

W 95 St

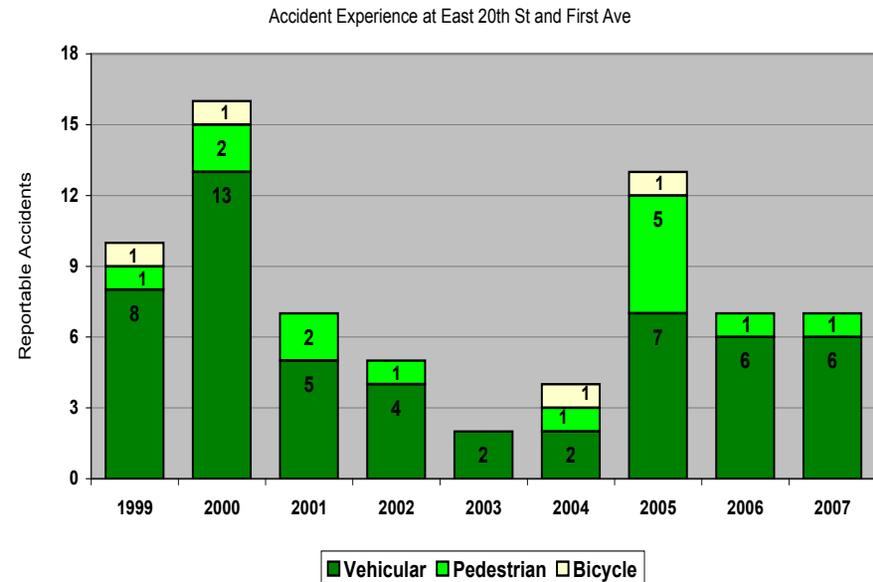
MANHATTAN



EAST 20TH STREET/ FIRST AVENUE

Description

The intersection at East 20th Street and First Avenue was identified as problematic for pedestrians based on community concerns regarding the high number of crashes at this location as well as a pedestrian fatality that occurred in 2006. Because there are educational facilities on both the northern and southern block faces of East 20th Street between First and Second Avenues, providing safe crossing at this intersection was a high priority for the Department. At this intersection, vehicles could enter onto the service road paralleling First Avenue along its east side. They could also enter the intersection mid-block from First Avenue between East 20th and East 21st Streets. Crossing this intersection from the northeast to northwest corners of East 20th Street was dangerous for pedestrians since the “Walk” sign corresponded with a heavy stream of traffic turning onto First Avenue coming both east and west from East 20th Street. Because of this, pedestrians were often likely to cross when the “Don’t Walk” sign was illuminated but after the northbound First Avenue traffic had passed.



From 2000 to 2005, the reportable crash experience at this location fluctuated. There was a high of 16 reportable crashes in 2000, of which two involved pedestrians and one involved a bicyclist. Reportable crashes decreased to two in 2003 from seven in 2001, but increased to 13 in 2005, of which five involved pedestrians and one involved a bicyclist. While pedestrian crashes also fluctuated between 1999 and 2005, the large increase in 2005 drew attention to this location. After an evaluation of the intersection was completed in 2006, safety improvements were designed and completed in the same year. **Since then, both pedestrian and vehicular crashes have remained the same at one and six, respectively since the study began.**



This Green Street was constructed where the service road along the eastern side First Avenue formally existed. By closing off the service area to vehicles, pedestrians have more space to walk and encounter less vehicle conflicts as they walk along First Avenue.



At 20th Street, this sign warns vehicles to pay attention to pedestrians crossing at this intersection.

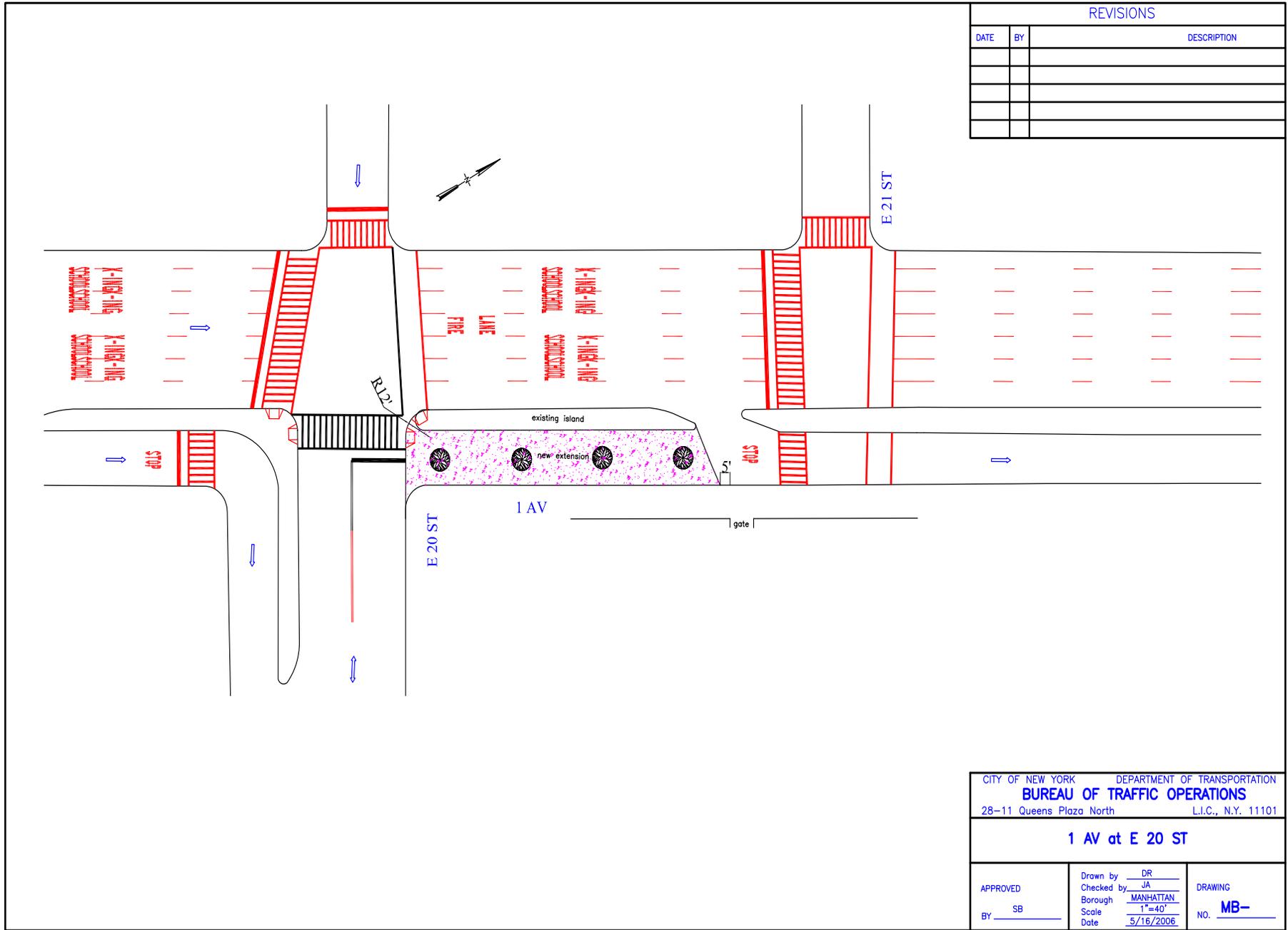
Improvements Implemented in November 2006

The entrance to the service road on the east side of First Avenue was closed, normalizing the intersection and eliminating a portion of the service road. This reduced the distance required to cross First Avenue on the north side and allowed the Department to realign the crosswalk and shorten the crossing distance of East 20th Street on the east side. Vehicles are still able to access the service road at the existing opening in the median south of East 21st Street. As part of this closure and in conjunction with the Department of Parks and Recreation, a Greenstreet was installed between East 20th and East 21st Streets, providing an amenity to the community.

The traffic signals at East 20th Street and First Avenue were also modified to provide additional crossing time for pedestrians. The existing Leading Pedestrian Interval (LPI) across First Avenue (which allows pedestrians begin crossing First Avenue prior to the vehicles on East 20th Street receiving a green indication) was increased to 18 seconds from 11 seconds. While the realignment of the east crosswalk resulted in the removal of the right arrow signals for northbound First Avenue, an eight second LPI was installed to supply the additional crossing time for pedestrians. Americans with Disability Act (ADA) compliant wheelchair ramps were also stalled at this intersection during reconstruction.



The LPI on East 20th Street gives pedestrians more time to cross the street without vehicle conflict.



REVISIONS		
DATE	BY	DESCRIPTION

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

1 AV at E 20 ST

APPROVED BY <u>SB</u>	Drawn by <u>DR</u> Checked by <u>JA</u> Borough <u>MANHATTAN</u> Scale <u>1"=40'</u> Date <u>5/16/2006</u>	DRAWING NO. <u>MB-</u>
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PARK AVENUE AT EAST 33RD STREET

Description

The intersection of Park Avenue and East 33rd Street had consistently been ranked number one in the number of pedestrian crashes in the City, holding this position from 1996 through 1998, and again in 2001 and 2003. This trend is directly attributed to the unusual configuration of the intersection and its location at the terminus or “mouth” of the Park Avenue Tunnel, which runs under Park Avenue between East 33rd and East 40th Streets. The tunnel serves two-way traffic with one lane in each direction. There is a posted height clearance of 8’–11” and trucks are prohibited in the tunnel. At the north leg of the intersection, the Park Avenue Tunnel emerges, severely limiting visibility for southbound Park Avenue traffic exiting the tunnel. Additionally, the merging of southbound Park Avenue surface traffic and southbound tunnel traffic exiting at East 33rd Street created unsafe pedestrian and vehicular conditions. Overall, pedestrians crossing on the north leg of the intersection were at the most risk due to the limited visibility.

