

Safe Streets for Seniors

Washington Heights, Manhattan

FINAL REPORT

August 13, 2012



Janette Sadik-Khan, Commissioner



**Safe Streets for Seniors
Washington Heights, Manhattan**

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PROJECT DESCRIPTION

Since 1990 the number of pedestrian fatalities in New York City has decreased by 56%. Moreover, prior to 1950, pedestrians accounted for $\frac{3}{4}$ of all traffic fatalities and since then, that percentage has decreased to account for about $\frac{1}{2}$ of all traffic fatalities. Despite these statistical improvements, pedestrians continue to be the largest at risk mode – with older adults more likely to suffer serious injuries or fatalities from traffic crashes than other pedestrians. The rate of pedestrian fatalities for every 100,000 persons in the City has decreased by nearly half since 1991 – to 2.0 from 3.8 – while the rate of senior pedestrian fatalities per 100,000 seniors has decreased even more sharply – to 6.6 from 13.1. Nevertheless, while seniors make up only 12% of the population in New York City, they still comprise 39% of pedestrian fatalities. The recognition of the disproportional representation of the senior population among severe pedestrian injuries and fatalities led to the development of the Department’s Safe Streets for Seniors (SSS) Program.

The purpose of this project is to address senior pedestrian safety issues at twenty-five Senior Pedestrian Focus Areas (SPFAs) in the five boroughs of New York City and to develop and implement mitigation measures to improve the safety of seniors and other pedestrians within the 25 SPFAs. DOT identified SPFAs to include the top senior pedestrian crash (severe injury and fatality) areas within each borough. Four of the SPFAs are located in the Bronx, seven in Brooklyn, five in Queens, eight in Manhattan and one in Staten Island. The SPFAs have been selected based on the density of senior pedestrian crashes resulting in fatalities or severe injuries in a five-year period. DOT conducted in-house studies for five pilot SPFAs and is utilizing consultant services to perform a comprehensive study of pedestrian safety conditions at intersections and along corridors within twenty selected SPFAs.

The project evaluates the crash history and existing traffic conditions and controls (e.g., roadway geometry, signal timing) at selected intersections and corridors within each SPFA in order to develop short- and long-term measures to reduce pedestrian crashes specifically for seniors, and improve safety and traffic operations for all users. The consultant makes specific safety recommendations consisting of low-cost as well as capital engineering and design improvements for these twenty areas. In addition, the consultant conducts data analysis as needed, prepares engineering and design schematics and related services, as necessary, for capital improvements.

Background

BACKGROUND

Land-use in the Washington Heights Study Area is predominantly residential with a substantial share of commercial areas, primarily along Saint Nicholas Avenue and Broadway. There are a few Senior Centers located in the Study Area, including Fort Washington Senior Center at 4111 Broadway between West 173rd Street and West 174th Street, Star Senior Citizen Center at 650 West 187th Street between Broadway and Wadsworth Avenue and “Y” Senior Center at 59 Nagle Avenue between Ellwood Street and Hillside Avenue.

There are six schools in the study area including:

- P.S. 173 at 306 Fort Washington Avenue between West 173rd Street and West 174th Street
- P.S. 132 Juan Pablo Duarte at 185 Wadsworth Avenue between West 182nd Street and West 183rd Street
- Junior High School 143 E Roosevelt at 511 West 182nd Street between Audubon Avenue and St. Nicholas Avenue
- Gregorio Luperon High School Math and Science at 516 West 181st Street between Amsterdam Avenue and Audubon Avenue
- High School for Health Careers and Science at 549 Audubon Avenue located north of West 193rd Street
- The Washington Heights Academy at P.S. 178 at 12 Ellwood Street located west of Hillside Avenue

Transit access in this area includes 2 subway lines: 1 and A (Exhibit 2). There are several bus routes operating in the vicinity of the Washington Heights Study Area: M3, Bx3, M4, M5, Bx7, Bx11, Bx13, Bx35, Bx36, M98, M100 and M101.



EXHIBIT 1 – AERIAL PHOTO



EXHIBIT 2 – TRANSIT MAP

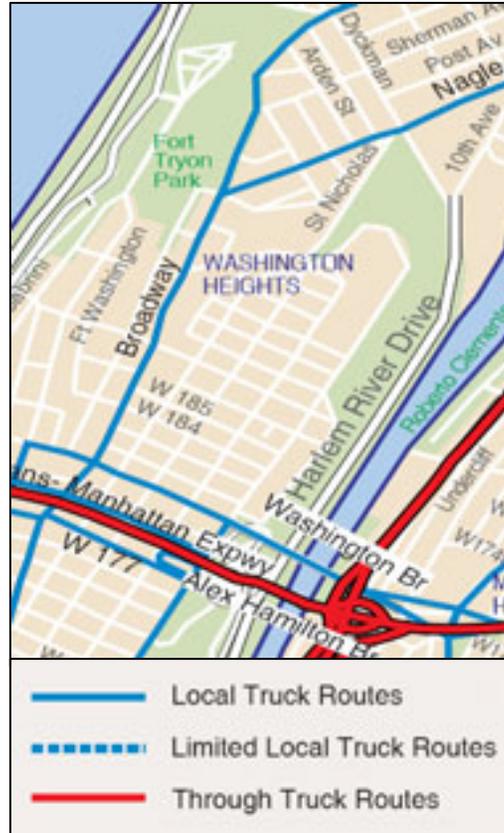


EXHIBIT 3 – TRUCK MAP

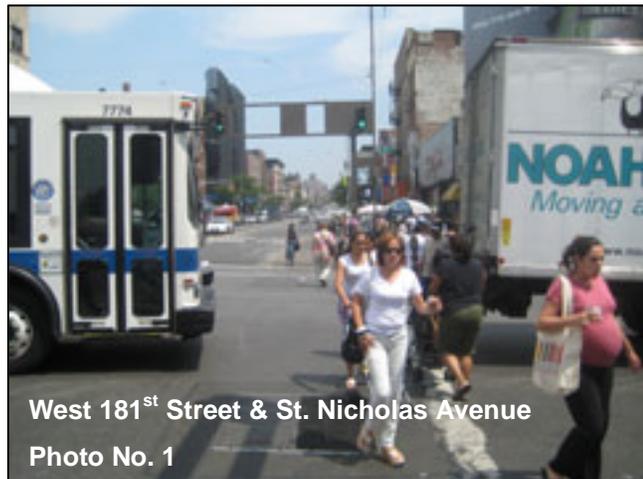


EXHIBIT 4 – BIKE MAP

EXISTING CONDITIONS

The Washington Heights Study Area consists of three major north-south corridors: Broadway, St. Nicholas Avenue and Amsterdam Avenue and three major east-west corridors: West 178th Street, West 181st Street and Dyckman Street. Broadway, West 178th Street and West 181st Street are designated truck routes (Exhibit 3).

The Cross Bronx Expressway, a grade separated highway, traverses through the study area between West 178th Street and West 179th Street. The expressway connects the George Washington Bridge to the Alexander Hamilton Bridge on the east side of the study area. A significant volume of traffic both exits the expressway into Amsterdam Avenue at West 175th Street and enters the expressway at West 181st Street and Amsterdam Avenue. The expressway is a through truck route (Exhibit 3).



Each major corridor, with the exception of Dyckman Street, carries at least one NYCT bus route (Exhibit 2). The existing street geometry of Broadway, Amsterdam Avenue and St. Nicholas Avenue includes four moving lanes, two in each direction, with parking on both sides. The major east-west corridors, 178th Street, 181st Street and Dyckman Street include from two to four moving lanes with parking lanes on each side. Currently, there is a study being conducted by NYCDOT along West 181st Street as part of the Congested Corridor Program (Photo No.1).

The combination of heavy traffic volumes, operational factors and non-standard geometric alignment along these corridors make them difficult for a senior pedestrian to safely cross. There were numerous issues that were repeatedly observed during the field visits and/or conveyed by senior pedestrians during interviews. Those issues are provided below:

- Insufficient crossing time
- Missing or inadequate pedestrian ramps
- Missing crosswalk striping
- Motorists turning quickly and not yielding to pedestrians

Prior to this study, the first phase of the school safety engineering project, a NYCDOT initiative to improve pedestrian safety in the immediate vicinity of elementary and middle schools citywide, was completed in 2007. This study reviewed some of the same intersections that are in the current study area and developed recommendations to improve pedestrian safety for students that are also applicable to seniors. The recommendations developed under the school safety project have been shown in the “Illustrating the Solution” section of this report. The schools in this project area that were studied under the school safety engineering project include:

- Incarnation School
- P.S. 132 & Annex, Juan Pablo Duarte School
- St. Spyridon Parochial School

The full copy of the priority school report for each school is available on the NYCDOT’s website at <http://www.nyc.gov/html/dot/html/safety/saferoutes.shtml>. Copies of the proposed recommendation maps from those reports have been included in Appendix F for reference.

There is another NYCDOT project planned in the study area. The construction of Plaza De Las Americas will close West 175th Street between Broadway and Wadsworth Avenue for a pedestrian plaza. This project is scheduled for 2012, and the design plans have been included in Appendix G for reference.

Broadway

Broadway is a major north-south corridor. It is a 60-foot wide roadway with two moving lanes in each direction and parking on both sides.

At Broadway and West 173rd Street, it is recommended that the median on the north leg be extended across the crosswalk (Photo No. 2). A neckdown is recommended for the east side of the median. These measures will slow turning traffic and provide a refuge area for pedestrians. NYCDOT recommended the following for this intersection (see Appendix G):



- A curb extension with a neckdown along Broadway on the southeast corner
- Stripe allowed lane movements for the south leg of Broadway

On the northwest corner of Broadway and West 175th Street, the pedestrian ramp on West 175th Street should be replaced with a new NYCDOT standard pedestrian ramp and ADA safety surface (Photo No. 3).



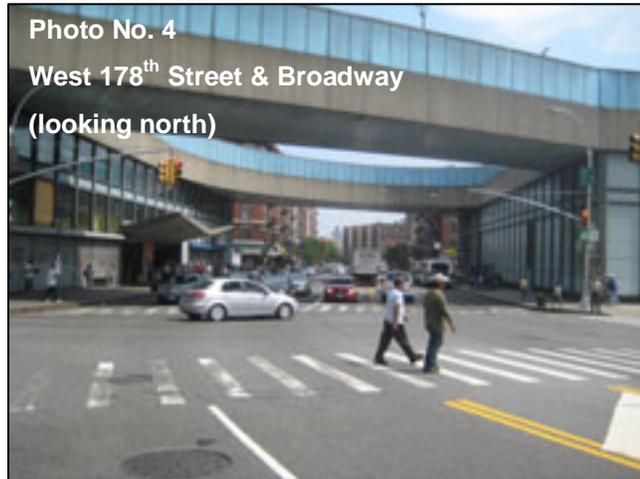
Under the NYCDOT's School Safety Project for Incarnation School, recommendations were proposed along West 175th Street between Broadway and Amsterdam Avenue (Appendix F).

Curb extensions were recommended for the following intersections:

- Northeast & southeast corners of West 175th Street & Wadsworth Avenue
- All four corners of West 175th Street & St. Nicholas Avenue
- All four corners of West 175th Street & Audubon Avenue
- Northwest & southwest corners of West 175th Street & Amsterdam Avenue

As discussed previously, Plaza De Las Americas proposes to create a pedestrian plaza by closing off West 175th Street to vehicular traffic between Broadway and Wadsworth Avenue (see Appendix G).

