New York City Department of Transportation
Office of School Safety Engineering

School Safety Engineering Project

FINAL REPORT: I.S 77, Queens

Prepared by
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July 10, 2006

School Safety Engineering Project
Final Report: I.S. 77, Queens

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[redacted]

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). I.S. 77 in Queens 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

2.2 NEIGHBORHOOD DESCRIPTION

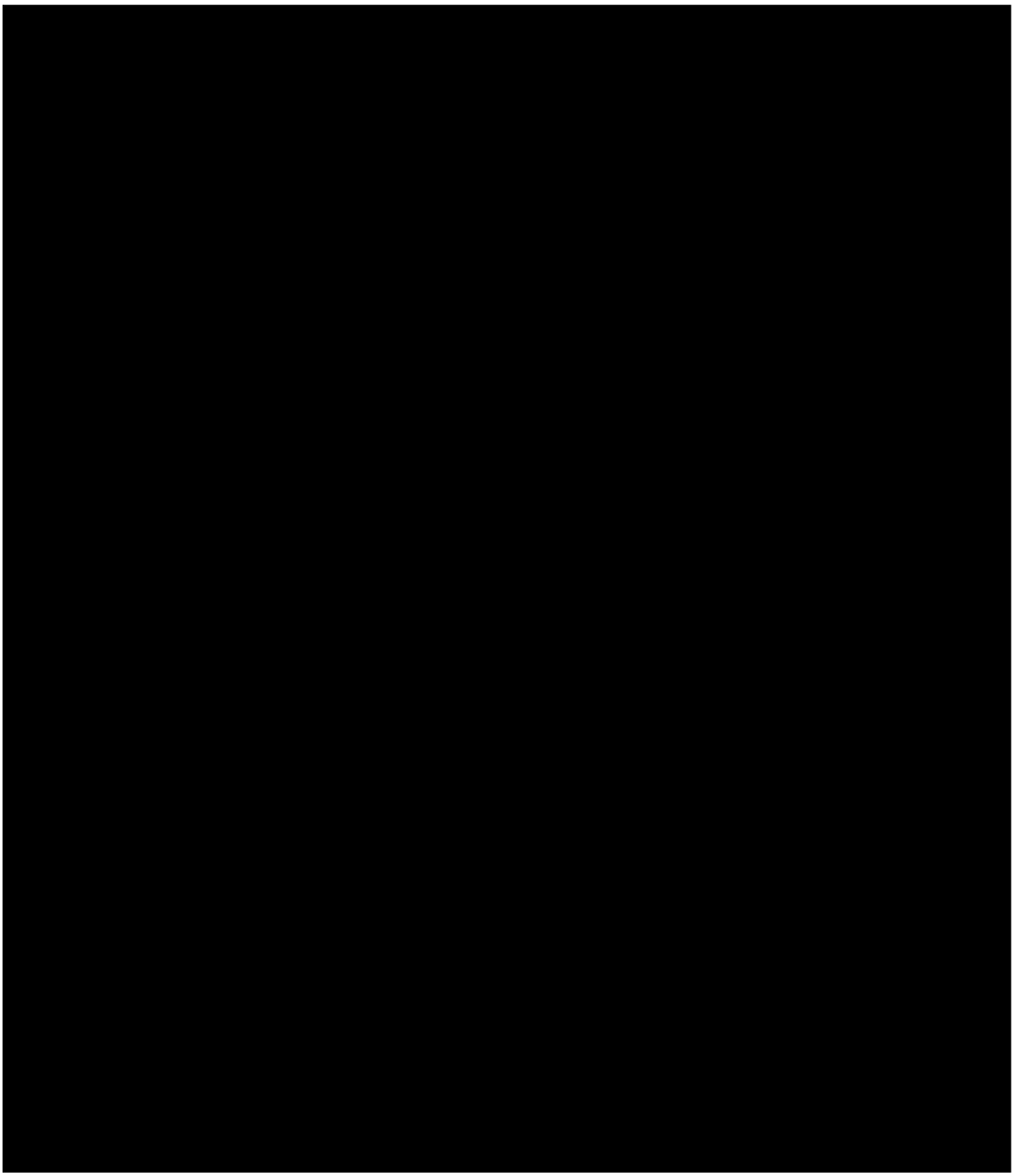
Exhibit 1, at the end of this section, shows an aerial view of the neighborhood surrounding the school. I.S. 77 is bounded by Seneca Avenue on the north, George Street on the east, Cypress Avenue on the south, and Centre Street on the west. The area surrounding the school is generally residential in nature. Seneca Avenue and Cypress Avenue have some commercial activities and Cypress Avenue carries high traffic volumes. Myrtle Avenue is one block to the north, and also carries high traffic volumes.

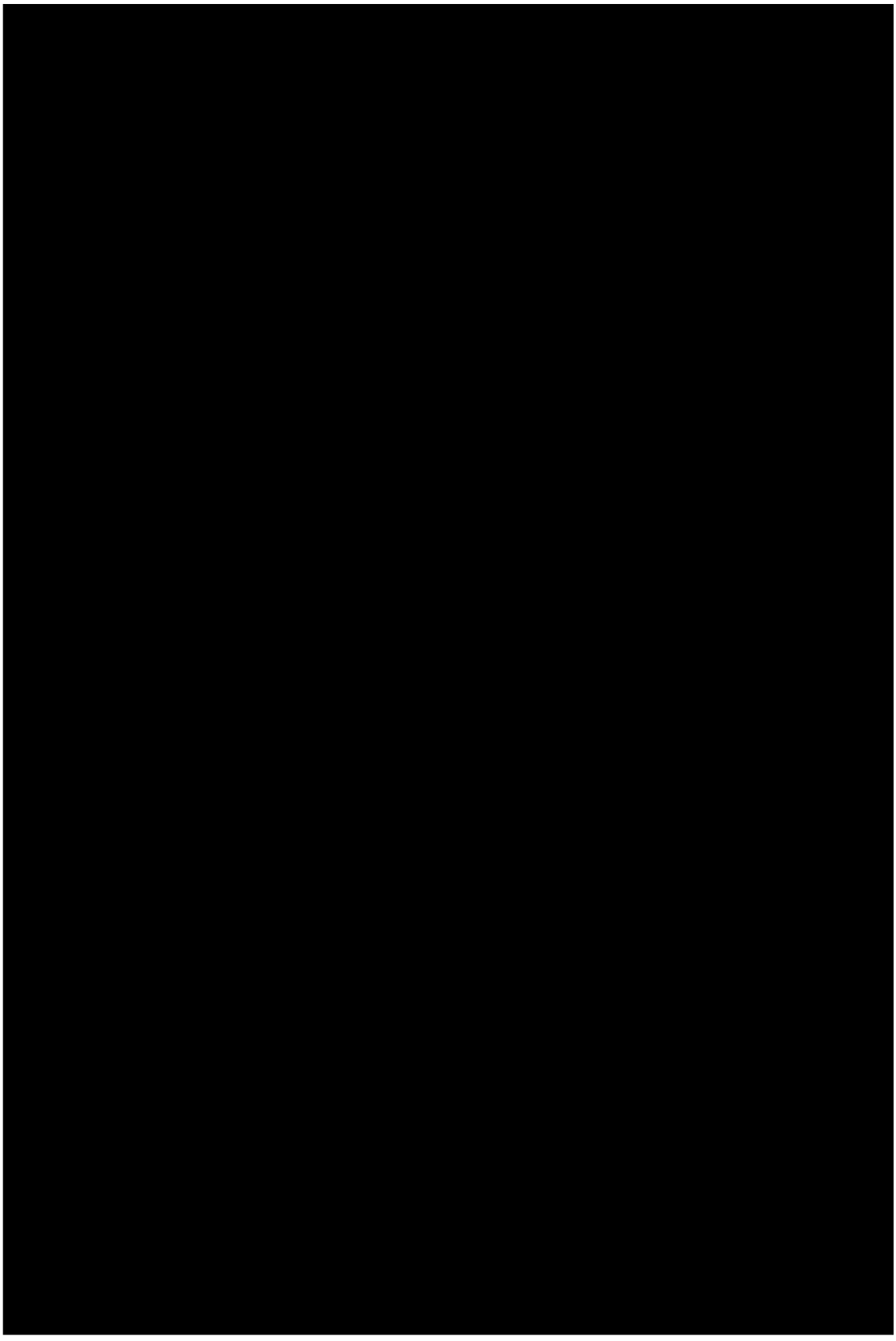
2.3 MEETING WITH SCHOOL REPRESENTATIVES

Consultant staff, the principal of I.S. 77, the Dean/Security Officer, the UFT Chapter Leader, the programmer, the Parent Coordinator, the Chairman of Community Board 5 (Queens) and a representative of NYCDOT Safety Education met at the school on the morning of Friday, June 18, 2004. According to the school officials, the problems facing I.S. 77 student pedestrians are:

- Traffic volumes are always heavy on Cypress Avenue and Myrtle Avenue. Volumes are heavy on Seneca Avenue during arrival and dismissal.
- Speeding is a problem on Seneca Avenue in front of the school, especially through the intersection of Centre Street and Seneca Avenue.
- Centre Street is closed for 10-15 minutes at dismissal, but at other times, children can be exposed to speeding traffic.
- The school is requesting a traffic signal for the intersection of Seneca Avenue and George Street.
- A special problem exists in the area since the one-way streets are not paired, which causes some confusion for those attempting to navigate the area.

(See Appendix for a complete summary of school concerns).





2.6 PRIMARY MODE OF TRANSPORT TO AND FROM SCHOOL

The school's "catchment area" as defined by the Department of Education, and supplied by NYCDOT, is shown in Exhibit 2 at the end of this section. Based upon information gathered from school officials, the catchment area shown in Exhibit 2 was verified as accurate for I.S. 77.

The perimeter of the catchment area varies, however, and is slightly irregular. The area is generally outlined by Wyckoff Avenue and 80th Avenue on the south; Palmetto Street and Madison Street on the west; Madison Street again on the north; and Fresh Pond Road and Cypress Hills Street on the east.

Table 1 presents the modes of travel for I.S. 77 as identified by school representatives.

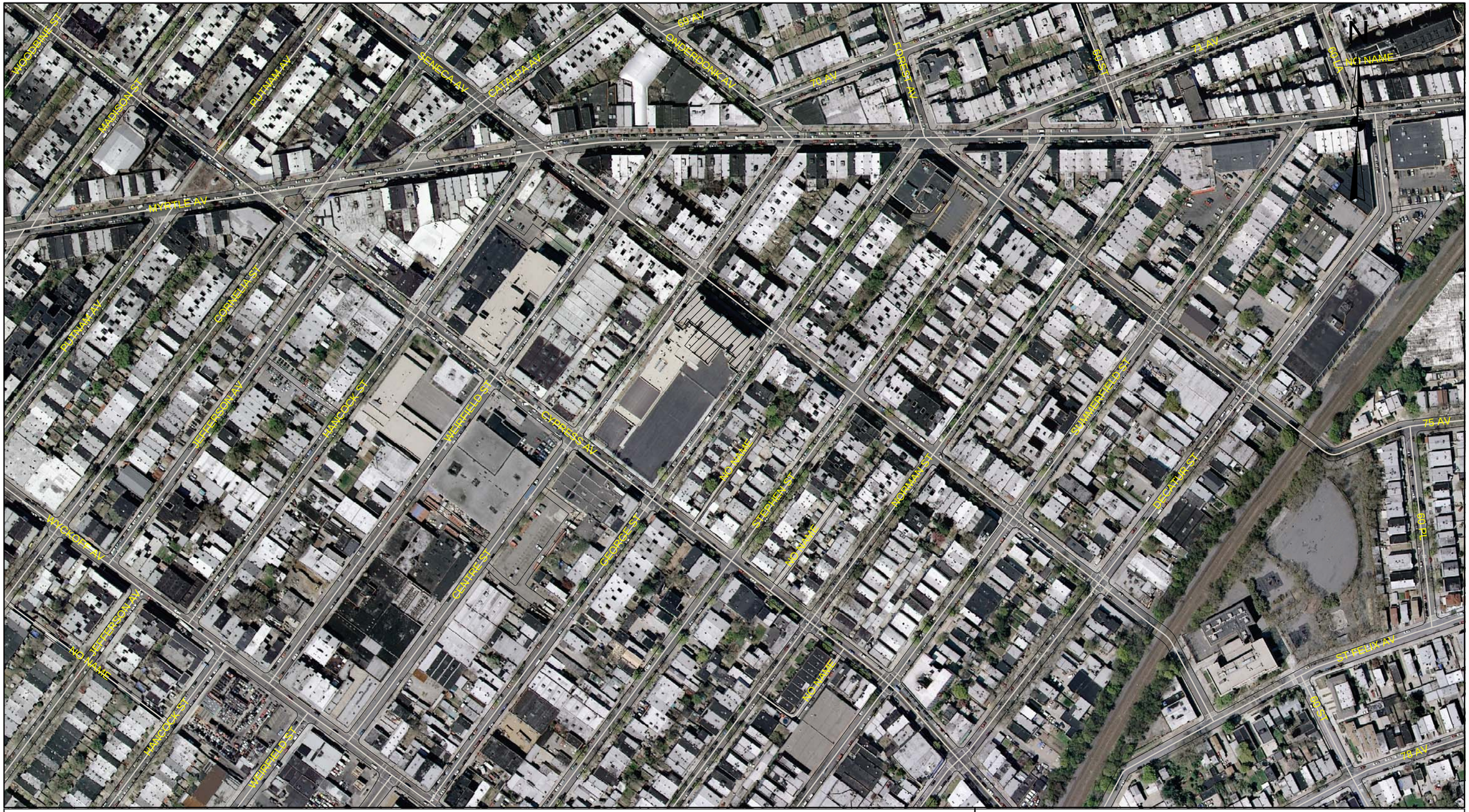
TABLE 1: MODE OF TRAVEL	**STUDENTS (Percentage)**
Walk	70%
Driven by car	5%
School bus	10%
MTA Bus/Subway	15%
Bicycle	0%
TOTAL	**100%**

2.7 ADDITIONAL STUDENT PEDESTRIAN TRAFFIC GENERATORS

There are some stores and restaurants along both Seneca Avenue and Cypress Avenue that are attractions for I.S. 77 student pedestrians. A new elementary school, P.S. 239, is located on Weirfield Street between Seneca Avenue and Cypress Avenue, one short block to the west, and also generates pedestrian and vehicular traffic in the neighborhood.

