

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



School Safety Engineering Project

FINAL REPORT: Sacred Heart School, Staten Island



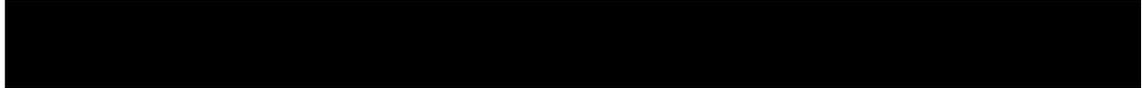
**Prepared by
The RBA Group/Urbitrans Associates**



September 21, 2006

**School Safety Engineering Project
Final Report: Sacred Heart School, Staten Island**

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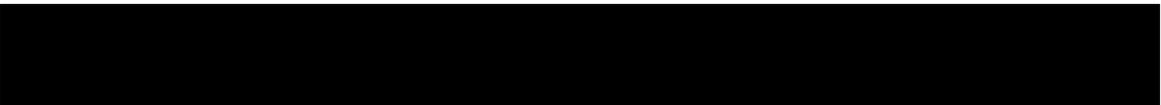
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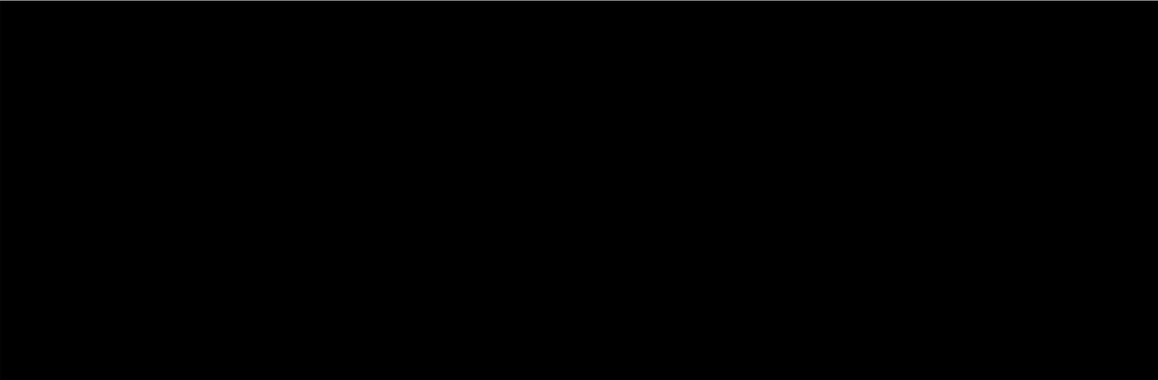
1. INTRODUCTION

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, 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). The Sacred Heart School in Staten Island 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 shows an aerial view of the neighborhood surrounding the school. The Sacred Heart School is bounded by Castleton Avenue to the north, Cary Avenue to the south, Bement Avenue to the east, and North Burgher Avenue to the west. The neighborhood surrounding the school generally consists of residential land uses. Immediately adjacent to the school, there are single-family houses fronting Bement Avenue to the east and Cary Avenue to the south. Castleton Avenue is an major east-west roadway through the neighborhood and carries high volumes of commuter traffic during the weekday morning and evening peak periods. Forest Avenue, another major east-west roadway in Staten Island, is located approximately three blocks the south of the school and also carries high volumes of commuter traffic during the weekday morning and evening peak periods.

The Sacred Heart Church is located on the northwest corner of the North Burgher Avenue and Castleton Avenue intersection (see Figures 1 and 2). The Staten Island Civil Courthouse is located on the northeast corner of the Castleton Avenue and Bement Avenue intersection, and houses the Civil Court and associated offices.

2.3 MEETING WITH SCHOOL REPRESENTATIVES

Members of the consultant team met with the principal and secretary from the Sacred Heart School on the morning of June 3, 2004. According to the principal, the problems faced by students at the Sacred Heart School are as follows:

- High traffic volumes and high vehicle speeds on Castleton Avenue during commute times.
- Congestion along North Burgher Avenue and along Castleton Avenue in the vicinity of the school during school arrival and dismissal times.
- Parents dropping-off students between school buses along North Burgher Avenue.
- The signal timing is too long at the Castleton Avenue and North Burgher Avenue intersection.

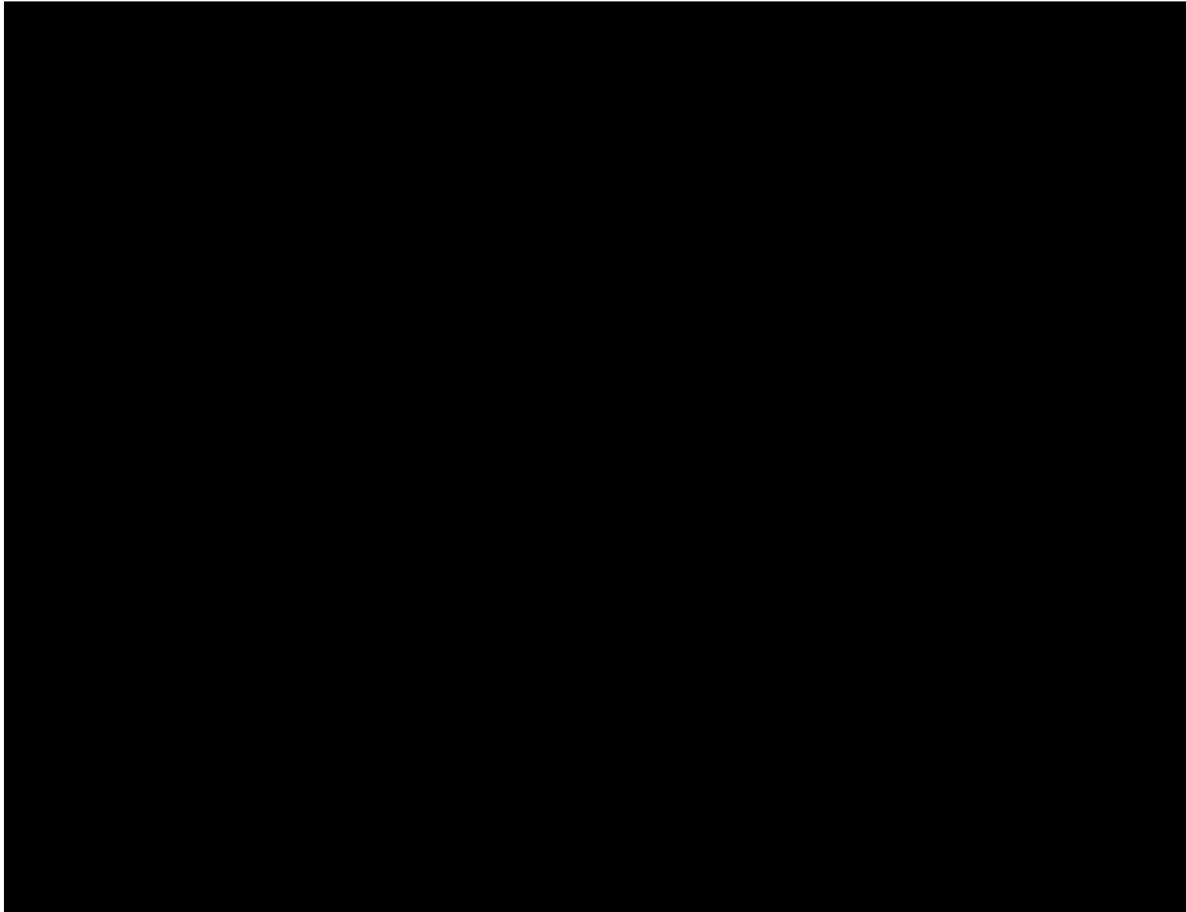
(See the Appendix at the end of this document for a summary of the school administration's concerns, and the school's survey response.)



Figure 1: Looking south along North Burgher Avenue, south of Castleton Avenue (Sacred Heart School is to the left)



Figure 2: Looking north along North Burgher Avenue toward Castleton Avenue (Sacred Heart School is to the right)





2.6 PRIMARY MODES OF TRANSPORT TO AND FROM SCHOOL

The school’s catchment area is typically defined by the Department of Education and normally shown in an Exhibit at the end of this section. However, because Sacred Heart is a private parochial school, the actual “catchment area” is dependent upon other factors determined by the school administrators. Therefore, no actual catchment area is available for the Sacred Heart School.

According to school officials, approximately ten percent of the students walk to school, 79 percent arrive by private vehicles, ten percent arrive by yellow buses, and one percent takes public transportation.

Table 1 presents the modes of travel for the Sacred Heart School as identified by school officials.

TABLE 1: MODES OF TRAVEL (AS ESTIMATED BY SCHOOL OFFICIALS)	STUDENTS (Percentage)
Walk	10%
Driven by car	79%
School bus	10%
Bus/Subway	1%
Bicycle	0%
TOTAL	100%

2.7 ADDITIONAL STUDENT PEDESTRIAN TRAFFIC GENERATORS

There were no student pedestrian generators observed in the immediate vicinity of the school. However, there are a variety of commercial land uses along Castleton Avenue (to the north) and Broadway (to the west).

2.8 CROSSING GUARDS LOCATIONS

According to school officials, crossing guards are assigned to the following intersections:

- Castleton Avenue and North Burgher Avenue
- Cary Avenue and North Burgher Avenue
- Castleton Avenue and Bement Avenue

It should be noted that the school crossing guard for the intersection of Castleton Avenue and Bement Avenue has been removed. There was no school crossing guard assigned to this intersection during the 2004 to 2005 school year. Exhibit 3 shows the school crossing guard locations.

