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Brooklyn/ Queens

Atlantic Avenue Safety Improvements

(Brooklyn and Queens)

Description

Atlantic Avenue is a primary local arterial roadway that connects the Brooklyn waterfront and the Brooklyn-Queens Expressway on the west with Conduit Avenue and the Van Wyck Expressway in Queens to the east. Atlantic Avenue is one of the major truck routes in Brooklyn as it traverses the entire borough along an east-west direction.

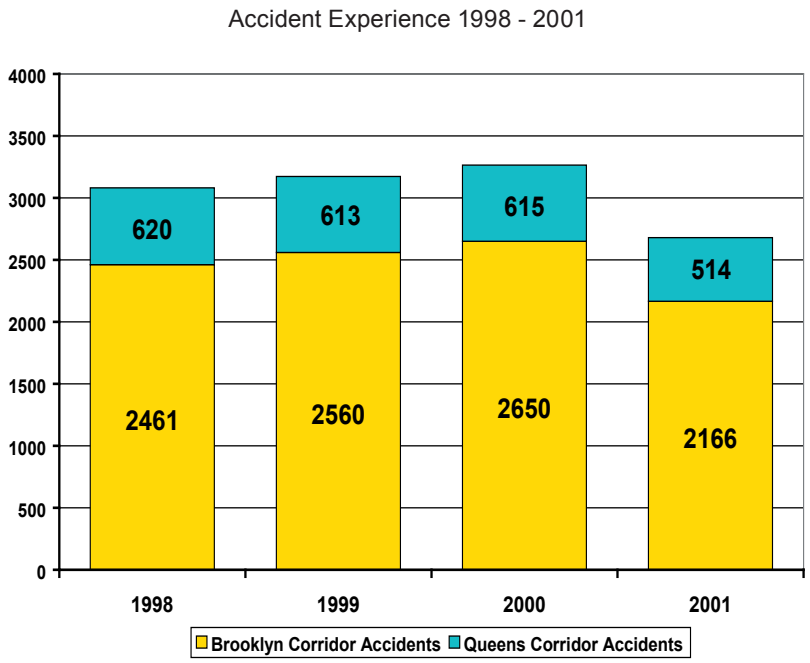
For the most part, the Atlantic Avenue corridor ranges between four and six moving lanes with two parking lanes. Several portions of the roadway also have a raised center median separating the roadways. In Brooklyn, land use along the Atlantic Avenue corridor is heavy with a bustling mix of residential and commercial land uses. In areas with a heavy concentration of land uses, such as the area in the vicinity of the Atlantic Avenue Long Island Rail Road Station (LIRR), there is a high convergence of pedestrians and vehicles. These contribute to high pedestrian volumes at several intersections and conflicts between motorists and pedestrians. These same conflicts are also apparent at locations where schools, high-density residential developments and commercial land uses are prevalent.

In Queens, adjacent land uses are primarily lower density residential developments with some industrial and commercial development along the corridor. There are also several public facilities such as schools and religious institutions along Atlantic Avenue especially between Woodhaven and Rockaway Boulevard.

Traffic volumes in both Queens and Brooklyn are high, with both a high volume of passenger vehicles and trucks as Atlantic Avenue is a major truck route for Brooklyn. There are also several bus lines which travel along this corridor.

Another factor which contributes to safety concerns is the elevated train structure carrying the LIRR. This elevated train structure created unusual roadway geometries due to its placement over the entire roadway. Along this segment of the Atlantic Avenue corridor, vehicles are required to access a dedicated turning lane located on the inside of the elevated columns, while the primary travel lanes are located on the outside of

the elevated columns. Left turns are problematic due to the limited sight distances and conditions created by the elevated columns.



In terms of the overall accident experience along the entire Atlantic Avenue corridor, accidents steadily increased between 1998 and 2000 before decreasing dramatically in 2001.