2.8 CROSSING GUARD LOCATIONS

According to the school officials, there are no crossing guards assigned to I.S. 77. There is one crossing guard in the area of the school, at Centre Street and Seneca Avenue, who is assigned to P.S. 239.

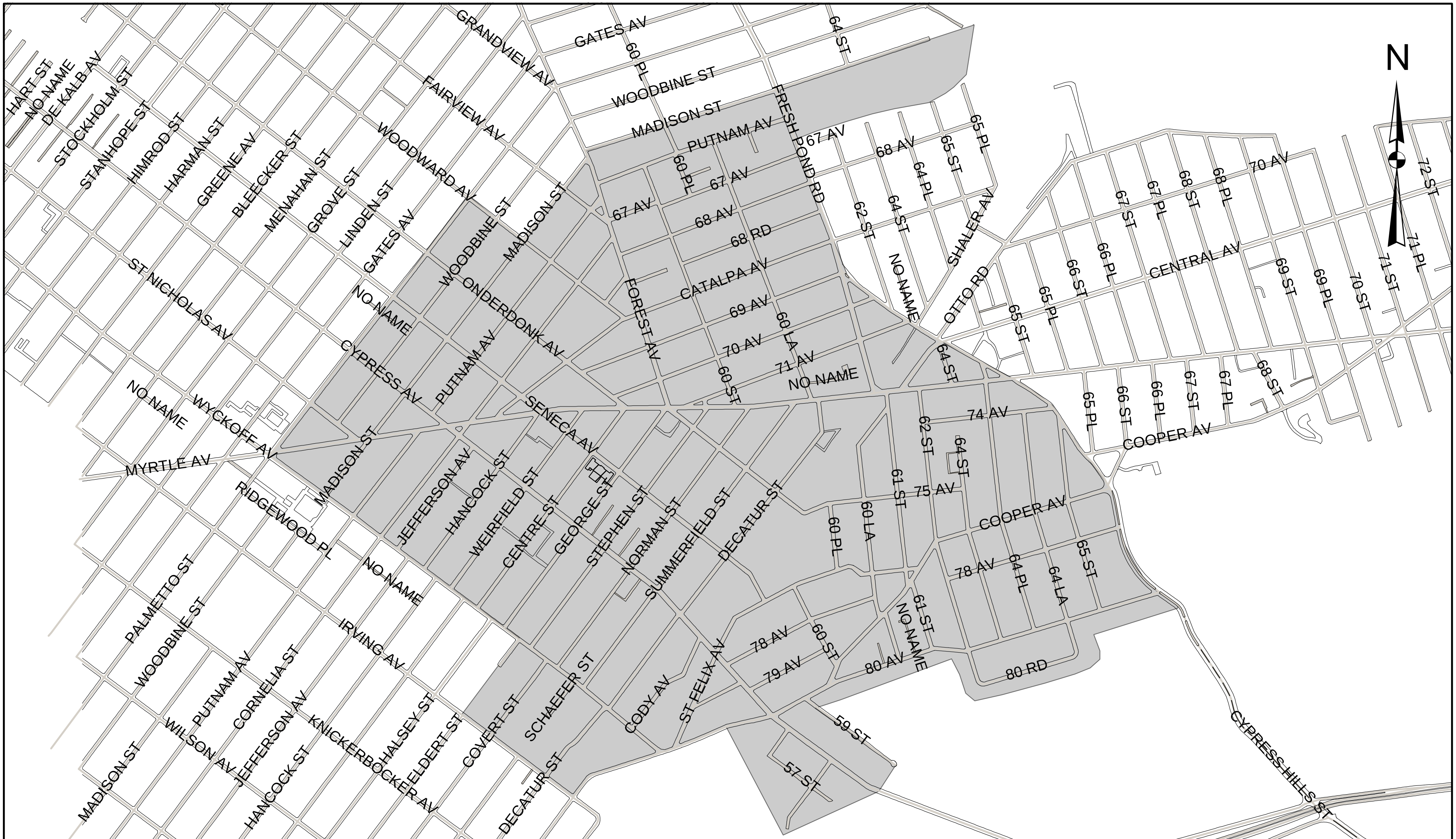


0 250 500 1,000 Feet

EXHIBIT 1

I.S. 77 QUEENS

AERIAL PHOTOGRAPH



LEGEND:

CATCHMENT AREA, (DEPARTMENT OF EDUCATION DESIGNATED AREA FROM WITHIN WHICH STUDENTS ARE ENTITLED TO ATTEND I.S. 77)

0 250 500 1,000 Feet

EXHIBIT 2

I.S. 77 QUEENS

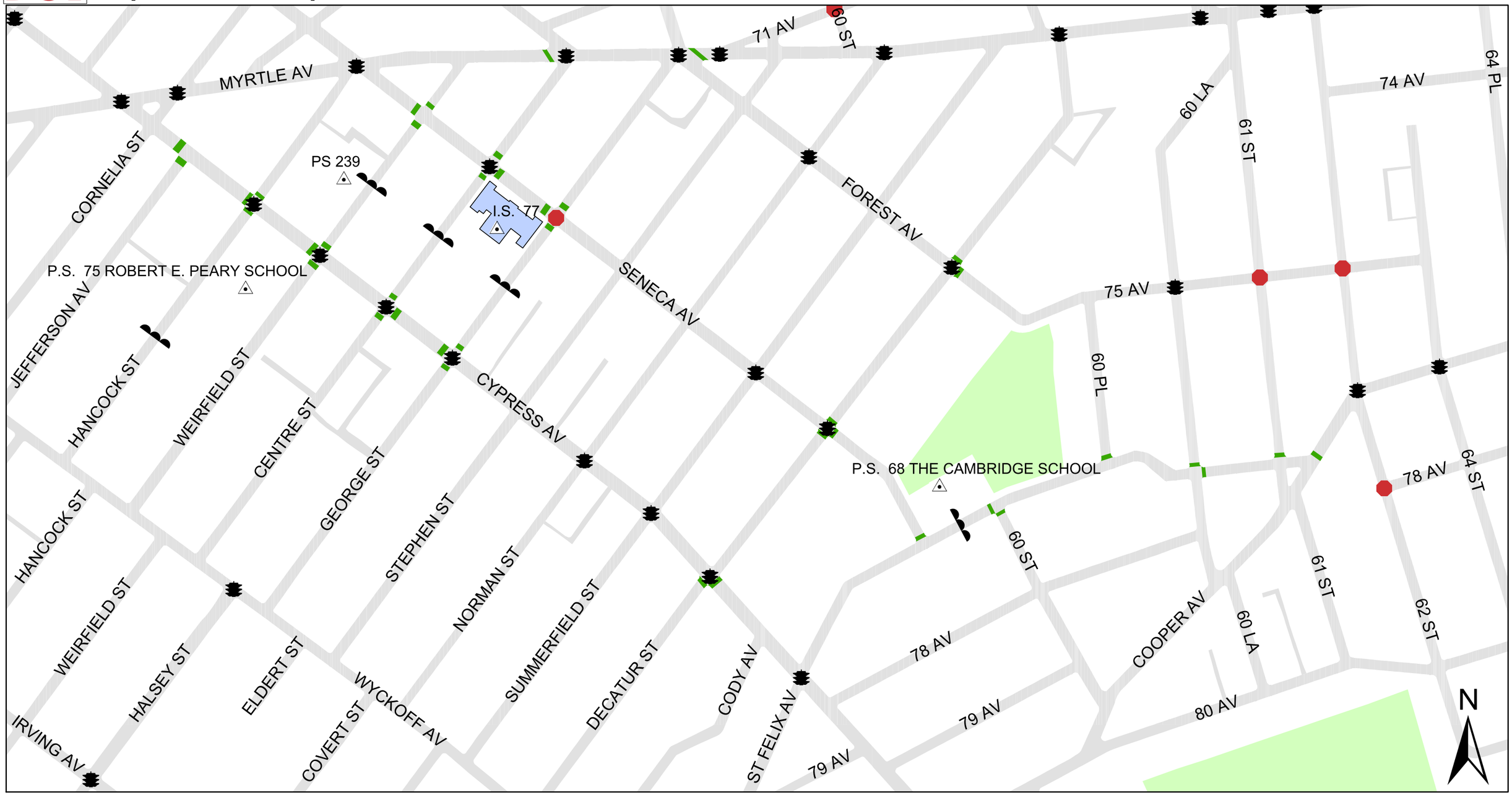
CATCHMENT AREA

NEW YORK CITY DOT

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

IS 77 Queens

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

Map created on 11/17/2006

EXHIBIT 3

COMM. BOARD: 405
PRECINCT: 104

1.5.1

3. TRAFFIC OPERATIONS

3.1 SCHOOL BUS OPERATIONS

According to school representatives, there are approximately 200 students who ride an MTA bus to school, and approximately 120 students who ride a yellow school bus to school. The current web site information shows six yellow buses serving about one hundred-twenty students, and eight special education buses serving about 75 students.

3.2 PARENT DROP-OFF OPERATIONS

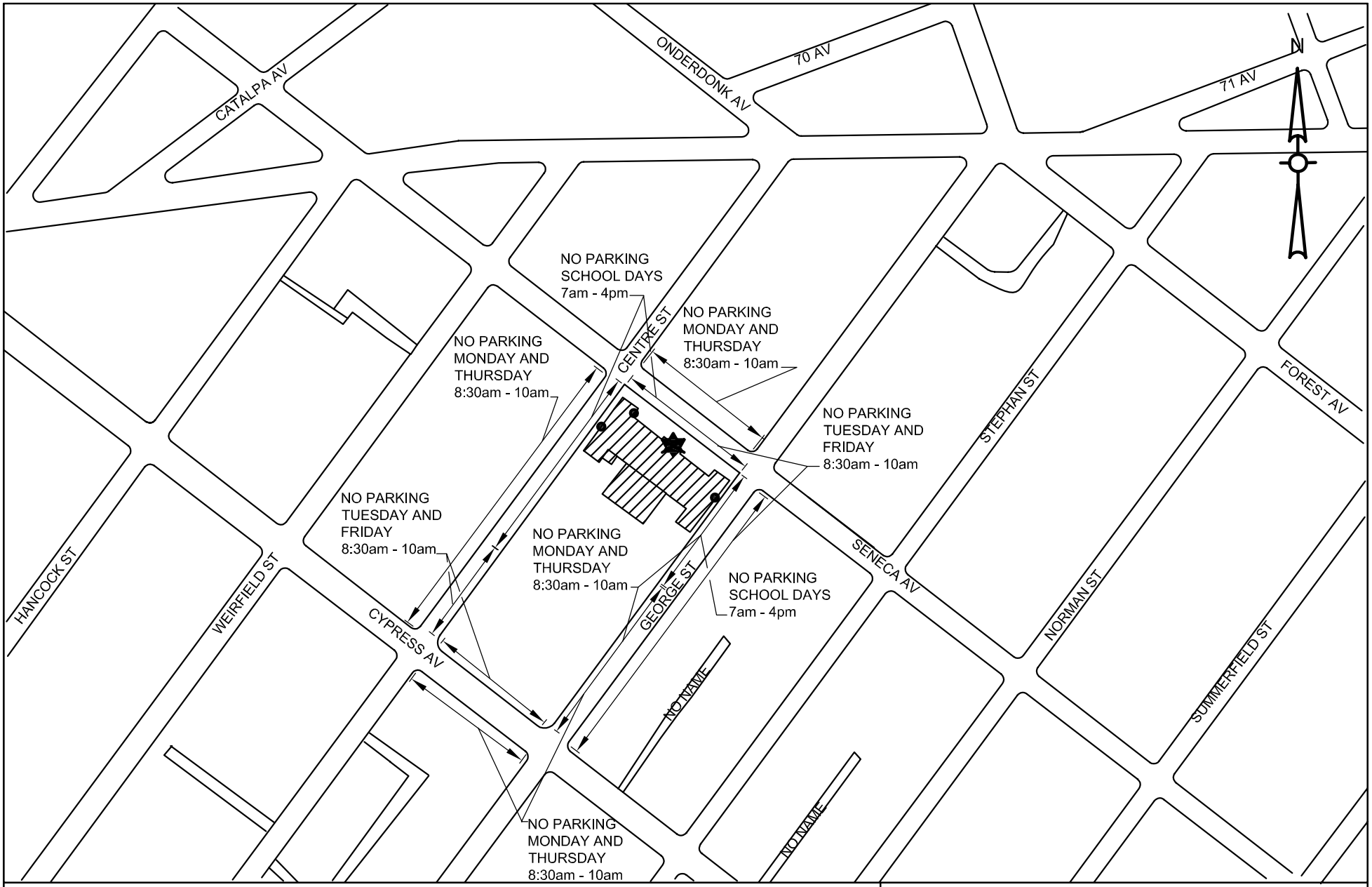
According to school representatives, 5% of the students are being dropped off. In general, there is not much congestion at arrival and dismissal times, although there is some double-parking around the school during these periods. Centre Street is closed during dismissal time.