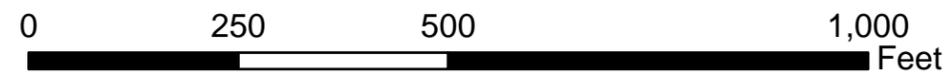
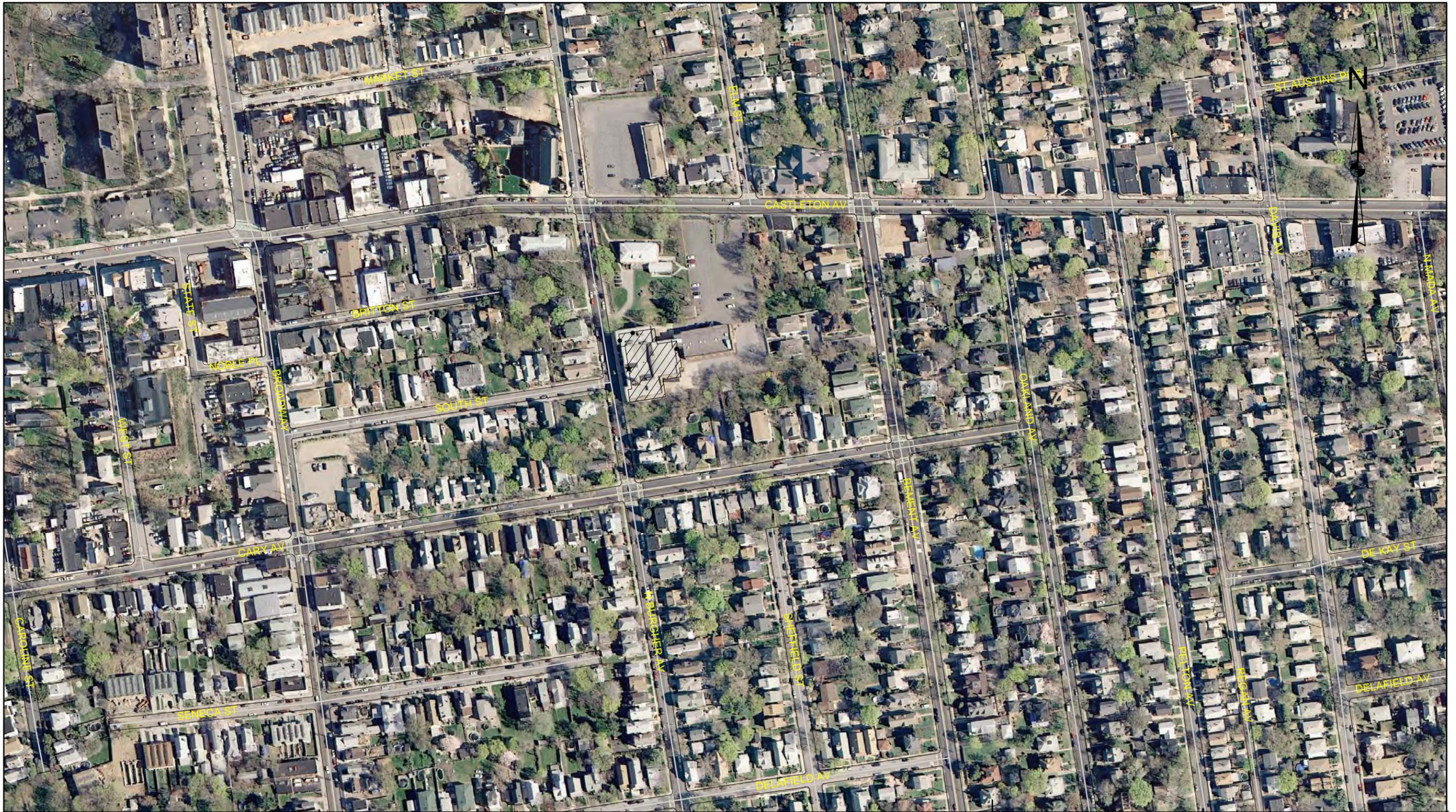
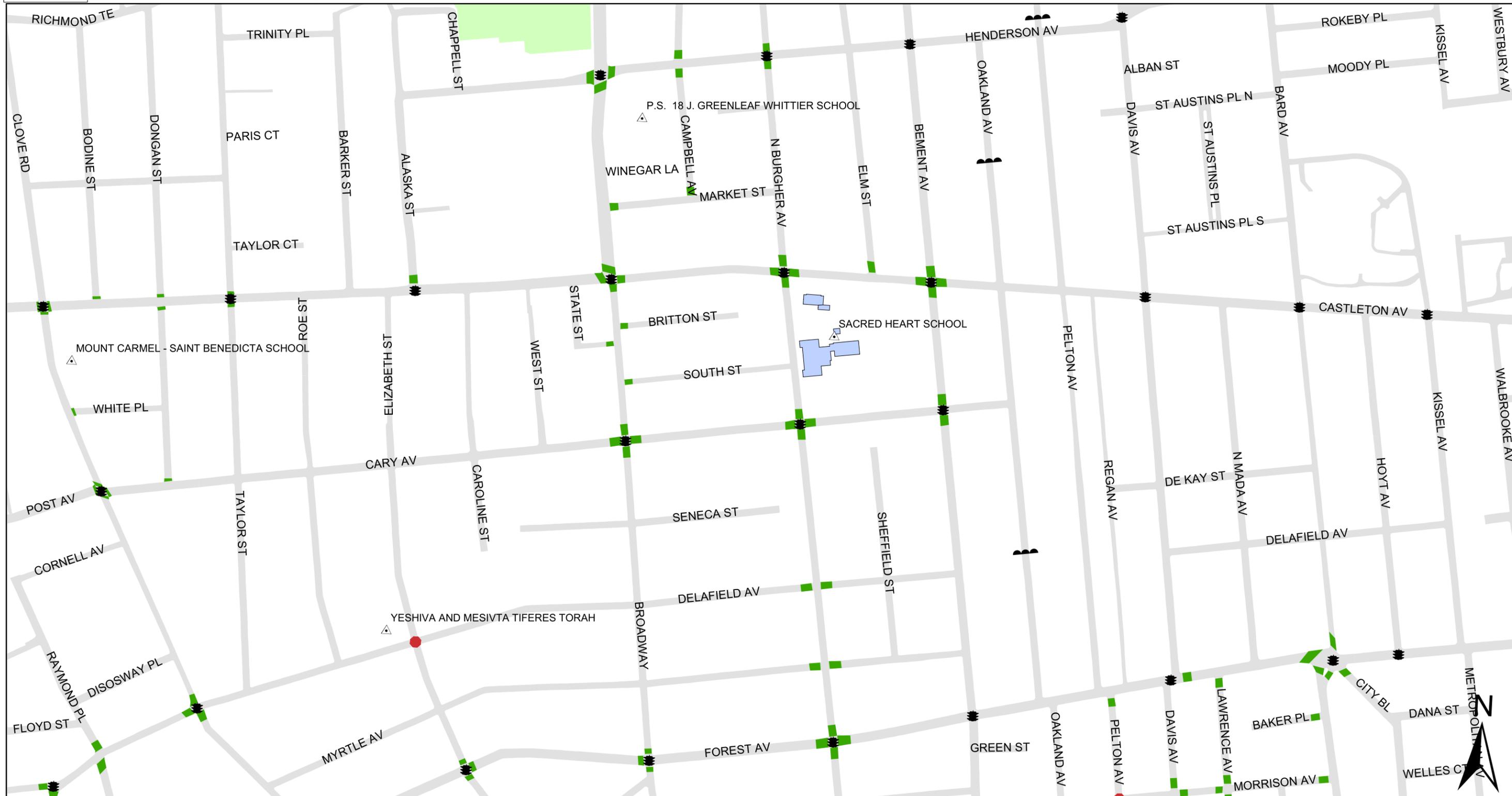


EXHIBIT 1
SACRED HEART SCHOOL
STATEN ISLAND
AERIAL PHOTOGRAPH



School Traffic Safety Map



The School Traffic Safety Map was established to help provide the maximum degree of safety for children going to and from school - by indicating the location of speed reducers, school crosswalks and some traffic control devices. (While virtually all intersections in NYC benefit from traffic control devices - such as stop signs, traffic signals, yield signs, and all way stop signs - this map shows only traffic signals and all way stop signs.) The school crosswalks that are shown are ladder striped and make the crosswalk more visible to drivers and help make the intersection safer. These crosswalks are where school children are recommended to cross.

Note: Every attempt has been made to provide complete and accurate information that is updated regularly. The City's streets are constantly changing and it is not always possible to present information without error.

LEGEND:

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

Staten Island
SACRED HEART SCHOOL

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

Map created on 11/16/2006

EXHIBIT 2

COMM. BOARD: 501
 PRECINCT: 120

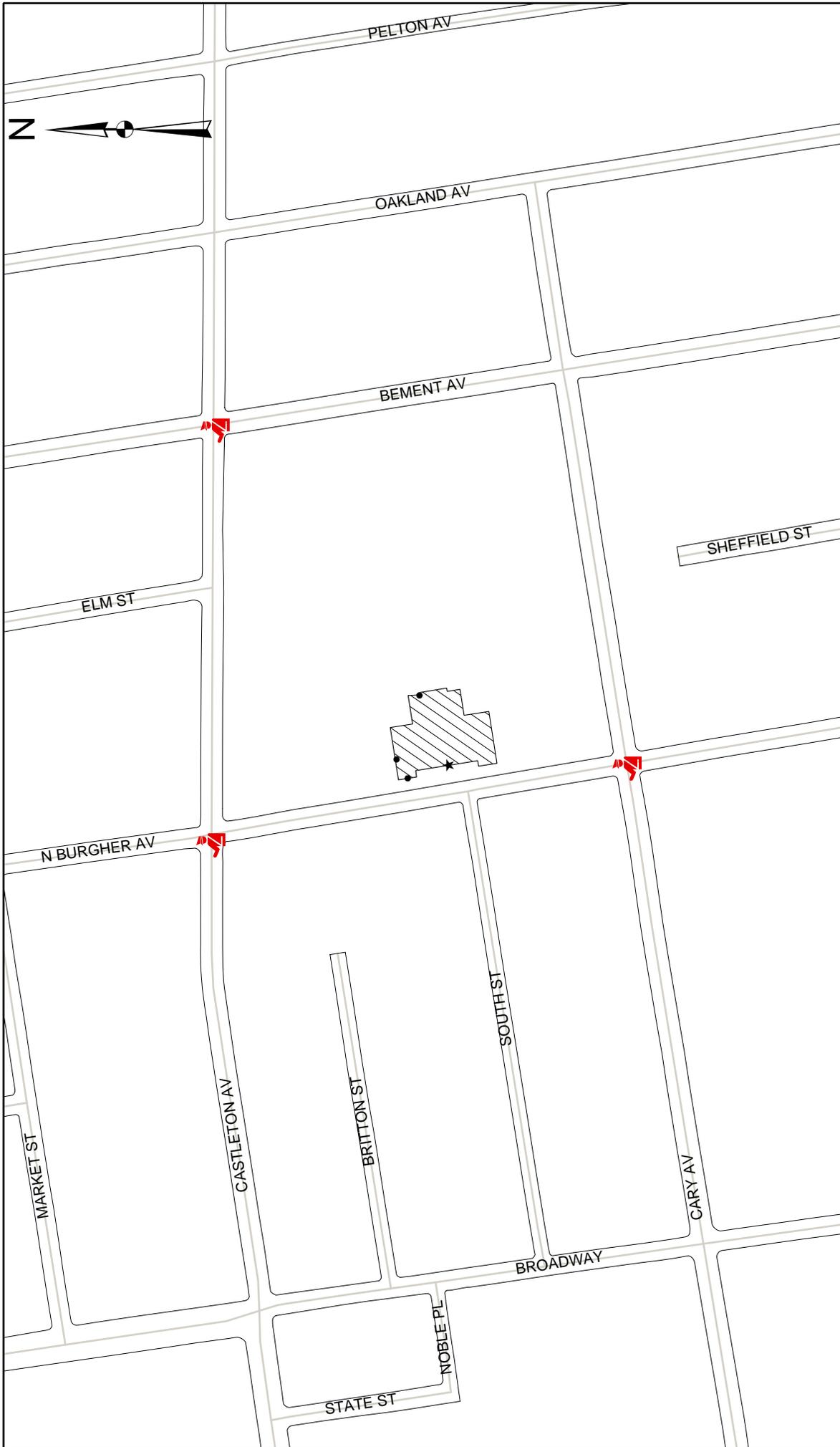


EXHIBIT 3
SACRED HEART SCHOOL
STATEN ISLAND

CROSSING GUARD LOCATIONS



LEGEND:

CROSSING GUARD LOCATION



3. TRAFFIC OPERATIONS

3.1 SCHOOL BUS OPERATIONS

According to school representatives, approximately five students ride a city (MTA) bus to school, and approximately 55 students ride a yellow school bus to school. Bus transportation for all students consists of three yellow school buses. The yellow buses drop-off students in front of the school on the east side of North Burgher Avenue.

3.2 PARENT DROP-OFF OPERATIONS

According to school representatives, approximately 79 percent of the students are being dropped off. Typically, parents drop off students on North Burgher Avenue and in the schoolyard, which also used as a parking lot (the school has a large paved area around the back and sides of the school). There is a driveway to the school located on the south side of Castleton Avenue that is used to access the parking lot. Parents enter from Castleton Avenue via the driveway, drop off their children near the school, and exit via the same driveway onto Castleton Avenue. The school has attempted to maintain a circulation pattern within the schoolyard for such drop off operations, but the parents do not always follow it. Field observations revealed that there are remnants of pavement markings and arrows in the parking lot, but they are faded and not very visible. The school also reported that the parking lot becomes quite congested, especially during inclement weather.



Figure 4: Schoolyard/parking lot access driveway on the south side of Castleton Avenue, north of the school building

3.3 PARKING REGULATIONS

Parking regulations around the school are shown in Exhibit 4.

3.4 EXISTING SCHOOL SIGNS AND MARKINGS

Exhibit 2 shows the existing school signals and pavement markings around the Sacred Heart School. It should be noted that a citywide signage program is currently underway to upgrade school signage to the current edition of the Federal Manual of 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 6.)

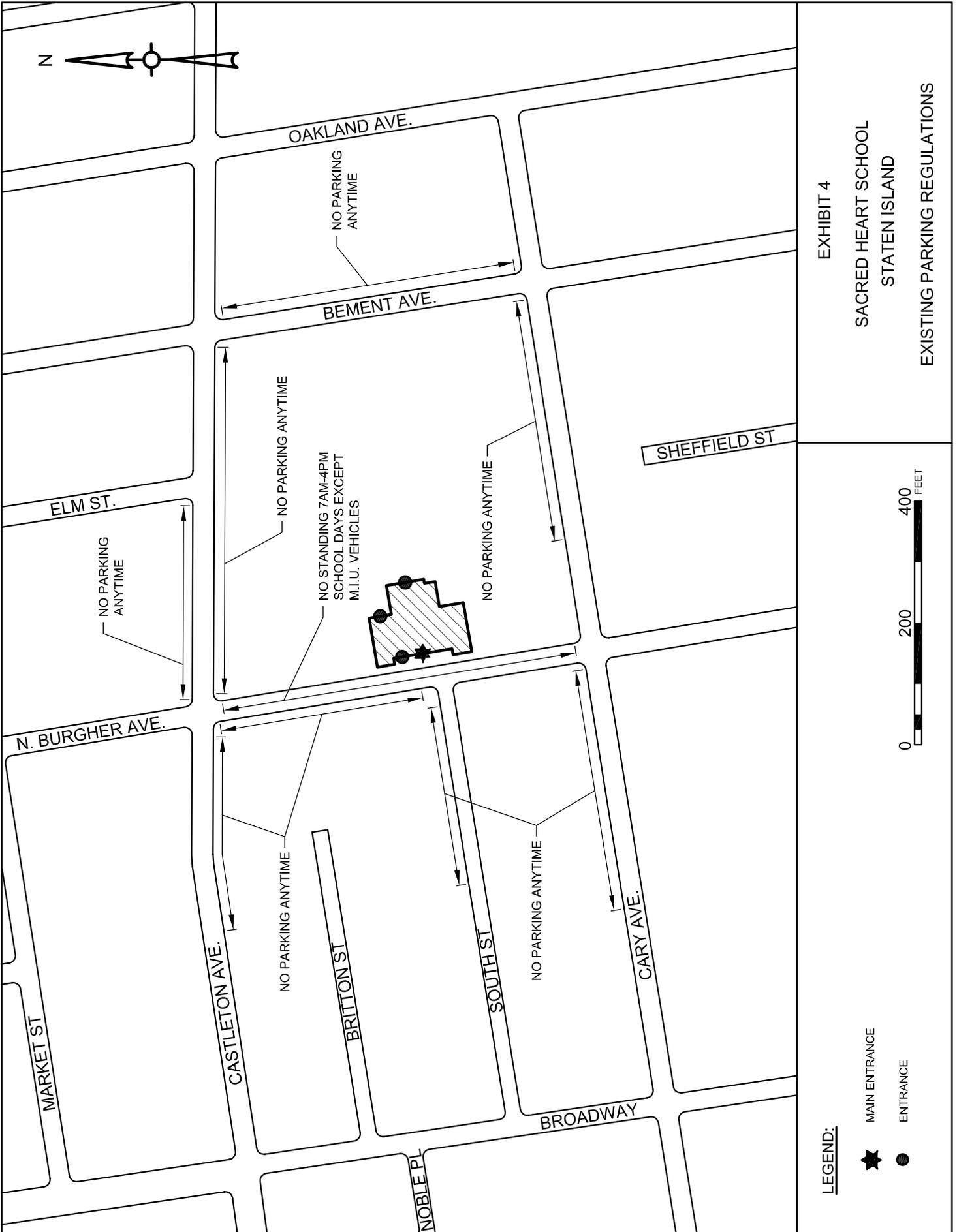


EXHIBIT 4
 SACRED HEART SCHOOL
 STATEN ISLAND
 EXISTING PARKING REGULATIONS

LEGEND:

- ★ MAIN ENTRANCE
- ENTRANCE

0 200 400 FEET

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 Sacred Heart School 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 (1998-2000)				
INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED ACCIDENTS*
North Burgher Avenue and Castleton Avenue	7	0	0	0
Castleton Avenue and Elm Street	1	0	0	0
Castleton Avenue and Bement Avenue	13	2	0	1
Cary Avenue and Broadway	16	1	0	1
Cary Avenue and North Burgher Avenue	3	0	0	0
Cary Avenue and Bement Avenue	10	0	0	0
North Burgher Avenue and Delafield Avenue	3	1	0	1
North Burgher Avenue and Myrtle Avenue	3	0	0	0
North Burgher Avenue and Forest Avenue	11	0	0	0
TOTAL	67	4	0	3

* 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 (2001-2004)				
INTERSECTION	TOTAL ACCIDENTS	PEDESTRIAN ACCIDENTS	PEDESTRIAN FATALITIES	SCHOOL-RELATED ACCIDENTS*
North Burgher Avenue and Castleton Avenue	11	2	0	0
Castleton Avenue and Elm Street	2	0	0	0
Castleton Avenue and Bement Avenue	20	0	0	0
Cary Avenue and Broadway	21	1	0	0
Cary Avenue and North Burgher Avenue	3	0	0	0
Cary Avenue and Bement Avenue	18	2	0	0
North Burgher Avenue and Delafield Avenue	10	0	0	0
North Burgher Avenue and Myrtle Avenue	1	0	0	0
North Burgher Avenue and Forest Avenue	28	1	0	0
TOTAL	114	6	0	0