Based upon these known factors, DOT has been actively working at this location to improve overall safety, especially for pedestrians. A central component of this initiative was the prohibition of pedestrians from using the north leg to cross Park Avenue directly at the mouth of the tunnel. This was accomplished through the use of signs and an iron fence at the northeast and northwest corners. Nevertheless, non-compliance of these regulations remains high. **In 2008, more dramatic improvements were implemented to reduce these conflicts.**

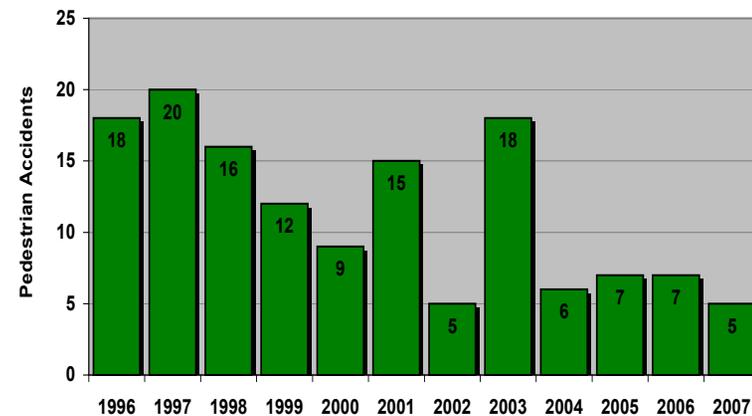
In terms of the crash history at this location, this intersection has consistently ranked first in the City with the highest number of pedestrian crashes (18 in 1996, 20 in 1997, 16 in 1998 and 15 in 2001.) Pedestrian crashes peaked in 1997 with 20 and continued to decline with 16 crashes in 1998

and 12 crashes in 1999, the year the Department implemented its improvements. In 2000, the first full year for which post-implementation information is available, crashes declined to nine, which is 55% less than the crash experience in 1997. The Department believes the decline since 1999 can be attributed to the improvements and changes to pedestrian movements through this intersection. However, in 2001, pedestrian crashes increased substantially to 15, a 67% increase. Given the decline in crashes at this location between 1997 and 2000 and the unusual increase that took place in 2001, the Department took a closer look at the contributing factors for crashes that took place at this intersection. A detailed analysis of each of the 15 crashes indicated that most of these crashes were attributed to pedestrians crossing against the signal and occurred in the southbound direction where vehicles exit the tunnel. After this analysis took place, pedestrian crashes in 2002 declined to only five, a 67% decrease. **Although pedestrian crashes increased to 18 in 2003, they continued to remain lower than previous years, but the intersection still ranked high in total pedestrian crashes between 2004 and 2007.**

Improvements Implemented in October 1999

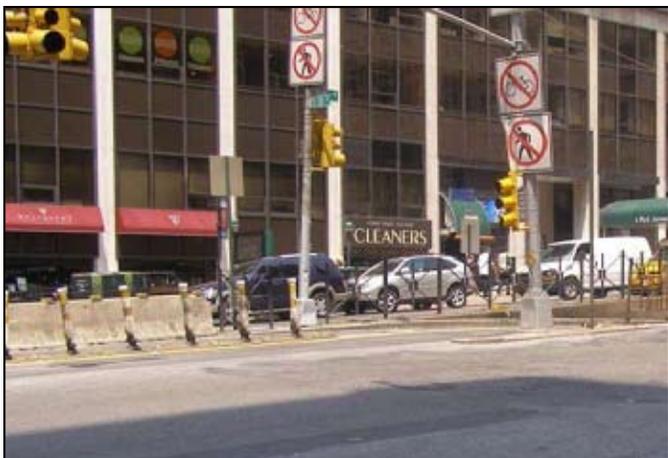
As part of the 1999 Mayor’s Holiday Traffic Program, the Department implemented several measures to separate Park Avenue Tunnel traffic from pedestrians. This was accomplished by the installation of barriers extending from the mouth of the tunnel at the north leg of the intersection to near the south leg. Now pedestrians are physically able to cross Park Avenue only at the south leg (in conformance with the existing regulation). Furthermore, westbound traffic on East 33rd Street is no longer allowed to continue across Park Avenue, but is required to turn right (northbound) at Park Avenue. Green

Accident Experience at Park Avenue and East 33rd Street



Oversized signage advised pedestrians to cross with care and wait for the walk signal

right arrow signals have been installed for westbound East 33rd Street. The improvements resulted in an overall reduction in conflicts between pedestrians and turning vehicles at all crosswalks in the intersection. Directional signs were installed throughout the area to direct truckers to appropriate truck routes (e.g., East 31st Street) and avoid unnecessary travel on East 33rd Street or Park Avenue. Specifically, the following improvements were implemented:



Pedestrian signage, iron pedestrian fences and other roadway improvements discourage pedestrians from crossing at this location and provide for safer vehicular movements

- A Jersey barrier separating the southbound tunnel exit from southbound Park Avenue surface traffic.
- Flexible delineators along the centerline of Park Avenue between the mouth of the tunnel and the south leg crosswalk.
- Signs to direct motorists primarily to East 31st Street to access East 33rd Street west of Park Avenue and points west.
- Daylighting of the south curb of East 33rd Street at the approach to Park Avenue to facilitate turning movements for trucks.
- Remove alternate side “No Standing” regulations on East 33rd Street between Lexington and Park Avenues since the additional capacity created by making the curb lane a travel lane is no longer needed (East 33rd Street experiences reduced volume as a result of the improvements).

Despite the overall decrease in the average number of crashes occurring at this intersection each year, it still ranked near the top on the “High Pedestrian Crash Location” list. In order to address this problematic location, a dramatic plan emerged to improve this intersection. Since pedestrian crashes continued to occur with the majority of these crashes involving pedestrians struck by vehicles exiting the tunnel in the southbound direction, the Park Avenue tunnel was converted to one-way northbound from two-way operation.

Implemented Improvements in August 2008

- Wider northbound tunnel and viaduct lanes
- Shorter crossing distances accomplished by the installation of pedestrian refuge islands and a neckdown
- Reduced pedestrian / vehicle conflicts
- More predictable vehicle movements
- Improved roadway alignment for vehicles

Method

- Closed southbound tunnel for vehicular traffic from East 40th Street to East 33rd Street
- Enhanced safety at 33rd Street and 40th Street by constructing concrete pedestrian refuge islands and a neckdown at 33rd Street
- Implemented signals, markings and signage modifications
- Reduced number of travel lanes along corridor
- Aligned roadway south of 33rd Street through channelization



BEFORE conditions at E 33rd Street: Pedestrian stuck in middle of roadway with no safety area (facing east).



AFTER conditions at E 33rd Street: Pedestrians have refuge island between north and southbound traffic (facing south).



AFTER: Park Avenue tunnel at E. 40th Street (facing south) with one-way northbound tunnel traffic pattern. Southbound traffic is directed onto local streets. The newly constructed pedestrian island provides a safe refuge for the numerous pedestrians crossing the street.



BEFORE conditions: Vehicles traveling southbound on the Viaduct approaching the tunnel at East 40th Street.



AFTER conditions: New traffic patterns force all southbound vehicles on the Viaduct to use local lanes at East 40th Street.



A neckdown was constructed on the SE corner of Park Avenue and East 33rd Street. The sidewalk extension shortened the crossing distance for pedestrians and aligned the intersection with the northeast curb line.



BEFORE conditions: NB and SB vehicles could use the tunnel, creating hazardous conditions for pedestrians at E. 33rd Street.



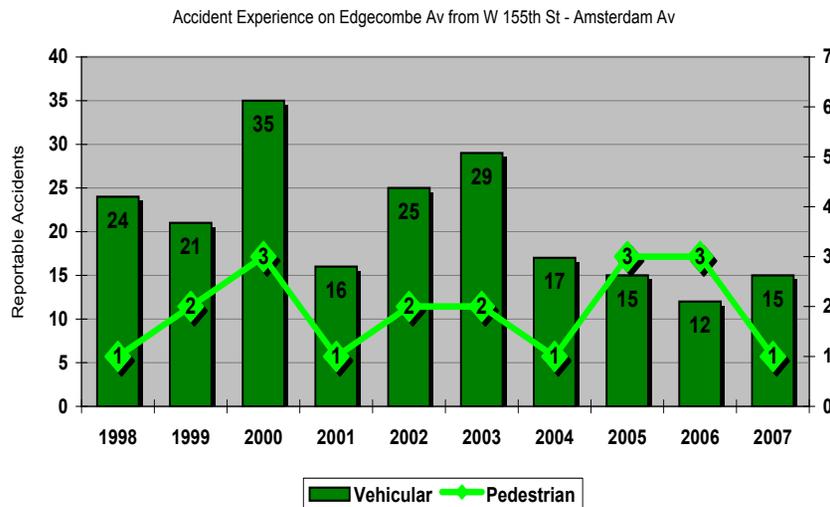
AFTER conditions: Only NB vehicles can enter the tunnel at E. 33rd Street, eliminating the SB conflict for pedestrians at this location.