3.3 PARKING REGULATIONS

Parking regulations around the school block are shown in Exhibit 4 at the end of this section.

3.4 EXISTING SCHOOL SIGNS AND MARKINGS

Exhibit 3, at the end of Section 2, shows the existing school signs, signals, and pavement markings around I.S. 77. 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 accompanied by downward pointing arrows. This will make the school crossing warning signs more visible to motorists. Signs scheduled to be installed under this program are shown as "existing" in Exhibit 6.



LEGEND:

MAIN ENTRANCE

ENTRANCE

0 200 400 FEET

EXHIBIT 4

I.S. 77 QUEENS

EXISTING PARKING REGULATIONS

3.5 ACCIDENT SUMMARY

Exhibit 5 and Table 2 show a summary of accidents, as obtained from the New York State Department of Motor Vehicles (DMV), in the vicinity of I.S. 77 for a three-year period from January 1, 1998 through December 31, 2000. The DMV data provides some detail relating to the circumstances and cause of an 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.

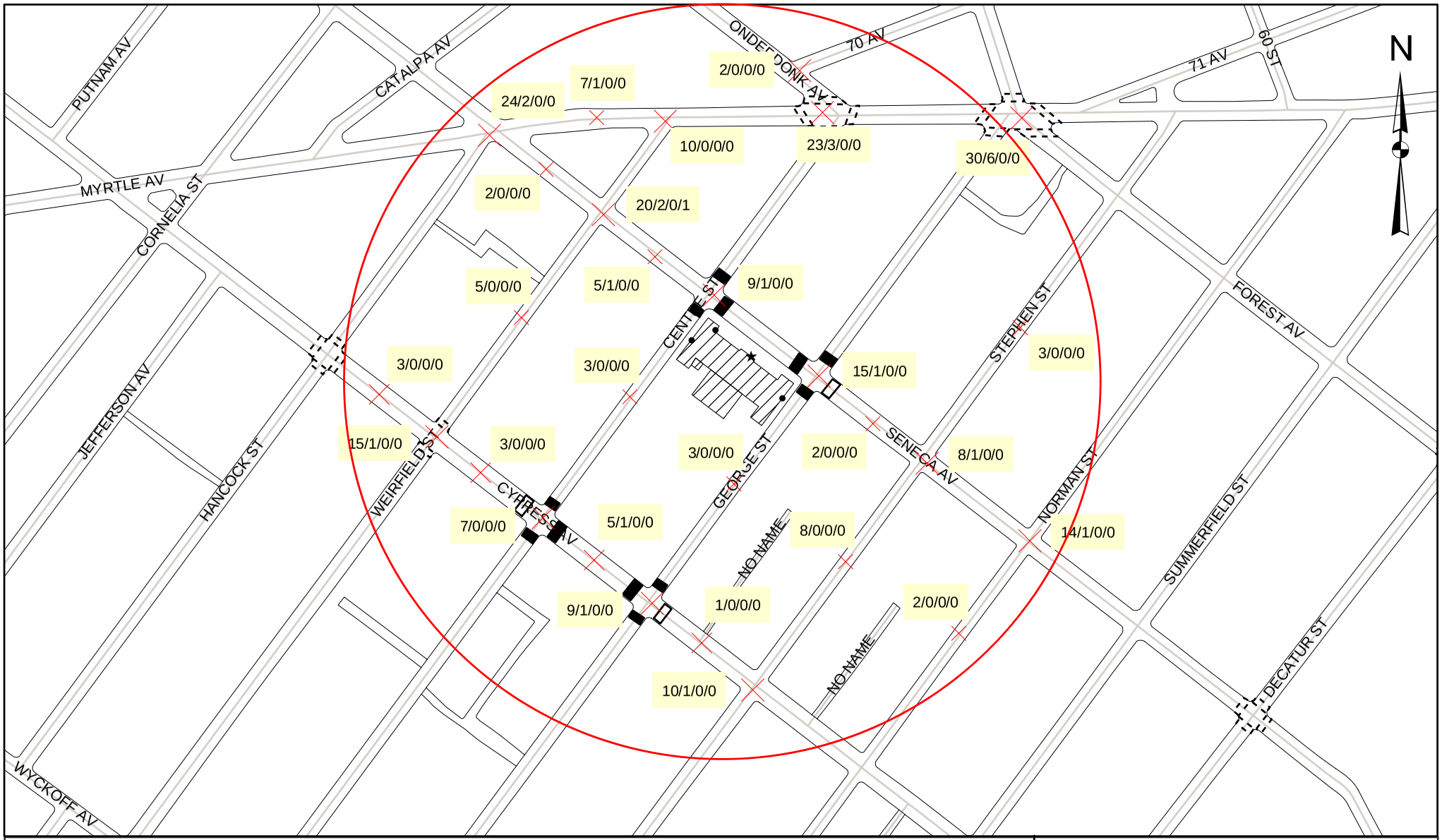
This report targets intersections closest to the school where the highest concentration of student pedestrians occurs. Intersections farther from the school and locations for which detailed data was not available at the time of this study will be addressed with the ongoing work of DOT's School Safety 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*
Myrtle Ave/Hancock St and Seneca Ave	24	2	0	0
Myrtle Ave and Weirfield St	10	0	0	0
Myrtle Ave and George St/Forest Ave	30	6	0	0
Myrtle Ave and Onderdonk Ave	23	3	0	0
Seneca Ave and Weirfield St	20	2	0	1
Seneca Ave and Centre St	9	1	0	0
Seneca Ave and George St	15	1	0	0
Seneca Ave and Stephen St	8	1	0	0
Seneca Ave and Norman St	14	1	0	0
Cypress Ave and Weirfield St	15	1	0	0
Cypress Ave and Centre St	7	0	0	0
Cypress Ave and George St	9	1	0	0
Cypress Ave and Stephen St	10	1	0	0
70th Ave and Onderdonk Ave	2	0	0	0
TOTAL	**196**	**20**	**0**	**1**

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

TABLE 3: ACCIDENT SUMMARY OF NYPD DATA (2001-2004)				
INTERSECTION	**TOTAL ACCIDENTS**	**PEDESTRIAN ACCIDENTS**	**PEDESTRIAN FATALITIES**	**SCHOOL-RELATED ACCIDENTS***
Myrtle Ave/Hancock St and Seneca Ave	49	8	0	1
Myrtle Ave and Weirfield St	9	1	0	0
Myrtle Ave and George St/Forest Ave	48	8	0	0
Myrtle Ave and Onderdonk Ave	25	4	0	0
Seneca Avenue and Weirfield St	14	0	0	0
Seneca Ave and Centre St	6	0	0	0
Seneca Ave and George St	16	3	0	0
Seneca Ave and Stephen St	10	1	0	1
Seneca Ave and Norman St	23	1	0	1
Cypress Ave and Weirfield St	15	1	0	0
Cypress Ave and Centre St	18	0	0	0
Cypress Ave and George St	13	3	0	0
Cypress Ave and Stephen St	22	3	0	0
70th Ave and Onderdonk Ave	7	0	0	0
TOTAL	**275**	**33**	**0**	**3**
* 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

13

EXHIBIT 5

I.S. 77 QUEENS

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 I.S. 77. Details on specific intersections or roadway segments are given in the following sections.

3.6.1 Seneca Avenue and Centre Street

This is a four-leg signalized intersection with school crosswalks located across the north and south legs of Centre Street and the east leg of Seneca Avenue. A pedestrian crosswalk is located across the west leg of Seneca Avenue. Seneca Avenue is a two-way street with one travel lane and a parking lane on each side of the roadway. Centre Street is a one-way northbound street with one travel lane and parking on both sides of the roadway (see Figures 4 and 5).

There were nine accidents reported at this intersection between 1998 and 2000; one of which was a pedestrian accident, but was neither school-related or a fatality (Table 2). NYPD accident data (Table 3) shows a total of six accidents reported at this intersection between 2001 and 2004, none of which were pedestrian accidents.

The school principal reported a speeding problem on Seneca Avenue. Therefore, a speed survey was conducted on Seneca Avenue between Centre Street and George Street in order to verify the existence of a speeding problem and to determine its extent.

The eastbound vehicles on Seneca Avenue between Centre Street and George Street were found to be traveling with an 85^{th} percentile speed of 29 mph. The westbound vehicles on Seneca Avenue between Centre Street and George Street were found to be traveling with an 85^{th} percentile speed of 27 mph.

The 85^{th} 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 Seneca Avenue between Centre Street and George Street are shown in the Appendix at the end of the document.

Figure 4: Looking south on Centre Street across Seneca Avenue, school is on the left

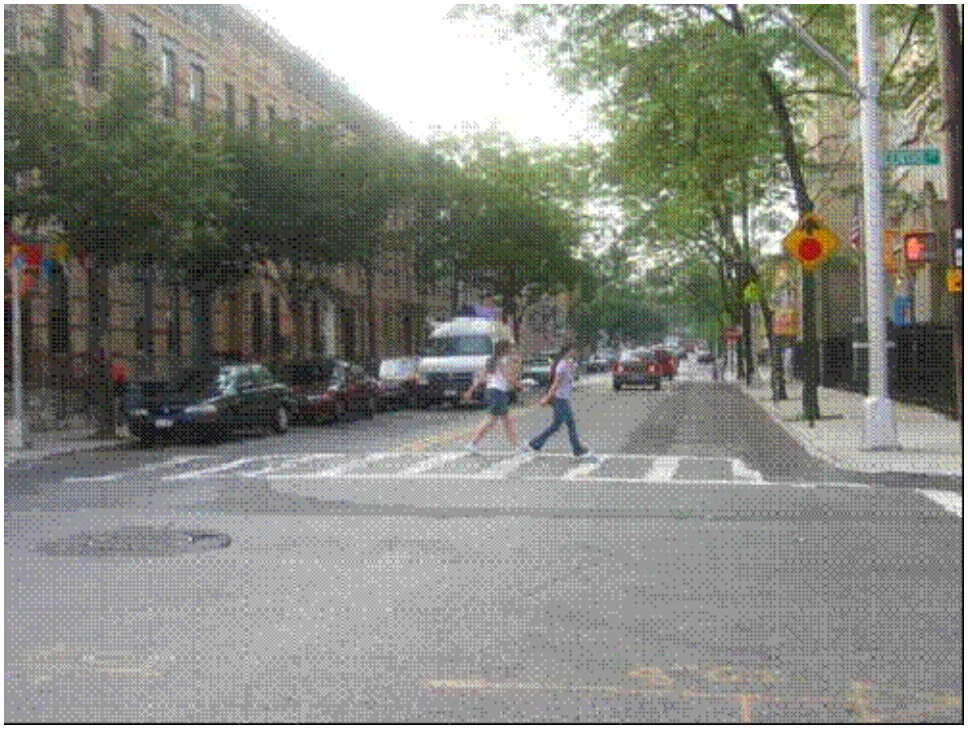


Figure 5: Looking east on Seneca Avenue across Centre Street, the front of the school is on the right

3.6.2 Seneca Avenue and George Street

This is a four-leg all-way stop-controlled intersection with school crosswalks located across the north and south legs of George Street and the west leg of Seneca Avenue.