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

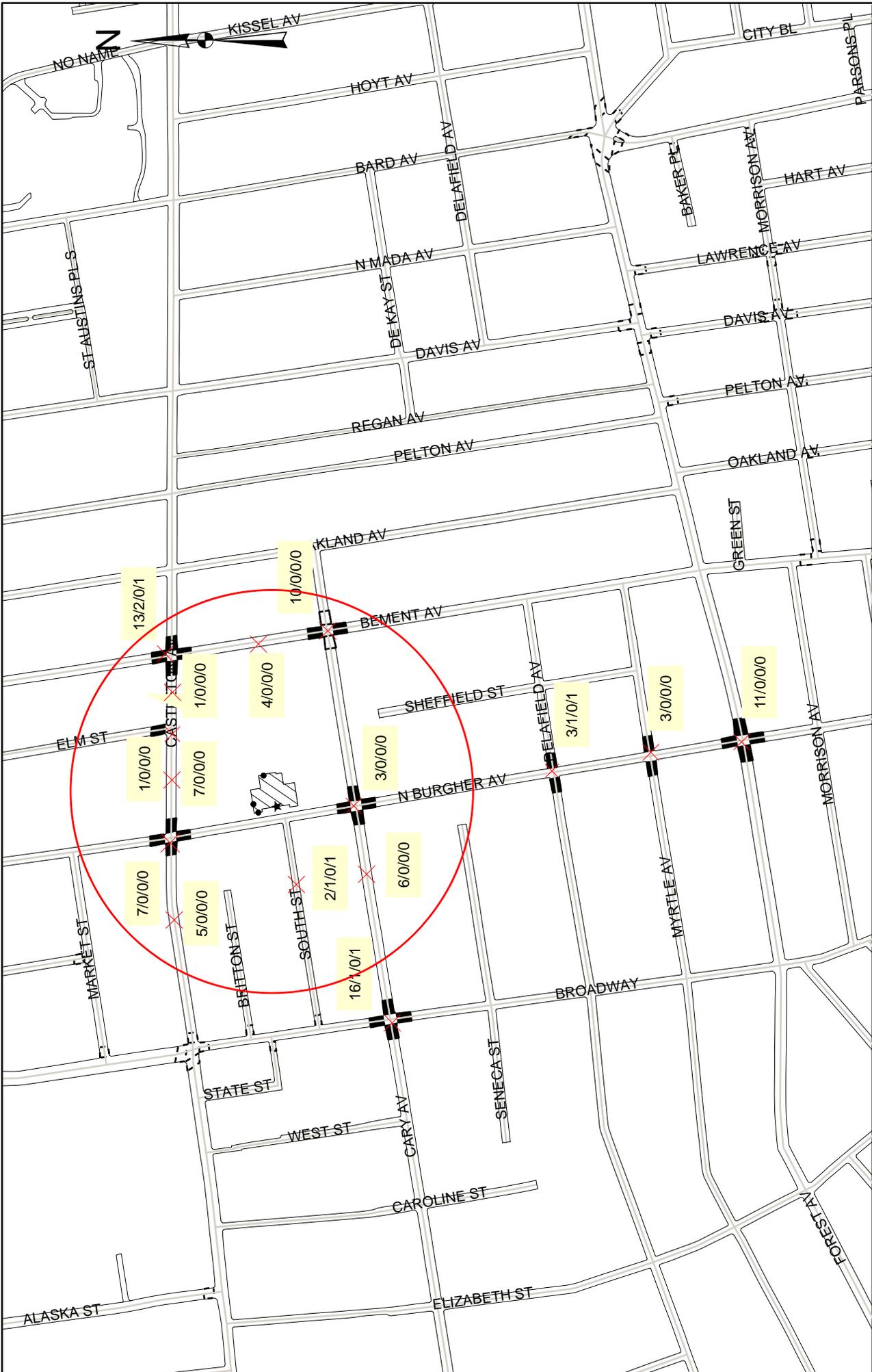
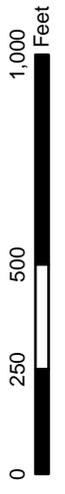


EXHIBIT 5
SACRED HEART SCHOOL
STATEN ISLAND
ACCIDENT SUMMARY (1998-2000)



LEGEND:
 ACCIDENT LOCATION
 SCHOOL CROSSWALK
 SCHOOL CROSSWALK ASSIGNED TO ANOTHER SCHOOL
 BORDER OF 700 FEET
 X/X/X
 TOTAL ACCD / PED ACCD / PED FATAL / SCHOOL PED ACCD

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 the Sacred Heart School.

3.6.1 North Burgher Avenue and Castleton Avenue

This is a signalized four-leg intersection with school crosswalks located across all legs (see Figure 5). North Burgher Avenue is a one-way northbound street with one travel lane and on-street parking on both sides of the roadway, except for "NO PARKING ANYTIME" at the west leg of the section between Castleton Avenue and South Street. Castleton Avenue is a two-way street with one travel lane.

According to school representatives, speeding is a problem along Castleton Avenue, especially during the morning hours. Therefore, a speed survey was conducted on Castleton Avenue, between North Burgher Avenue and Elm Street, in order to verify the existence of a speeding problem and to determine its extent.

Eastbound vehicles on Castleton Avenue, between North Burgher Avenue and Elm Street, were found to be traveling at an 85th percentile speed of 30 mph. Westbound vehicles traveling along this same section of Castleton Avenue were found to be traveling at an 85th percentile speed of 31 mph. The 85th percentile speed is considered to be the representative speed for the street segment. Speeds above a 30 mph threshold indicate a speeding problem that may require appropriate traffic calming measures. A preliminary check concluded that it is not feasible to install a speed reducer on Castleton Avenue between North Burgher and Elm Street as it is a bus route for the S-46 line.

The detailed results of the spot speed survey along Castleton Avenue, between North Burgher Avenue and Elm Street, are shown in the Appendix at the end of this document.

School representatives also indicated that there is traffic congestion along both North Burgher Avenue and Castleton Avenue in the vicinity of the school during arrival and dismissal times.

The NYS DMV accident data (Table 2) indicates that there were a total of seven accidents at this intersection between 1998 and 2000, but no pedestrian accidents. No pedestrian fatalities were reported at this intersection during this time period.



Figure 5: Looking north along North Burgher Avenue across the intersection with Castleton Avenue

3.6.2 Castleton Avenue and Elm Street

This is an unsignalized “T”-intersection with a school crosswalk located across the north leg of Elm Street (see Figure 6). Castleton Avenue is a two-way street with one travel lane. Elm Street is a one-way southbound street with one travel lane and on-street parking on both sides of the roadway.

The NYS DMV accident data (Table 2) indicates that there was one accident at this intersection between 1998 and 2000, and it was not a pedestrian accident.



Figure 6: Looking northeast across Castleton Avenue toward the intersection with Elm Street

3.6.3 Castleton Avenue and Bement Avenue

This is a signalized four-leg intersection with school crosswalks located across all legs (see Figure 7). Castleton Avenue is a two-way street with one travel lane and one on-street parking lane on each side of the roadway. Bement Avenue is also a two-way street with one travel lane and one on-street parking lane on the east side of the roadway.

The NYS DMV accident data (Table 2) indicates that there were a total of 13 accidents at this intersection between 1998 and 2000, including two pedestrian accidents, one of which was school-related. The school-related accident occurred at approximately 2:00 pm on November 18, 1998 when a 14-year-old pedestrian sustained a “non-incapacitating injury” at the intersection. The pedestrian’s actions at the time of the accident were not reported. The road surface was dry and the weather was clear at the time of the accident, and the accident was reported to have occurred during daylight conditions. No pedestrian fatalities were reported at this intersection during this time period.



Figure 7: Looking east along Castleton Avenue toward the intersection with Bement Avenue

3.6.4 Cary Avenue and Broadway

This is a signalized four-legged intersection with school crosswalks located across all legs (see Figure 8). Cary Avenue is a two-way street with one travel lane and one on-street parking lane on each side of the roadway. Broadway is also a two-way street with one travel lane and one on-street parking lane on each side of the roadway.

The NYS DMV accident data (Table 2) indicates a total of 16 accidents at this intersection between 1998 and 2000, including one pedestrian accident which was also school-related. This school-related accident occurred at approximately 3:00 pm on May 14, 1999 when a nine-year-old pedestrian sustained a “non-incapacitating injury” at the intersection. The pedestrian’s actions at the time of the accident were not reported. The road surface was dry and the weather was clear at the time of the accident. The lighting condition was not reported. No pedestrian fatalities were reported at this intersection during this time period.



Figure 8: Looking east along Cary Avenue at its intersection with Broadway

3.6.5 Cary Avenue and North Burgher Avenue

This is a signalized four-leg intersection with school crosswalks located across all legs (see Figure 9). North Burgher Avenue is a one-way northbound street with one travel lane and on-street parking on both sides of the roadway, except for “NO PARKING ANYTIME” at the west leg of the section between Castleton Avenue and South Street. Cary Avenue is a two-way street with one travel lane and on-street parking lane on the south side of the roadway.

The NYS DMV accident data (Table 2) indicates that there were a total of three accidents at this intersection between 1998 and 2000, but no pedestrian accidents. However, one school-related pedestrian accident was reported mid-block on South Street between Broadway and North Burgher Avenue. This particular accident occurred at approximately 4:00 pm on January 28, 1999 when a four-year-old pedestrian sustained an incapacitating injury while playing in the roadway. At the time of the accident, the road surface was reported as dry and the weather was reported as cloudy. The accident reportedly occurred under daylight conditions.



Figure 9: Looking west along Cary Avenue toward North Burgher Avenue

3.6.6 Cary Avenue and Bement Avenue

This is a signalized four-leg intersection with school crosswalks across the north and south legs of Bement Avenue, and pedestrian crosswalks across the east and west legs of Cary Avenue (see Figure 10). Cary Avenue is a two-way street with one travel lane and on-street parking lane on the south side of the roadway. Bement Avenue is also a two-way street with one travel lane and on-street parking lane on the west side of the roadway.

The stop bars on the southbound and eastbound approaches to this intersection are both set back from the crosswalk, apparently to accommodate the turning path of buses at the intersection. Both stop bars have adjacent signs posted that read: “STOP HERE ON RED SIGNAL”.

The NYS DMV accident data (Table 2) indicates a total of ten accidents at this intersection between 1998 and 2000, but no pedestrian accidents. No pedestrian fatalities were reported at this intersection during this time period.



Figure 10: Looking south along Bement Avenue toward the intersection with Cary Avenue

3.6.7 North Burgher Avenue and Delafield Avenue

This is an unsignalized four-leg intersection with school crosswalks located across the east and west legs of Delafield Avenue. North Burgher Avenue is a one-way northbound street with one travel lane and on-street parking on both sides of the roadway, except for “NO PARKING ANYTIME” at the west leg of the section between Castleton Avenue and South Street. Delafield Avenue is a two-way street with one travel lane and one on-street parking lane on each side of the roadway.

The NYS DMV accident data (Table 2) indicates a total of three accidents at this intersection between 1998 and 2000, including one pedestrian accident that was also school-related. The school-related accident occurred at approximately 2:00 pm on March 26, 1998 when a 13-year-old pedestrian suffered an incapacitating injury while playing in the roadway. The pedestrian’s specific location was not reported. At the time of the accident, the road surface was dry and the weather was clear, and the accident occurred during daylight conditions. No pedestrian fatalities were reported at this intersection during this time period.

3.6.8 North Burgher Avenue and Myrtle Avenue

This is an unsignalized four-leg intersection with school crosswalks located across the east and west legs of Myrtle Avenue. North Burgher Avenue is a one-way northbound street with one travel lane and on-street parking lanes on both sides of the roadway.

Myrtle Avenue is a two-way street with one travel lane and one on-street parking lane on each side of the roadway.

The NYS DMV accident data (Table 2) indicates a total three accidents at this intersection between 1998 and 2000, but no pedestrian accidents.