The intersection of Broadway and West 178th Street is a block away from where the George Washington Bridge traffic exits onto local streets, resulting in high vehicular and pedestrian volumes (Photo No. 4). Turning movement counts for the AM and PM peak periods were performed. The data revealed that 346 pedestrians using the south crosswalk conflicting with 160 eastbound vehicles making a right turn from West 178th Street during the PM peak (Appendix D). A Leading Pedestrian Interval (LPI) is recommended for the south leg of this intersection to allow pedestrians more crossing time. New NYCDOT standard pedestrian ramps and ADA safety surfaces are recommended for the northwest and northeast corners along Broadway at West 178th Street. On the south leg of the intersection, it is recommended that the existing striping be replaced with a raised median that extends through the crosswalk.



A raised median in line with existing striping is recommended for the north leg of Broadway at West 179th Street (Photo No. 5), mirroring the median recommended for Broadway at West 178th Street. This will offer a pedestrian refuge area for seniors.

At the intersection of Broadway and West 181st Street, a neckdown is recommended for the northwest corner of the intersection to shorten the crossing distance for pedestrians. The existing pedestrian ramps on the southwest corner of the intersection are steep; it is recommended that they be replaced with new NYCDOT standard pedestrian ramps and ADA safety surfaces.

The pedestrian ramps on the northeast corners of West 182nd Street and West 183rd Street and on southeast corners of West 183rd Street and West 184th Street should be replaced with NYCDOT standard pedestrian ramps and ADA safety surfaces.

A wide neckdown (14-foot) is recommended for the southwest corner of Broadway and West 184th Street. This measure will shorten the crossing distance for pedestrians and slow turning traffic.

NYCDOT recommended a new geometric design for the intersection of Broadway, Bennett Avenue, Nagle Avenue and Hillside Avenue to improve pedestrian refuge areas (Photo No. 6). The recommendation will include curb extensions with neckdowns at the northeast and southeast corners along Broadway and a change in traffic direction along Bennett Avenue to accommodate the new geometry. These measures will provide additional sidewalk width and improve pedestrian-vehicle visibility (see Site 6).



Photo No. 6
Broadway & Hillside Avenue
(looking west)

Fort Washington Avenue

The intersection of Fort Washington Avenue and West 178th Street is a congested with heavy truck and bus volumes. Fort Washington Avenue is a 44-foot wide two-way intersection where traffic from the George Washington Bridge exits onto local streets. High-visibility crosswalks are recommended for all legs of the intersection. The pedestrian ramps on the northeast corner should be replaced with NYCDOT standard pedestrian ramps and ADA safety surfaces (see Site 2).

St. Nicholas Avenue

St. Nicholas Avenue is a north-south corridor that ends at the major intersection of Fairview Avenue, Fort George Hill, Fort George Avenue and West 193rd Street. It is a 60-foot wide roadway with two moving lanes in each direction and parking on both sides (Photo No. 7).

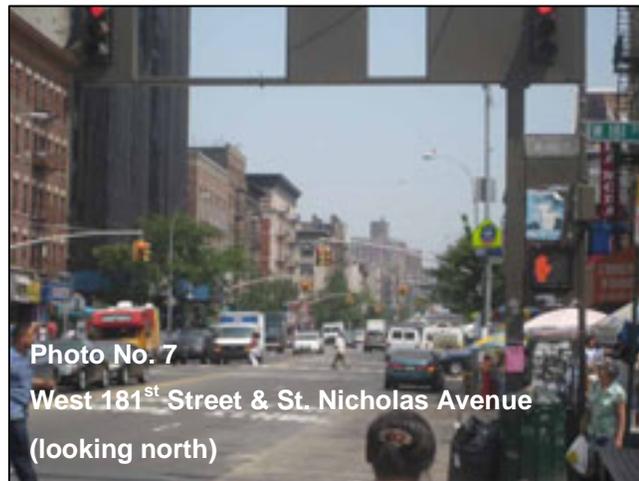


Photo No. 7
West 181st Street & St. Nicholas Avenue
(looking north)

New pedestrian ramps are needed for the southwest corner of St. Nicholas Avenue and West 181st Street. It is recommended that the existing pedestrian ramps on the northeast and southeast corners be replaced with new pedestrian ramps.

The intersection of St. Nicholas Avenue, Fairview Avenue, Fort George Hill, Fort George Avenue, West 193rd Street and Wadsworth Terrace has heavy vehicular volume and is a dangerous crossing for pedestrians. NYCDOT recommended a

new geometric design to improve pedestrian safety (see Appendix G). The recommendations include:

- Reconstruct the northeast corner of Ft. George Hill and Fairview Avenue
- Striped median along Ft. George Hill between Ft. George Avenue and Fairview Avenue with a new no left turn sign for southbound traffic
- Extended left-turn bay at St. Nicholas Avenue and West 193rd Street (Photo No. 8)
- New concrete pedestrian refuse on the south leg of St. Nicholas Avenue at West 193rd Street
- Striped 8-foot parking lane, where feasible, and advanced stop bars along St. Nicholas Avenue south of Wadsworth Avenue
- Right turn only striping and a no left turn sign for east bound traffic along Wadsworth Avenue at St. Nicholas Avenue
- Installation of a painted median with 13-foot wide parking lane striping along Fort George Avenue
- Reconstruct corner quadrants with smaller radii at the north and south corners of Audubon Avenue at Fort George Avenue and stripe 10-foot parking lanes



Nagle Avenue

Nagle Avenue is a west-east corridor between Broadway and 10th Avenue.

The intersection of Hillside Avenue and Nagle Avenue is a stop-controlled intersection (Photo No. 9). The concrete island west of Hillside Avenue at Nagle Avenue should be removed and a painted curb extension is recommended for the curb between Hillside Avenue and Fort George Hill. The curb extension should extend out to Nagle Avenue. This measure will slow vehicles from

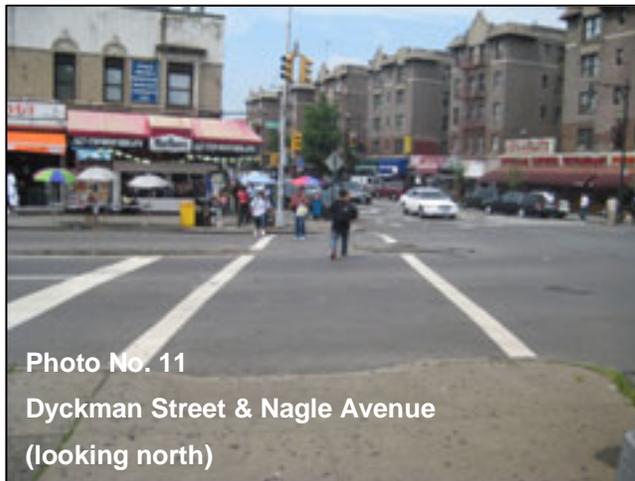


Hillside Avenue by normalizing the intersection. The curb extension creates a wider pedestrian refuge area than the existing median and will shorten the crossing distance across Hillside Avenue.



The intersection of Dyckman Street, Hillside Avenue and Fort George Hill has heavy vehicular and pedestrian volumes due to a subway stop for the 1 line. On Fort George Hill at Nagle Avenue, an island is proposed to slow turning vehicles and provide a safe refuge for pedestrians. East of the proposed island at Fort George Hill and Nagle Avenue, Fort George Hill currently does not have striped crosswalks (Photo No. 10). Pedestrian signal

heads are recommended on the west and east sides of Fort George Hill along with school crosswalks on the west side and standard crosswalks on the east side. On the east side of Fort George Hill, a painted neckdown should connect across the slip to the existing island located between Fort George Hill and Dyckman Street and a painted neckdown is recommended at the northeast corner to improve the pedestrian refuge area (see Site 6).



At the intersection of Nagle Avenue and Dyckman Street, the south side of Nagle Avenue along the east leg is used as a parking lot, so a concrete curb extension is recommended for the southeast corner of Dyckman Street at Nagle Street to shorten the crossing distance for seniors. For the west and the east leg of the intersection, the existing raised medians that extend through the crosswalk are broken and inadequate (Photo No. 11).

A reconstruction of the medians is recommended to provide a safe refuge for pedestrians. On the northwest corner of the intersection, the pedestrian ramp on Dyckman Street should be replaced with a new NYCDOT standard pedestrian ramp and ADA safety surface. New traffic striping lanes are recommended for the north and south legs along Dyckman Street with a new standard crosswalk for the south leg of the intersection and new school crosswalks for the west leg along Nagle Avenue.

Audubon Avenue

Audubon Avenue is a two-way street with one lane in each direction and parking on both sides.

At the intersection of Audubon Avenue and West 181st Street, high visibility crosswalks are recommended for the west and east (see Site 4).

Audubon Avenue and West 186th Street is an uncontrolled intersection. Traffic volume data was collected at this intersection to determine if it should be signalized. The data indicated that the intersection does not meet any of the warrants for signalization given in Chapter 4C of The Manual on Uniform Traffic Control Devices (MUTCD 2009). Detailed traffic volume data are presented in Appendix D.

Amsterdam Avenue

Amsterdam Avenue is a 63-foot wide two-way street with two moving lanes in each direction. Most streets intersect Amsterdam Avenue as T-intersections. Amsterdam Avenue connects to the Washington Bridge at West 181st Street.



Amsterdam Avenue and West 181st Street is a major intersection where traffic enters and exits Washington Bridge (Photo No. 12). The northwest and the northeast corners of this intersection have pedestrian ramps that should be replaced with new NYCDOT standard pedestrian ramps configuration and ADA safety surfaces. It is recommended that the median on the east leg of the intersection be extended across the crosswalk.

The median will slow down turning traffic and improve the pedestrian refuge area. Construction details have been provided in Appendix E.

The intersection of Amsterdam Avenue and West 190th Street is stop-controlled for eastbound West 190th Street traffic. Traffic volume data was collected to determine if the intersection should be signalized (see Appendix D). The analysis showed that a traffic signal should be installed at this intersection. New standard crosswalks are also recommended for the north and south legs. A pedestrian ramp on the southwest corner on Amsterdam Avenue should be replaced with a new NYCDOT standard pedestrian ramp and ADA safety surface.