A pedestrian crosswalk is located across the east leg of Seneca Avenue. Seneca Avenue is a two-way street with one travel lane and a parking lane on each side of the roadway. George Street is a one-way southbound street with one travel lane and parking on both sides of the roadway (see Figures 6 and 7).

To more fully assess the situation for the area in the neighborhood of I.S. 77, the consultant performed a search of NYCDOT records for any warrant studies that may have been performed at any of the intersections in the vicinity of the school. A warrant study was completed in October 2004 for the intersection of Seneca Avenue and George Street to determine the need for traffic signal control for the intersection. The study included a full warrant analysis including such factors as vehicle and pedestrian counts, accident analysis, vehicular speeds, and signal spacing. The study determined that a traffic signal was not warranted.

There were 15 accidents reported at this intersection between 1998 and 2000; one of these accidents was a pedestrian accident, which was not a school-related accident (Table 2). NYPD accident data (Table 3) shows a total of 16 accidents reported at this intersection between 2001 and 2004. There were three pedestrian accidents during the same four-year period, none of which were school-related. There were no pedestrian fatalities reported during either time period.

Figure 6: Looking south on George Street across Seneca Avenue, school is off to the right

Figure 7: Looking west on Seneca Avenue toward George Street, school is to the left

3.6.3 Seneca Avenue and Weirfield Street

This is a four-leg two-way stop-controlled intersection and has no school or pedestrian crosswalks across any legs. Seneca Avenue is a two-way street with one travel lane and a parking lane on each side of the roadway. Weirfield Street is a one-way northbound stop-controlled street with one travel lane and parking on both sides of the roadway.

There were 20 accidents reported at this intersection between 1998 and 2000; two of these accidents were pedestrian accidents, one of which was a school-related accident (Table 2). In the school-related accident, a fourteen-year-old pedestrian sustained a "possible injury" on Friday, March 13, 1998 at 8:00 am. The location of the pedestrian at the time of accident and the pedestrian action prior to the accident were not reported. The road was dry and the weather was clear. There were no pedestrian fatalities reported during the same three-year period. NYPD accident data (Table 3) shows a total of 14 accidents reported at this intersection between 2001 and 2004. There were no pedestrian accidents during the same four-year period.

3.6.4 Cypress Avenue and Centre Street

This is a four-leg signalized intersection with school crosswalks located across the north and south legs of Centre Street and the east leg of Cypress Avenue. A pedestrian crosswalk is located across the west leg of Cypress Avenue. Cypress Avenue is a two-way street with one travel lane and a parking lane on each side of the roadway. Centre Street is a one-way northbound street with one travel lane and parking on both sides of the roadway (see Figures 8 and 9). Higher volumes of traffic are experienced on Cypress Avenue

This intersection was the site of seven accidents between 1998 and 2000; none of which were pedestrian accidents. NYPD accident data (Table 3) shows a total of 18 accidents; none of these were pedestrian accidents.

The school principal reported a speeding problem on Centre Street. Therefore, a speed survey was conducted on Centre Street between Cypress Avenue and Seneca Avenue in order to verify the existence of a speeding problem and to determine its extent.

The 85th percentile speed for northbound vehicles on Centre Street between Cypress Avenue and Seneca Avenue was found to be 27 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 Centre Street between Cypress Avenue and Seneca Avenue are shown in the Appendix at the end of the document.

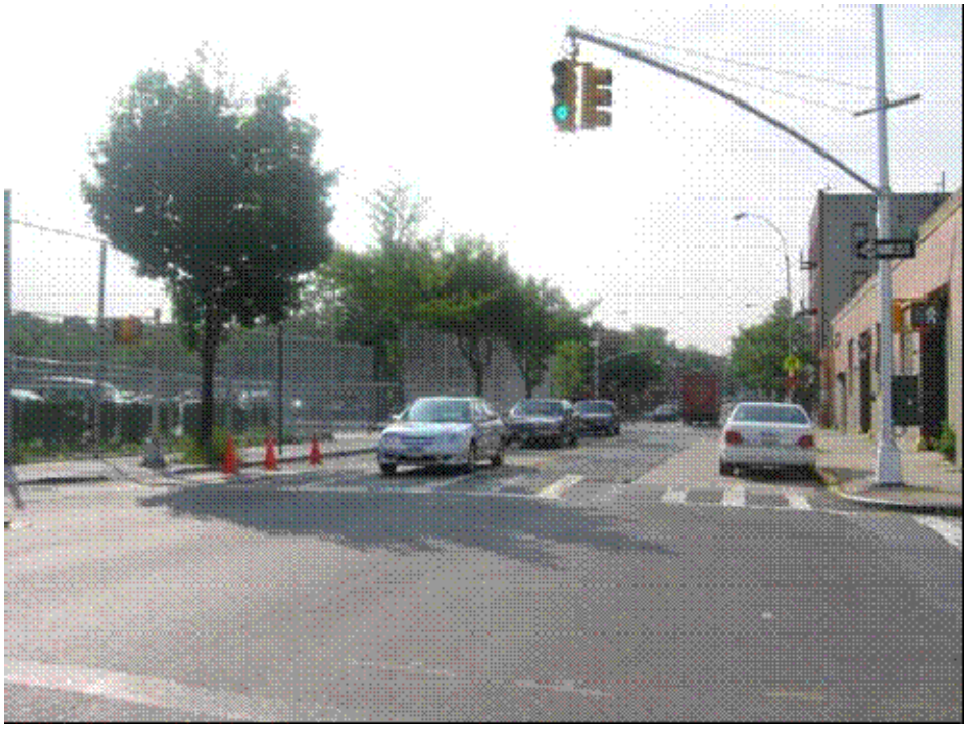


Figure 8: Looking east on Cypress Avenue across Centre Street, schoolyard is to the left

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Figure 9: Looking north on Centre Street across Cypress Avenue, school is on the right

3.6.5 Cypress Avenue and George Street

This is a four-leg signalized intersection with school crosswalks located across the north and south legs of George Street, and the west leg of Cypress Avenue. A pedestrian crosswalk is located across the east leg of Cypress Avenue. Cypress Avenue is a two-way street with one travel lane and a parking lane on each side of the roadway. George Street is a one-way southbound street with one travel lane and parking on both sides of the roadway (see Figures 10 and 11). Higher volumes of traffic are experienced on Cypress Avenue.

This intersection has been the site of nine accidents between 1998 and 2000; one of these was a pedestrian accident, which was not a school-related accident. NYPD accident data (Table 3) shows a total of 13 accidents between 2001 and 2004, three of these were pedestrian accidents, none of which were school-related. There were no pedestrian fatalities during either time period.

Figure 10: Looking west on Cypress Avenue across George Street intersection

Figure 11: Looking east along Cypress Avenue across George Street

3.6.6 Seneca Avenue and Norman Street

This is a four-leg unsignalized intersection and has no school or pedestrian crosswalks across any legs. Seneca Avenue is a two-way street with one travel lane and a parking lane on each side of the roadway. Norman Street is a one-way northbound street with one travel lane and parking on both sides of the roadway.

This intersection has been the site of 14 accidents between 1998 and 2000; one of these was a pedestrian accident, which was not a school-related accident. NYPD accident data (Table 3) shows a total of 23 accidents between 2001 and 2004; one of these was a pedestrian accident, which was also a school-related accident. No additional information is available about the school-related accident. There were no pedestrian fatalities during either time period.

3.6.7 Seneca Avenue and Stephan Street

This is a four-leg unsignalized intersection and has no school or pedestrian crosswalk across any legs. Seneca Avenue is a two-way street with one travel lane and a parking lane on each side of the roadway. Stephan Street is a one-way southbound street with one travel lane and parking on both sides of the roadway.

This intersection has been the site of eight accidents between 1998 and 2000; one of these was a pedestrian accident, which was not a school-related accident (Table 2). NYPD accident data (Table 3) shows a total of ten accidents between 2001 and 2004; one of these was a pedestrian accident, which was also a school-related accident. No additional information is available about the school-related accident. There were no pedestrian fatalities during either time period.

3.6.8 Myrtle Avenue/Seneca Avenue and Hancock Street

This is a five-leg signalized intersection with school crosswalks located across the east and west legs of Myrtle Avenue, high-visibility crosswalks across the southeast leg of Seneca Avenue and north leg of Hancock Street, and a pedestrian crosswalk across the northwest leg of Seneca. Myrtle Avenue is two-way, east-west street with one lane and a parking lane on each side of the roadway. Seneca Avenue is a two-way street with one travel lane and a parking lane on each side of the roadway. Hancock Street is a one-way northbound street with one travel lane and parking on both sides of the roadway.

This intersection has been the site of 24 accidents between 1998 and 2000; two of these were pedestrian accidents, none were school-related (Table 2). NYPD accident data (Table 3) shows a total of 49 accidents between 2001 and 2004, eight of these were pedestrian accidents, one of which was a school-related accident. There were no pedestrian fatalities during either time period.

3.7 SIGNAL TIMING

Pedestrian crossing times were field-verified for crosswalks at signalized intersections in the vicinity of I.S. 77, and were found to be adequate in all directions and approaches based upon a child pedestrian walking at a rate of 3 foot per second. Signal timings are shown in Table 4.

TABLE 4: PEDESTRIAN CROSSING TIMES AT SIGNALIZED INTERSECTIONS				
INTERSECTION	**CROSSWALK LENGTH (FEET)**	**PEDESTRIAN TIME ACTUAL (SECONDS)**	**PEDESTRIAN TIME REQUIRED (SECONDS)**	**TIMING ADJUSTMENT REQUIRED?**
Cypress Ave and Centre St				
Crossing Cypress Ave	40	20	17	NO
Crossing Centre St	30	32	13	NO
Cypress Ave and George St				
Crossing Cypress Ave	40	20	17	NO
Crossing George St	30	32	13	NO
Seneca Ave and Centre St				
Crossing Seneca Ave	36	19	15	NO
Crossing Centre St	30	32	13	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 in the vicinity of I.S. 77 are generally in fair condition. Sidewalks are seven to 15 feet in width on the school block face, and are in fair condition.

3.8.3 Pedestrian Ramps

Pedestrian ramps in the area of the school appear to be standard, except for the conditions at the following locations:

- Seneca Avenue and George Street
  - The pedestrian ramps are missing on both sides of the roadway for the pedestrian crosswalk located across the east leg of Seneca Avenue.
- Cypress Avenue and Centre Street
  - The pedestrian ramp is missing on the southeast corner, on the east side of Centre Street, for the school crosswalk located across the south leg of Centre Street.
  - Also on the southeast corner, the pedestrian ramp is smaller than standard size on the south side of Cypress Avenue, for the school crosswalk located across the east leg of Cypress Avenue.
  - Both of the pedestrian ramps on the southwest corner have a lip at the curb, instead of a smooth transition from the pavement to the ramp, on the south side of Cypress Avenue and the west side of Centre Street.
  - Both of the pedestrian ramps on the northwest corner have a lip at the curb, instead of a smooth transition from the pavement to the ramp, on the north side of Cypress Avenue and the west side of Centre Street.
- Cypress Avenue and George Street

- Both of the pedestrian ramps on the southeast corner have a lip at the curb, instead of a smooth transition from the pavement to the ramp, on the south side of Cypress Avenue and the east side of George Street.
- Both of the pedestrian ramps on the southwest corner have a lip at the curb, instead of a smooth transition from the pavement to the ramp, on the south side of Cypress Avenue and the west side of George Street.
- Both of the pedestrian ramps on the northeast corner have a lip at the curb, instead of a smooth transition from the pavement to the ramp, and are also smaller than standard size on the north side of Cypress Avenue and the east side of Centre Street.

There are also some obstructions to the crosswalk paths in the sidewalk/pedestrian ramp area on the southeast corner of Cypress Avenue and George Street. One is a traffic signal pole and the other is a fire call box, both of which are in the path of the crosswalk located across the east leg of Cypress Avenue (see Figure 12).

There is a drainage inlet on the northeast corner, which is in the path of the school crosswalk located across the north leg of George Street (see Figure 13).