3.6.9 North Burgher Avenue and Forest Avenue

This is a signalized four-leg intersection with school crosswalks located across all legs. North Burgher Avenue is a one-way northbound street with one travel lane and on-street parking lanes on both sides of the roadway. Forest Avenue is a two-way street with one travel lane and one on-street parking lane on each side of the roadway.

The NYS DMV accident data (Table 2) indicate a total of 11 accidents at this intersection between 1998 and 2000, but no pedestrian accidents. No pedestrian fatalities were reported at this intersection during this time period.

3.7 SIGNAL TIMING

Pedestrian crossing times were verified in the field for crosswalks at signalized intersections in the vicinity of Sacred Heart School, and were found to be adequate based upon a child pedestrian walking at the rate of three feet 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?
Castleton Avenue and North Burgher Avenue				
crossing Castleton Avenue	37	34	16	NO
crossing North Burgher Avenue	33	52	14	NO
Castleton Avenue and Bement Avenue				
crossing Castleton Avenue	36	34	15	NO
crossing Bement Avenue	38	52	16	NO
Cary Avenue and Broadway				
crossing Cary Avenue	37	34	15	NO
crossing Broadway	34	52	15	NO
Cary Avenue and North Burgher Avenue				
crossing Cary Avenue	38	34	16	NO
crossing North Burgher Avenue	32	52	14	NO
Cary Avenue and Bement Avenue				
crossing Cary Avenue	37	34	15	NO
crossing Bement Avenue	34	52	15	NO
Forest Avenue and North Burgher Avenue				
crossing Forest Avenue	42	34	17	NO
crossing North Burgher Avenue	32	52	14	NO

Note: A child pedestrian walking rate of 3 ft/sec, plus 3 seconds reaction time, was utilized to calculate the

required pedestrian crossing time.

3.8 PHYSICAL CONDITIONS

3.8.1 Roadways and Sidewalks

Roadways in the vicinity of the Sacred Heart School were observed to be in good condition. Sidewalks are approximately four to eight feet wide on the block faces adjacent to the school (a sidewalk less than five feet wide is considered substandard), and were observed to be in fair condition, except along the north side of Cary Avenue at the driveway to the Sacred Heart School. This sidewalk is showing signs of some deterioration (see Figure 11).

3.8.2 Pedestrian Ramps

Pedestrian ramps in the vicinity of the school were observed to be standard, except as noted below:

- A pedestrian ramp is missing on the southeast corner of the North Burgher Avenue and Castleton Avenue intersection (see Figure 12).
- A pedestrian signal pole obstructs the pedestrian area on the southeast corner of the North Burgher Avenue and Castleton Avenue intersection (see Figure 12).
- A catch basin on the northeast corner of the Cary Avenue and North Burgher Avenue intersection is located within the easterly crosswalk.
- A pedestrian signal pole obstructs the pedestrian area on the northeast corner of the North Burgher Avenue and Cary Avenue intersection.
- A pedestrian ramp is missing on the northeast corner of the Cary Avenue and Broadway intersection.
- A utility pole obstructs the pedestrian area on the northeast corner of the Cary Avenue and Broadway intersection.



Figure 11: Looking north across Cary Avenue toward the Sacred Heart School driveway serving the parking lot and schoolyard on the south side of school



Figure 12: Looking east at the pedestrian signal pole on the southeast corner of the North Burgher Avenue and Castleton Avenue intersection

4. PROPOSED MEASURES TO IMPROVE SCHOOL PEDESTRIAN SAFETY

This section describes the proposed measures to improve school pedestrian safety around the Sacred Heart School. 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 the Sacred Heart School is discussed as follows, and is shown in more detail in Exhibit 6 at the end of this section. See Section 4.3 for additional recommendations for this area from the report for P.S. 18, a nearby priority school.

4.1 SHORT-TERM MEASURES

- Remove “M.I.U. vehicle” restriction on existing “NO STANDING 7AM – 4PM SCHOOL DAYS” signs

The existing parking regulation along the east side of North Burgher Avenue in front of the main entrance to Sacred Heart School currently restricts standing between 7:00 am and 4:00 pm on school days, but allows standing for “M.I.U. vehicles”. This allowance should be removed for 30 feet in front of the school’s main entrance. (This is a typical requirement for all NYC schools in order to provide for emergency access to and from the school.)

- Install graphic “YIELD TO PEDESTRIAN” signs

Install graphic “YIELD TO PEDESTRIAN” signs on the following intersection approaches with substantial vehicle–student volumes:

- The eastbound and westbound approaches to the Cary Avenue and Bement Avenue intersection.

- Place advance 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.

- Establish Drop-Off Circulation Plan within Schoolyard/Parking Lot

Sacred Heart School has attempted to maintain a circulation pattern within the schoolyard/parking lot for parent drop-off operations, but the parents do not always follow it. In addition, pavement markings in this area are faded and may not be visible. Therefore, it is recommended that a parent drop-off circulation pattern be formally established for the schoolyard/parking lot in order to reduce congestion during arrival and dismissal times.

This plan could be accomplished by the following actions:

- Remove the existing bollards from the school access driveway on the north side of Cary Avenue to permit the driveway to be used by vehicles exiting the schoolyard.
- Convert the school's driveway on the south side of Castleton Avenue to a one-way driveway into the schoolyard (the driveway currently also accommodates exiting vehicles).
- Install "DO NOT ENTER" signs at the Castleton Avenue driveway facing into the schoolyard, in conjunction with signs reading "NO EXIT."
- Install "DO NOT ENTER" signs at the Cary Avenue driveway facing Cary Avenue. Mount "ONE-WAY" signs at the top of the signposts, pointing out (to the south) towards Cary Avenue. Additional advisory signs could be added if needed stating "VEHICULAR ENTRANCE TO SCHOOLYARD ON CASTLETON AVENUE".
- Delineate a travel path for parent drop-offs through the schoolyard/parking lot with pavement markings, including directional arrows in the center of the intended travel path.

➤ Administer student pedestrian safety education program

School officials requested that student participate in a Safety Education Program. It is therefore recommended that:

- The school should participate in the NYCDOT Safety Education Program to educate students to use designated school crosswalks while crossing the street, not to cross mid-block, not to cross against signals, and not to run out between cars.

4.2 LONG-TERM MEASURES

➤ Pedestrian Ramps

The following actions are recommended to address the deficiencies described in Section 3.8.2:

- A pedestrian ramp should be installed on the southeast corner of the North Burgher Avenue and Castleton Avenue intersection.
- The pedestrian signal pole on the southeast corner of the North Burgher Avenue and Castleton Avenue intersection should be relocated.

- The catch basin on the northeast corner of the Cary Avenue and North Burgher Avenue intersection should be relocated outside the easterly crosswalk.
- The pedestrian signal pole on the northeast corner of the Cary Avenue and North Burgher Avenue intersection should be relocated.
- A pedestrian ramp should be installed on the northeast corner of the Cary Avenue and Broadway intersection.
- The utility pole on the northeast corner of the Cary Avenue and Broadway intersection should be relocated.

➤ Install curb extensions at the following locations:

Consideration should be given to installing curb extensions at the following locations, provided that the Final Design confirms that construction of the recommended curb extensions would be feasible and not interfere with traffic operations. Final details pertaining to the number, location and geometry of curb extensions will be developed during the Final Design/Contract Document preparation.

- On the northwest and southwest corners of the Cary Avenue and North Burgher Avenue intersection.
- On the east side of North Burger Avenue, north of Castleton Avenue, for the northerly crosswalk, and on the west side of North Burgher Avenue, south of Castleton Avenue, for the southerly crosswalk.

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

4.3 ADDITIONAL RECOMMENDATIONS FROM PRIORITY SCHOOLS IN THE VICINITY OF SACRED HEART SCHOOL

4.3.1 Recommendations for P.S. 18 (John Greenleaf Whittier School):

The following actions are recommended as part of proposed measures to improve school pedestrian safety around P.S. 18, which is a nearby priority school. All references in Section 4.3 refer to the P.S. 18 School report.

➤ Install “NO STANDING 7AM – 4PM SCHOOL DAYS” signs

Install “NO STANDING 7AM - 4PM SCHOOL DAYS” signs for 30 feet in front of the main entrance to the school. (This is a typical requirement for all NYC schools in order to provide for emergency access to and from the school.)

➤ Daylighting at the intersection of Henderson Avenue and Campbell Avenue

During the meeting with the consultant team, school officials reported a sight distance problem on the southeast corner of the Henderson Avenue and Campbell Avenue intersection. Field observations of this area determined that vehicles (especially vans) parking on east side of Campbell Avenue, south of Henderson Avenue, were obstructing sight lines for northbound drivers approaching the intersection. Therefore, the following action is recommended:

- Improve sight distance at the intersection by installing “NO STANDING ANYTIME” signs on the east side of Campbell Avenue. The signs should be placed approximately 20 feet set back from building/property line, excluding the area designated for the crosswalk (marked or unmarked). These signs should face northbound traffic on Campbell Avenue approaching Henderson Avenue. The installation of daylighting will be subject to review by NYCDOT.

➤ Place advance 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.

➤ Install crosswalks at the intersection of Henderson Avenue and North Burgher Avenue

A new signal was installed at the intersection of Henderson Avenue and North Burger. The intersection has school crosswalks at the north and south legs.

Therefore, the following action is recommended:

- Install a school cross walk at the west leg of the intersection and install all appropriate advance warning devices.
- Install a pedestrian crosswalk at the east side of the intersection and install all appropriate advance warning devices.

➤ Install pedestrian ramps

Pedestrian ramps were found to be missing at several locations identified in Section 3.8.2. Therefore, it is recommended to:

- Install a pedestrian ramp on the southeast corner of the Broadway and Henderson Avenue intersection for the crosswalk located across the south leg.

- Install a pedestrian ramp on the northeast corner of the Broadway and Henderson Avenue intersection for the crosswalk located across the north leg.
- Install a pedestrian ramp on the southeast and southwest corners of the Campbell Avenue and Henderson Avenue intersection for the crosswalk located across the south leg.

➤ Install a speed reducer (hump) on Henderson Avenue

School officials reported a speeding problem along Henderson Avenue in the vicinity of the school. The speed survey conducted along Henderson Avenue between Broadway and North Burgher Avenue showed that 85th percentile speeds in both directions exceeded the 30 mph threshold speed limit. Westbound vehicles on Henderson Avenue were found to be traveling at an 85th percentile speed of 33 mph, and eastbound vehicles on Henderson Avenue were found to be traveling at an 85th percentile speed of 32 mph (see Section 3.6.1 and the Appendix). Therefore, the following action is recommended:

- Install one speed reducer (hump) on Henderson Avenue between Broadway and Campbell Avenue.