In 1998, the entire Atlantic Avenue Corridor experienced 3080 accidents. When broken down by Borough, Brooklyn accounted for 2,461 accidents (12th Citywide) and Queens, 620 accidents (95th Citywide). In 1999, the entire corridor experienced 3173 accidents. By borough, Brooklyn accounted for 2,560 accidents (10th Citywide) and Queens, 613 accidents (97th Citywide). In 2000, the entire corridor experienced 3265 accidents. By borough, Brooklyn accounted for 2,650 accidents (10th Citywide) and Queens accounted for 615 accidents (105th Citywide). ***In 2001, the entire corridor experienced 2,680 accidents. By borough, Brooklyn accounted for 2,166 accidents and Queens accounted for 514.***

Atlantic Avenue from Woodhaven Boulevard to Rockaway Boulevard (Queens)

Implemented Improvements - Queens

Beginning in the mid 1980's, the Department has performed a considerable amount of work to enhance vehicular and pedestrian safety along the Atlantic Avenue Corridor in Queens. These improvements have achieved considerable success and the Department continues to study and implement additional improvements along the corridor.

In 1987, the Department in response to elected officials and community concern initiated a safety study on Atlantic Avenue in the vicinity of Woodhaven and Rockaway Boulevards. The accident history in Atlantic Avenue at the time was not unusual for the volume of traffic, except for a series of three fatal crashes in 1987 which resulted in five fatalities. These accidents were attributed to alcohol abuse, red light violations, and high rates of speed.

In this area, Atlantic Avenue consisted of eight lanes (six moving and two parking), and a ten-foot wide raised center median. The roadway measured 90 feet in width. Adjacent land use is primarily low-density residential, along with dispersed civic institutions such as schools and churches.

As part of the study, the City's Transportation and Police Departments initiated an aggressive safety campaign. As part of this initiative, several immediate issues such as installation of safety-related signs and increased summons activity took place. From October 1987 to March 1988, nearly 4000 summonses were issued (of which 500 were for red light violations), and 65 traffic signs were installed.

In addition, the department implemented a major capital improvement project to widen the center mall and provide for left turn bays. These improvements narrowed the roadway to two travel lanes and the turning bays reduced conflicts and rear-end accidents. The narrowed roadway also provided for reduced passing and weaving maneuvers. The medians also provide pedestrian refuge areas and reduced crossing distances for pedestrians.

These improvements led to a dramatic decrease in the number of accidents. In 1988, this corridor had 468 total accidents. By 1992, the number had decreased to 360 total accidents. Average travel speeds also decreased. ***By 2001, accidents along this corridor had fallen to 129, a 72% decline over the 9 year period.***

Additional improvements have included the upgrade of eight inch red signal lenses to twelve inch lenses for improved visibility at all problem locations.

In November 2003, a left turn signal was installed at Atlantic Avenue and Lefferts Boulevard.

Atlantic Avenue Corridor - Brooklyn

Implemented Improvements – Brooklyn

In Brooklyn, Atlantic Avenue serves as a vital primary east-west arterial, as it connects the Brooklyn waterfront with interior portions of the borough, as well as servings as a through truck route. As such there are heavy vehicular and pedestrian volumes along most of the corridor.

- Beginning in calendar year 2000, several improvements were implemented at the following intersections:
    - Atlantic and Saratoga Avenues – A left turn phase for westbound Atlantic Avenue [March 2000]
    - Atlantic and Troy Avenues – Exclusive left turn phase for eastbound Atlantic Avenue [March 2000]
    - Atlantic Avenue and 96th Street (Queens) – A new traffic signal [September 2000]
    - Atlantic Avenue and Clinton Street – A Leading Pedestrian Interval to cross Atlantic Avenue [November 2000]
    - Atlantic and Vanderbilt Avenues – Left turn phases for both westbound Atlantic Avenue and northbound Vanderbilt Avenue [May 2002]
    - Atlantic and Brooklyn Avenues – Exclusive left turn phase for westbound Atlantic Avenue [May 2002]
    - Atlantic and Rockaway Avenues – A dual left turn phase for both directions of Atlantic Avenue [December 2002]
    - Atlantic and Classon Avenues – A left turn phase for eastbound Atlantic Avenue [April 2002]
    - Atlantic Avenue and Logan Street - A left turn phase for westbound Atlantic Avenue [April 2003]
- The Department installed exclusive left turn signal phases at various locations where the east and westbound roadways are separated by the elevated train structure. Vehicles making left turns are forced to do so from under the El structure with limited sight distances. The following locations were modified in August 2003 ***(except as noted)*** so that left turns are made only on an exclusive phase:

- Atlantic and New York Avenues [eastbound left turn phase]
- Atlantic and Schenectady Avenues [westbound left turn phase]
- Atlantic and Utica Avenues [dual left turn phase]
- Atlantic and Rochester Avenues [dual left turn phase]
- Atlantic and Buffalo Avenues [dual left turn phase]
- ***Atlantic and Kingston Avenues [eastbound left turn phase] (December 2003)***
- ***Atlantic and Albany Avenues [westbound left turn phase] (December 2003)***

- ***Refurbished the crosswalks at the following intersections in June 2004:***
  - ***Logan Street***
  - ***Highland Place***
  - ***Essex Street***
  - ***Linwood Street***
  - ***Ashford Street***
  - ***Hendrix Street***
  - ***Van Siclen Avenue***
  - ***Miller Avenue***
  - ***Bradford Street***
  - ***Wyona Street***
  - ***Vermont Street***
  - ***New Jersey Avenue***
  - ***Pennsylvania Avenue***

Atlantic Avenue Safety Study

In September 2004, the Department began a consultant study to improve vehicular and pedestrian conditions along the 2.2 mile stretch from Pennsylvania Avenue at the eastern end to Rockaway Boulevard at the western end. The study area is located within a high density residential area that experiences a high volume of trucks and cars. Additionally, a large number of pedestrians cross Atlantic Avenue enroute to train stations, schools and adjacent commercial land uses. The project will evaluate the traffic flow impacts associated with a reduction in the number of travel lanes through a widening of the median similar to the improvements implemented along the Queens segment in the late 1980's.

CITYWIDE INITIATIVES

Citywide Oversized Street Name Signs

Background

The Department has committed to installing oversized street name signs on dozens of heavily traveled corridors throughout the five boroughs. These street name signs, typically mounted on a signal mast arm, allow motorists to easily identify cross streets on major roadways. Generally, these signs measure 16” high and between 72” to 96” in length.

These signs serve to assist motorists to easily identify cross streets on wide urban arterials. For most motorists, reading street names on corner posts is difficult or impossible. These signs help the motorist identify the street and reduce speed accordingly to facilitate turning movements.

The corridors that have been identified to receive this treatment are indicated below and installation is ongoing. ***To date, the number of signs that have been installed citywide is 1132. Corridors that have been completed are denoted by an asterisk.***

Bronx

- Grand Concourse*
- East Tremont Avenue*
- Bruckner Boulevard North and South Service Roads*
- ***Baychester Avenue****
- ***Williamsbridge Road****
- ***Castle Hill Avenue****
- ***Morris Park Avenue****
- ***Pelham Parkway***
- ***Webster Avenue***
- ***Melrose Avenue***
- ***Willis Avenue***

- ***3rd Avenue***
- ***Boston Road***
- ***Eastchester Avenue***
- ***Randal Avenue***
- ***Legget Avenue***
- ***East Bay Avenue***
- ***Bronx Park East***

Brooklyn

- Eastern Parkway*
- Kings Highway*
- Flatbush Avenue*
- Ocean Parkway*
- ***86th Street****
- ***Atlantic Avenue****
- ***Empire Boulevard****
- ***Coney Island Avenue****
- ***Ocean Avenue****
- ***Fulton Street***
- ***Flatlands Avenue***
- ***Pennsylvania Avenue***
- ***Utica Avenue***
- ***Church Avenue***
- ***Avenue U***

In December 2004, an additional 114 signs will be installed in Brooklyn on the following corridors:

- ***Flatlands Avenue***
- ***Pennsylvania Avenue***
- ***Utica Avenue***
- ***Church Avenue***
- ***Ave U***

- ***Grand Avenue***
- ***Third Avenue***
- ***Forth Avenue***
- ***Fifth Avenue***
- ***Thomas S. Boyland Street***

Manhattan

- Houston Street*
- 23rd Street*
- West Street*
- 125th Street
- ***Chambers Street****
- ***Canal Street****
- ***14th Street****
- ***57th Street***
- ***72nd Street***
- ***79th Street***
- ***86th Street***
- ***96th Street***
- ***116th Street***
- ***145th Street***
- ***Cathedral Parkway / Central Park North***