EDGECOMBE AVENUE

Description

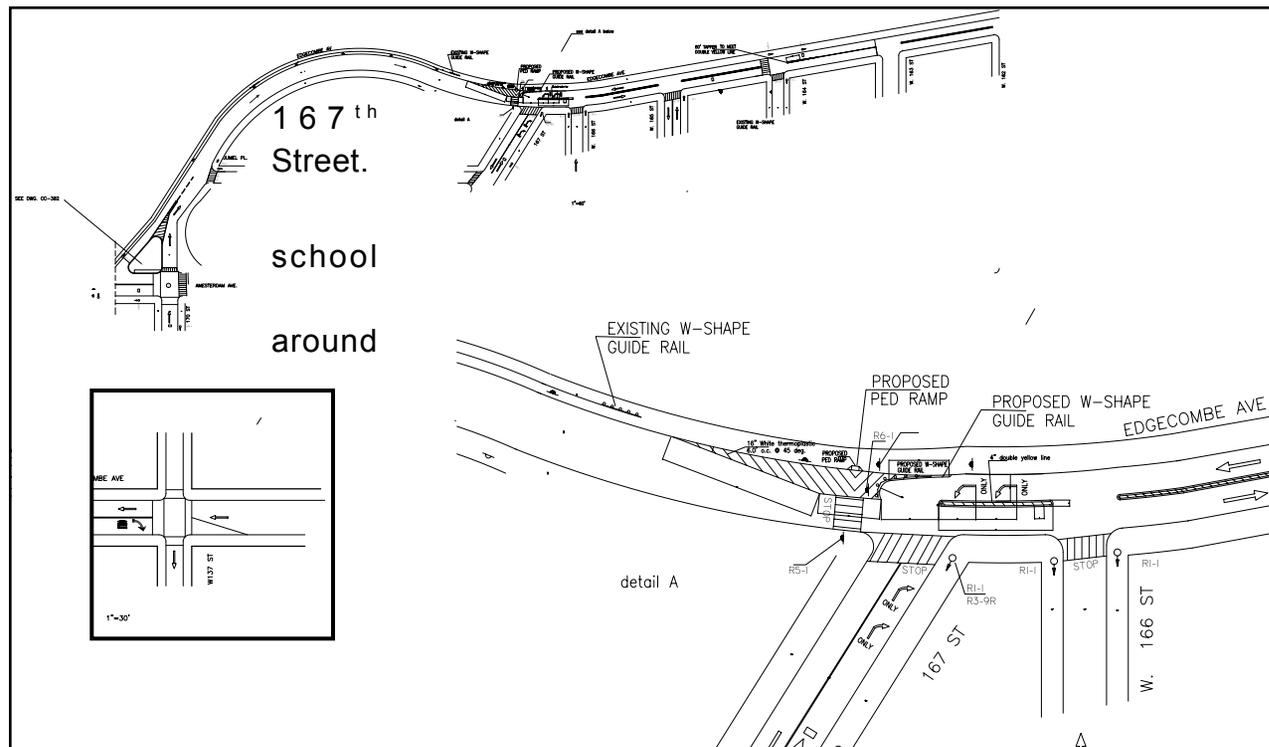
Along the section of Edgecombe Avenue between West 155th Street and Amsterdam Avenue there are three schools (IS 90/PS 79, IS 164, and PS 8), a new police precinct (33rd Precinct) and a playground. The community raised concerns regarding the traffic safety of the school children in the area, limited parking and congestion. The Department, in coordination with Community Board 12 convened a task force to address these concerns. Members included the Department of Parks and Recreation, the Department of Sanitation, the Fire Department, the Community League and the Board of Education. As a result, the Department identified specific problems and in July 2002 implemented a series of improvements to ensure that the needs of the community were met.



As part of the review of the corridor, the Department examined the crash history for Edgecombe Avenue between West 155th Street and Amsterdam Avenue. Crashes along this corridor have been volatile, fluctuating between 16 and 35 before improvements were implemented in 2002. **Pedestrian crashes were on the rise from 1998 to 2000, declined in 2001 and fluctuated between one and three from 2002 to 2007. While the improvements made in 2002 might not have been effective immediately, evidenced by the high number of crashes in 2003, the Department believes that the 24% decline in total crashes after implementation of safety measures can be attributed to these safety improvements.**

Improvements Implemented In July 2002

- Converted Edgcombe Avenue to one-way southbound (from two-way operation) from Jumel Place to West 167th Street.
- Converted Jumel Place to one-way northbound (from two-way operation) from West 167th Street to Edgcombe Avenue.
- Converted West 168th Street to one-way eastbound (from two-way operation) from Amsterdam Avenue to Jumel Place.
- Installed angle parking on West 168th Street between Amsterdam Avenue and Jumel Place.



- Narrowed Edgcombe Avenue with pavement markings between West Street and West 164th
- Installed additional crosswalks and appropriate signage PS 8 and IS 90.
- Installed curve warning signs on Edgcombe Avenue.

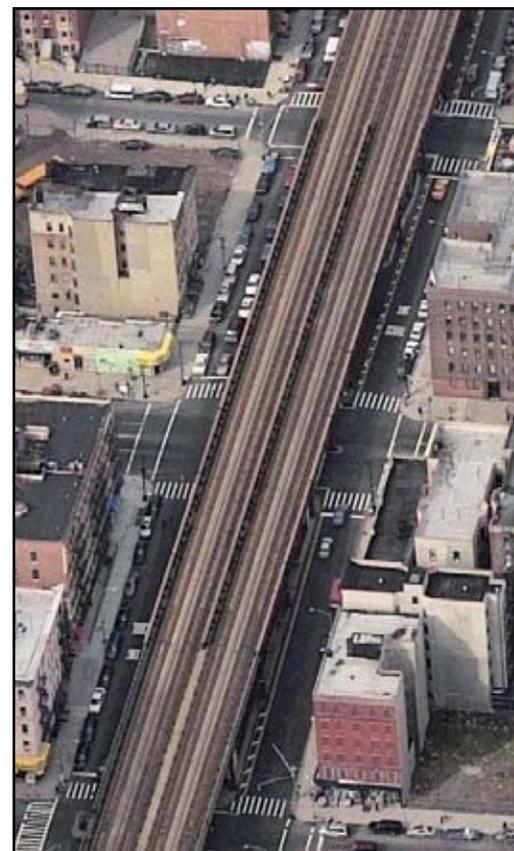


UPPER PARK AVENUE

Description

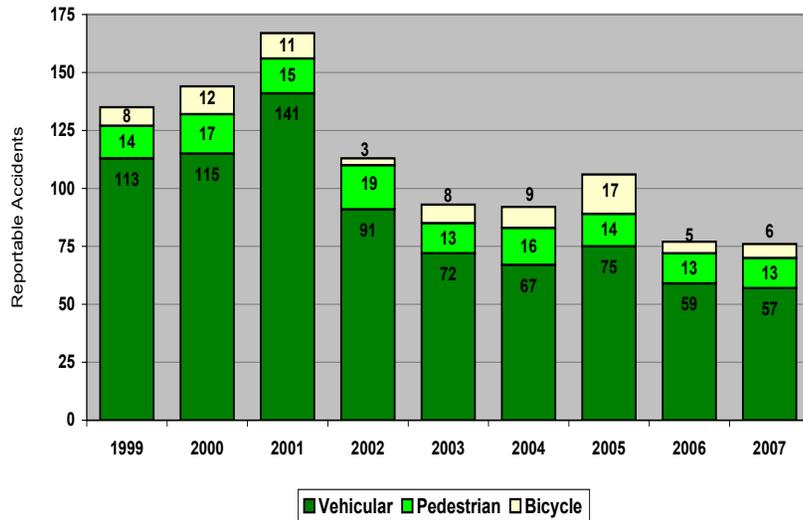
Beginning at East 96th Street, the Park Avenue roadway is divided by the Metro-North Viaduct which runs above the roadway from East 96th Street to East 132nd Street. The viaduct splits the Park Avenue roadway into separate northbound and southbound corridors with a typical width of 24 to 26 feet and vehicles often use it as a two-lane roadway. Along the entire corridor, a stone fascia is closely aligned to the curb line, and along a ten-block portion between East 101st Street and East 111th Street, the fascia of the viaduct is aligned approximately one foot from the curb line. This contributes to limited sight distances as motorists are not able to clearly view or react to a pedestrian's presence as they emerge from behind the stone fascia. Motorists also have a difficult time seeing other vehicles emerging from underneath the viaduct. The impacts in pedestrian and traffic flow on the roadway from these characteristics is most evident between East 101st and East 111th Streets and in the vicinity of the Metro-North station at East 125th Street.

The Metro-North station at East 125th Street is a highly congested area with high volumes of pedestrians and passengers discharging and loading. Additionally, the roadway narrows at this intersection to 19 feet due to the columns supporting the rail station and tracks above. Much of the street below the station is leased from the City for vehicle parking by private entities.



Aerial view of the Park Avenue corridor with improved markings and buffer zone

Accident Experience on Upper Park Av



The crash experience for this corridor indicates a rising trend in crashes along the length of the corridor between 1999 and 2001. Reportable crashes increased each year starting at 135 in 1999, reaching 167 in 2001. Pedestrian crashes remained relatively consistent ranging between 13 and 17 per year, while bicycle crashes fluctuated between eight and 12 per year. The rising crash trends predate the improvements that were implemented in September 2002. In 2002, reportable crashes decreased by 32%, to 113 from 167 in 2001, and bicycle crashes fell to only three. Total crashes post implementation have decreased by 40%, and with the exception of 2005, crashes have steadily declined since improvements were made.

Improvements Implemented in September 2002

In conjunction with a DDC Engineering Resurfacing project between East 96th and East 132nd Streets, the following improvements were implemented in September 2002:

- Installed a three-foot wide thermoplastic ‘buffer’ (flush channelization) using pavement marking between East 101st and East 132nd Streets. The buffer is intended to realign the single travel lane away from the pedestrian refuge area in the center of Park Avenue’s north and south roadways. The buffer markings improve the line of sight between motorist and pedestrian as well as cause motorists to reduce speed by creating the appearance of a narrowed roadway.
- Installed “Wait for Walk Signal” pavement messages to advise pedestrians to wait for a fresh walk signal between East 101st and East 111th Streets where the stone walls of the viaduct severely limit visibility for both pedestrians and motorists.

- Installed 20-foot jersey barriers at the north and south ends of each block in advance of the crosswalks between East 127th and East 132nd Streets to prevent motorists from traveling beneath the elevated structure. Some of these barriers have been removed as space beneath the tracks has been leased for parking purposes.
- Installed edge lines between East 97th and East 100th Streets south of the new bus terminal.
- Installed “No Standing 7-10AM Mon-Fri” regulations on the west curb (southbound) from East 132nd Street to East 130th Street to provide a second travel lane during the morning peak period.
- Removed signal faces (for northbound and southbound traffic) within the area beneath the elevated structure north of East 127th Street.
- Upgraded crosswalk markings to high visibility at all signalized intersections.
- Installed advance pedestrian crossing warning signs in the section of the stone viaduct between East 101st and East 111th Streets.