➤ Replace sidewalk

The sidewalk along the east side of Broadway, south of Market Street, is cracked and broken (see Section 3.8.1 and Figure 8) and should be replaced. Therefore, the following action is recommended:

- Replace the broken and cracked section of sidewalk along the east side of Broadway, south of Market Street.

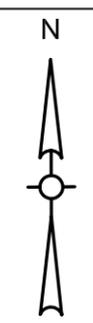
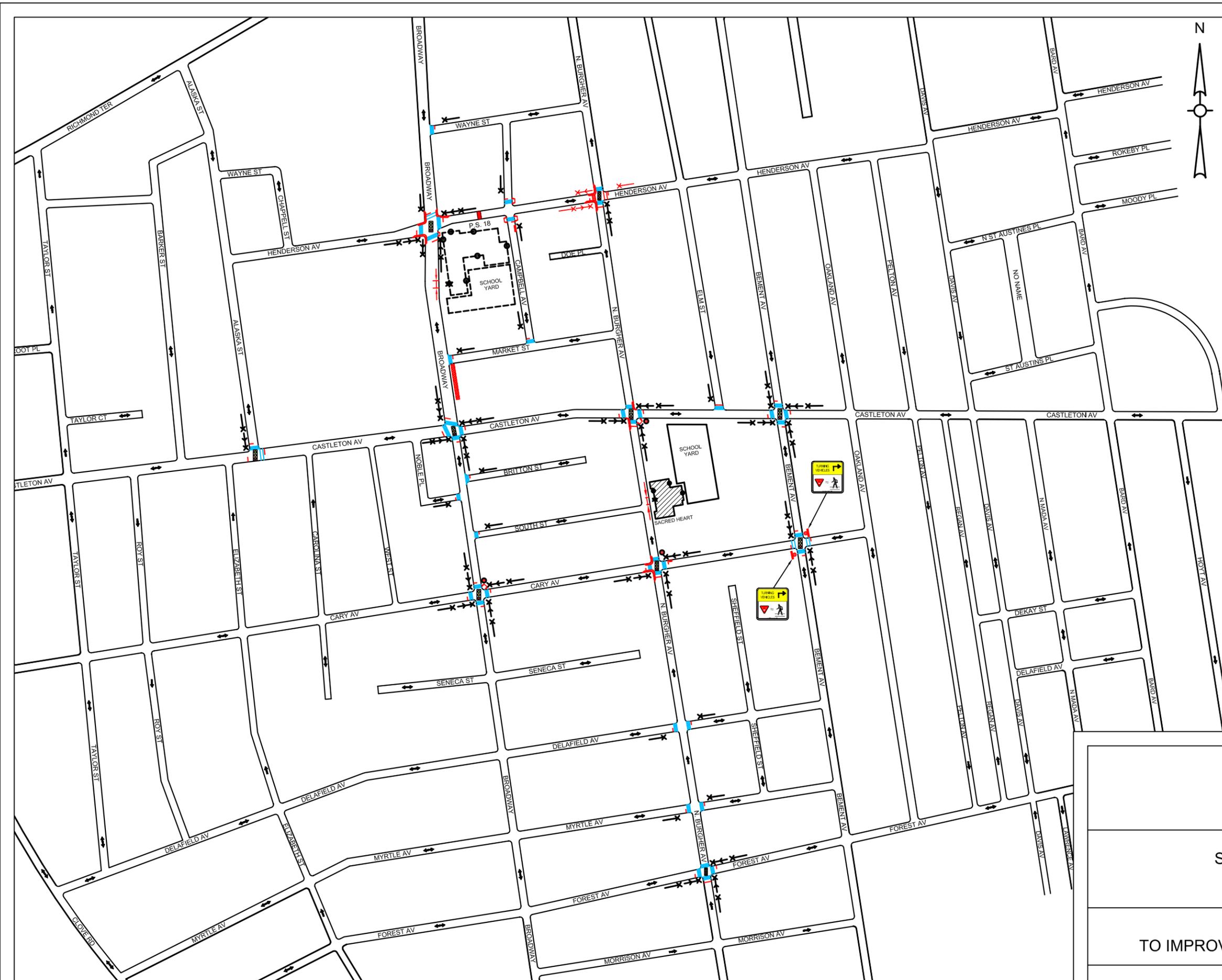
➤ Install curb extensions at the following locations:

Consideration should be given to installing curb extensions at the following locations, provided that the Final Design confirms that construction of the recommended curb extensions would be feasible and not interfere with traffic operations. Final details pertaining to the number, location and geometry of curb extensions will be developed during the Final Design/Contract Document preparation

- On the northeast, northwest, and southwest corners of the Broadway and Henderson Avenue intersection.
- On the northwest and southwest corners of the North Burger Avenue and Henderson Avenue intersection.

The purpose of the curb extensions is to shorten the crossing distance for pedestrians, and to reduce speeds of vehicles approaching and turning at these

heavily utilized school crosswalks. These curb extensions would not eliminate or reduce the width of any moving lanes.



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
-  PROPOSED SPEED REDUCER
-  AREA OF SIDEWALK TO BE RECONSTRUCTED
-  PROPOSED SCHOOL CROSSWALK
-  PROPOSED PEDESTRIAN CROSSWALK
-  PROPOSED TRAFFIC SIGN
-  PROPOSED PEDESTRIAN RAMP
-  EXISTING STOP LINE IN ADVANCE OF SCHOOL CROSSWALK
-  PROPOSED "NO STANDING 7:00AM - 4:00PM SCHOOL DAYS"
-  PROPOSED "NO STANDING"
-  POLE TO BE RELOCATED
-  DRAINAGE INLET TO BE RELOCATED
-  PROPOSED CURB EXTENSION (NECKDOWN)
-  PROPOSED DAYLIGHTING

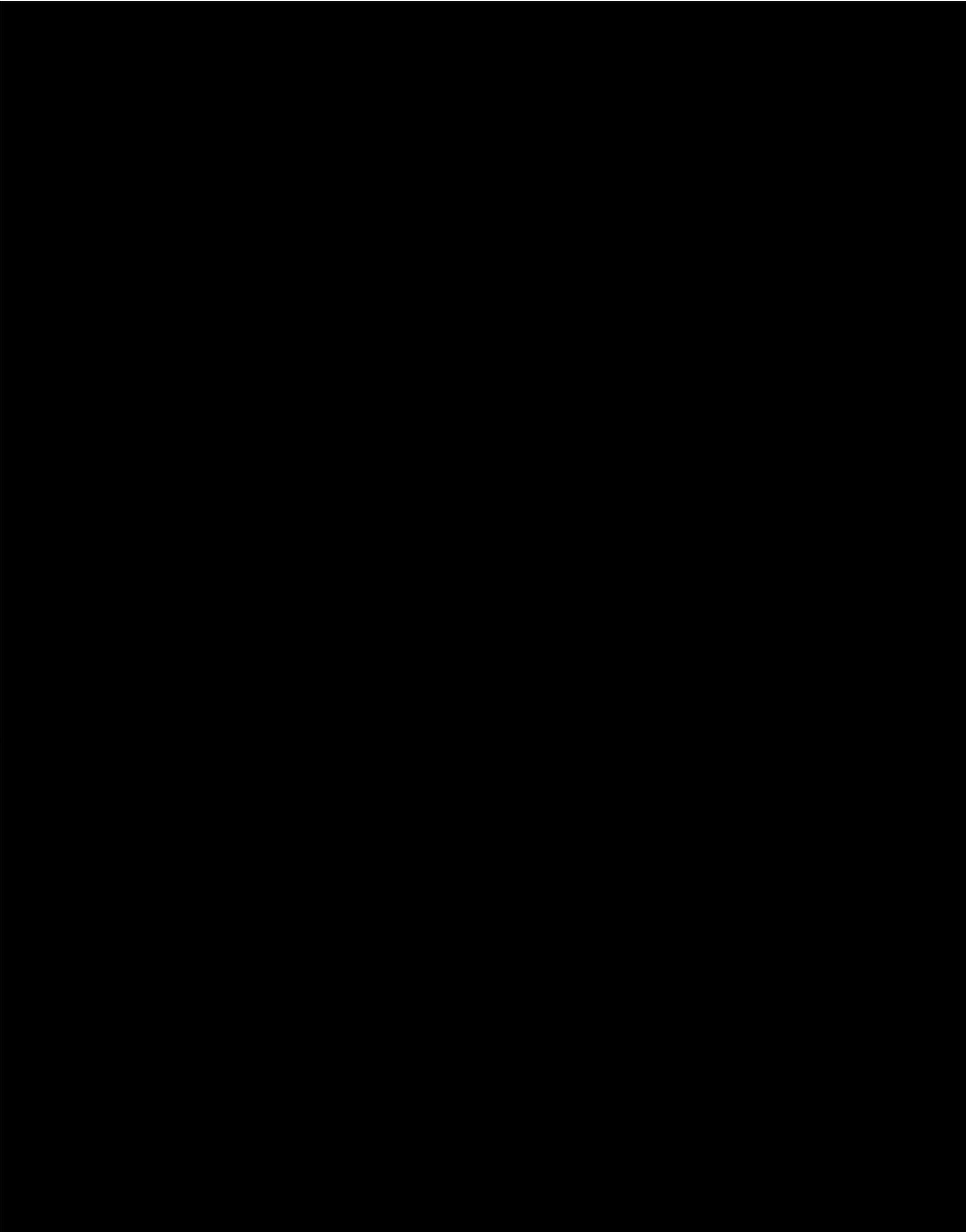
1" = 400'