Queens

- Northern Boulevard*
- Long Island (Horace Harding) Expressway North and South Service Road*
- ***Astoria Boulevard****
- ***Metropolitan Avenue****
- ***Hillside Avenue****
- ***Grand Central Parkway North and South Service Roads****
- ***North Conduit Avenue****

- ***South Conduit Avenue****
- ***21st Street****
- ***Francis Lewis Boulevard***
- ***Lefferts Boulevard****
- ***Bell Boulevard****
- ***Queens Boulevard***
- ***Woodhaven / Cross Bay Boulevard***
- ***Union Turnpike***
- ***Utopia Parkway***
- ***Main Street***

Staten Island

- Richmond Avenue*
- Morningstar Road*
- Victory Boulevard*
- Richmond Terrace*
- ***Hylan Boulevard****
- ***Hugenot Avenue****
- ***Woodrow Road****
- ***Arden Avenue****
- ***Amboy Road****
- ***Bay Street****
- ***Richmond Hill Road****
- ***Richmond Road****
- ***Forest Avenue****
- ***Clove Road****

Improving Safety at Intermodal Transit Stations / Bus Stops Under the El

Background

Throughout the city, numerous subway lines run above grade on elevated structures. Typically, these structures, generally know as an "el" are supported by large metal columns pillars often situated within the roadway, which creates irregular street geometry. This situation is exacerbated at intermodal transfer locations where bus stops are located underneath the transit station. In total, there are approximately 48 stations with these characteristics, 41 of which are located in the Bronx.

At these locations, a high volume of pedestrians move between the elevated train structures to numerous bus lines which parallel or intersect the train line. In addition, these stations are usually located along commercial corridors which contribute to additional vehicular and pedestrian traffic.

Building upon these concerns, the Department has embarked on a project in conjunction with the New York City Department of City Planning to improve pedestrian and vehicular circulation around the entrances to subway stations, as well as improving safety and security. Overall, this project, entitled "Subway-Sidewalk Interface" seeks to utilize a variety of tools that should mitigate the safety concerns at these locations. Types of treatments that may be proposed include signage, lighting, signal timing adjustments, pavement markings and other engineering improvements.

Primary Safety Concerns

While each of the subway locations are unique, there are general characteristics that are prevalent at all locations that contribute to problems at these locations.

Buses using both curb and travel lanes at East 233rd Street

Vehicular Concerns

Because of the placement of support columns in the roadway, there is insufficient roadway width for two lanes of traffic in each direction, but too much roadbed for one lane in each direction. Typically, the roadway underneath the elevated structures is comprised of two 12' moving lanes situated within the pillars and two 15' parking/other lanes on the outside or curbside of the pillars. The excess roadbed has a variety of uses; turn lanes, loading and unloading, weaving, travel lane and bus stop loading and unloading. This alignment is especially problematic for through vehicle movements around these bus stops. Finally, buses are unable to access the curb at these stops due to the placement of the columns, causing them to stop within the travel lane and delay traffic behind them.

Truck delivery blocking both lanes at Burnside Avenue and Jerome Avenue

An additional problem created by the elevated structure relates to visibility. During all hours of the day, visibility is compromised due to the elevated structure. This includes blocked sunlight, shadows and glare, as well as the columns themselves blocking visibility of pedestrians and vehicles. During the evening, poor lighting and shadows

Shadows from elevated structure and pedestrians waiting for bus at Broadway and West 231st Street

impede vision for both vehicles and pedestrians.

Alignment of columns and raised median at Westchester Avenue and Prospect Avenue

Additional concerns that are common at these locations include vehicular double parking, trucks loading and unloading curbside and in the space between the pillars. Signage is also problematic, in that the overhead structure contributes to difficulty in identifying signs. Contaminates from the subway and dust cause signs to become dirty and difficult to see.