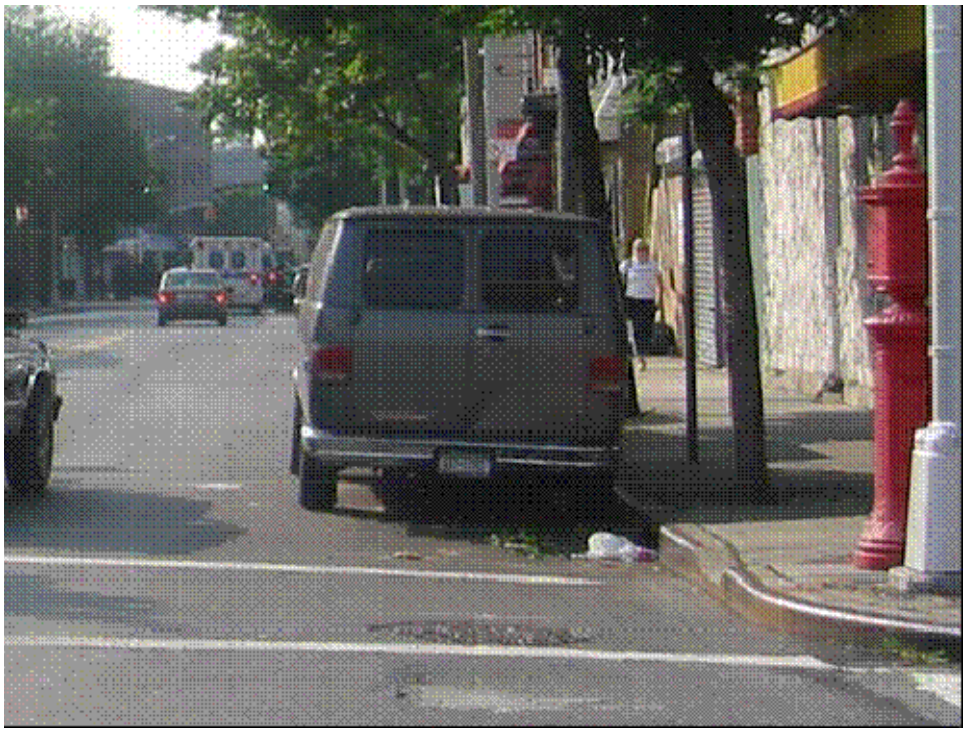


Figure 12: Looking east on Cypress Avenue at pedestrian ramp on southeast corner with lip at curb (Also note fire call box and traffic signal pole in path of pedestrian crosswalk located across east leg of Cypress Avenue)

Figure 13: Looking north on east side of George Street, north of Cypress Avenue, at drainage inlet in path of crosswalk located across north leg of George Street

4. PROPOSED MEASURES TO IMPROVE SCHOOL PEDESTRIAN SAFETY

This section describes the proposed measures to improve school pedestrian safety around I.S. 77. 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 I.S. 77 is discussed as follows, and is shown in more detail in Exhibit 6 at the end of this section.

4.1 SHORT-TERM MEASURES

- *Install "No Standing 7AM - 4PM School Days" signs*

  There are "No Parking 7AM – 4PM School Days" signs along the south side of Seneca Avenue between Centre Street and George Street. These existing signs should be replaced with "No Standing 7AM – 4PM School Days" signs. (Prohibiting standing in front of school's main entrance for a distance of 30 feet is a typical requirement for all NYC schools in order to provide for emergency access to and from the school.)

- *Place advanced stop bar before school crosswalk*

  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 intersections and mid-block crossings, the vehicle stop line can be moved farther back from the pedestrian crosswalk.

  For school crosswalks with significant potential for vehicular/pedestrian conflicts, it is recommended that the advance stop bar be placed ten feet in advance of the crosswalk to maximize the safety benefit for school-aged pedestrians. (This would improve visibility of pedestrians to motorists, and allow pedestrians to proceed in a crosswalk before motor vehicles turn.)

  Ten-foot advanced stop bars before school crosswalks are recommended on the following approaches of signalized intersections surrounding I.S. 77:

  - Northbound approach of Centre Street at Seneca Avenue
  - Westbound approach of Seneca Avenue at Centre Street
  - Northbound approach of Centre Street at Cypress Avenue
  - Westbound approach of Cypress Avenue at Centre Street
  - Southbound approach of George Street at Cypress Avenue
  - Eastbound approach of Cypress Avenue at George Street

- *Pedestrian crosswalk at the following locations*

  There are no pedestrian crosswalks at the two-way stop-controlled intersections of Seneca Avenue/Norman Street, Seneca Avenue/Stephan Street, and Seneca Avenue/Weirfield Street. These intersections have experienced school-related accidents. It is therefore recommended to:

- Provide pedestrian crosswalks across the north and south legs of Norman Street at Seneca Avenue
- Provide pedestrian crosswalks across the north and south legs of Stephan Street at Seneca Avenue
- Provide pedestrian crosswalks at the north and south legs of Weirfield Street at Seneca Avenue
- Place a stop bar four feet in advance of the proposed pedestrian crosswalks

➢ *Administer student pedestrian safety education program*

Since the information about the accident location and pedestrian action prior to accident is not available for the school-related accidents, it is presumed that most of these accident occurred while the students were crossing the uncontrolled approaches of the intersections. It is therefore recommended that:

- The NYCDOT Safety Education Program work with the school to educate the students not to cross at the unmarked and uncontrolled legs of the intersection, at mid-block locations, and not to cross against signals.

4.2 LONG-TERM MEASURES

➢ *Consider curb extensions at the following locations:*

The school principal reported a speeding problem on Seneca Avenue between Center Street and George Street. Therefore, a spot speed survey was conducted in order to verify the existence of a speeding problem on Seneca Avenue. The eastbound and westbound vehicles at Seneca Avenue between Centre Street and George Street were found to be traveling with an 85th percentile speed of 29 and 27 mph, respectively, below the threshold speed limit of 30 mph.

However, in order to reduce the crossing distance at the uncontrolled legs of Seneca Avenue, curb extensions are proposed at the following locations (the proposed curb extensions would also help reduce speeds on Seneca Avenue):

- Northwest and southwest corners of Seneca Avenue at Norman Street
- Northeast and southeast corners of Seneca Avenue at Stephan Street
- Northeast and southeast corners of Seneca Avenue at George Street
- Northwest and southwest corners of Seneca Avenue at Centre Street
- Northwest and southwest corners of Seneca Avenue at Weirfied Street
- Northwest and southwest corners of Cypress Avenue at George Street
- Northeast and southeast corners of Cypress Avenue at Centre Street

Curb extensions should be installed at the corners as shown in Exhibit 6. The purpose of the curb extension is to provide additional reservoir 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

extension 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.

- *Construct Pedestrian Ramps*

  Pedestrian ramps are missing at the intersection of Seneca Avenue and George Street, on both sides of the roadway for the pedestrian crosswalk located across the east leg of Seneca Avenue.

  The pedestrian ramp is missing at the intersection of Cypress Avenue and Centre Street on the southeast corner, on the east side of Centre Street, for the school crosswalk located across the south leg of Centre Street.

  The following is therefore recommended:

  - Construct pedestrian ramps on both the north and south sides of Seneca Avenue for the crosswalk located across the east leg of the George Street intersection.
  - Construct a pedestrian ramp on the east side of Centre Street for the crosswalk located across the south leg of the Cypress Avenue intersection.

- *Reconstruct or Modify Pedestrian Ramps*

  Several pedestrian ramps are either smaller than standard or have a lip at the curb preventing a smooth transition between the pavement and the pedestrian ramp. The following intersections were found to have non-standard conditions:

  Cypress Avenue and Centre Street intersection:

  - On the southeast corner, the pedestrian ramp is smaller than standard size on the south side of Cypress Avenue, for the school crosswalk located across the east leg of Cypress Avenue.
  - Both of the pedestrian ramps on the southwest corner have a lip at the curb, instead of a smooth transition from the pavement to the ramp, on the south side of Cypress Avenue and the west side of Centre Street.
  - Both of the pedestrian ramps on the northwest corner have a lip at the curb, instead of a smooth transition from the pavement to the ramp, on the north side of Cypress Avenue and the west side of Centre Street.

  Cypress Avenue and George Street intersection:

  - The pedestrian ramps on the southeast corner are both smaller than standard size and have a lip at the curb, instead of a smooth transition from the pavement to the ramp, on the south side of Cypress Avenue and the east side of George Street.
  - The pedestrian ramps on the southwest corner both have a lip at the curb, instead of a smooth transition from the pavement to the ramp, on the south side of Cypress Avenue and the west side of George Street.

- Both of the pedestrian ramps on the northeast corner have a lip at the curb, instead of a smooth transition from the pavement to the ramp, and are smaller than standard size on the north side of Cypress Avenue and the east side of George Street.

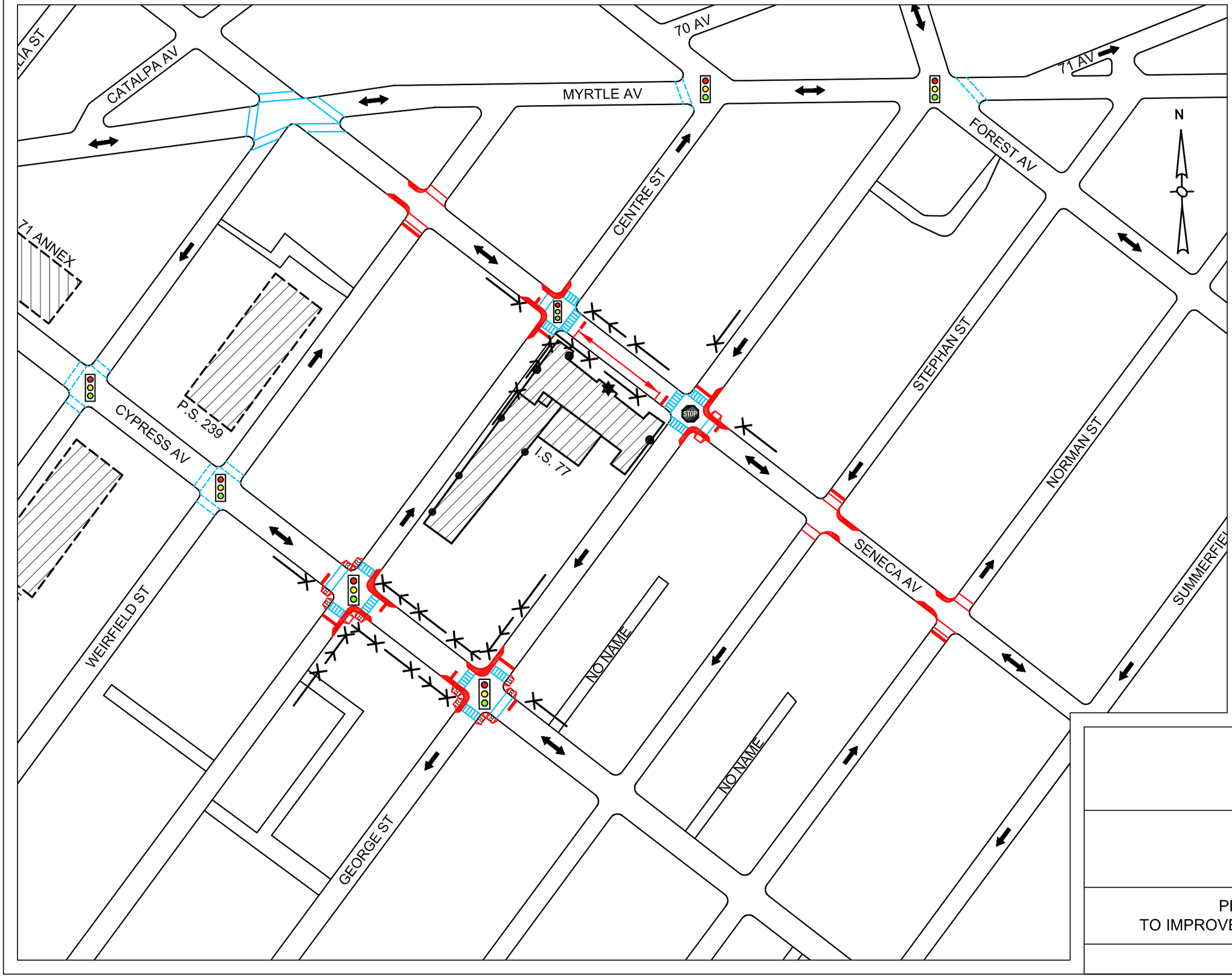
The following improvements are therefore recommended:

Cypress Avenue and Centre Street intersection:

- Reconstruct the pedestrian ramp on the southeast corner of Cypress Avenue and Centre Street, since the pedestrian ramp is smaller than standard size on the south side of Cypress Avenue, for the school crosswalk located across the east leg of Cypress Avenue.
- Modify the pedestrian ramps on the southwest corner to eliminate the lip at the curb, and provide a smooth transition from the pavement to the ramp, on the south side of Cypress Avenue and the west side of Centre Street.
- Modify the pedestrian ramps on the northwest corner to eliminate the lip at the curb, and provide a smooth transition from the pavement to the ramp, on the north side of Cypress Avenue and the west side of Centre Street.