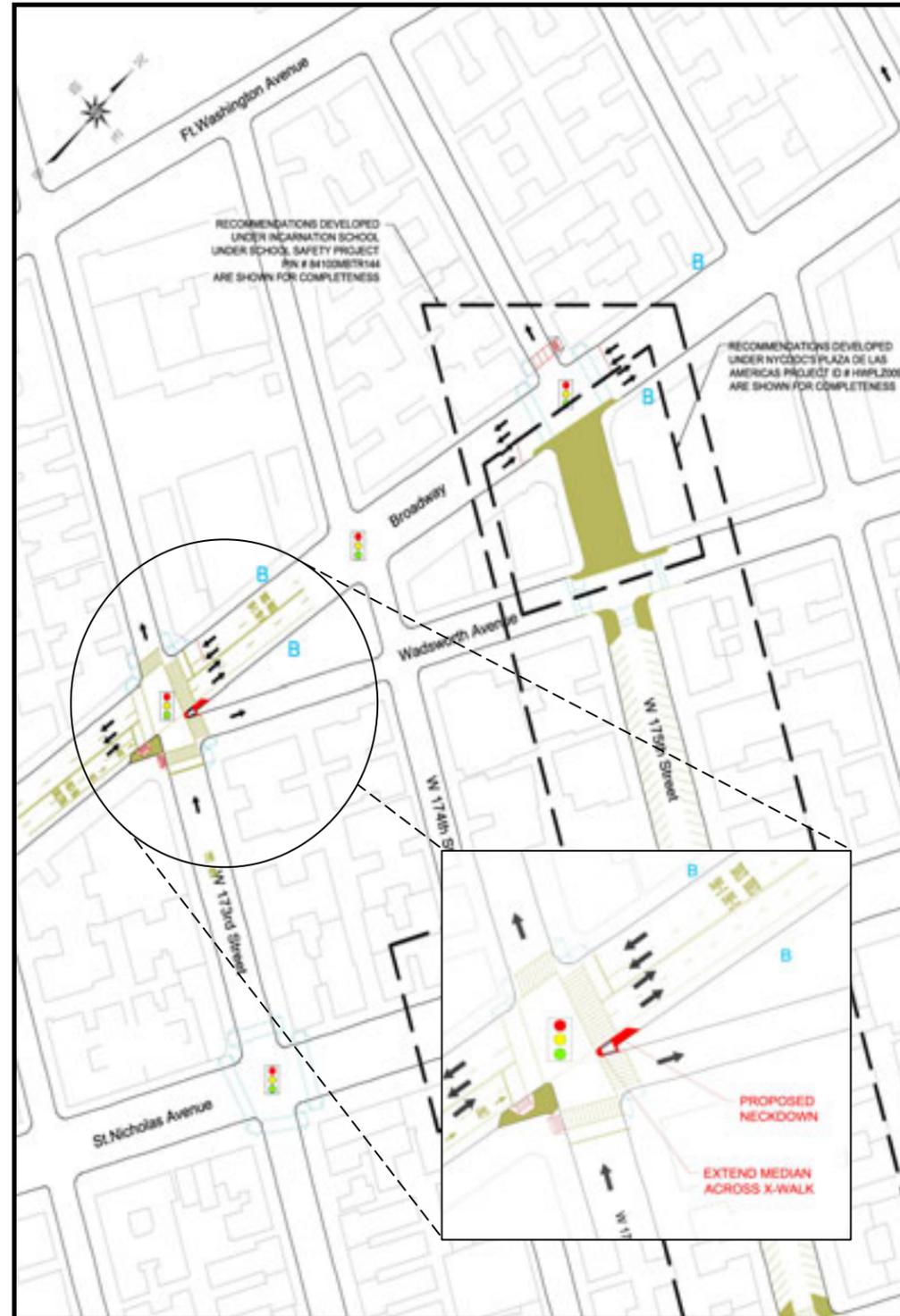
Illustrating the Solution

INDEX



- LEGEND**
- EXISTING TRAVEL DIRECTION
 - EXISTING SIGNALIZED INTERSECTION
 - EXISTING SCHOOL CROSSWALK
 - EXISTING HIGH VISIBILITY CROSSWALK
 - EXISTING STANDARD CROSSWALK
 - EXISTING PEDESTRIAN RAMP
 - EXISTING CATCH BASIN
 - EXISTING TRAFFIC SIGN
 - SUBWAY ENTRANCE
 - BUS STOP
 - PROPOSED STOP BAR
 - PROPOSED SCHOOL CROSSWALK
 - PROPOSED HIGH VISIBILITY CROSSWALK
 - PROPOSED STANDARD CROSSWALK
 - PROPOSED NEW PEDESTRIAN RAMP
 - REPLACE EXISTING PEDESTRIAN RAMP
 - PROPOSED CATCH BASIN
 - PROPOSED TRAFFIC SIGN
 - PROPOSED CURB EXTENSION (NECKDOWN)
 - PROPOSED PEDESTRIAN SIGNAL
 - PROPOSED SIGNALIZED INTERSECTION
 - PROPOSED LPI
 - SW OBSTRUCTION: SIGNAL POLE
 - SW OBSTRUCTION: STREET LIGHT
 - PLANNED DOT PROJECT

SITE 1: BROADWAY (FROM W 173RD STREET TO W 175TH STREET)



- Pedestrian concerns in this area:**
- Signal timing (insufficient crossing time)
 - Turning vehicles not yielding to pedestrians
 - Missing or inadequate pedestrian ramps

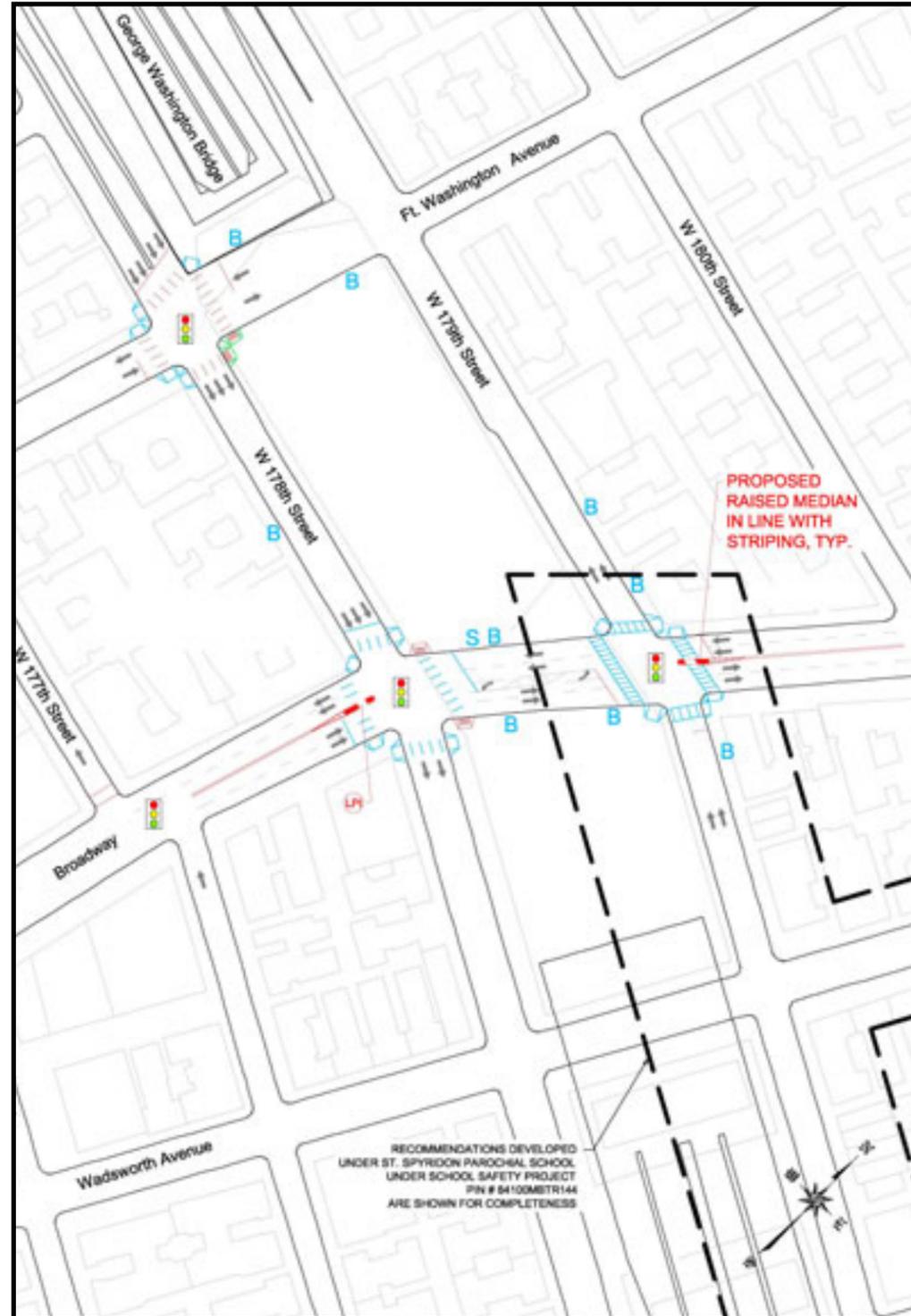
- Recommended improvements include:**
- Time all signals for seniors and where feasible, the crossing time will be extended
 - Install new advanced stop bars
 - Extend the raised median across the crosswalk on West 173rd Street & Broadway
 - Install a neckdown on the east island of West 173rd Street & Broadway

- Additional Information:**
- Parking regulations for the project area have been collected and are shown in Appendix C
 - Details of curb extension construction are shown in Appendix E
 - Recommendations developed for Incarnation School are shown in Appendix F
 - Recommendations developed for Plaza De Las Americas are shown in Appendix G
 - Detailed drawings of the proposed NYCDOT work are shown in Appendix G
 - This study area was visited on July 31st, 2008, September 30th, 2008 and May 27th, 2009

	EXISTING HIGH VISIBILITY CROSSWALK		PROPOSED HIGH VISIBILITY CROSSWALK		PROPOSED CURB EXTENSION (NECKDOWN)
	EXISTING STANDARD CROSSWALK		PROPOSED STANDARD CROSSWALK		PROPOSED LPI
	EXISTING SCHOOL CROSSWALK		PROPOSED SCHOOL CROSSWALK		PROPOSED PEDESTRIAN SIGNAL
	EXISTING STOP BAR		PROPOSED STOP BAR		PROPOSED SIGNALIZED INTERSECTION
	EXISTING SIGNALIZED INTERSECTION		PROPOSED PED REFUGE ISLAND (RAISED ISLAND)		EXISTING PEDESTRIAN RAMP
	EXISTING TRAVEL DIRECTION		EXISTING BUS STOP		PROPOSED NEW PED RAMP
			EXISTING SUBWAY STOP		REPLACE EXISTING PED RAMP
					PLANNED DOT PROJECT

Illustrating the Solution

SITE 2: BROADWAY (FROM W 177TH STREET TO W 179TH STREET)



Pedestrian concerns in this area:

- Signal timing (insufficient crossing time)
- Missing or inadequate pedestrian ramps
- Turning vehicles not yielding to pedestrians

Traffic Analysis for W 178th Street:

West 178th Street & Broadway:

- Turning Movement Count

Recommended improvements include:

- Time all signals for seniors and where feasible, the crossing time will be extended
- Install new advanced stop bars
- Stripe new high visibility crosswalks
-all four legs of West 178th Street & Fort Washington Avenue
- Install a raised median in line with existing striping
-the south leg of West 178th Street & Broadway
-the north leg of West 179th Street & Broadway
- Incorporate Leading Pedestrian Interval on the south leg of West 178th Street & Broadway

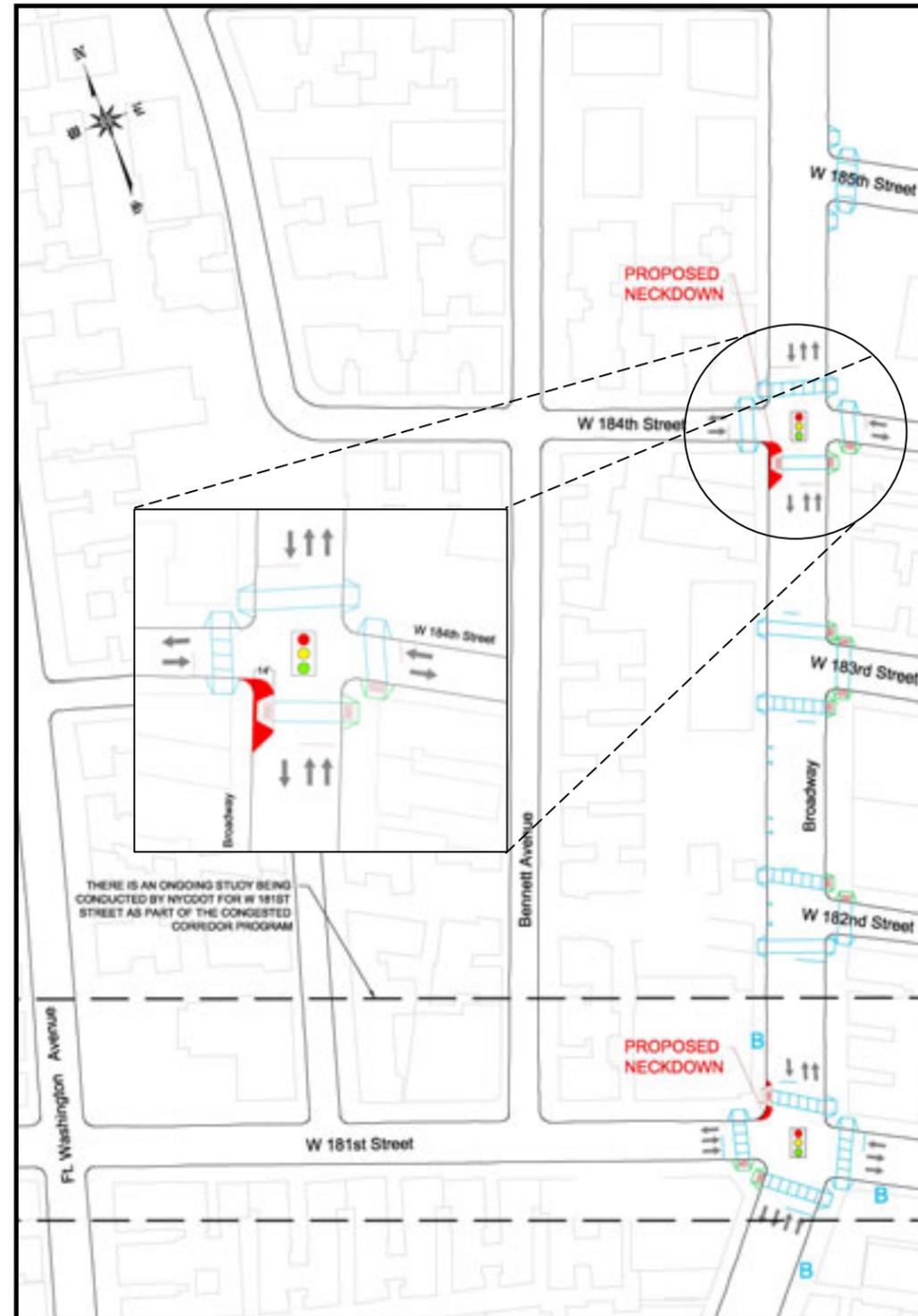
Additional Information:

- Parking regulations for the project area have been collected and are shown in Appendix C
- Details of median construction are shown in Appendix E
- Recommendations developed for St. Spyridon Parochial School are shown in Appendix F
- This study area was visited on July 31st, 2008, September 30th, 2008 and May 27th, 2009

	EXISTING HIGH VISIBILITY CROSSWALK		PROPOSED HIGH VISIBILITY CROSSWALK		PROPOSED CURB EXTENSION (NECKDOWN)
	EXISTING STANDARD CROSSWALK		PROPOSED STANDARD CROSSWALK		PROPOSED LPI
	EXISTING SCHOOL CROSSWALK		PROPOSED SCHOOL CROSSWALK		PROPOSED PEDESTRIAN SIGNAL
	EXISTING STOP BAR		PROPOSED STOP BAR		PROPOSED SIGNALIZED INTERSECTION
	EXISTING SIGNALIZED INTERSECTION		PROPOSED PED REFUGE ISLAND (RAISED ISLAND)		EXISTING PEDESTRIAN RAMP
	EXISTING TRAVEL DIRECTION		EXISTING BUS STOP		PROPOSED NEW PED RAMP
			EXISTING SUBWAY STOP		REPLACE EXISTING PED RAMP
					PLANNED DOT PROJECT

Illustrating the Solution

SITE 3: BROADWAY (FROM W 181ST STREET TO W 184TH STREET)



Pedestrian concerns in this area:

- Signal timing (insufficient crossing time)
- Missing or inadequate pedestrian ramps

Recommended improvements include:

- Time all signals for seniors and where feasible, the crossing time will be extended
- Install new advanced stop bars
- Install a neckdown
 - on the northwest corner of West 181st Street & Broadway
 - on the southwest corner of West 184th Street & Broadway

Additional Information:

- Parking regulations for the project area have been collected and are shown in Appendix C
- Details of curb extensions are shown in Appendix E
- There is an ongoing study being conducted by NYCDOT for West 181st Street as part of the Congested Corridor Program
- This study area was visited on July 31st, 2008, September 30th, 2008 and May 27th, 2009

	EXISTING HIGH VISIBILITY CROSSWALK		PROPOSED HIGH VISIBILITY CROSSWALK		PROPOSED CURB EXTENSION (NECKDOWN)
	EXISTING STANDARD CROSSWALK		PROPOSED STANDARD CROSSWALK		PROPOSED LPI
	EXISTING SCHOOL CROSSWALK		PROPOSED SCHOOL CROSSWALK		PROPOSED PEDESTRIAN SIGNAL
	EXISTING STOP BAR		PROPOSED STOP BAR		PROPOSED SIGNALIZED INTERSECTION
	EXISTING SIGNALIZED INTERSECTION		PROPOSED PED REFUGE ISLAND (RAISED ISLAND)		EXISTING PEDESTRIAN RAMP
	EXISTING TRAVEL DIRECTION		EXISTING BUS STOP		PROPOSED NEW PED RAMP
			EXISTING SUBWAY STOP		REPLACE EXISTING PED RAMP
					PLANNED DOT PROJECT

SITE 4: WEST 181ST STREET (FROM ST. NICHOLAS AVENUE TO AMSTERDAM AVENUE)



Pedestrian concerns in this area:

- Signal timing (insufficient crossing time)
- Missing or inadequate pedestrian ramps

Recommended improvements include:

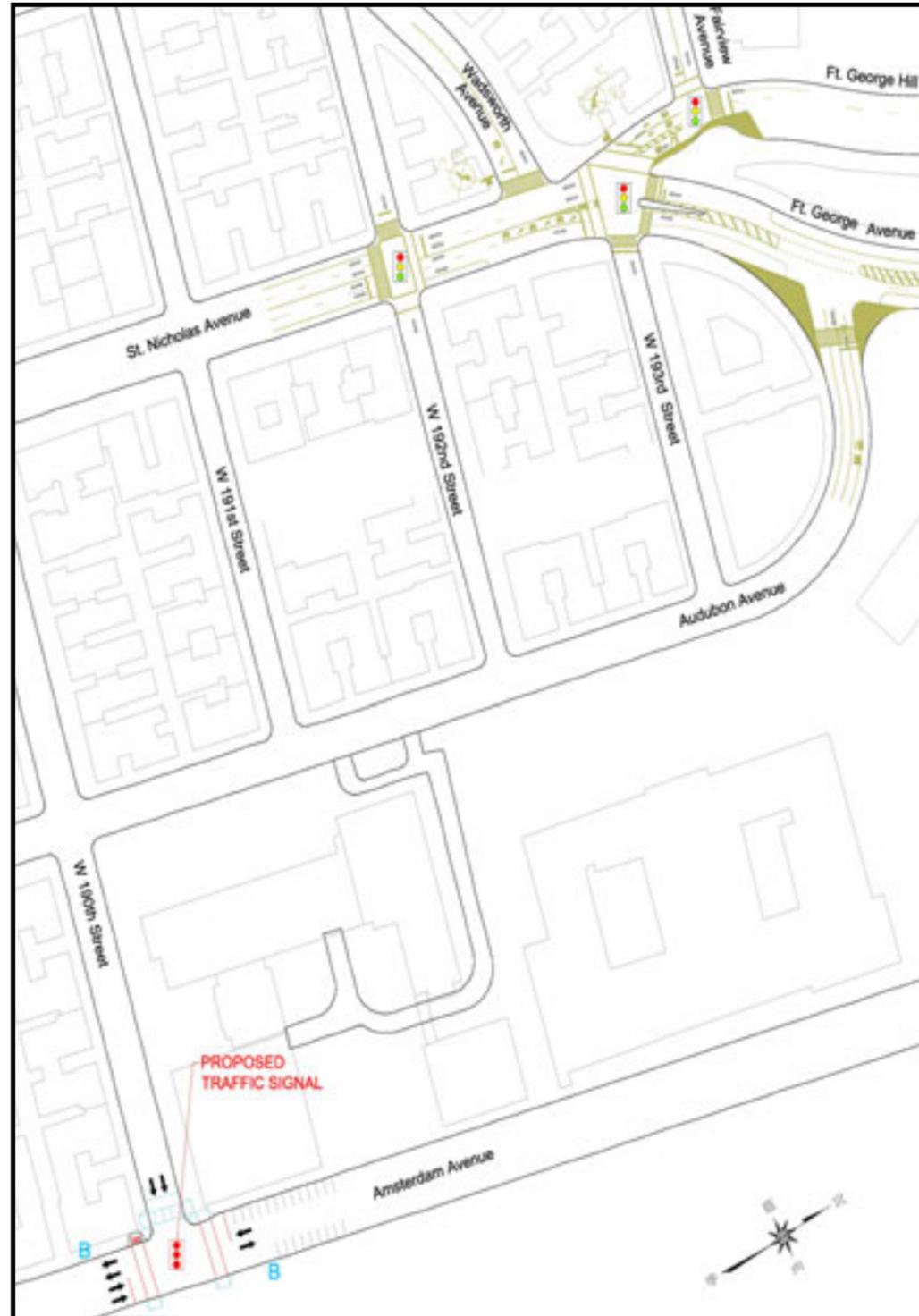
- Time all signals for seniors and where feasible, the crossing time will be extended
- Install new advanced stop bars
- Stripe new high visibility crosswalks
-west and east legs of Audubon Avenue & West 181st Street
- Extend the raised median across the crosswalk on West 181st Street & Amsterdam Avenue

Additional Information:

- Parking regulations for the project area have been collected and are shown in Appendix C
- Details of median construction are shown in Appendix E
- Recommendations developed for St. Spyridon Parochial & P.S. 132 are shown in Appendix F
- There is an ongoing study being conducted by NYCDOT for West 181st Street as part of the Congested Corridor Program
- This study area was visited on July 31st, 2008, September 30th, 2008 and May 27th, 2009

	EXISTING HIGH VISIBILITY CROSSWALK		PROPOSED HIGH VISIBILITY CROSSWALK		PROPOSED CURB EXTENSION (NECKDOWN)
	EXISTING STANDARD CROSSWALK		PROPOSED STANDARD CROSSWALK		PROPOSED LPI
	EXISTING SCHOOL CROSSWALK		PROPOSED SCHOOL CROSSWALK		PROPOSED PEDESTRIAN SIGNAL
	EXISTING STOP BAR		PROPOSED STOP BAR		PROPOSED SIGNALIZED INTERSECTION
	EXISTING SIGNALIZED INTERSECTION		PROPOSED PED REFUGE ISLAND (RAISED ISLAND)		EXISTING PEDESTRIAN RAMP
	EXISTING TRAVEL DIRECTION		EXISTING BUS STOP		PROPOSED NEW PED RAMP
			EXISTING SUBWAY STOP		REPLACE EXISTING PED RAMP
					PLANNED DOT PROJECT

SITE 5: ST. NICHOLAS AVENUE AND FORT GEORGE AVENUE



Pedestrian concerns in this area:

- Signal timing (insufficient crossing time)
- Missing or inadequate pedestrian ramps

Traffic Analysis:

West 190th Street & Amsterdam Avenue:

- Automatic Traffic Recorder Counts

Recommended improvements include:

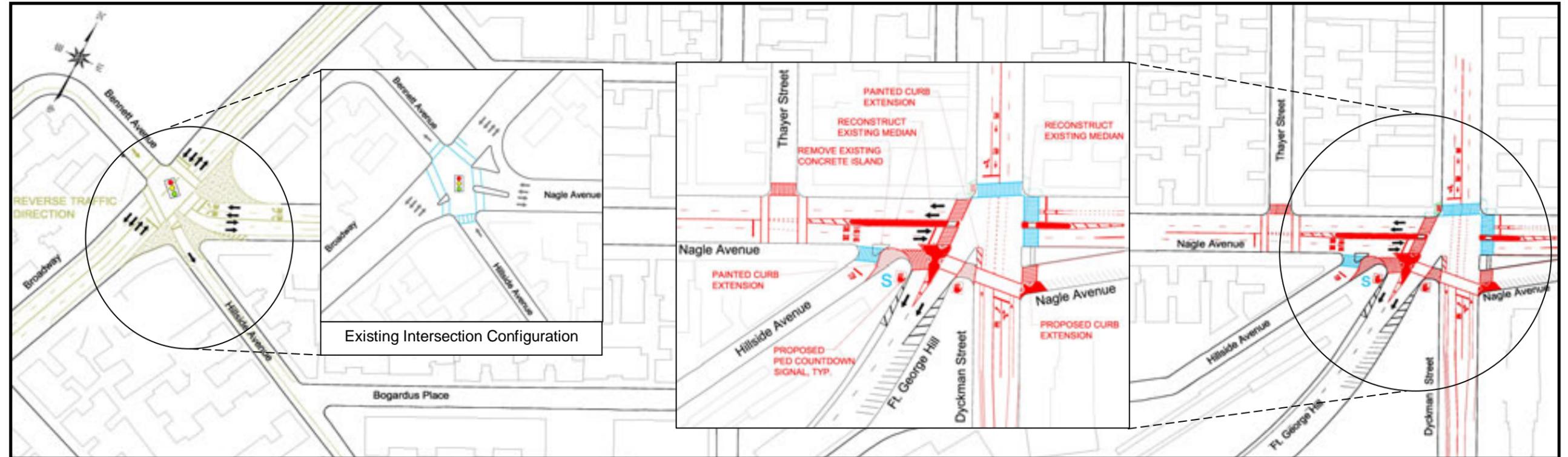
- Time all signals for seniors and where feasible, the crossing time will be extended
- Install new advanced stop bars
- Signalize the intersection of West 190th Street & Amsterdam Avenue
- Stripe new standard crosswalks
-north and south leg of West 190th Street & Amsterdam Avenue

Additional Information:

- Parking regulations for the project area have been collected and are shown in Appendix C
- Details of median construction are shown in Appendix E
- NYCDOT Drawings for the intersection of St. Nicholas Avenue, West 193rd Street, Fort George Hill and Fort George Avenue are shown in Appendix G
- This study area was visited on July 31st, 2008, September 30th, 2008 and May 27th, 2009

	EXISTING HIGH VISIBILITY CROSSWALK		PROPOSED HIGH VISIBILITY CROSSWALK		PROPOSED CURB EXTENSION (NECKDOWN)
	EXISTING STANDARD CROSSWALK		PROPOSED STANDARD CROSSWALK		PROPOSED LPI
	EXISTING SCHOOL CROSSWALK		PROPOSED SCHOOL CROSSWALK		PROPOSED PEDESTRIAN SIGNAL
	EXISTING STOP BAR		PROPOSED STOP BAR		PROPOSED SIGNALIZED INTERSECTION
	EXISTING SIGNALIZED INTERSECTION		PROPOSED PED REFUGE ISLAND (RAISED ISLAND)		EXISTING PEDESTRIAN RAMP
	EXISTING TRAVEL DIRECTION		EXISTING BUS STOP		PROPOSED NEW PED RAMP
			EXISTING SUBWAY STOP		REPLACE EXISTING PED RAMP
					PLANNED DOT PROJECT

SITE 6: NAGLE AVENUE (FROM BROADWAY TO DYCKMAN STREET)



Pedestrian concerns in this area are:

- Signal timing (insufficient crossing time)
- Missing or inadequate pedestrian ramps

Additional Information:

- Parking regulations for the project area have been collected and are shown in Appendix C
- Details of curb extension construction are shown in Appendix E
- NYCDOT Drawings for the intersection of Broadway, Bennett Avenue, Hillside Avenue and Nagle Avenue are shown in Appendix G
- This study area was visited on July 31st, 2008, September 30th, 2008 and May 27th, 2009

Recommended improvements include:

- Time all signals for seniors and where feasible, the crossing time will be extended
- Install new advanced stop bars
- Stripe
 - standard crosswalks for the south leg of Fort George Hill (east of island) and south approach of Dyckman Street
 - school crosswalks for the south leg of Fort George Hill (west of island) and west leg of Nagle Avenue
- Reconstruct existing median
 - west and east legs of Nagle Avenue & Dyckman Street
 - at Fort George Hill & Nagle Avenue
- Stripe allowed lane movements along Dyckman Street at Nagle Avenue
- Remove existing island at Hillside Avenue & Nagle Avenue
- Install painted curb extension
 - the east curb of Hillside Avenue at Nagle Avenue
- Install concrete curb extension
 - the southeast corner of Dyckman Street at Nagle Avenue
- Install pedestrian signal heads on the west and east side of Fort George Hill

**APPENDIX A:
PHOTO LOG
(SEPARATE COVER)**

APPENDIX B: FIELD INVESTIGATIONS FORM

APPENDIX B – FIELD INVESTIGATIONS FORM

Washington Hts	Subway / Bus Stop	Issues							Short Term Solutions					Long Term Solutions							Photos		
		Heavy Left Turns	Congestion	P-V Visual Conflict	Faded X-Walk	Apex Curb	SW Obstruction	Broken SW & Curbs	Puddling	New X-walk	High V / School X-Restripe X-Walk	Move Stop Bars Back 10'	New Signs	LPI	Resurface	New Ped Ramp	Update Ped Ramp w Safety	Daylighting	Move Meter Behind Stop	Relocate Sign		Relocate Obstruction	Remove
LOCATIONS																							
Example:	¹ S-NE	² E->N				³ ALL	⁴ x	⁵ NW					⁶ E->N		⁷ ALL					⁸ SL			⁹ 4, 5
Explanation	1.Subway Stop on NE Corner 2.Heavy left turns going Eastbound to Northbound 3.Apex curb on NW, NE, SW, SE corners 4.Sidewalk obstruction on SW & NE corners 5.Broken curb on NW corner 6.LPI for Eastbound to Northbound traffic 7.New ped ramp for NW, NE, SW, SE corners 8.Relocate obstruction(street light) on SW & NE corners 9.Intersection photograph in photo log, picture # 4, 5																						
Broadway @ W 173rd Street		extend median across x-walk					x			HV-S						ALL					NS, G, SP		
Broadway @ W 175th Street	S	resurface West leg								HV-N						ALL					FH		
Broadway @ W 178th Street		congested			x		x									ALL						G	
Broadway @ W 181st Street		congested			x		x						ALL			ALL						G	
Broadway @ W 184th Street							x						ALL			ALL						SP	
Broadway @ Hillside Avenue		at-grade cut thru on south median					x			HV-N,S,W	new stop bars-N,S					possible geometric redesign						G	
Ft. Washington Ave @ W 178th Street		GWB exits, en route to Yankee Stadium								HV-ALL		new stop bars-E,S										heavy truck & bus volume	
Pinehurst Avenue @ W 181st Street		no x-walk across 181st										low ped volume				new stop bar-S						ALL	
St Nicholas @ W 175th Street		175th is very wide				ALL																	x
St Nicholas @ W 181st Street	B-ALL	congested w/ trucks, buses, peds					x			HV-ALL		ALL				ALL						NS	
St Nicholas @ W 187th Street	B-N,S					ALL				HV-N,E						ALL							
St Nicholas @ W 193rd Street	B-S	ped ramps don't line up w x-walks					x				x	ALL											G
Audubon Avenue @ W 183rd Street							x					ALL	st. sign	x		ALL							G
Audubon Avenue @ W 186th Street		stop-controlled intersection (on 186th)							x?							ALL							full counts, possibly signalize
Amsterdam Avenue @ W 181st Street		faded st. print			x		x			N,E,S legs have pavers		ALL				repair pavers-N,S							G, SP
Amsterdam Avenue @ W 190th Street	B-S	stop-controlled			x					public park on E						ALL							full counts, possibly signalize
Dyckman Avenue @ Nagle Avenue																ALL							
S Subway	ALL	All 4 corners (NW, NE, SW, SE)							CB	Catch Basin	SP	Signal Poles	G	Garbage Can	FH	Fire Hydrant							
B Bus stop	Y2P	Yield to Pedestrians							SL	Street Light	IS	ISLAND	NS	NewsStand									

APPENDIX C: MAP OF PROPOSED CHANGES



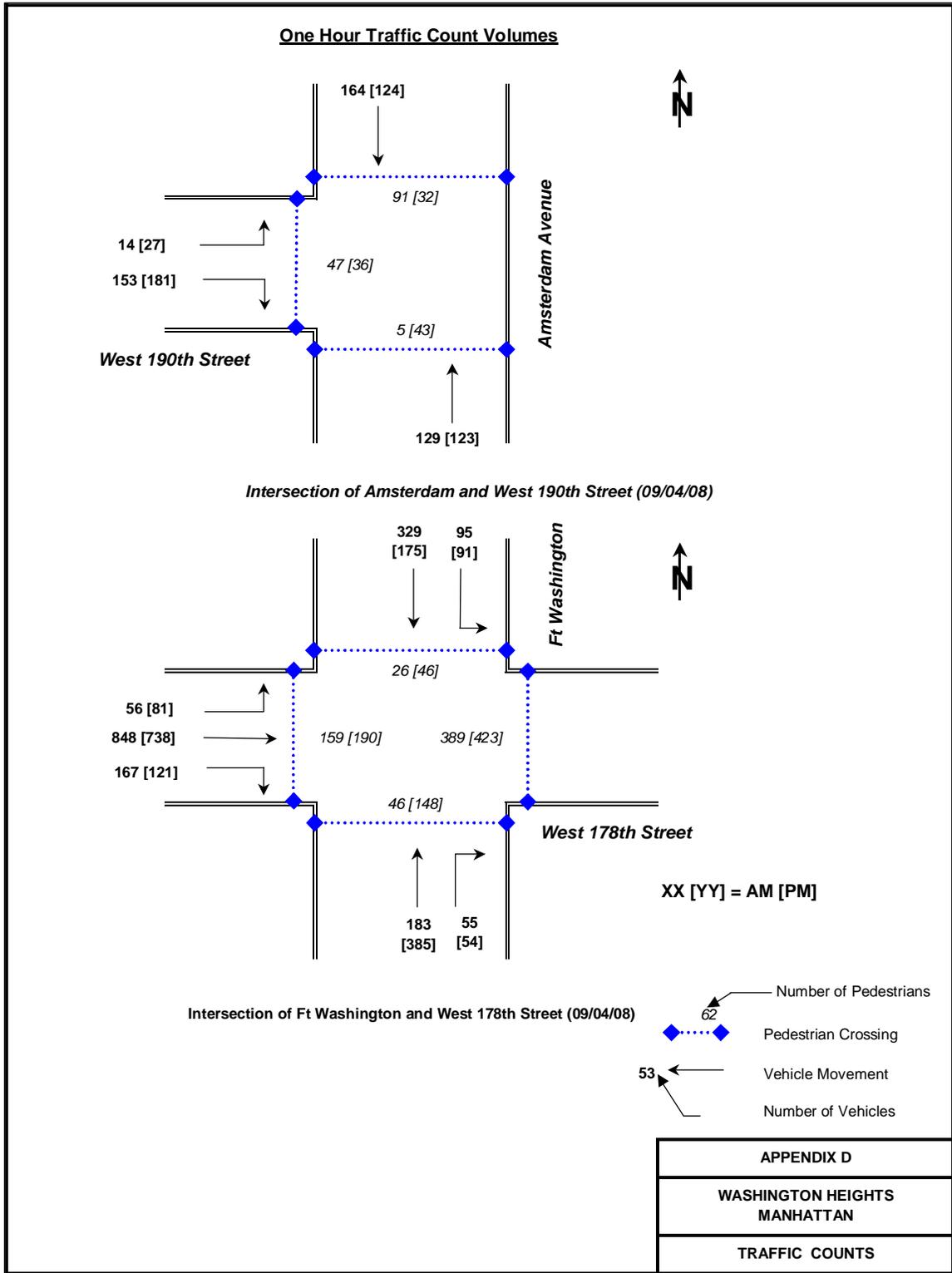
- LEGEND**
- EXISTING TRAVEL DIRECTION
 - ↔ EXISTING SIGNALIZED INTERSECTION
 - ▬ EXISTING SCHOOL CROSSWALK
 - ▬ EXISTING HIGH VISIBILITY CROSSWALK
 - ▬ EXISTING STANDARD CROSSWALK
 - ↗ EXISTING PEDESTRIAN RAMP
 - Ⓜ EXISTING CATCH BASIN
 - Ⓢ EXISTING TRAFFIC SIGN
 - S SUBWAY ENTRANCE
 - B BUS STOP
 - PROPOSED STOP BAR
 - ▬ PROPOSED SCHOOL CROSSWALK
 - ▬ PROPOSED HIGH VISIBILITY CROSSWALK
 - ▬ PROPOSED STANDARD CROSSWALK
 - ↗ PROPOSED NEW PEDESTRIAN RAMP
 - ↗ REPLACE EXISTING PEDESTRIAN RAMP
 - Ⓜ PROPOSED CATCH BASIN
 - Ⓢ PROPOSED TRAFFIC SIGN
 - ↗ PROPOSED CURB EXTENSION (NECKDOWN)
 - Ⓢ PROPOSED PEDESTRIAN SIGNAL
 - ↔ PROPOSED SIGNALIZED INTERSECTION
 - Ⓢ PROPOSED LPI
 - Ⓢ SW OBSTRUCTION: SIGNAL POLE
 - Ⓢ SW OBSTRUCTION: STREET LIGHT
 - PLANNED DOT PROJECT



