143	0	0	245	0	0	194	0
14:50:00	766	0	132	0	0	205	0	0	224	0	0	205	0
14:55:00	643	0	74	0	0	110	0	0	179	0	0	280	0
15:00:00	693	0	144	0	0	127	0	0	258	0	0	164	0
15:05:00	727	0	133	0	0	134	0	0	198	0	0	262	0
15:10:00	670	0	89	0	0	190	0	0	171	0	0	220	0
15:15:00	737	0	161	0	0	125	0	0	253	0	0	198	0
15:20:00	296	0	58	0	0	37	0	0	82	0	0	119	0
7,161		0	1,241	0	0	1,417	0	0	2,233	0	0	2,270	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	14:15:00	To 15:15:00	4,038	
PM	15:00:00 To 20:00:00	14:30:00	To 15:30:00	7,161	

HOLLY CROSS

OCTOBER 5, 2005

2:30 pm - 3:30 pm

Title1 : SCHOOL SAFETY ENGINEERING
Title2 : BOROUGH OF MANHATTAN
Title3 : NYC-DOT

Site:
Date: 10/05/05

Shift B