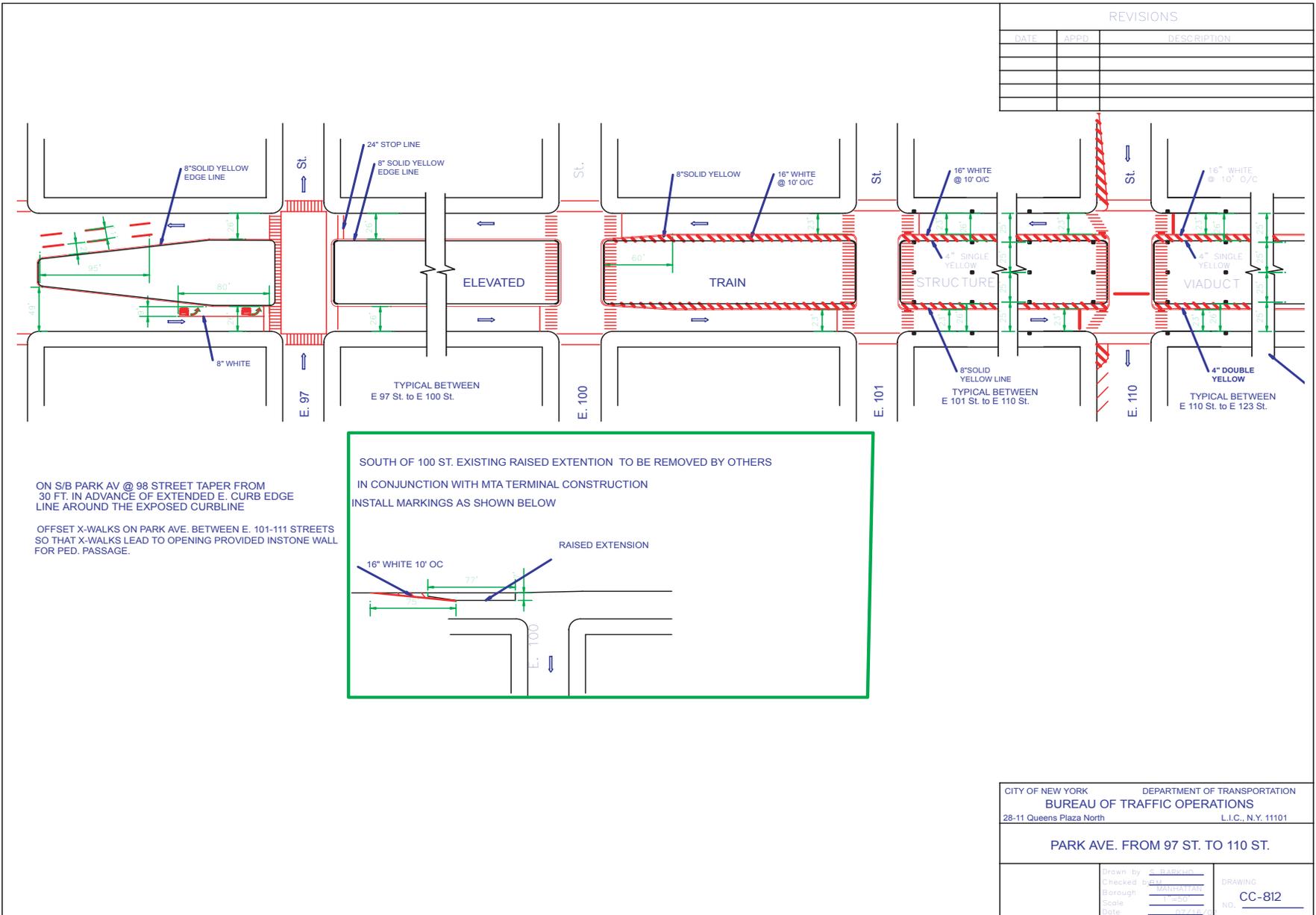
The improvements are shown on the following pages.

Improvements Implemented in 2008

- **As part of DOT’s Phase I of capital construction at Priority Schools, construction of a new sidewalk on Park Avenue between 104th and 105th Streets was completed. The new sidewalk provides a raised protected area for pedestrians to stand when exiting from the underpass of the elevated structure that runs along Park Avenue. Other safety measures implemented near PS 72 include neckdowns on Lexington Avenue at 104th and 105th Streets. The new sidewalk and neckdowns were recommended by DOT’s Priority School Report for PS 72 published in 2006.**



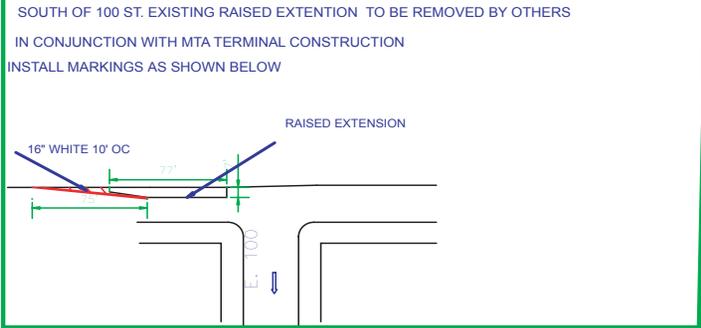
New sidewalk on southbound Park Avenue at East 105th Street



REVISIONS		
DATE	APPD	DESCRIPTION

ON S/B PARK AV @ 98 STREET TAPER FROM 30 FT. IN ADVANCE OF EXTENDED E. CURB EDGE LINE AROUND THE EXPOSED CURBLINE

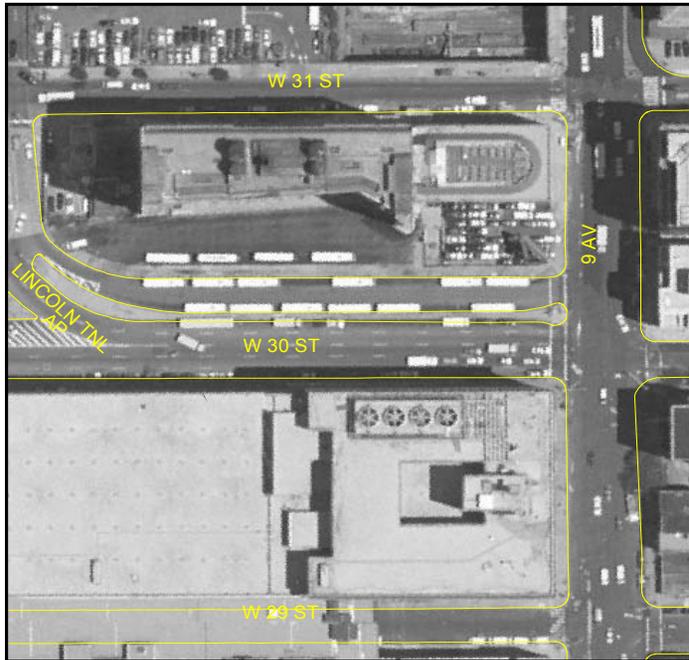
OFFSET X-WALKS ON PARK AVE. BETWEEN E. 101-111 STREETS SO THAT X-WALKS LEAD TO OPENING PROVIDED IN STONE WALL FOR PED. PASSAGE.



CITY OF NEW YORK		DEPARTMENT OF TRANSPORTATION	
BUREAU OF TRAFFIC OPERATIONS			
28-11 Queens Plaza North		L.I.C., N.Y. 11101	
PARK AVE. FROM 97 ST. TO 110 ST.			
Drawn by	<u>S. BABOUN</u>	DRAWING NO.	<u>CC-812</u>
Checked by	<u>M. MANNING</u>		
Borough	<u>MANHATTAN</u>		
Scale	<u>1"=20'</u>		
Date	<u>02/21/10</u>		