Pedestrian Concerns

Wheelchair passenger waiting to board bus at Morrison Avenue and Westchester Avenue

Given these stations' role as intermodal transfer facilities and their locations in commercial corridors, there is a high volume of pedestrian activity moving through these intersections. These volumes and the associated problems caused by the columns create numerous unsafe pedestrian conditions. One of the most critical issues relates to pedestrians exposure to traffic,

Pedestrians waiting for bus in roadbed at Bay Parkway and 86th Street

Pedestrians crossing at Bay Parkway and 86th Street

especially while waiting at the bus stops. At most of these locations, buses are unable to access the curb and pedestrians are forced to wait, load and unload from the bus in the roadbed. This bus stop location offers the pedestrian little to no protection from moving traffic within and outside of the columns. This problem is exacerbated in areas where turning vehicles weave through the bus stop to make turns or proceed around the bus.

Pedestrian/Vehicle/Bus Conflicts at station

Another pedestrian concern involves the movement of pedestrians across these streets. At most locations, the stairways from the elevated platform does not land at the corner of the intersection. This causes pedestrians traveling through the intersection to "cling" to the closest set of columns and wait to cross the street within the roadbed, as opposed to within the designated crosswalks. In addition, pedestrians also suffer from the same visibility concerns as motorists, which includes the lack of natural light during the day and shadows at night.

Agency Response

Given these safety concerns, the Department has embarked on an ambitious program to address the pressing needs of motorists and pedestrians at these locations. As part of these efforts, DOT has begun to explore the adoption of a policy that systematically takes into account the following criteria:

- ***Pedestrian safety;***
- ***ADA accessibility;***
- ***Traffic flow;***
- ***New York City Transit Authority/MTA Bus requirements; and***
- ***Economic feasibility***

Based upon the above criteria, the Department has identified three possible alignment alternatives to mitigate the safety issues at these locations. These treatments vary in the amount of intervention required at each location, as well as overall costs. In some cases, examples of these treatments may already exist

at locations throughout the city. The proposed alignment alternatives include:

- ***Construction of Refuge Island***
- ***Installation of Raised Median with Guard Rail or Flexible Bollards***
- ***Construction of Full Neckdown***

As mentioned previously, there are both benefits and disbenefits to each of these proposed treatments. Based upon the unique physical characteristics of each of the 48 locations, each location may require treatments tailored to the needs at that location.

Bus Stops Under the El Pilot Program

Given that many of the recommendations are site specific, in 2003 the Department set out to determine the suitability and performance of some of the proposed treatments. As such, the Department installed treatments at two locations citywide, Bay Parkway and 86th Street in Brooklyn and Jerome Avenue and Burnside Avenue in the Bronx. The following details the improvements made at each of the locations

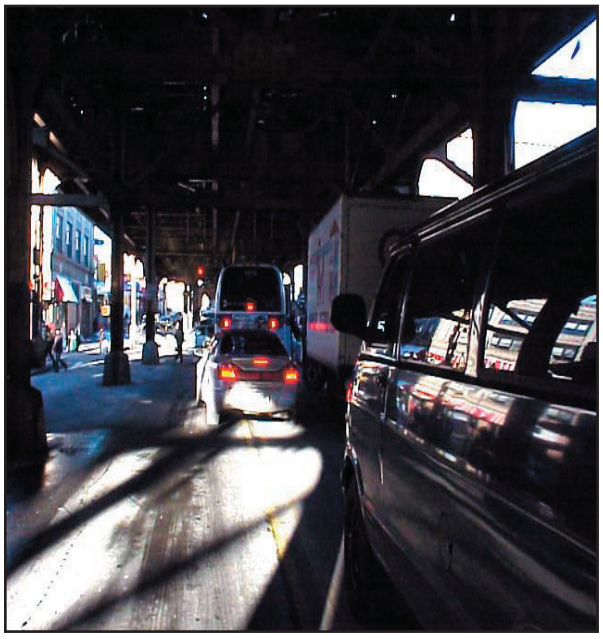
Jerome Avenue/Burnside Avenue

Description

The intersection of Jerome Avenue and Burnside Avenue is a major multi-modal intersection under the elevated subway station. This intersection and corridor is characterized by the large metal pillars supporting the elevated station or “el”, which is situated over Jerome Avenue. These columns contribute to creating unusual street geometry as the columns divide the roadway into narrow driving lanes inside the columns, with a wide parking lane outside the columns.