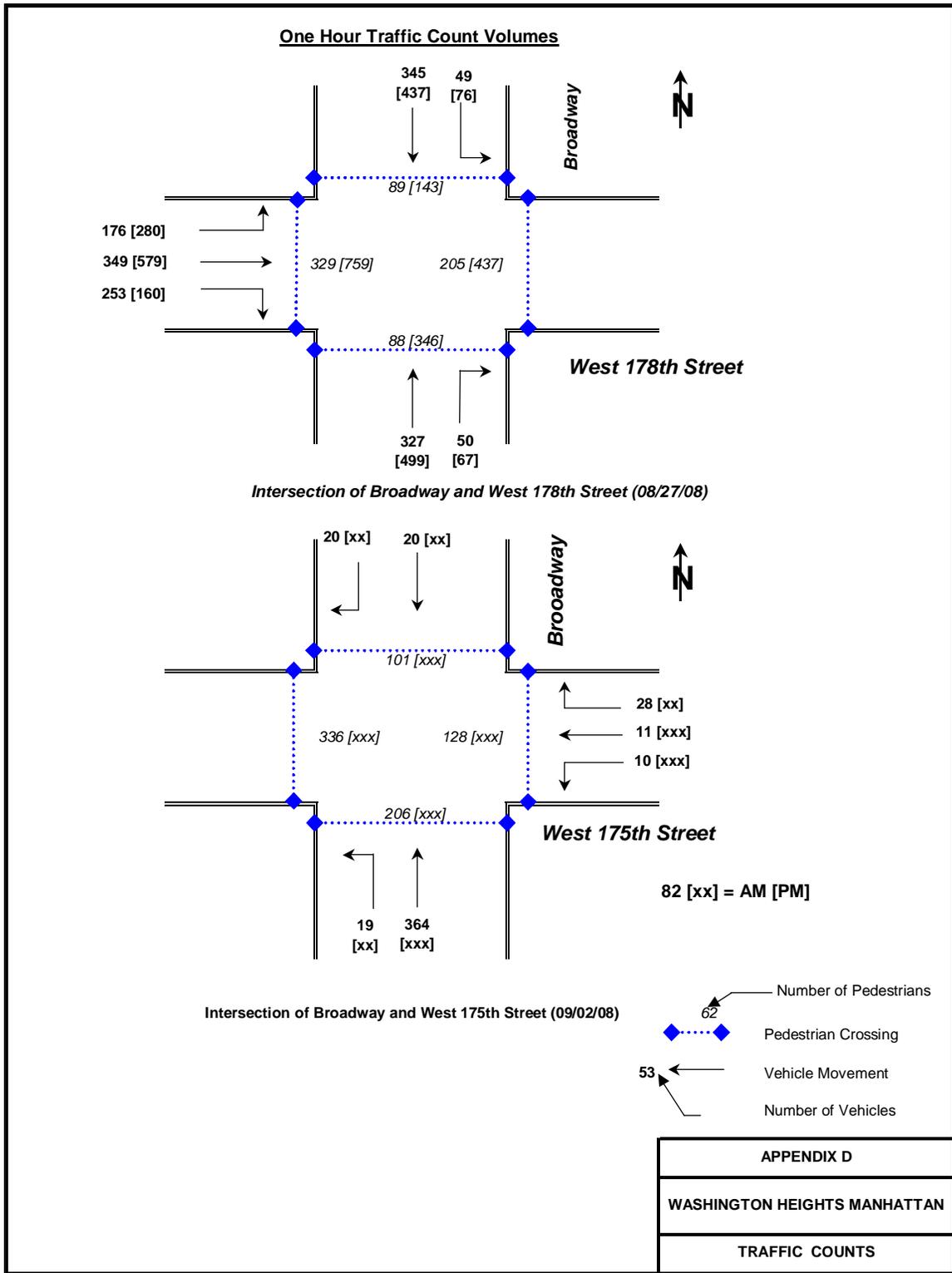
SENIOR PEDESTRIAN SAFETY AREA
 WASHINGTON HEIGHTS
 PROPOSED MEASURES
 TO IMPROVE SAFETY

APPENDIX D: TRAFFIC COUNTS

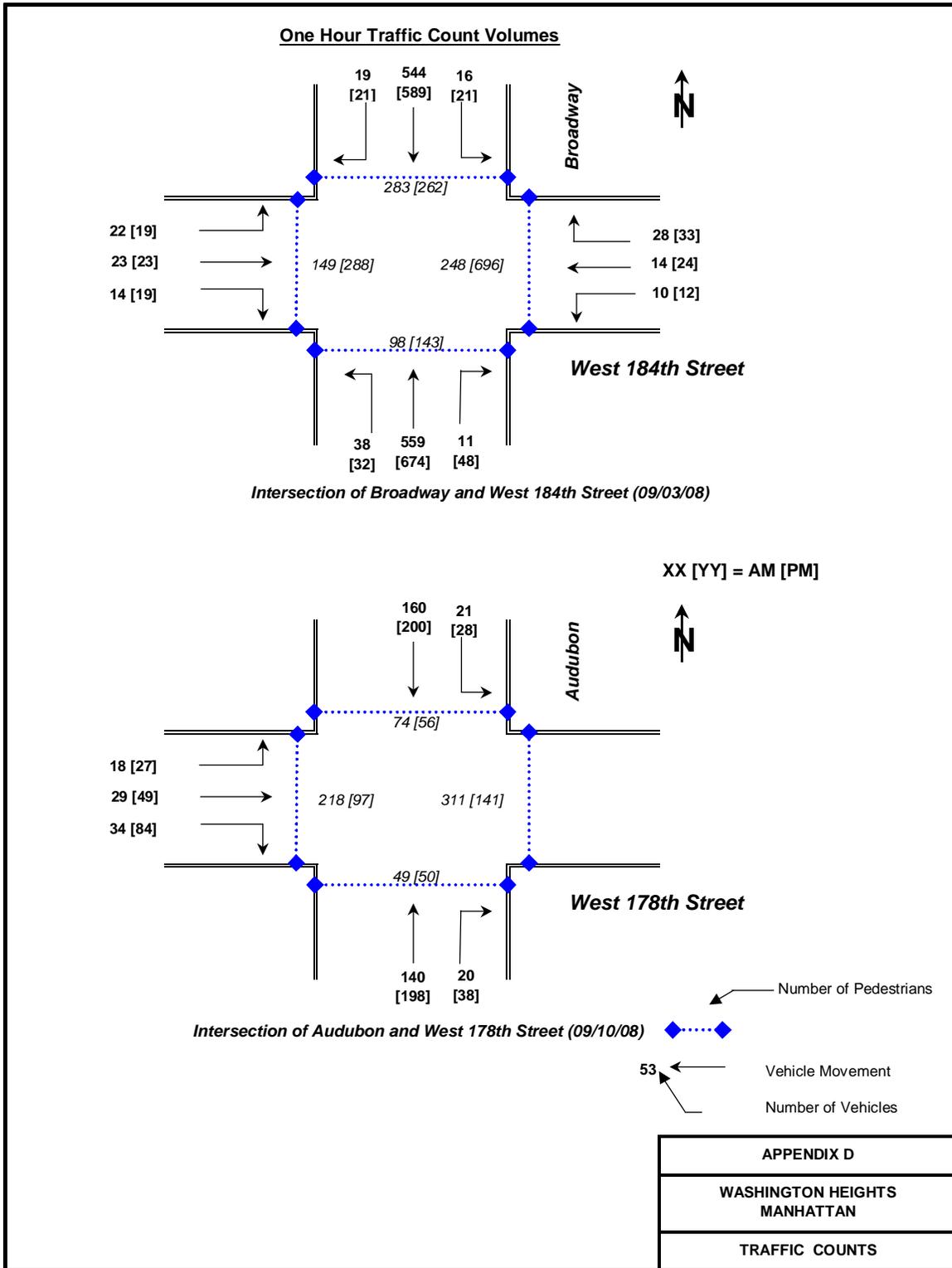
APPENDIX D – TRAFFIC COUNT



APPENDIX D – TRAFFIC COUNT (CONT.)



APPENDIX D – TRAFFIC COUNT (CONT.)



APPENDIX D – TRAFFIC COUNT (CONT.)

The RBA Group 40 Marcus Drive, Suite 201 Melville, NY 11747										
Roadway:	West 186th Street								Site:	
Location:	Just W/O Audubon Ave									
Town:	Manhattan									
Seven Day Volume, per Channel Channel: EB										
Interval Begin	Mon 10/13/2008	Tue 10/14/2008	Wed 10/15/2008	Thu 10/16/2008	Fri 10/17/2008	Sat 10/18/2008	Sun 10/19/2008	Mon - Fri Average	Week Average	
12:00 AM	-	24	29	37	29	61	105	29.8	47.5	
1:00 AM	-	17	19	18	20	75	93	18.5	40.3	
2:00 AM	-	11	12	12	14	50	61	12.3	26.7	
3:00 AM	-	11	8	8	20	22	51	11.8	20.0	
4:00 AM	-	4	15	16	19	26	45	13.5	20.8	
5:00 AM	-	17	11	15	21	31	60	16.0	25.8	
6:00 AM	-	24	28	37	37	15	33	31.5	29.0	
7:00 AM	-	67	57	82	82	23	18	72.0	54.8	
8:00 AM	-	64	71	106	99	55	19	85.0	69.0	
9:00 AM	22	44	60	60	87	52	49	54.6	53.4	
10:00 AM	44	55	56	75	116	68	63	69.2	68.1	
11:00 AM	55	76	66	94	151	97	77	88.4	88.0	
12:00 PM	81	84	82	90	93	106	100	86.0	90.9	
1:00 PM	81	81	64	114	126	121	98	93.2	97.9	
2:00 PM	71	113	109	90	104	172	138	97.4	113.9	
3:00 PM	84	114	98	123	100	120	143	103.8	111.7	
4:00 PM	117	139	114	145	140	145	186	131.0	140.9	
5:00 PM	150	134	98	122	156	185	170	132.0	145.0	
6:00 PM	151	119	136	123	115	202	153	128.8	142.7	
7:00 PM	95	84	110	147	222	170	169	131.6	142.4	
8:00 PM	95	57	76	108	173	214	151	101.8	124.9	
9:00 PM	66	70	62	92	114	224	82	80.8	101.4	
10:00 PM	43	45	35	54	90	143	70	53.4	68.6	
11:00 PM	49	44	50	39	90	120	89	54.4	68.7	
Totals	1204	1498	1466	1807	2218	2497	2223	1696.7	1892.4	
Peak Hours										
12:00 AM - 12:00 PM Volume	11:00 AM	11:00 AM	8:00 AM	8:00 AM	11:00 AM	11:00 AM	12:00 AM	11:00 AM	11:00 AM	
	55	76	71	106	151	97	105	88.4	88.0	
12:00 PM - 12:00 AM Volume	6:00 PM	4:00 PM	6:00 PM	7:00 PM	7:00 PM	9:00 PM	4:00 PM	5:00 PM	5:00 PM	
	151	139	136	147	222	224	186	132.0	145.0	

APPENDIX D – TRAFFIC COUNT (CONT.)