WEST 30TH STREET/ 9TH AVENUE



Aerial view of West 30th Street and Ninth Avenue

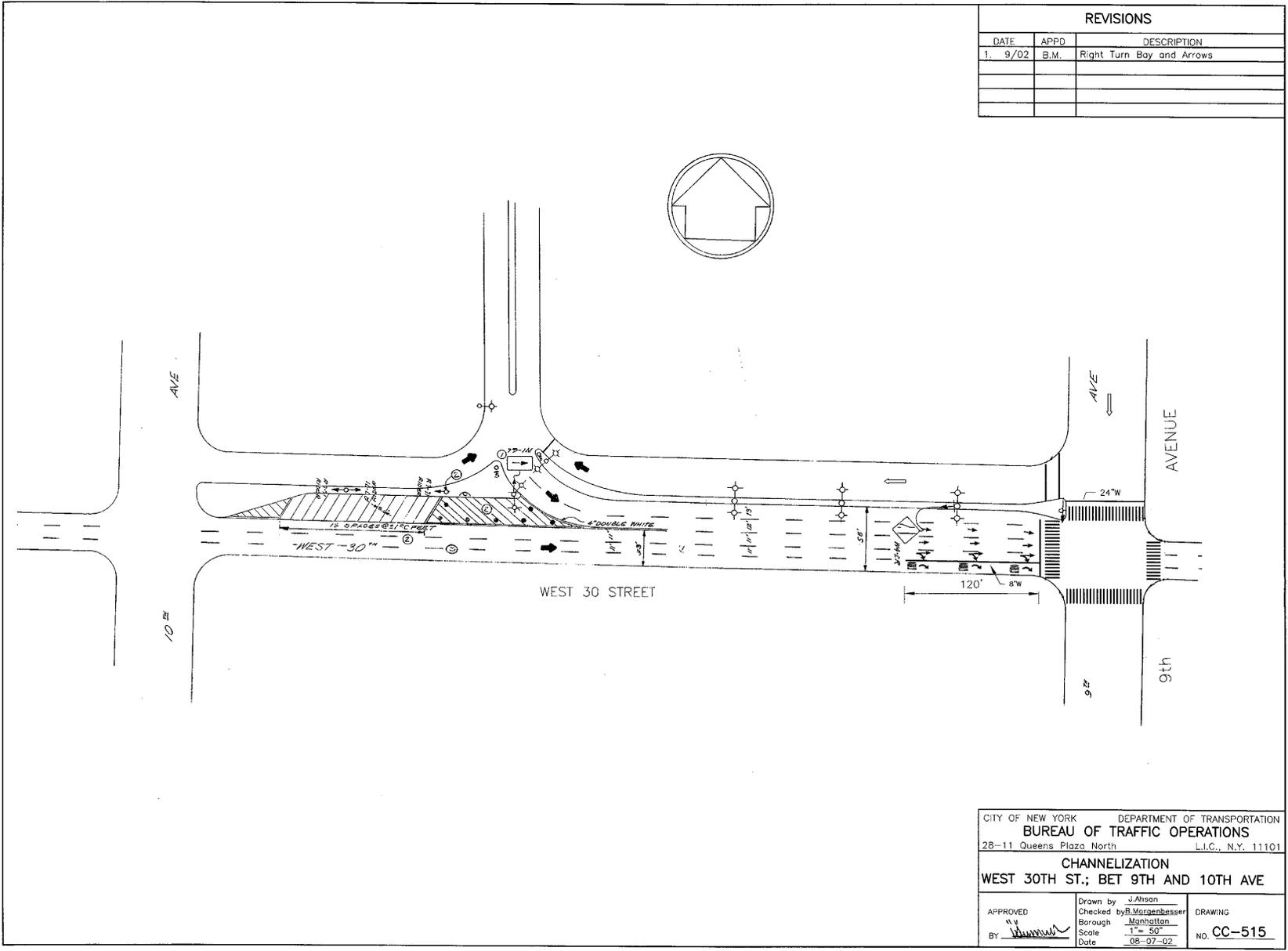
Description

The intersection of West 30th Street and 9th Avenue is a complex intersection. At this location, traffic travels southbound along 9th Avenue while Lincoln Tunnel traffic travels eastbound along West 30th Street. Midblock, between 9th and 10th Avenues are the approach and exit ramps to and from the Lincoln Tunnel which contribute to most of the traffic on West 30th Street. Traffic on West 30th Street is separated by striping on the western end and a raised median east of the Tunnel roadway, generally known as Dyer Avenue. At certain times of the day, the Port Authority allows buses to layover on the northern portion of the roadway separated by the median. Additionally, a large number of United States Postal Service vehicles utilize this roadway, as there are postal facilities on both sides of West 30th Street. With the high amount of vehicular traffic associated with the Lincoln Tunnel, there are pedestrian/vehicle conflicts at this location, especially during peak hours when post office employees cross West 30th Street while vehicles enter and exit the Lincoln Tunnel.

Implemented Improvements

- Old pedestrian crossing signs were repositioned for improved visibility in September 2002.
- “Yield to Pedestrian” signs were installed on the southeast and southwest corners in September 2002.
- Lane assignment markings were installed in November 2002 to improve vehicular movements and decrease conflicts.
- All crosswalks were upgraded to high visibility to improve pedestrian safety in November 2002.
- A Leading Pedestrian Interval (LPI) was installed on the south leg of the intersection in December 2002.
- Two new pedestrian signals for the westerly crossing of West 30th Street were installed and signal timing modifications were completed in December 2002.
- **A new protected bike lane was installed on 9th Avenue south of 31st street that narrows the street and provides a refuge island to promote safer pedestrian crossing.**

The improvements are shown on the following page.



REVISIONS		
DATE	APPD	DESCRIPTION
1. 9/02	B.M.	Right Turn Bay and Arrows

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

CHANNELIZATION
WEST 30TH ST.; BET 9TH AND 10TH AVE

APPROVED	Drawn by J. Anson	DRAWING NO. CC-515
BY <i>[Signature]</i>	Checked by B. M. [Signature]	
	Borough Manhattan	
	Scale 1" = 50'	
	Date 08-07-02	



TRIANGLE @ CANAL, LAIGHT AND VARICK STREETS

Description

The triangle formed by Canal, Laight and Varick Streets has become a key gateway into the growing neighborhood of Tribeca and Lower Manhattan. Its status as an ungraded cobble-stoned parking area with no usable sidewalk or curb was aesthetically unpleasant for both pedestrians and vehicles. In its original configuration, there was no separation between the cobblestoned pedestrian area and the roadway, leaving pedestrians without a defined sidewalk and unprotected from vehicles. In addition, the sidewalk on the western curb of Varick Street was substandard.

The triangle lies due east of the Holland Tunnel Exit Rotary and experiences significant traffic exiting from the Tunnel and heading onto Canal Street and into Lower Manhattan. Currently, traffic signals and street lights within the triangle are on concrete cylinders. There is no curb or graded sidewalk separating the non-roadway portion of the area with the marked street. Parking within the triangle was largely unregulated and the area was frequently used as a storage area for disabled vehicles from the Holland Tunnel.

For pedestrians, both the 8th Avenue Subway Line (A,C,E) and the 7th Avenue Line (1,9) have exits/entrances on corners directly adjacent to the triangle. As the neighborhood around it has grown, pedestrian traffic crossing the triangle and the area around it has increased



In its original configuration, the triangle was used as a temporary parking lot and did not provide adequate pedestrian space

noticeably. New bars, restaurants, and shops have opened and complemented the growing residential population.

The Department's safety improvement plan for this location involved several key partners:

- Port Authority of NY and NJ - partial owners of the triangle and operators of the Holland Tunnel
- Department of Design and Construction – water main project on Varick Street
- Parks Department
- Police Department – First Precinct and Transit Police
- Community Board 1

Central to these efforts to improve the safety and aesthetic values of the triangle is the creation of a pedestrian-friendly park. This park, built under the Parks Department GreenStreets Program would serve several key purposes:

- Create a welcoming and safe environment for pedestrians crossing the area in and around the triangle.
- Provide the growing residential and business community with valuable green space.
- Establish clear markings and curb lines to improve vehicle safety.
- Offer regulated parking for Police Department vehicles.
- Act as a visual gateway into Lower Manhattan for vehicles coming from New Jersey (via the Tunnel) and northern Manhattan.

Implemented Improvements

- March 2003
 - DOT – Manhattan Street Maintenance excavated the triangle area and prepared it for construction
- June 2003
 - Department of Design and Construction – Restoration of Varick Street roadway and replacement of the sidewalk on the western side and the curb on the eastern side
- Fall 2003
 - DOT - Installed new streetlights on Canal Street, Laight Street and Varick Street
- September 2004
 - DOT – Relocated and modified street light and signal poles and traffic and pedestrian signals to accommodate the new street alignment
- October 2004
 - Port Authority of New York and New Jersey – Construction of the sidewalk around the triangle and installation of curbs on Laight and Canal Streets
- Winter/Spring 2006
 - New York City Parks Department – Redesign Park
- Spring 2006
 - Implementation of interim plan that includes site cleanup and installation of sod lawn
- Spring 2007
 - Finalize contract documents
- **Summer 2008**
 - **Ground breaking and construction of park began**

The improvements and redesigned park are shown on the following two pages.



Parks Department plans for the Triangle. They began work in the Summer of 2008.