As an intermodal facility, three bus lines, the 4 subway line and numerous for-hire vehicles provide public transportation at this intersection. The Bx 32 operates north-south along Jerome Avenue, and both the Bx 40 & 42 operate along Burnside Avenue.

These transit lines contribute to heavy activity as commuters transfer between the subway and other transit modes. While the intermodal movements contribute to heavy pedestrian volumes, both Burnside and Jerome Avenues are busy commercial corridors characterized by a high number of pedestrians and vehicles traversing and parking in the area.



Double parked trucks, shadows and difficulty in snow removal exacerbate the conditions at these

In its original configuration, the bus stop was located within the roadbed, without any roadway markings or physical protection from vehicles. This configuration forced pedestrians to wait, load and unload in the roadbed. In addition, the placement of the landing of the stairways from the elevated station situated pedestrians away from the corner. This contributed to pedestrians venturing to the nearest set of columns and crossing the street within the roadway instead of at the crosswalk.

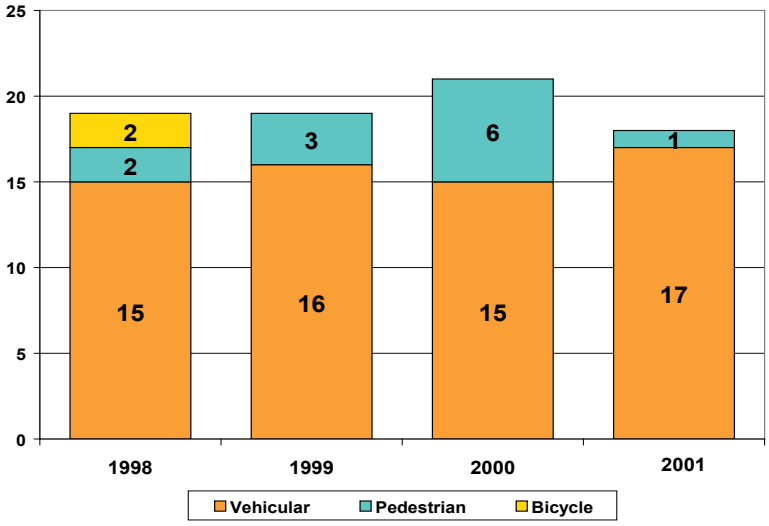
For vehicles, the excess roadbed along the curbside was used for a variety of uses depending on motorist behavior and the presence of a stopped bus in the travel lane. These uses included a right turn lane, a weaving lane and a travel lane. In addition, commercial vehicles sometimes used the lane for loading and unloading.

This location also experiences poor lighting during both the daytime and evening hours due to the blocked sunlight, shadows and glare which is caused by the elevated structure. These factors contribute to impeding motorists and pedestrian visibility.

Another concern at this location that affected both pedestrian and vehicular safety included double parking along both Jerome and Burnside Avenue. Due to the high amount of commercial activity on these streets, this was a frequent problem.

In terms of the accident experience at this location, between 1998 and 2001 vehicular accidents remained fairly consistent. In 1998, there were a total of 19 accidents, two of which involved pedestrians and two that involved cyclists. In 1999, total accidents remained at 19, with 16 vehicular and three pedestrian accidents. In 2000, total accidents increased slightly to 21, while pedestrian

Accident Experience 1998-2001



accidents doubled to six from three in 1999. ***In 2001, total accidents declined slightly to 18, however, pedestrian accidents decreased to one. There were no fatalities between 1998 and 2003.***