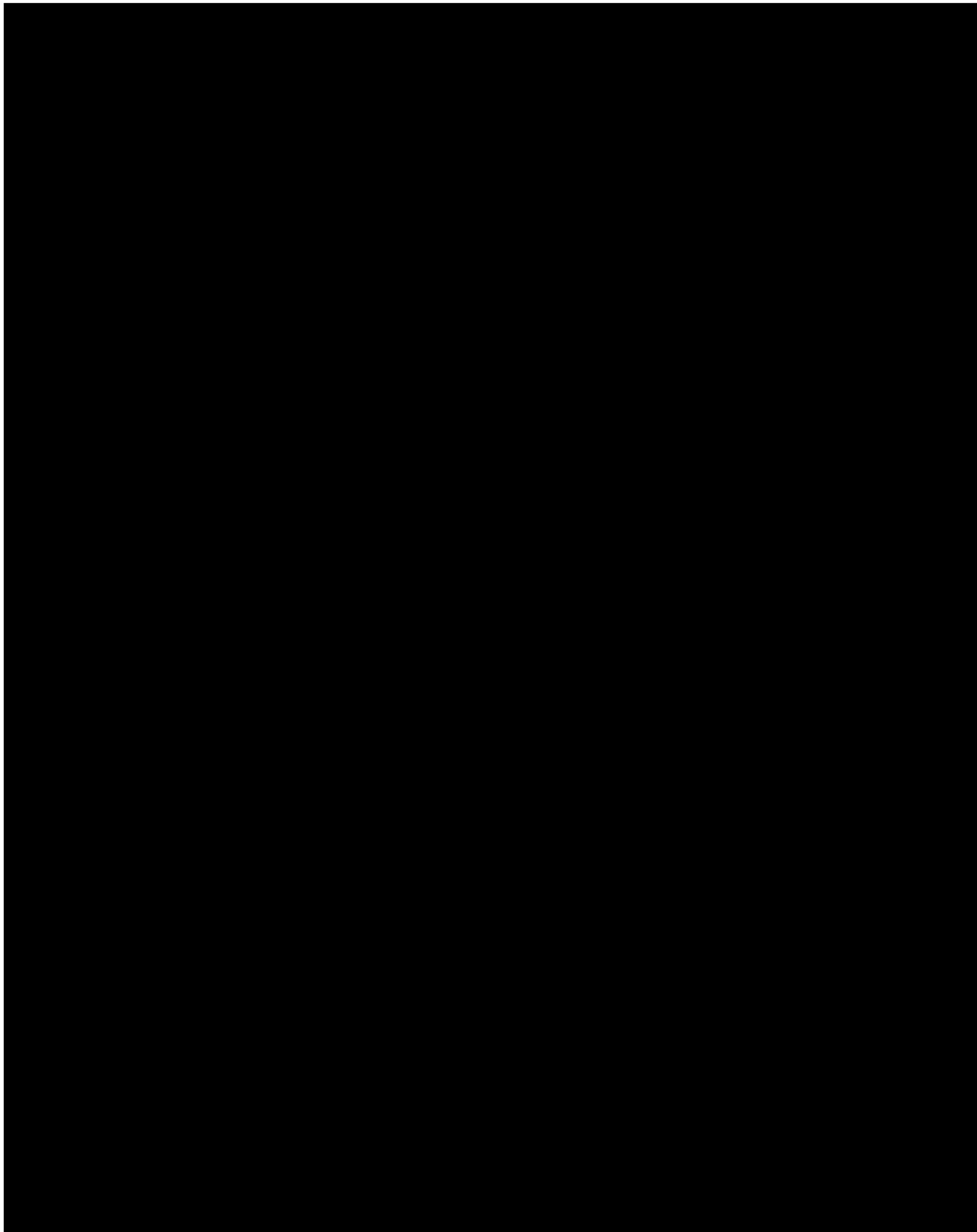
EXHIBIT 6

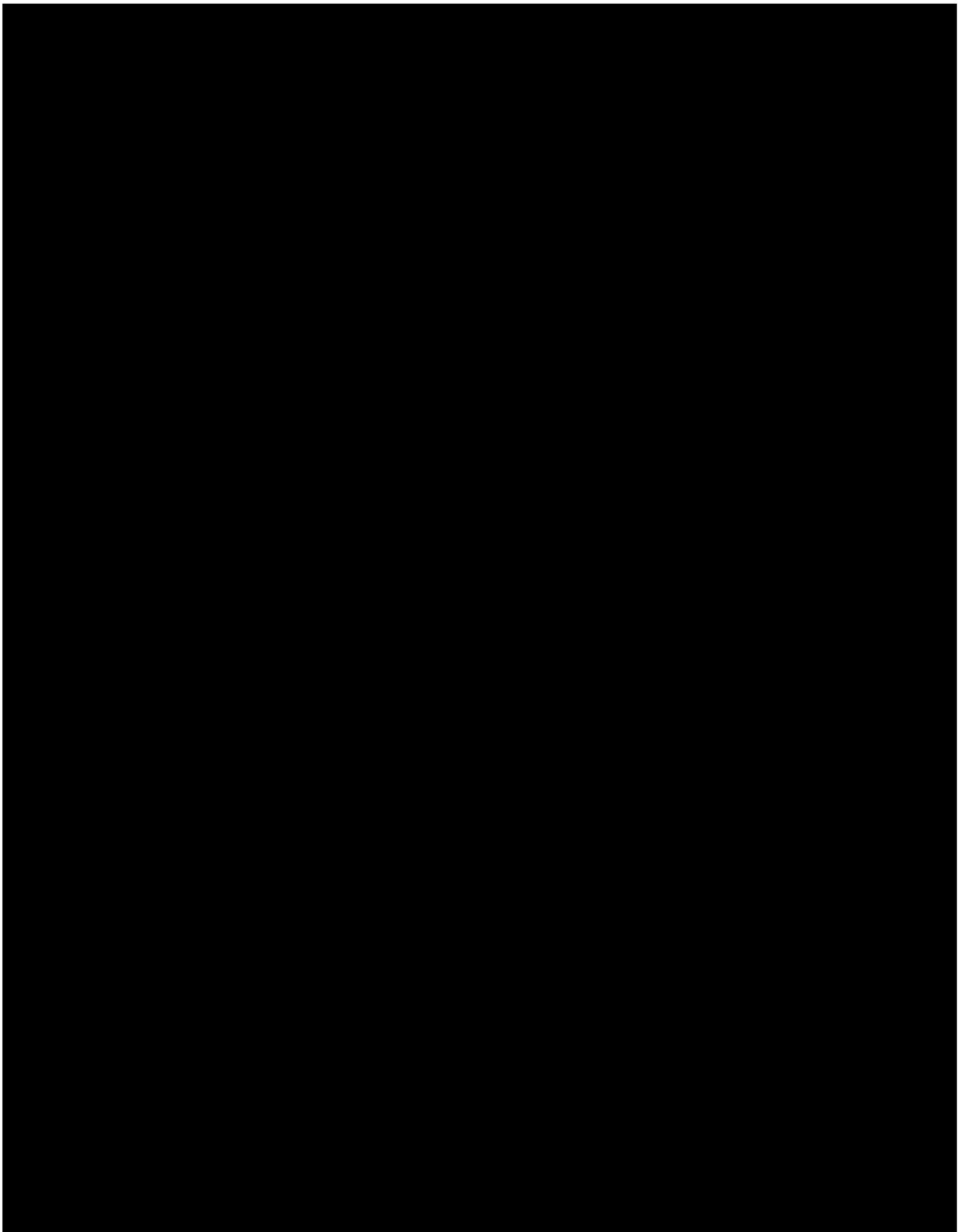
**SACRED HEART SCHOOL
STATEN ISLAND**

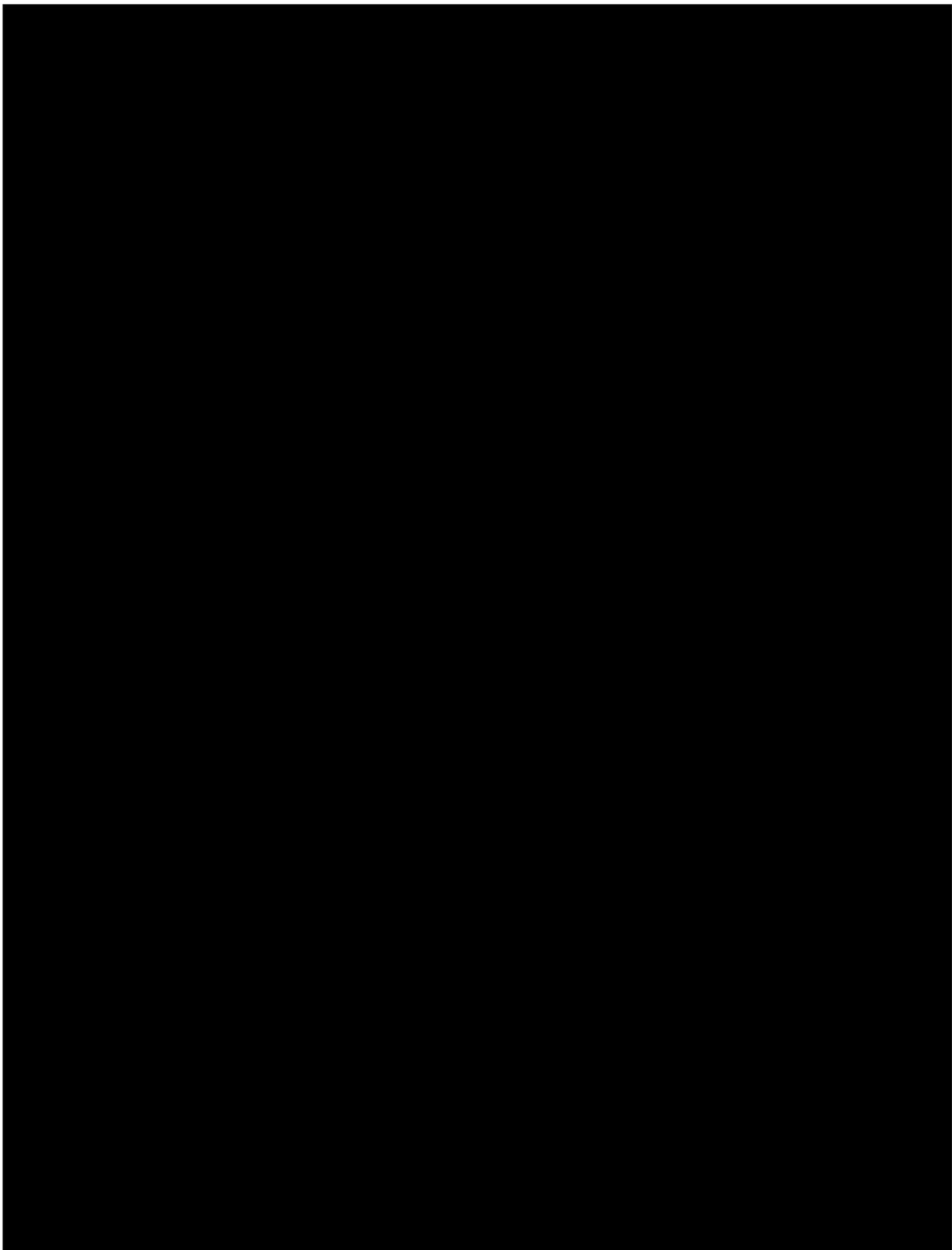
**POTENTIAL MEASURES
TO IMPROVE STUDENT PEDESTRIAN SAFETY**

APPENDIX









SPOT SPEED STUDY

Date: **May 11, 2005** Time: **10:20AM**
 Location: **Castleton Ave between N.Burgher Ave and Elm St**
 Surveyor: **Richard Calvache & Keren Mor**