IMPROVEMENTS IN THE VICINITY OF THE HENRY HUDSON PARKWAY INTERCHANGE AND WEST 95TH AND 96TH STREETS

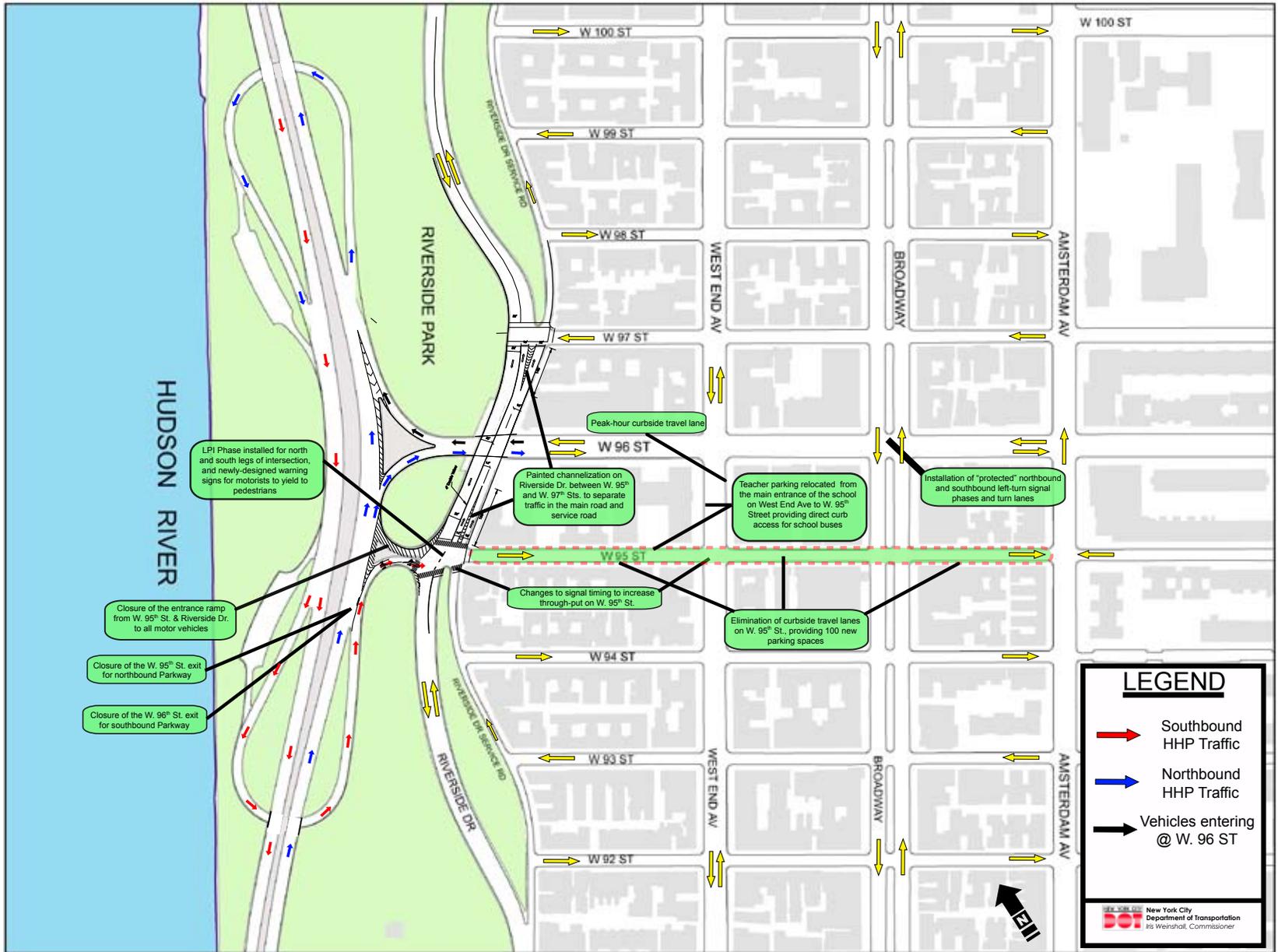
Description

For motorists and pedestrians alike, using the Henry Hudson Parkway (HHP) at the West 95th/96th Street interchange and the area roadways was a challenge, presenting numerous conflicts and safety issues, as well as traffic flow problems. In 2003, the Manhattan Borough President's Office retained a consultant to perform a traffic study on the West 96th Street Corridor. Working with the recommendations of this report, the Department developed a plan to improve traffic and pedestrian safety throughout this corridor.

There are four primary locations that were addressed as a result of this initiative:

- The Henry Hudson Parkway Interchange at West 95th and West 96th Streets
- The intersection of Riverside Drive and West 95th Street
- West 95th Street between Riverside Drive and Amsterdam Avenue
- The intersection of Broadway and West 96th Street

While the operation of the Henry Hudson Parkway interchange was the central component of this initiative, the safety improvements and changes in regulations on the interchange's supporting intersections provide for a substantial improvement in pedestrian and vehicular safety throughout the area. Although each component is detailed in the following pages, the illustration on the following page summarizes the overall improvements.





HENRY HUDSON PARKWAY INTERCHANGE

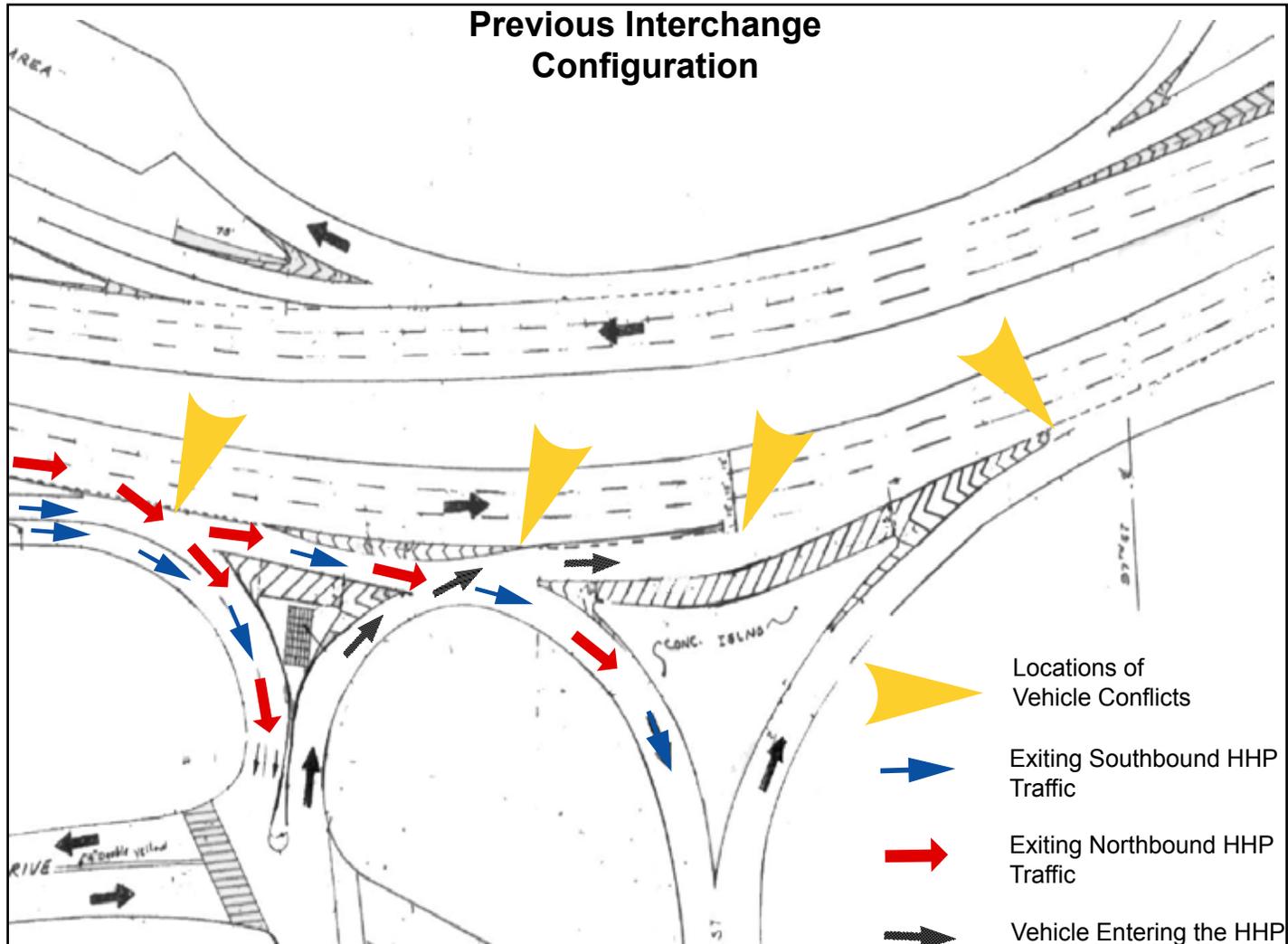
Description

For motorists traveling along the Henry Hudson Parkway, utilizing the West 95th/96th Street interchange had been a challenging event. The interchange, constructed in the mid-1930's, no longer met the safety and operational needs of this intensely-used roadway. The Henry Hudson Parkway is limited to passenger vehicles only, as all trucks, buses and commercial vehicles are prohibited from using the entire corridor. The corridor carries 120,000 vehicles daily with three lanes in each direction.

The interchange had provided two pairs of closely spaced entrance and exit ramps, all with substandard conditions for weaving, accelerating/decelerating and queuing. This design required all vehicles exiting the Parkway from both the northbound and southbound directions to utilize a single ramp. From this ramp, they had the option to exit at either West 95th or West 96th Street. Additionally, the exit ramp also served as the entrance ramp for vehicles entering the northbound parkway from West 95th Street. The substandard weaving section created chronic vehicle conflicts resulting in frequent overtaking and rear-end crashes. Vehicle merges were made more difficult by the large speed differential in traffic entering and exiting the Parkway. Furthermore, the interchange created undesirable demands on nearby local streets that served the access and egress needs of the Parkway.

The operation of the interchange also affected pedestrians. The intersection is located at a major entrance to the popular 267-acre Riverside Park, which is frequented by users traveling on foot, skates or bicycles. To access or exit the park, it is necessary for park-goers to cross Riverside Drive, a busy two-way street with a service road at the eastern edge of the park.

The original configuration of the interchange, as well as conflict points is illustrated graphically below:



Improvements Implemented in November 2003

In order to alleviate the conflict between vehicles exiting and entering the highway, the Department minimized the weaving conflicts by:

- Closing the entrance ramp from West 95th Street and Riverside Drive to all traffic
- Eliminating the West 95th Street exit for exiting northbound HHP traffic
- Eliminating the West 96th Street exit for southbound traffic

In this configuration, the weaving conflicts between northbound and southbound exiting vehicles are completely eliminated. Southbound vehicles are required to exit at the West 95th Street exit, while northbound vehicles are required to exit at the West 96th Street exit. Additionally, vehicles entering at the West 96th Street entrance are provided with a longer acceleration lane and have fewer conflicts with vehicles on the mainline HHP.