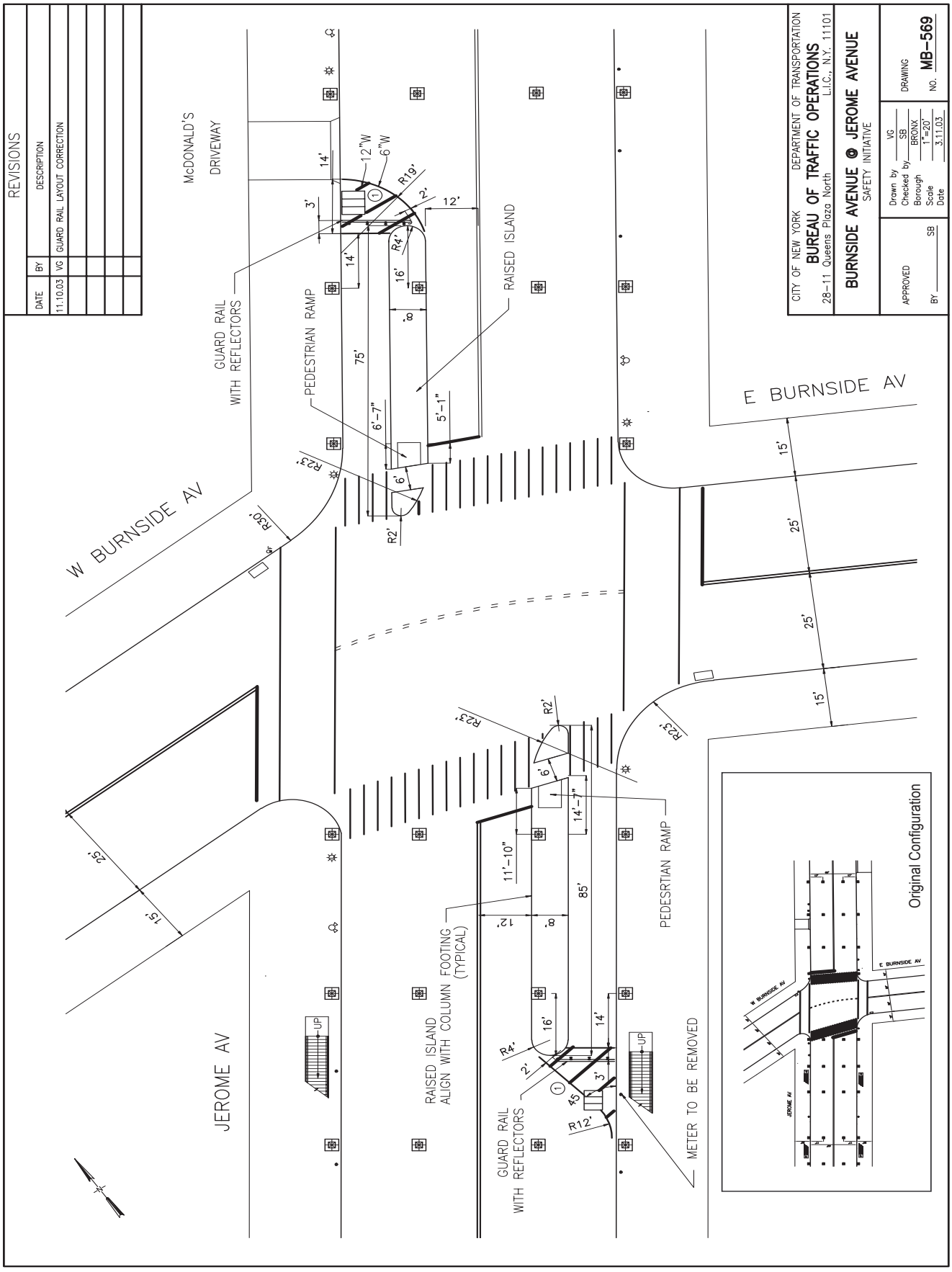
Improvements Implemented in December 2003

As a short term improvement, the Department constructed two concrete refuge islands in December 2003. These raised islands, 75 feet in length on the northwest corner and 85 feet on the southwest corner are aligned with the column footing and are 8 feet in width. In addition to providing the raised median, the Department also installed guardrails with reflectors that limited vehicles from accessing the lane between the sidewalk and the new refuge island. These treatments reduce the pedestrians exposure to vehicles while waiting for the bus and provide additional refuge for pedestrians waiting to cross the street.

Raised median with guard rail protects pedestrians waiting for the bus

In the long term, the installation of a full neckdown would provide full pedestrian protection, increase the available sidewalk space for bus shelters and requires little maintenance. These neckdowns would be installed only with a full reconstruction of the roadway.