School: **Sacred Heart**
 Direction: **Eastbound**
 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	4	4.0%	4.0%	68	1156
18	2	2.0%	6.1%	36	648
19	2	2.0%	8.1%	38	722
20	3	3.0%	11.1%	60	1200
21	12	12.1%	23.2%	252	5292
22	4	4.0%	27.3%	88	1936
23	5	5.1%	32.3%	115	2645
24	4	4.0%	36.4%	96	2304
25	16	16.2%	52.5%	400	10000
26	13	13.1%	65.7%	338	8788
27	8	8.1%	73.7%	216	5832
28	4	4.0%	77.8%	112	3136
29	6	6.1%	83.8%	174	5046
30	5	5.1%	88.9%	150	4500
31	1	1.0%	89.9%	31	961
32	5	5.1%	94.9%	160	5120
33	2	2.0%	97.0%	66	2178
34	2	2.0%	99.0%	68	2312
35	0	0.0%	99.0%	0	0
36	1	1.0%	100.0%	36	1296
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
	99	100.0%		2504	65072

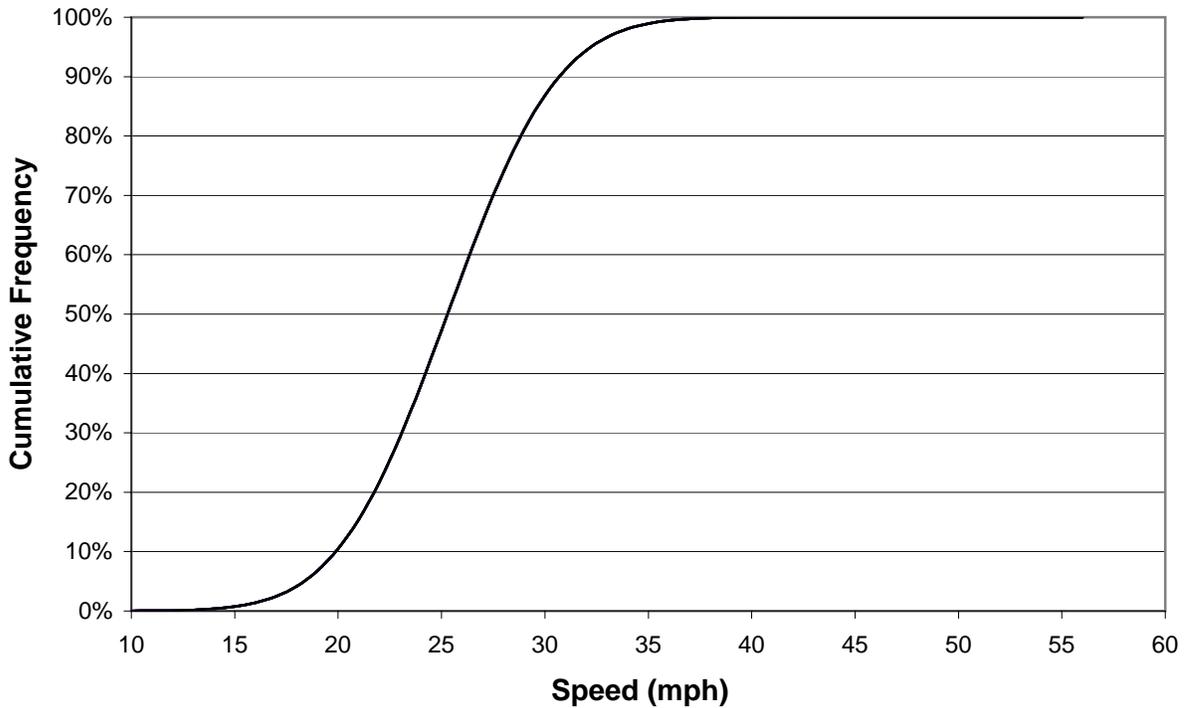
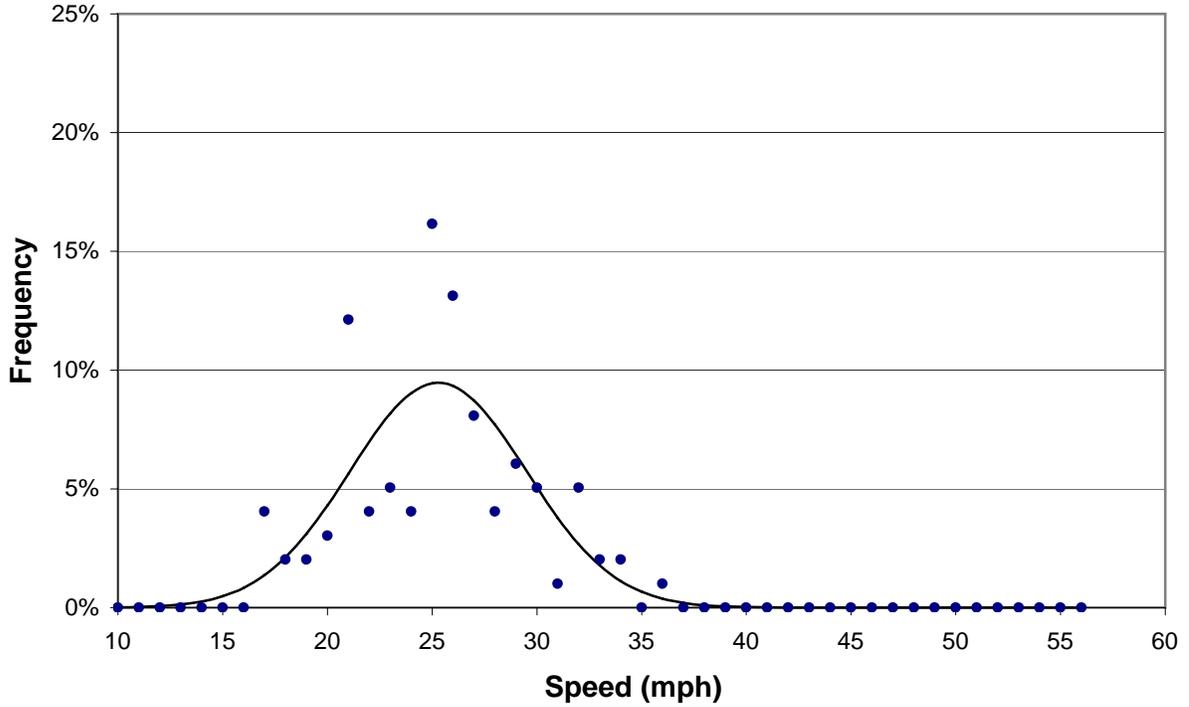
Mean Speed = 25.3 mph Median Speed = 25.3 mph
 Standard Deviation = 4.2 mph 15th Percentile Speed = 20.9 mph
 Margin of Error (95% Confidence) = ± 0.8 mph 85th Percentile Speed = 29.7 mph

SPOT SPEED STUDY

Date: **May 11, 2005** Time: **10:20AM**
 Location: **Castleton Ave between N.Burgher Ave and Elm St**
 Surveyor: **Richard Calvache & Keren Mor**

School: **Sacred Heart**
 Direction: **Eastbound**
 Comments:

Mean Speed = 25.3 mph Median Speed = 25.3 mph
 Standard Deviation = 4.2 mph 15th Percentile Speed = 20.9 mph
 Margin of Error (95% Confidence) = ± 0.8 mph 85th Percentile Speed = 29.7 mph



SPOT SPEED STUDY

Date: **May 11, 2005** Time: **10:20AM**
 Location: **Castleton Ave between N.Burgher Ave and Elm St**
 Surveyor: **Richard Calvache & Keren Mor**

School: **Sacred Heart**
 Direction: **Westbound**
 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	6	6.0%	6.0%	102	1734
18	0	0.0%	6.0%	0	0
19	2	2.0%	8.0%	38	722
20	0	0.0%	8.0%	0	0
21	3	3.0%	11.0%	63	1323
22	4	4.0%	15.0%	88	1936
23	5	5.0%	20.0%	115	2645
24	7	7.0%	27.0%	168	4032
25	7	7.0%	34.0%	175	4375
26	12	12.0%	46.0%	312	8112
27	15	15.0%	61.0%	405	10935
28	13	13.0%	74.0%	364	10192
29	5	5.0%	79.0%	145	4205
30	5	5.0%	84.0%	150	4500
31	2	2.0%	86.0%	62	1922
32	4	4.0%	90.0%	128	4096
33	6	6.0%	96.0%	198	6534
34	1	1.0%	97.0%	34	1156
35	1	1.0%	98.0%	35	1225
36	1	1.0%	99.0%	36	1296
37	0	0.0%	99.0%	0	0
38	1	1.0%	100.0%	38	1444
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
	100	100.0%		2656	72384

Mean Speed = 26.6 mph Median Speed = 26.6 mph
 Standard Deviation = 4.3 mph 15th Percentile Speed = 22.1 mph
 Margin of Error (95% Confidence) = ± 0.8 mph 85th Percentile Speed = 31.0 mph

SPOT SPEED STUDY

Date: **May 11, 2005** Time: **10:20AM**
 Location: **Castleton Ave between N.Burgher Ave and Elm St**
 Surveyor: **Richard Calvache & Keren Mor**

School: **Sacred Heart**
 Direction: **Westbound**
 Comments:

Mean Speed = 26.6 mph Median Speed = 26.6 mph
 Standard Deviation = 4.3 mph 15th Percentile Speed = 22.1 mph
 Margin of Error (95% Confidence) = ± 0.8 mph 85th Percentile Speed = 31.0 mph