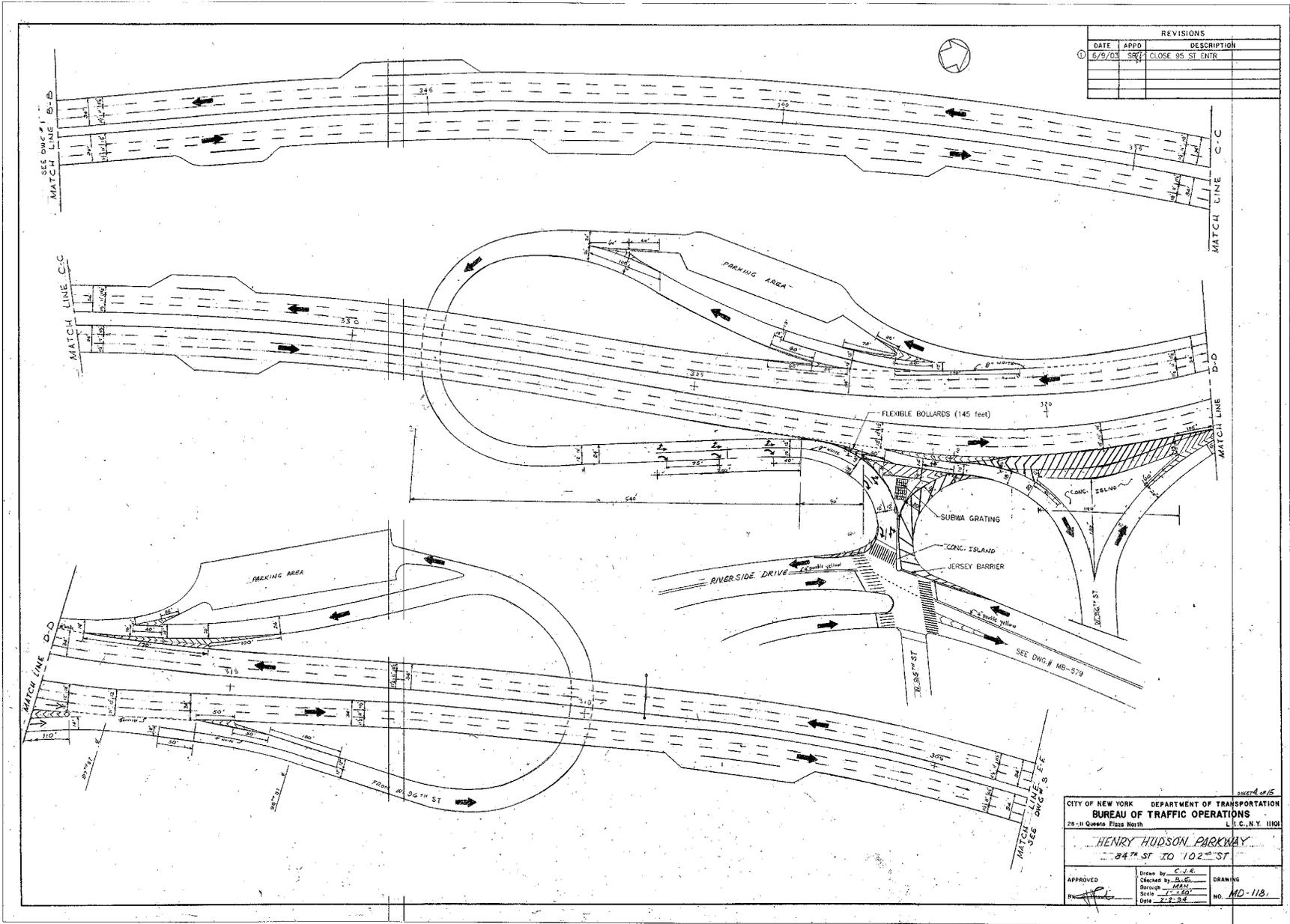
These treatments were implemented through the use of new markings on the roadway, advance signage, and the use of flexible bollards and delineators on all approaches and ramps. This represented a highly effective, low cost mitigation strategy

that effectively improved vehicular safety at the interchange. A comparison using NYPD data for the nine months prior to implementation versus two similar nine month periods after indicates a 60.5% reduction in the number of crashes at critical locations.

The improvements and resulting changes in traffic flow are shown on the following two pages.

NYPD Crash Data for the Henry Hudson Parkway Interchange - Before and After Implementation

Intersection	Number of Crashes			Percent Change Before compared to After 2
	Before (11/30/02 - 8/31/03)	After 1 (11/30/03 - 8/31/04)	After 2 (11/30/04 - 8/31/05)	
Henry Hudson Parkway and West 96th Street	43	27	15	-65.1%
Henry Hudson Parkway and West 95th Street	21	7	11	-47.6%
Riverside Drive and West 95th Street	12	4	4	-66.7%
Total	76	38	30	-60.5%



REVISIONS		
DATE	APPD	DESCRIPTION
6/9/03	SS	CLOSE 95 ST ENTR

SHEET 12 OF 15

CITY OF NEW YORK DEPARTMENT OF TRANSPORTATION
 BUREAU OF TRAFFIC OPERATIONS
 28-11 Queens Plaza North L.I.C., N.Y. 11381

HENRY HUDSON PARKWAY
 84TH ST TO 102ND ST

APPROVED	Drawn by <u>C.J.R.</u>	DRAWING
	Checked by <u>B.E.</u>	NO. <u>MD-118</u>
	Scale <u>1"=20'</u>	
	Date <u>2-2-04</u>	



Clockwise from above: The operation of the Henry Hudson Parkway/ West 95th/96th Street Interchange under the new configuration. Flexible delineators, traffic barrels and improved markings for southbound vehicles exiting at West 95th Street. Advanced signage advises motorists of approaching signal. Oversized gantry mounted signage advises motorists of approaching exit ramp.



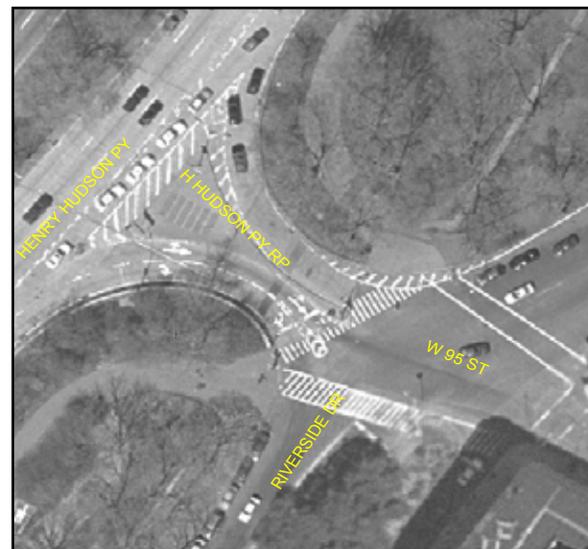


WEST 95TH STREET/ RIVERSIDE DRIVE

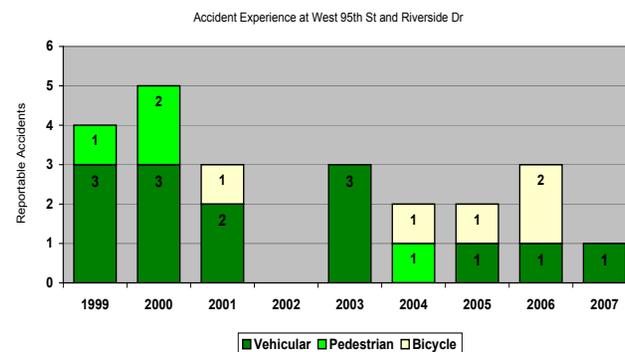
Description

The intersection of West 95th Street and Riverside Drive was a signalized four-way intersection with an entrance and exit ramp to the Henry Hudson Parkway along its western leg. Due to the curvature of the exit ramps from the northbound Henry Hudson Parkway, motorists had little time to react to pedestrians crossing the southwest side of the intersection. Motorists entering the northbound Henry Hudson Parkway, especially those turning from southbound Riverside Drive had limited visibility of pedestrians crossing on the northwest side of the intersection. Additionally, there was insufficient refuge area for pedestrians crossing between the exit and exit ramps.

The crash experience at this location varied between 1999 and 2001. In 1999, there were four reportable crashes, of which one involved a pedestrian. In 2000, pedestrian crashes increased to two and in 2001, there were no pedestrian crashes, but one involving a bicyclist. In 2002, the Department installed several immediate treatments to improve safety for pedestrians and motorists at this intersection. They were clearly successful as there were no reportable crashes during this year. These treatments were upgraded as part of the overall improvements taking place on the Henry Hudson Parkway and the resulting changes in traffic flow in 2003. **The total number of crashes has remained at three or below since this time, with significant declines in vehicular crashes and only one involving a pedestrian since implementation.**



Original configuration of Intersection



Improvements implemented in 2002

In September 2002, the Department installed several improvements aimed at improving safety at the intersection of West 95th Street and Riverside Drive at the entrance and exit ramps to the HHP. These included:

- High visibility crosswalks were installed on the north and south legs of the intersection.
- The west crosswalk was widened by three feet to provide additional pedestrian space.
- The radius of the northwest corner was modified and an expanded neckdown was installed using markings.
- A temporary neckdown using roadway markings was created to provide shorter crossing distance and to prevent motorists from making wide turns from the Henry Hudson Parkway exit to southbound Riverside Drive on the southwest corner.

Improvements Implemented in February 2003

- Installed five newly designed “Turning Vehicles Yield to Pedestrians” signs.
- A neckdown was installed on the northwest corner to provide shorter crossing distance and to slow motorists making turns onto the HHP entrance from southbound Riverside Drive.

Improvements Implemented in November 2003

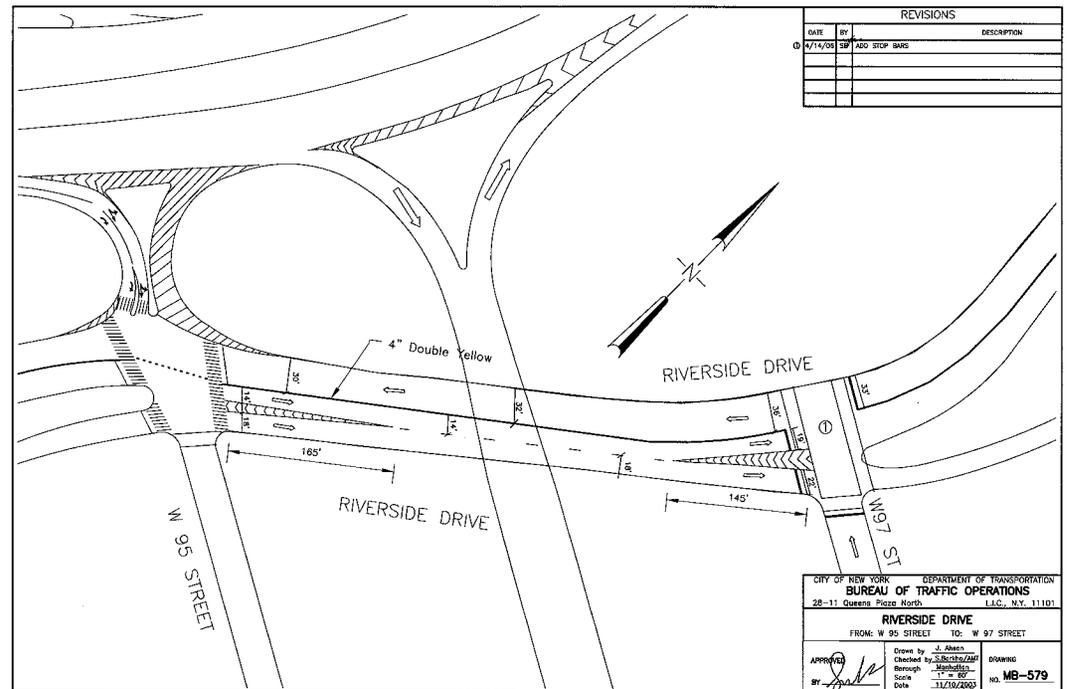
- As part of the overall changes in the operation of the Henry Hudson Parkway interchange, the Department closed the entrance ramp from West 95th Street and Riverside Drive to reduce conflicts on the Parkway. This closure was implemented through the use of signage and barriers.
- In an effort to better channelize traffic and organize weaving movement between the main roadway and service road of Riverside Drive, the Department installed additional roadway markings between West 95th and West 97th Streets. The improvement is illustrated below.