The RBA Group 40 Marcus Drive, Suite 201 Melville, NY 11747										
Roadway:	West 186th Street								Site:	
Location:	Just W/O Audubon Ave									
Town:	Manhattan									
Seven Day Volume, per Channel Channel: EB										
Interval	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon - Fri	Week	
Begin	10/20/2008	10/21/2008	10/22/2008	10/23/2008	10/24/2008	10/25/2008	10/26/2008	Average	Average	
12:00 AM	56	49	-	-	-	-	-	52.5	52.5	
1:00 AM	31	25	-	-	-	-	-	28.0	28.0	
2:00 AM	29	20	-	-	-	-	-	24.5	24.5	
3:00 AM	9	14	-	-	-	-	-	11.5	11.5	
4:00 AM	13	13	-	-	-	-	-	13.0	13.0	
5:00 AM	29	26	-	-	-	-	-	27.5	27.5	
6:00 AM	48	41	-	-	-	-	-	44.5	44.5	
7:00 AM	82	87	-	-	-	-	-	84.5	84.5	
8:00 AM	88	74	-	-	-	-	-	81.0	81.0	
9:00 AM	94	71	-	-	-	-	-	82.5	82.5	
10:00 AM	88	7	-	-	-	-	-	47.5	47.5	
11:00 AM	141	-	-	-	-	-	-	141.0	141.0	
12:00 PM	142	-	-	-	-	-	-	142.0	142.0	
1:00 PM	112	-	-	-	-	-	-	112.0	112.0	
2:00 PM	98	-	-	-	-	-	-	98.0	98.0	
3:00 PM	113	-	-	-	-	-	-	113.0	113.0	
4:00 PM	138	-	-	-	-	-	-	138.0	138.0	
5:00 PM	177	-	-	-	-	-	-	177.0	177.0	
6:00 PM	142	-	-	-	-	-	-	142.0	142.0	
7:00 PM	115	-	-	-	-	-	-	115.0	115.0	
8:00 PM	94	-	-	-	-	-	-	94.0	94.0	
9:00 PM	78	-	-	-	-	-	-	78.0	78.0	
10:00 PM	36	-	-	-	-	-	-	36.0	36.0	
11:00 PM	51	-	-	-	-	-	-	51.0	51.0	
Totals	2004	427	-	-	-	-	-	1934.0	1934.0	
Peak Hours										
12:00 AM -	11:00 AM	7:00 AM	-	-	-	-	-	11:00 AM	11:00 AM	
12:00 PM										
Volume	141	87	-	-	-	-	-	141.0	141.0	
12:00 PM -	5:00 PM	-	-	-	-	-	-	5:00 PM	5:00 PM	
12:00 AM										
Volume	177	-	-	-	-	-	-	177.0	177.0	

APPENDIX E: CONSTRUCTION DETAILS

APPENDIX E – CONSTRUCTION DETAIL – CURB EXTENSIONS

REVISIONS		
DATE	APPD	DESCRIPTION

NOTES:

- ALL CROSSWALK LINES TO BE 12" WIDE THERMOPLASTIC PAVEMENT MARKINGS
- STOP LINES SHALL BE 24" WIDE AND LOCATED AT EITHER:
 - A. THE BUILDING LINE
 - B. 4' FROM STANDARD CROSSWALK
 - C. 10' FROM SCHOOL CROSSWALK
- THE RADIUS, R, OF THE CORNER QUADRANT SHALL BE IN ACCORDANCE WITH THE LATEST REVISIONS OF H-1101 FOR SIDEWALK PEDESTRIAN RAMPS AND THE FOLLOWING GUIDELINES SHALL BE APPLIED IN DETERMINING THE RADIUS, R, OF THE CORNER QUADRANT:
 - R=12' INTERIOR > 90
 - R=13' INTERIOR BET. 83 AND 93
 - R=14' INTERIOR BET. 77 AND 80
 - R=15' INTERIOR BET. 72 AND 81
- CURB EXTENSIONS SHALL BE CONSTRUCTED OF STEEL FACED CONCRETE CURBS, 18 MINIMUM DEPTH. REFER TO H1010 R79 (LATEST REVISION) FOR STEEL FACED CURBS – TYPE D.
- REFER TO H1011 (LATEST REVISION) FOR DETECTABLE WARNING SURFACE.
- REFER TO H1011 (LATEST REVISION) FOR ADDITIONAL NOTES AND REQUIREMENTS FOR THE PEDESTRIAN RAMPS CORNER QUADRANT AREA OF THE SIDEWALK.
- THE WIDTH, W TO THE NECKDOWN IS EQUAL TO WIDTH OF THE PARKING LANE MINUS TWO (2) FEET. SEE TABLE BELOW.

WIDTH OF PARKING LANE (FT)	WIDTH OF NECKDOWN, W (FT)
7	5
8	6
- INSTALLATION OF A NECKDOWN MUST ALLOW FOR THE TURNING MOVEMENT OF A THIRTY FOOT SIGNLE UNIT TRUCK (SU-30). ON DESIGNATED TRUCK ROUTES OR REGULARLY SCHEDULED BUS ROUTES THAT REQUIRE TURNING, THE APPROPRIATE DESIGN VEHICLE SHALL BE USED.
- A FIRE TRUCK TURNING ZONE WITH A FIFTY FOOT OUTSIDE RADIUS SHALL BE MAINTAINED CLEAR OF PHYSICAL OBSTRUCTIONS (SIGNS, PLANTERS, NON-FLEXIBLE BOLLARDS, TREES, ETC).
- A 22-FOOT MINIMUM ROADWAY WIDTH (FROM CURB TO CURB OR PARKED VEHICLE) MUST BE MAINTAINED AT A FIRE HYDRANT, SO THAT A FIRE TRUCK MAY PASS ANOTHER PARKED AT THE HYDRANT.
- FIRE HYDRANTS AND PARKING METERS SHALL BE MOVED ONTO THE NECKDOWN. PLACEMENT SHALL BE IN ACCORDANCE WITH APPROPRIATE NYCDOT AND NYCEEP DESIGN STANDARDS.

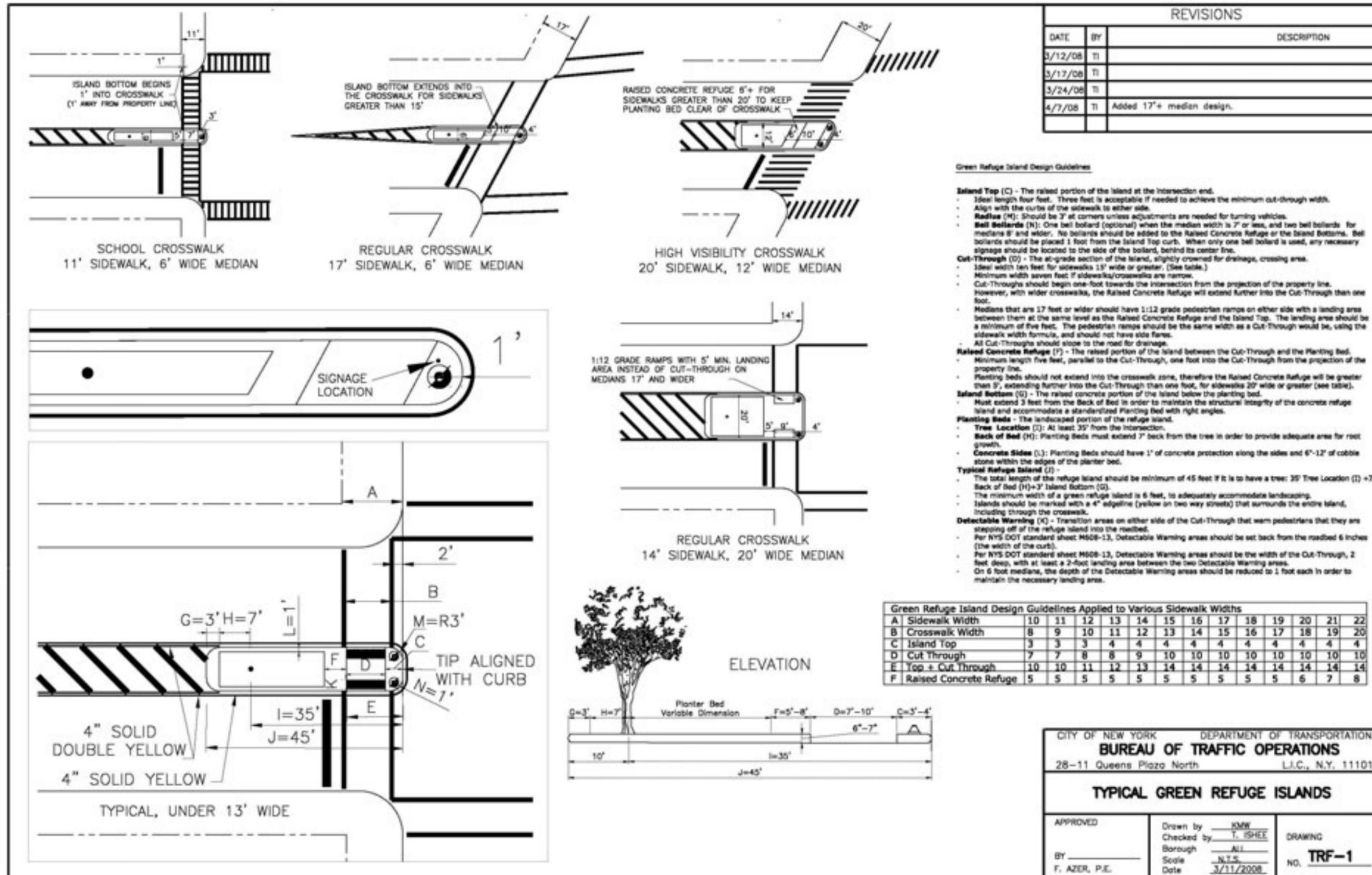
LOCATION	CASE	LENGTH
BROADWAY & WADSWORTH AVENUE	A	72.5'
BROADWAY & W 181ST STREET	A	57.0'
BROADWAY & W 184TH STREET	A	75.0'
DYCKMAN STREET & NAGEL AVENUE	A	78.0'