Cypress Avenue and George Street intersection:

- Reconstruct the pedestrian ramps on the southeast corner to make them standard in size and to eliminate the lip at the curb, and provide a smooth transition from the pavement to the ramp, on the south side of Cypress Avenue and the east side of George Street.
- Modify the pedestrian ramps on the southwest corner to eliminate the lip at the curb, and provide a smooth transition from the pavement to the ramp, on the south side of Cypress Avenue and the west side of George Street.
- Reconstruct the pedestrian ramps on the northeast corner to make them standard in size and to eliminate the small lip at the curb, providing a smooth transition from the pavement to the ramp, on the north side of Cypress Avenue and the east side of George Street.



LEGEND

- MAIN ENTRANCE
- OTHER ENTRANCES
- EXISTING TRAVEL DIRECTION
- EXISTING ADVANCE WARNING SIGN OR SCHEDUALED TO BE INSTALLED
- EXISTING SCHOOL CROSSWALK WARNING ASSEMBLY OR SCHEDUALED TO BE INSTALLED
- SIGNALIZED LOCATION
- EXISTING ALL WAY STOP LOCATION
- EXISTING SCHOOL CROSSWALK
- EXISTING PEDESTRIAN CROSSWALK
- EXISTING SCHOOL CROSSWALK ASSIGNED TO ANOTHER SCHOOL
- PROPOSED PEDESTRIAN CROSSWALK
- PROPOSED TRAFFIC SIGN
- PEDESTRIAN RAMP TO BE RECONSTRUCTED
- PROPOSED STOP LINE IN ADVANCE OF SCHOOL CROSSWALK
- PROPOSED "NO STANDING 7:OOAM - 4:00PM SCHOOL DAYS"
- PROPOSED CURB EXTENSION (NECKDOWN)

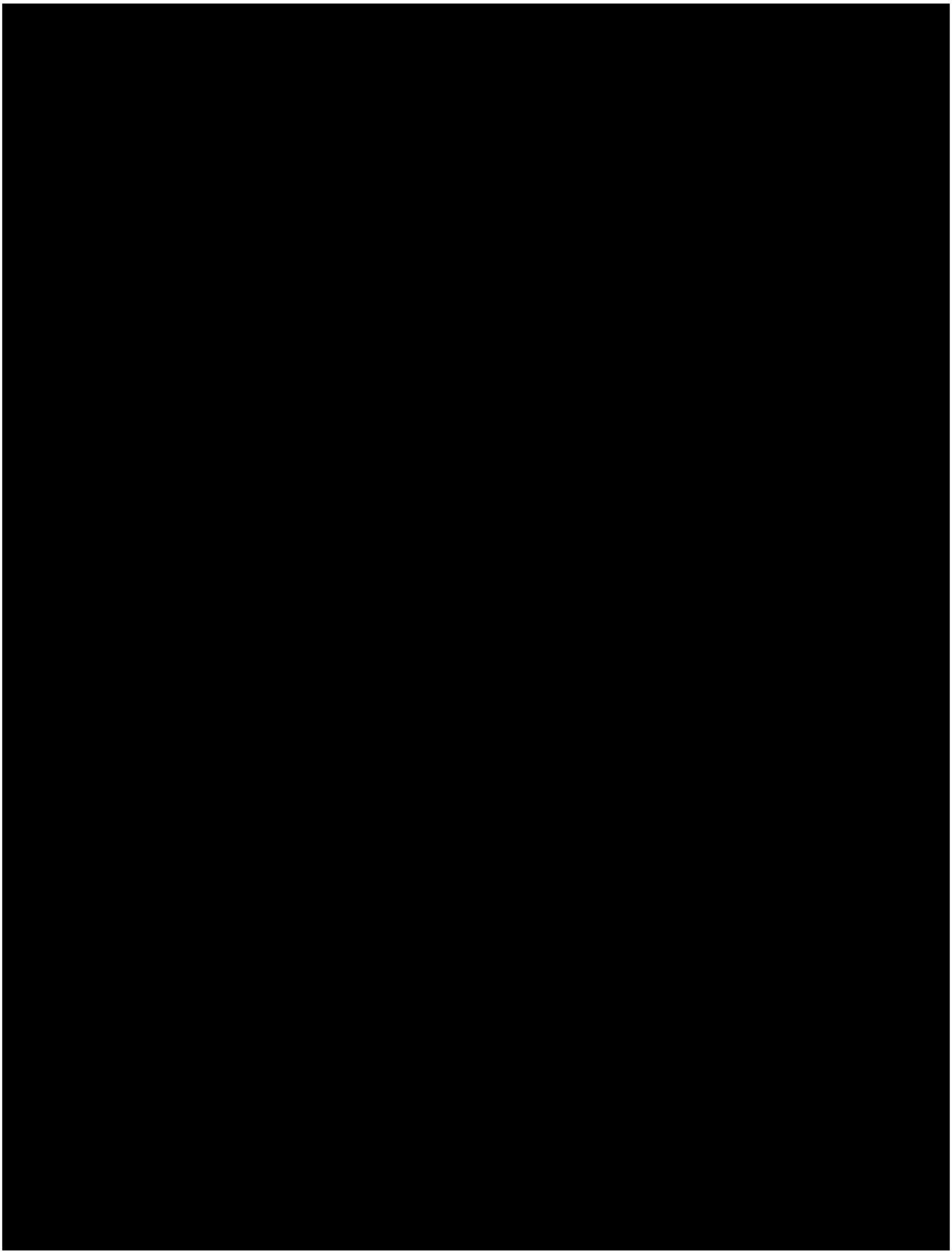
1" = 200'