Improvements Implemented in 2004

- A six second Leading Pedestrian Interval (LPI) was installed to cross Riverside Drive at West 95th Street. (April 2004)
- Adjusted signal timing at intersection to provide for additional green time for vehicles exiting at West 95th Street. (August 2004)

Future Improvements

At Riverside Drive and West 95th Street, the closed roadway space will be converted into a green street. The existing park will be expanded.



Details of new roadway markings and channelization on Riverside Drive

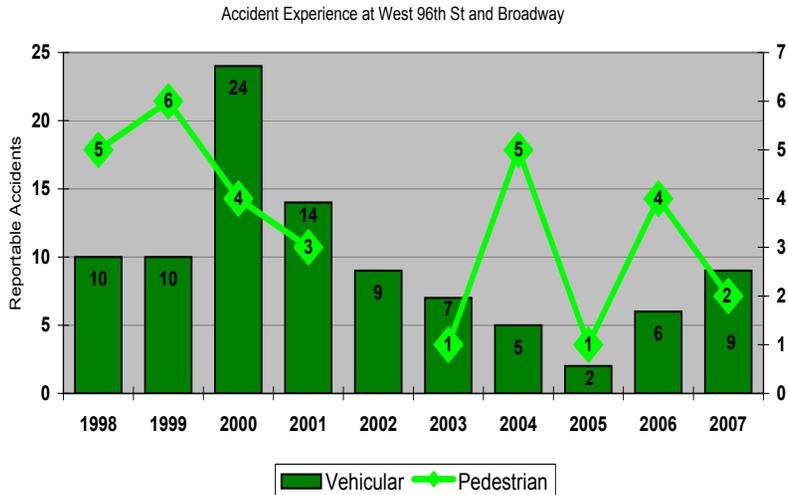


WEST 96TH STREET/ BROADWAY

Description

Broadway is the major two way, north-south arterial in the area. This intersection experiences extremely high vehicular and pedestrian traffic. Contributing factors include high density residential/commercial land uses, the 96th Street Subway station (1, 2, 3 and 9 lines), the M96 bus, and West 96th Street serving as one of the area's main east-west corridors due to the fact that it is two way and links up with the eastbound Central Park Transverse roadway as well as the West 96th Street entrance to the Henry Hudson Parkway. The roadway is split by a center median situated between the north and south travel lanes of Broadway that serves as a pedestrian refuge.

Overall, this was a poorly performing intersection due to the turning movements of vehicles. Double parking, buses making turns, and the lack of dedicated turn signals created numerous conflicts for motorists and pedestrians. Previously, left turns were prohibited in both directions daily between the hours of 7 AM and 7 PM. There was also some illegal turning activity that took place during these hours. Additional left turn prohibitions were also in place for westbound 95th Street which diverted eastbound traffic to West 94th Street and other residential streets.



In both 1998 and 1999, pedestrian crashes accounted for approximately 30% of total reportable crashes. While vehicular crashes increased significantly in 2000, pedestrian crashes, as a percentage of all reportable crashes, declined to less than 15%. Starting in 2001, vehicular crashes began a downward

trend from a high of 24 in 2000 to a low of 2 in 2005 but then went back up to six and nine in 2006 and 2007, respectively. Pedestrian crashes steadily declined from 1999 to 2003 but had odd increases in 2004 and 2006. As with the other improvements implemented throughout this corridor, the treatments at this location are part of an overall plan for improving traffic and safety throughout the area.

Improvements Implemented in November 2003

- Installation of a left turn signal phase and left turn bays on Broadway at West 96th Street to improve the performance of the intersection and to enable left turns.
- Replacement of meters on two blockfaces with truck loading zones to prevent double parking and ensure that at least two travel lanes are available for through traffic.

Improvements Implemented in 2004

- As a result of the left turn signals, there was a greater need for pedestrians to comply with traffic signals. Pedestrians were not fully aware that during one phase of the signal cycle, when through traffic on Broadway was stopped, vehicles are permitted to make left turns from Broadway. As such, the Department installed and upgraded pedestrian informational signage at the intersection (March 2004).
- Installed “dual left turn” signs to complement lane markings on the roadway to guide left-turning vehicles (September 2004)

Improvements Implemented in 2008

- **New standard pedestrian ramps, curbs and sidewalks have been installed**
- **A neckdown was installed at the southeast corner**
- **A new curb outline configuration was installed**
- **Bus pads were installed at all approaches**



WEST 95TH STREET BETWEEN RIVERSIDE DRIVE AND AMSTERDAM AVENUE

Description

West 95th Street is one of the two exits from the Henry Hudson Parkway. The roadway operates one-way eastbound for three blocks to Amsterdam Avenue. Between Amsterdam Avenue and its terminus at Central Park West, it operates one-way westbound (resulting in a “head-on” condition at Amsterdam Avenue). The roadway is 32 feet wide along the entire corridor. Before implementation of the changes, West 95th Street operated more as an arterial roadway than a local street because of its relationship to the Parkway exit and its width and parking restrictions provided for three possible travel lanes during much of the day. These factors contributed to a speeding problem along this corridor. In addition, there is a public school located on the northwest corner of West End Avenue which contributes to pedestrian activity along this corridor.

Improvements Implemented in November 2003

In order to decrease speeding, the Department amended the parking regulations along West 95th Street from Riverside Drive to Amsterdam Avenue. The new restrictions discourage vehicles from using West 95th Street as a through street by effectively reducing the number of available travel lanes. The new parking regulations also provide an additional 100 community parking spaces. The number of travel lanes available on weekdays was reduced from three to two on the block between Riverside Drive and West End Avenue, and from three to one on the blocks between West End Avenue and Broadway and between Broadway and Amsterdam Avenue. Signal timing changes were implemented for the intersections of West 95th Street at Riverside Drive and at West End Avenue to meet the needs of traffic flow with fewer travel lanes. The changes in the regulations are described on the following page:

Improvements Implemented in September 2004

At the intersection of West 95th Street and West End Avenue, signal timing was adjusted to provide for additional green time for traffic on West 95th Street, providing an additional four seconds of green time between 7AM - 11AM and 4PM - 10PM, Monday through Friday, and nine additional seconds from 2:15 PM - 11:45 PM on Saturday and Sunday.

West 95th Street	Before	After
North Side		
Between Riverside Drive and West End Avenue	No Standing 1PM - 7PM Except Sunday	No Parking 11:30AM - 1PM Monday & Thursday
Between West End Avenue and Broadway	No Standing 1PM - 7PM Except Sunday	No Parking 11:30AM - 1PM Monday & Thursday
Between Broadway and Amsterdam Avenue	No Parking Anytime	No Parking 11:30AM - 1PM Monday & Thursday
South Side		
Between Riverside Drive and West End Avenue	No Parking 8AM - 6PM Monday Through Friday	No Parking 8AM - 6PM Monday Through Friday
Between West End Avenue and Broadway	No Parking 8AM - 6PM Monday Through Friday	No Parking 11:30AM - 1PM Monday & Thursday
Between Broadway and Amsterdam Avenue	No Parking Anytime	No Parking 11:30AM - 1PM Monday & Thursday



WEST 96TH STREET/ WEST END AVENUE

Description

At West 96th Street and West End Avenue conflicts primarily resulted from vehicles turning west from West End Avenue onto West 96th Street. This is a particularly sensitive location because the west leg of the intersection is a designated school crosswalk for P.S. 75, a grade school located on the west side of West End Avenue between West 95th and West 96th Streets. Before the changes to the interchange there existed a six second Leading Pedestrian Interval (LPI) to allow school children and other pedestrians to start crossing the west leg across West 96th Street before traffic was permitted to move on West End Avenue. This allowed pedestrians to establish themselves in the crosswalk before experiencing conflicts with turning vehicles. During the hours of school arrival and dismissal, two school crossing guards assisted crossing this intersection.

Vehicle volumes increased most significantly at this intersection as a result of changes in traffic flow related to the closure of the West 95th Street entrance to Henry Hudson Parkway and the subsequent diversion of traffic to West 96th Street. These changes led to an increase in peak hour volumes.

Improvements Implemented in Summer 2004

- Installed “No Standing 7AM-10AM, 4PM-7PM, Mon-Fri” regulations on the east curb of West End Avenue for 120 feet south of West 96th Street to provide peak-hour northbound curbside travel lanes and restriped northbound approach to three moving lanes (July 2004).
- Relocated teacher parking regulations from the west side of West End Avenue to the north side of West 95th Street, and installed “No Standing School Days 7AM-4PM” regulations on West End Avenue to accommodate school buses and drop off/pick up of children.