CITY OF NEW YORK DEPARTMENT OF TRANSPORTATION
BUREAU OF TRAFFIC OPERATIONS
28-11 Queens Plaza North S.I.C., N.Y. 11101

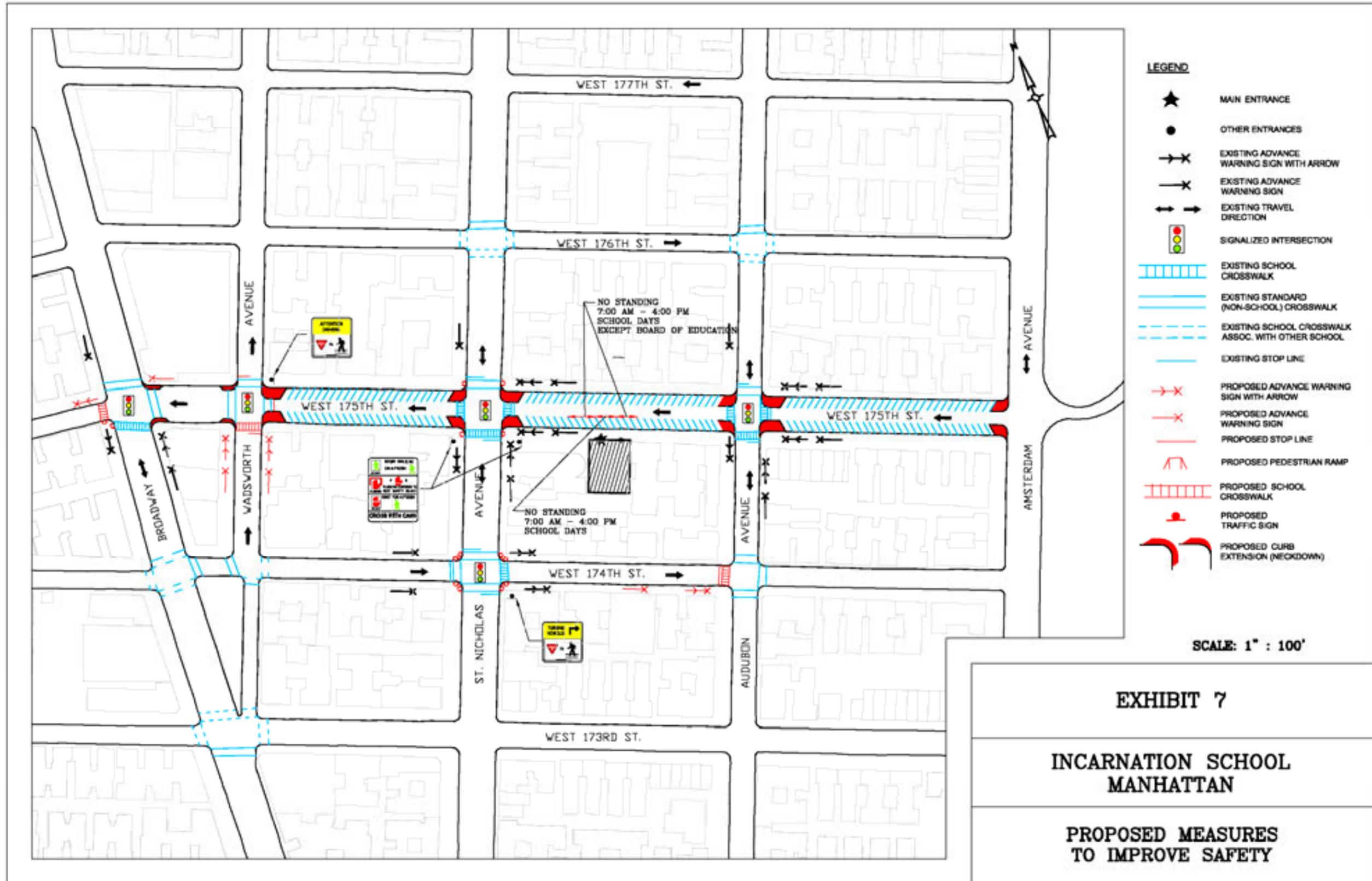
CURB EXTENSIONS AND PAVEMENT MARKING CONFIGURATIONS

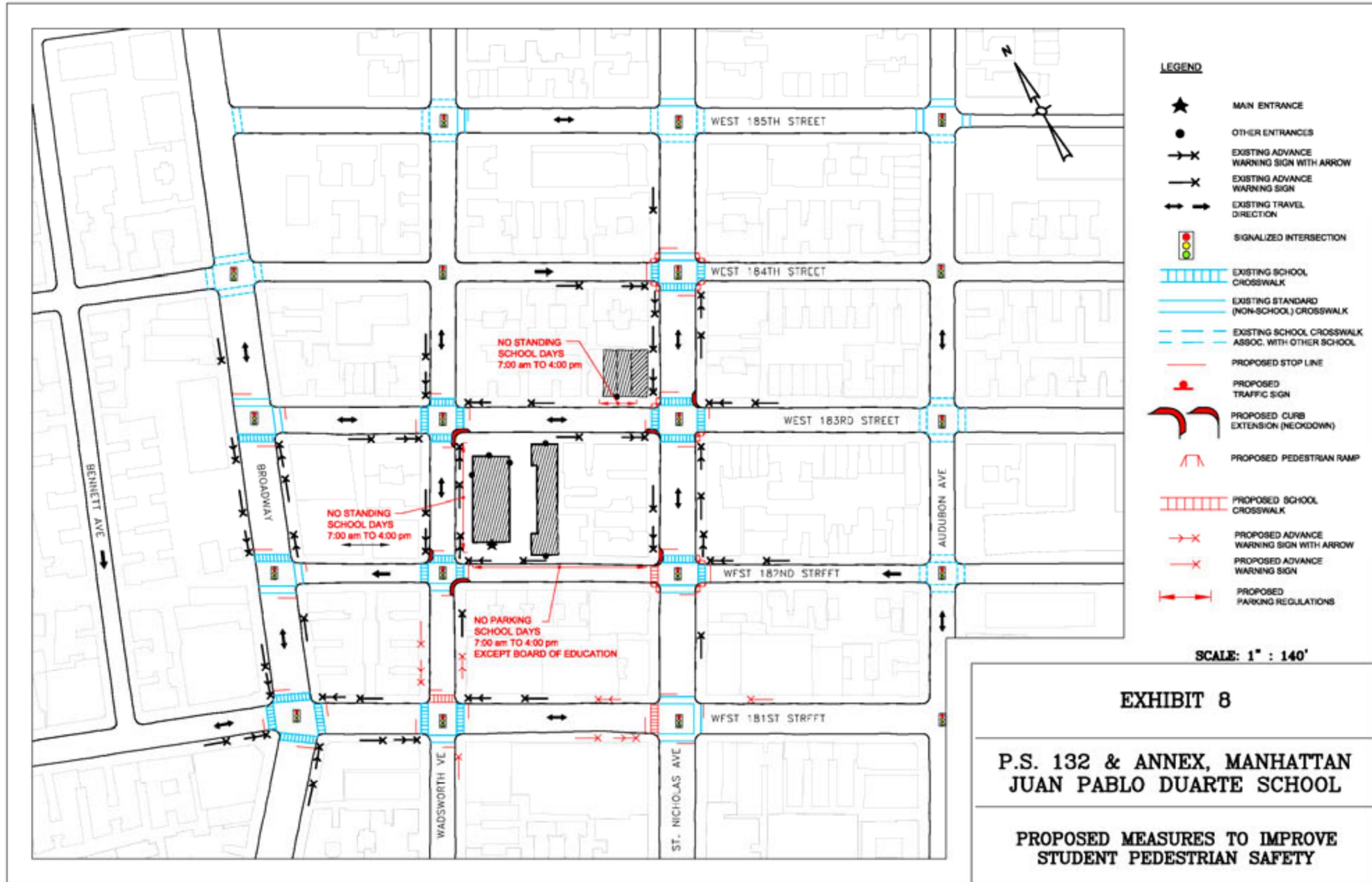
APPROVED BY _____	Drawn by <u>J.M.</u> Checked by <u>S.A.</u> Reviewed by <u>S.A.</u> Scale <u>AS SHOWN</u> Date <u>11/26/2007</u>	DRAWING NO. <u>XXX-X</u>
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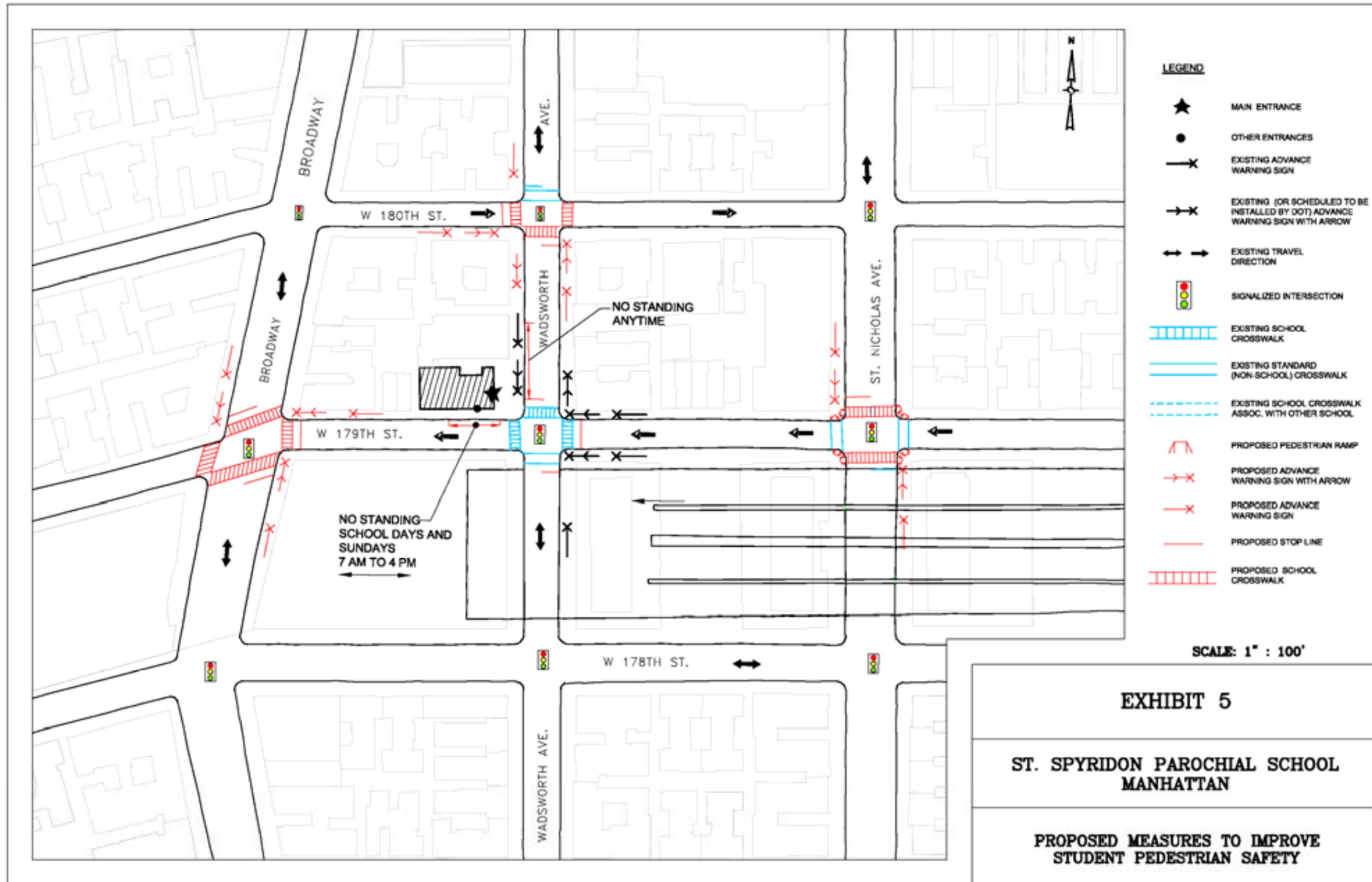
APPENDIX E – CONSTRUCTION DETAIL – MEDIAN



APPENDIX F: SCHOOL SAFETY EXHIBITS







APPENDIX G: NYCDOT DRAWINGS