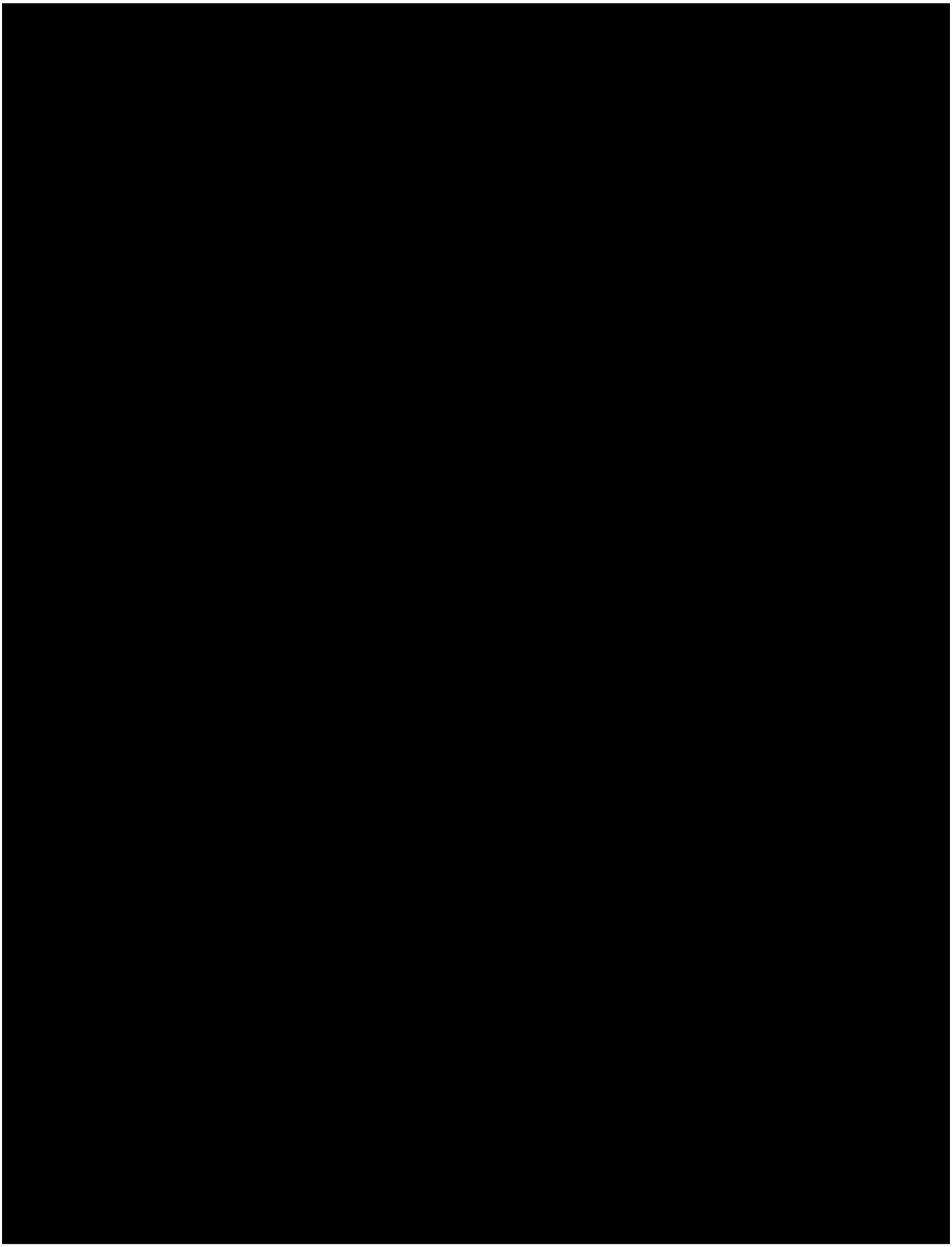
EXHIBIT 6

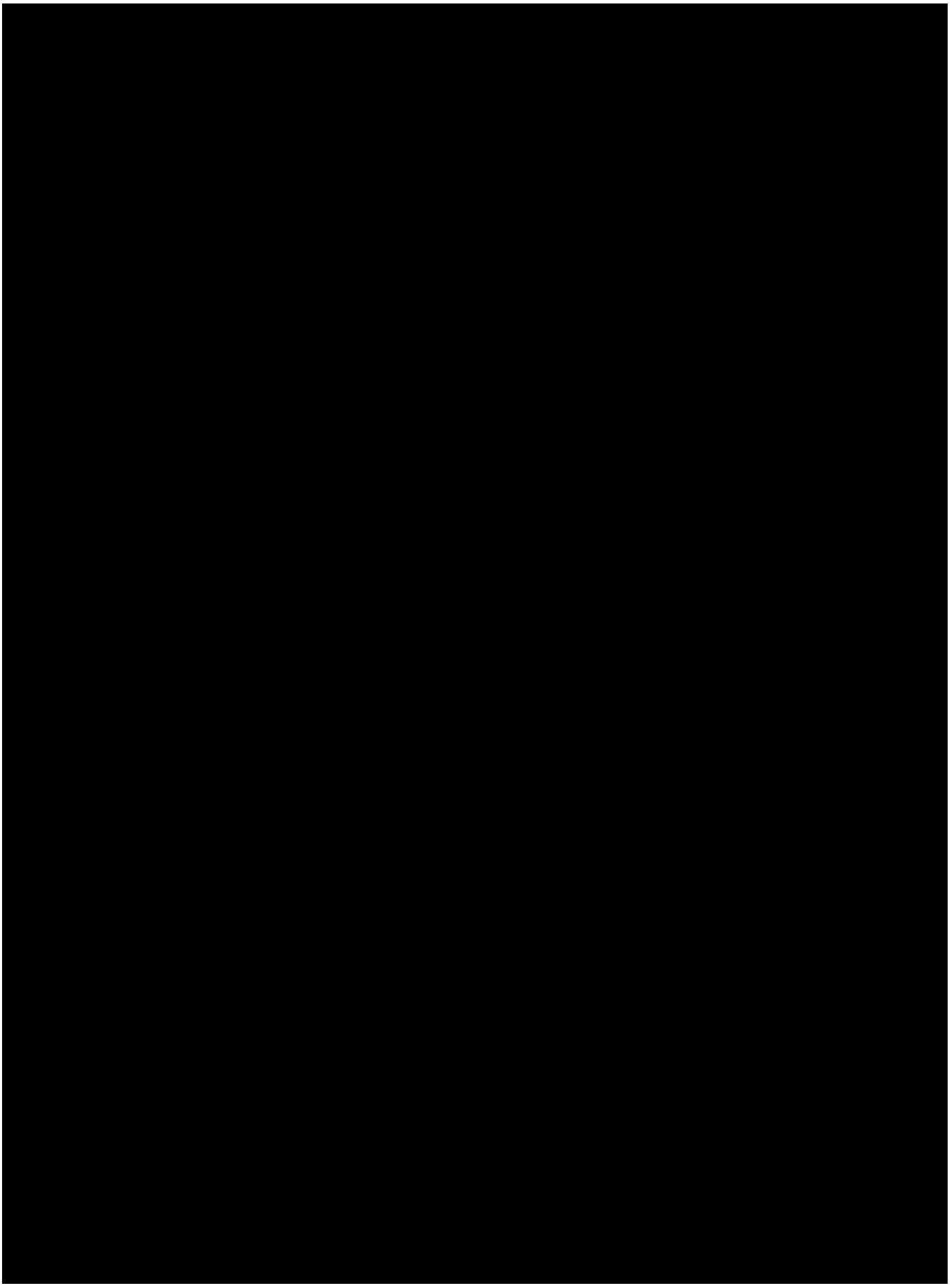
I.S. 77 QUEENS

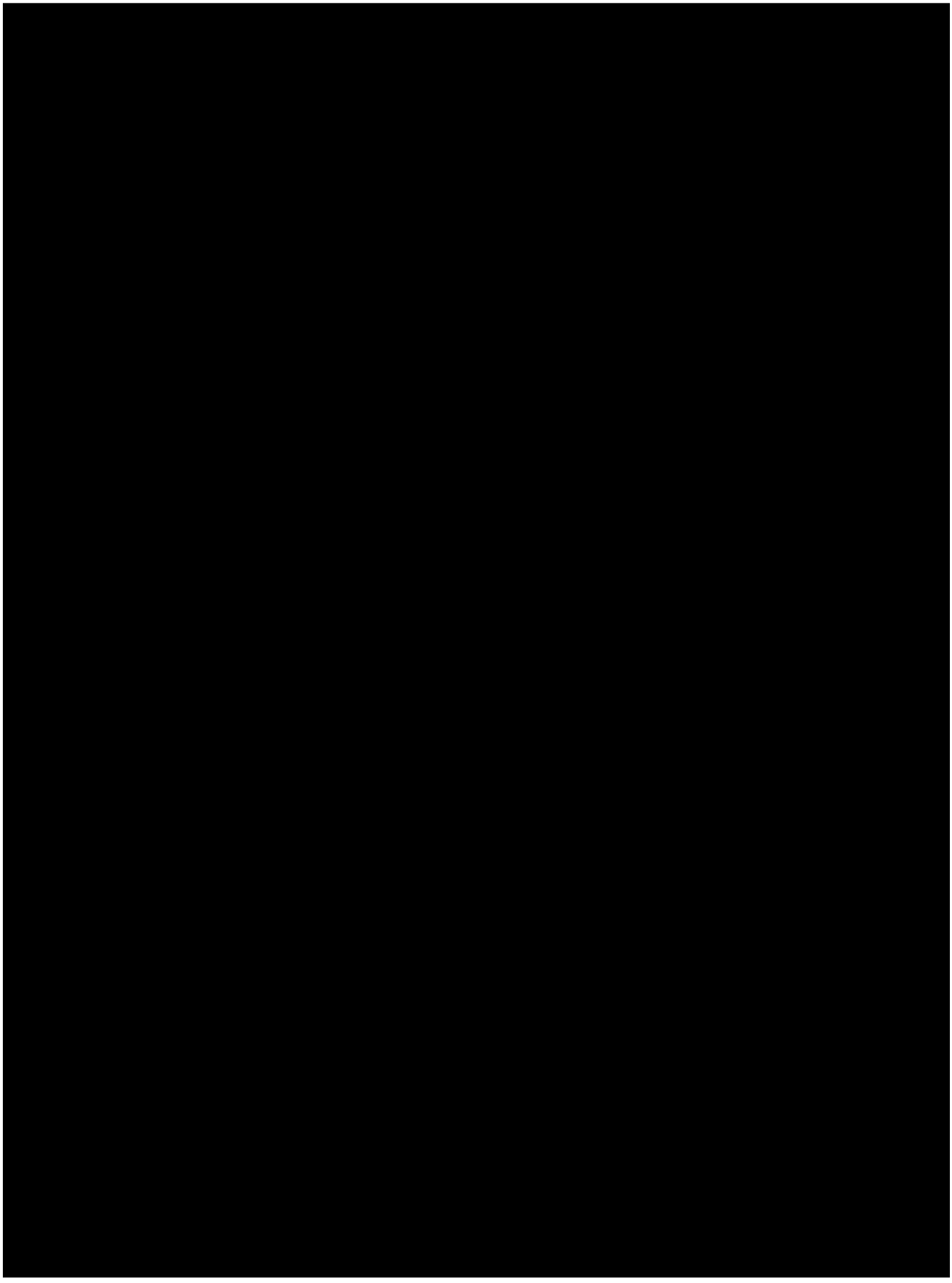
PROPOSED MEASURES
TO IMPROVE SCHOOL PEDESTRIAN SAFETY

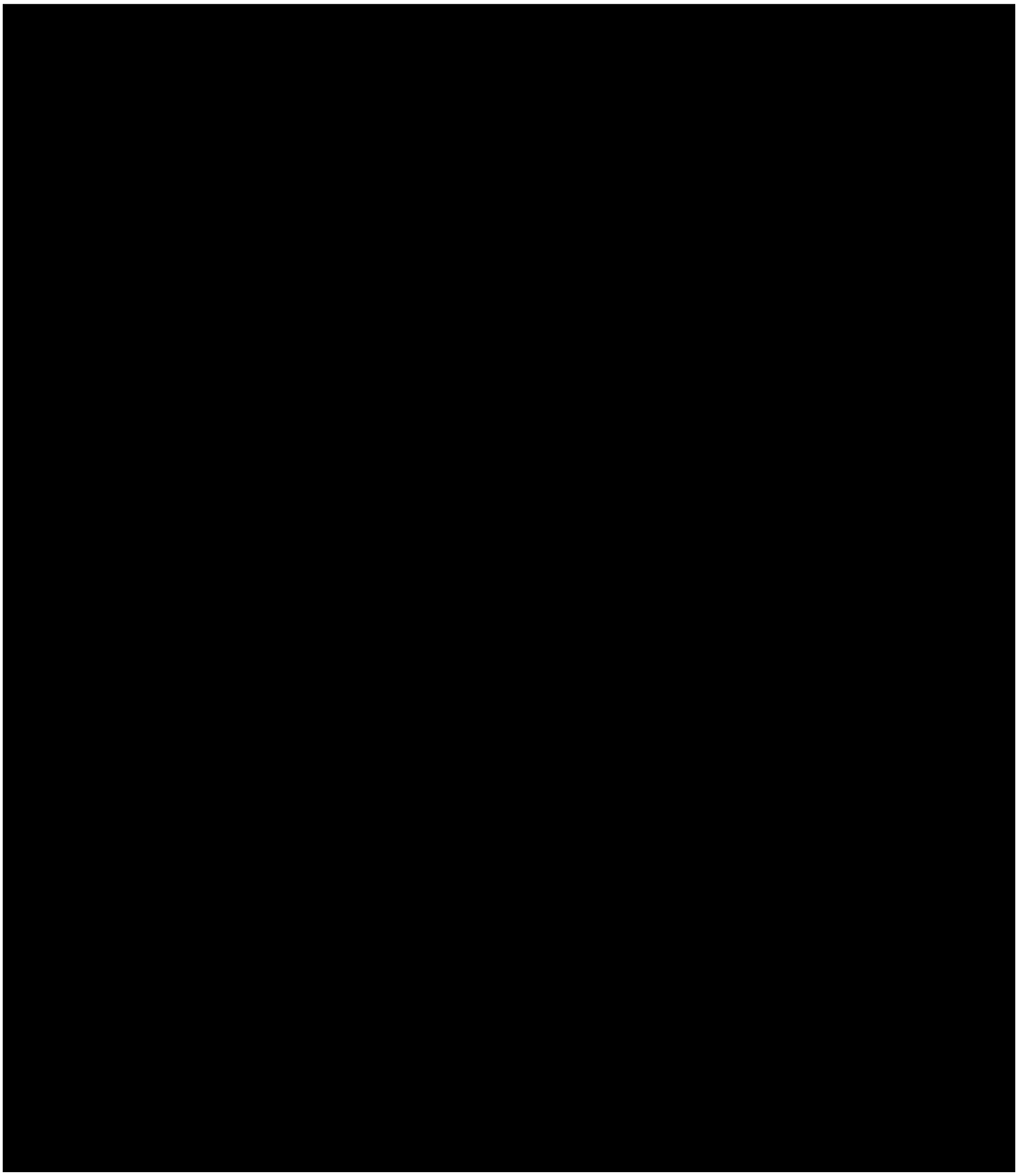
APPENDIX











SPOT SPEED STUDY

Date: **October 18, 2005** Time: **12:40 pm-1:40 pm** School: **I.S. 77**
Location: **Centre Street between Cypress Avenue & Seneca Avenue** Direction: **NB**
Surveyor: **R. Calvache/H. 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	0	0.0%	0.0%	0	0
19	0	0.0%	0.0%	0	0
20	8	13.1%	13.1%	160	3200
21	3	4.9%	18.0%	63	1323
22	13	21.3%	39.3%	286	6292
23	8	13.1%	52.5%	184	4232
24	4	6.6%	59.0%	96	2304
25	7	11.5%	70.5%	175	4375
26	7	11.5%	82.0%	182	4732
27	3	4.9%	86.9%	81	2187
28	4	6.6%	93.4%	112	3136
29	1	1.6%	95.1%	29	841
30	3	4.9%	100.0%	90	2700
31	0	0.0%	100.0%	0	0
32	0	0.0%	100.0%	0	0
33	0	0.0%	100.0%	0	0
34	0	0.0%	100.0%	0	0
35	0	0.0%	100.0%	0	0
36	0	0.0%	100.0%	0	0
37	0	0.0%	100.0%	0	0
38	0	0.0%	100.0%	0	0
39	0	0.0%	100.0%	0	0
40	0	0.0%	100.0%	0	0
41	0	0.0%	100.0%	0	0
42	0	0.0%	100.0%	0	0
43	0	0.0%	100.0%	0	0
44	0	0.0%	100.0%	0	0
45	0	0.0%	100.0%	0	0
46	0	0.0%	100.0%	0	0
47	0	0.0%	100.0%	0	0
48	0	0.0%	100.0%	0	0
49	0	0.0%	100.0%	0	0
50	0	0.0%	100.0%	0	0
51	0	0.0%	100.0%	0	0
52	0	0.0%	100.0%	0	0
53	0	0.0%	100.0%	0	0
54	0	0.0%	100.0%	0	0
55	0	0.0%	100.0%	0	0
56	0	0.0%	100.0%	0	0
	61	100.0%		1458	35322

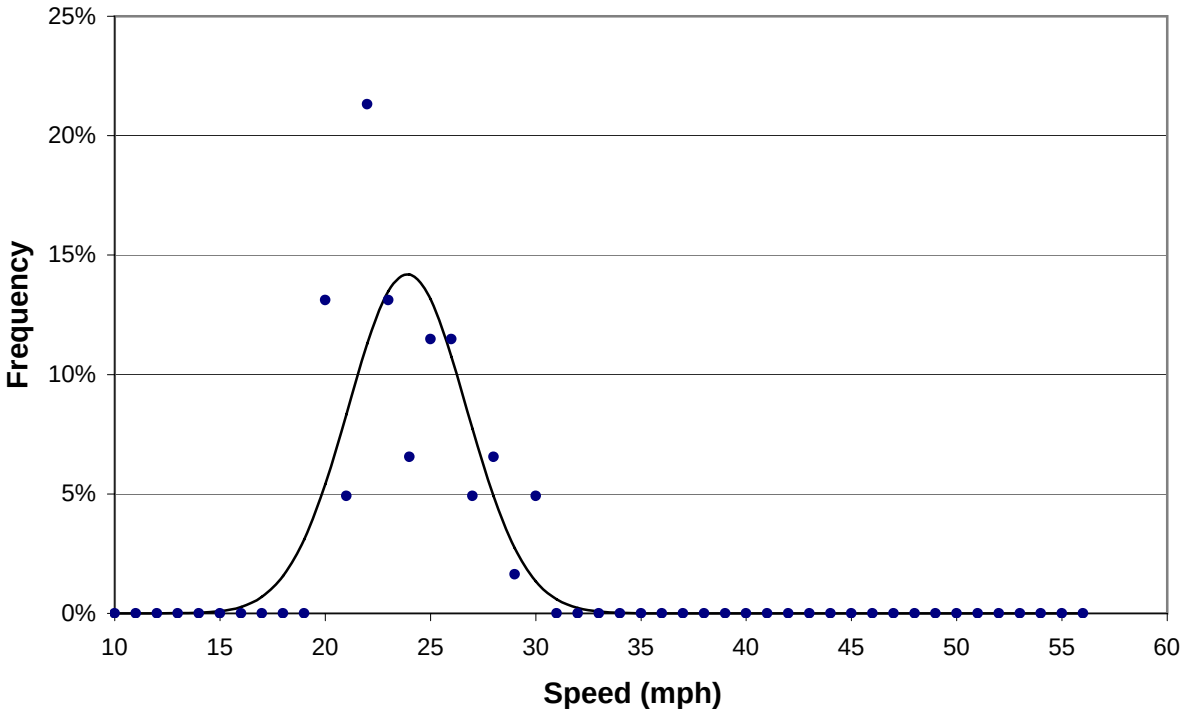
Mean Speed = 23.9 mph
Standard Deviation = 2.8 mph
Margin of Error (95% Confidence) = ± 0.7 mph

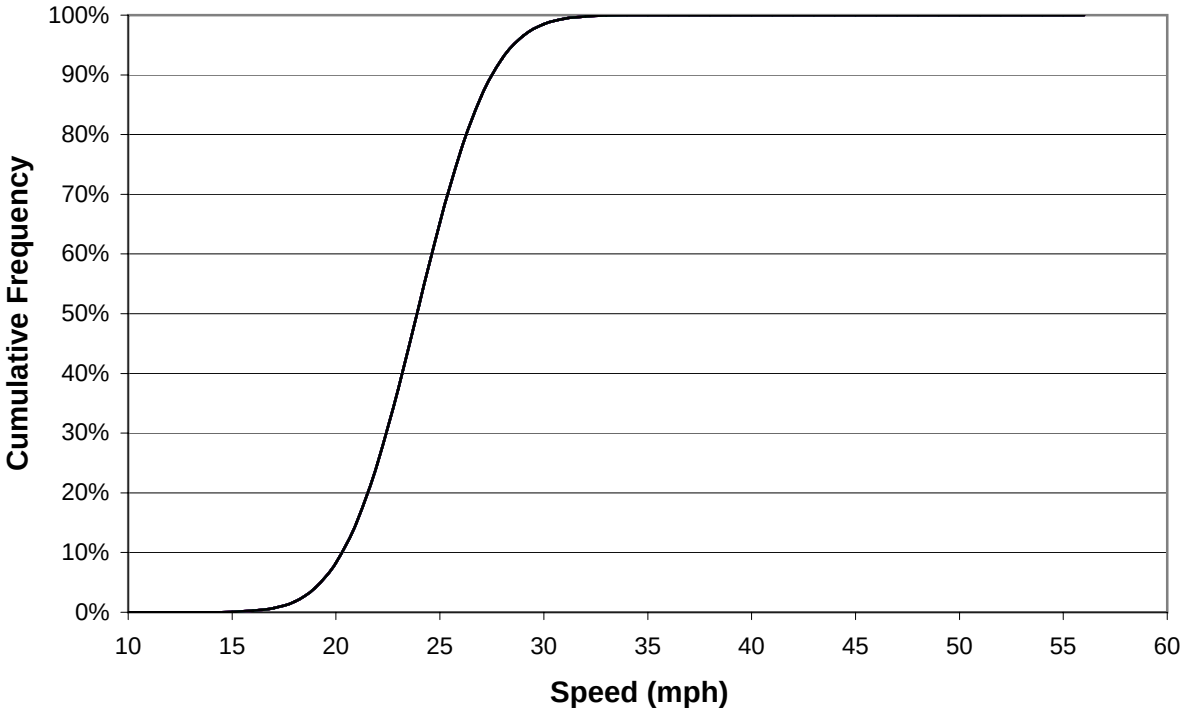
Median Speed = 23.9 mph
15th Percentile Speed = 21.0 mph
85th Percentile Speed = 26.8 mph

SPOT SPEED STUDY

Date: **October 18, 2005** Time: **12:40 pm-1:40 pm** School: **I.S. 77**
Location: **Centre Street between Cypress Avenue & Seneca Avenune** Direction: **NB**
Surveyor: **R. Calvache/H. Salinas** Comments:

Mean Speed =	23.9 mph	Median Speed =	23.9 mph
Standard Deviation =	2.8 mph	15th Percentile Speed =	21.0 mph
Margin of Error (95% Confidence) =	± 0.7 mph	85th Percentile Speed =	26.8 mph





SPOT SPEED STUDY

Date: **October 18, 2005** Time: **11:30 am - 12:30 pm** School: **I.S. 77**
Location: **Seneca Avenue between Centre Street & George Street** Direction: **Eastbound**
Surveyor: **R. Calvache/H. 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	0	0.0%	0.0%	0	0
19	0	0.0%	0.0%	0	0
20	6	12.5%	12.5%	120	2400
21	2	4.2%	16.7%	42	882
22	2	4.2%	20.8%	44	968
23	8	16.7%	37.5%	184	4232
24	4	8.3%	45.8%	96	2304
25	7	14.6%	60.4%	175	4375
26	3	6.3%	66.7%	78	2028
27	6	12.5%	79.2%	162	4374
28	4	8.3%	87.5%	112	3136
29	2	4.2%	91.7%	58	1682
30	2	4.2%	95.8%	60	1800
31	0	0.0%	95.8%	0	0
32	1	2.1%	97.9%	32	1024
33	0	0.0%	97.9%	0	0
34	0	0.0%	97.9%	0	0
35	0	0.0%	97.9%	0	0
36	0	0.0%	97.9%	0	0
37	0	0.0%	97.9%	0	0
38	0	0.0%	97.9%	0	0
39	1	2.1%	100.0%	39	1521
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
	48	100.0%		1202	30726

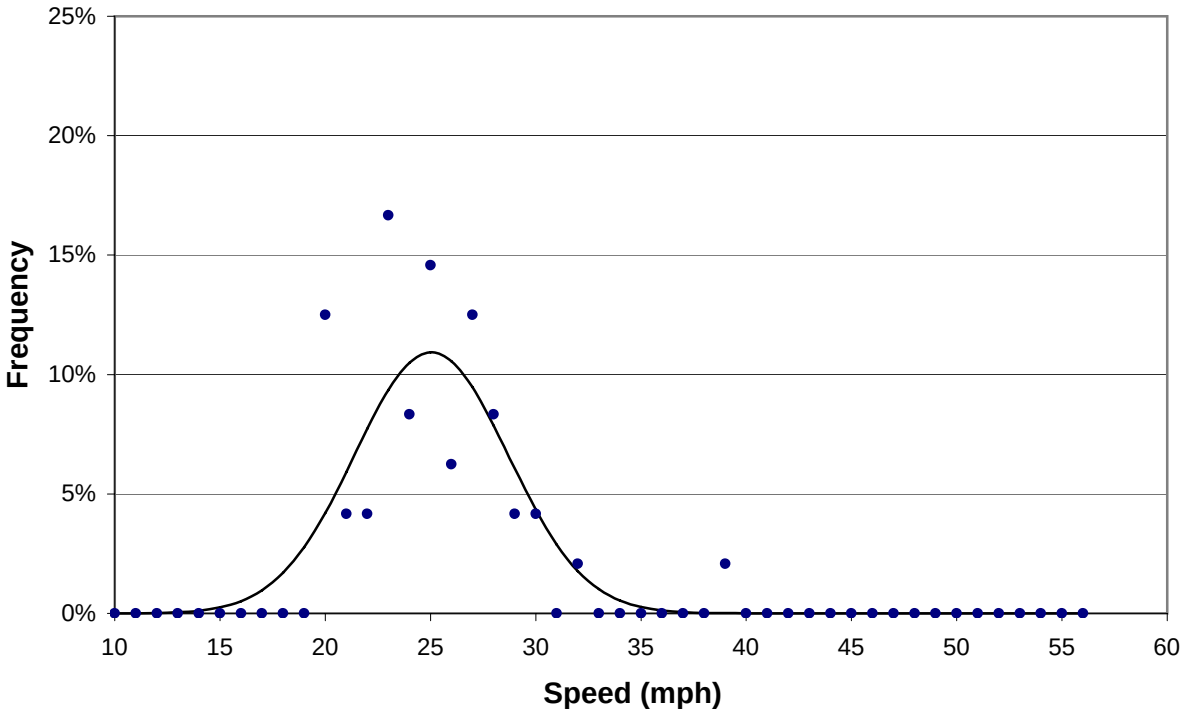
Mean Speed = 25.0 mph
Standard Deviation = 3.6 mph
Margin of Error (95% Confidence) = ± 1.0 mph

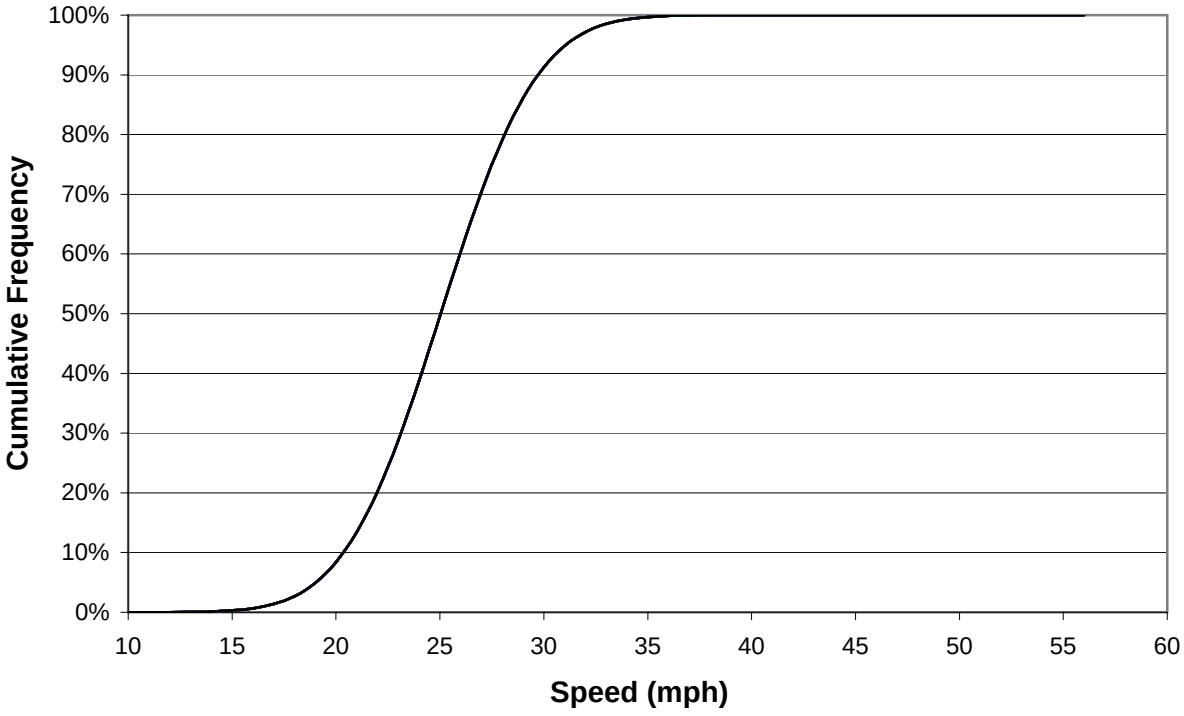
Median Speed = 25.0 mph
15th Percentile Speed = 21.3 mph
85th Percentile Speed = 28.8 mph

SPOT SPEED STUDY

Date: **October 18, 2005** Time: **11:30 am - 12:30 pm** School: **I.S. 77**
Location: **Seneca Avenue between Centre Street & George Street** Direction: **Eastbound**
Surveyor: **R. Calvache/H. Salinas** Comments:

Mean Speed =	25.0 mph	Median Speed =	25.0 mph
Standard Deviation =	3.6 mph	15th Percentile Speed =	21.3 mph
Margin of Error (95% Confidence) =	± 1.0 mph	85th Percentile Speed =	28.8 mph





SPOT SPEED STUDY

Date: **October 18, 2005** Time: **11:30 am - 12:30 pm** School: **I.S. 77**
Location: **Seneca Avenue between Centre Street & George Street** Direction: **Westbound**
Surveyor: **R. Calvache/H. 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	0	0.0%	0.0%	0	0
19	0	0.0%	0.0%	0	0
20	3	10.0%	10.0%	60	1200
21	0	0.0%	10.0%	0	0
22	7	23.3%	33.3%	154	3388
23	6	20.0%	53.3%	138	3174
24	2	6.7%	60.0%	48	1152
25	9	30.0%	90.0%	225	5625
26	2	6.7%	96.7%	52	1352
27	0	0.0%	96.7%	0	0
28	0	0.0%	96.7%	0	0
29	0	0.0%	96.7%	0	0
30	0	0.0%	96.7%	0	0
31	0	0.0%	96.7%	0	0
32	0	0.0%	96.7%	0	0
33	0	0.0%	96.7%	0	0
34	0	0.0%	96.7%	0	0
35	1	3.3%	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
	30	100.0%		712	17116

Mean Speed = 23.7 mph
Standard Deviation = 2.7 mph
Margin of Error (95% Confidence) = ± 1.0 mph

Median Speed = 23.7 mph
15th Percentile Speed = 20.9 mph
85th Percentile Speed = 26.6 mph

SPOT SPEED STUDY

Date: **October 18, 2005** Time: **11:30 am - 12:30 pm** School: **I.S. 77**
Location: **Seneca Avenue between Centre Street & George Street** Direction: **Westbound**
Surveyor: **R. Calvache/H. Salinas** Comments:

Mean Speed =	23.7 mph	Median Speed =	23.7 mph
Standard Deviation =	2.7 mph	15th Percentile Speed =	20.9 mph
Margin of Error (95% Confidence) =	± 1.0 mph	85th Percentile Speed =	26.6 mph