The improvements are shown on the following page.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CITY OF NEW YORK
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BUREAU OF TRAFFIC OPERATIONS
28-11 Queens Plaza North
L.I.C., N.Y. 11101
BURNSIDE AVENUE @ JEROME AVENUE
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(TYPICAL)
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WITH REFLECTORS
PEDESTRIAN RAMP
METER TO BE REMOVED
UP
Original Configuration

Bay Parkway/86th Street

Description

The intersection of Bay Parkway and 86th Street is a major multimodal intersection located under an elevated subway station. Like most of the other locations identified by this initiative, both the intersection and corridor is characterized the presence of large metal pillars supporting the elevated station or "el", which are situated within the roadbed of 86th Street. These columns contribute to creating unusual street geometry as the columns divide the roadway into narrow driving lanes inside the columns, with a wide parking lane outside the columns.

As an intermodal facility, three bus lines and the M and D subway lines converge at the Bay Parkway and 86th Street intersection. The elevated tracks are situated above 86th Street and the B1 bus route runs along 86th Street. The B6 and B82 bus routes run along Bay Parkway.

While the various transit lines and intermodal transfers contribute to the high pedestrian and vehicular volumes through the intersection, this location is also a focal point for commercial and retail activity, with the majority of businesses located along 86th Street. Overall, there are numerous conflicts between pedestrians and vehicles moving through the intersection and pedestrians moving between transit modes.

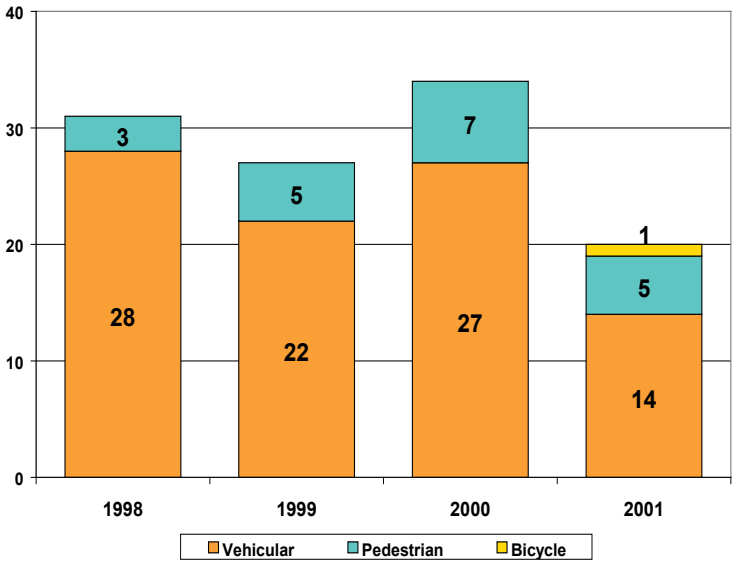
In its original configuration, the bus stop was located within the roadbed without any physical protection from motor vehicles. Unlike some other similar bus stops, a small refuge was delineated in the roadway for pedestrians waiting for the bus. This was accomplished with a thin strip of painted markings between the two pillars closest to the intersection. Operationally, vehicles were prohibited from making turns from 86th Street onto Bay Parkway between the hours of 7AM and 7PM.

The primary safety concern at this location relates to the fact that pedestrians are forced to wait, load and unload within the roadbed, while exposed to moving traffic. In addition, unlike other subway stations, the landings for each of the four stairways from the station platform are situated away from the corner. This configuration directs pedestrians in the opposite direction of the crosswalks and contributes to pedestrians venturing to the nearest set of columns and crossing the street within the roadway instead of at the crosswalk. This contributes to the high number of pedestrians who

jaywalk across these streets. Additional problems that have been identified at this location is frequent double parking by cars and trucks, especially along 86th Street, as well as sidewalk encroachments that reduce the space for pedestrians, especially along the northeast corner.

Operationally, the bus stops are near-sided on both sides of 86th Street and located within the moving lane. Hence, traffic either stops behind the bus or attempts to use the outer roadbed to bypass the bus, putting the pedestrians in the limited refuge space in danger.

Accident Experience 1998-2001



In terms of the accident history at this location, vehicular accidents represent most of the accidents at this location. In 1998, there were a total of 31 accidents, three of which involved pedestrians. In 1999, there were a total of 27 accidents, five of which involved pedestrians. In 2000, there were a total of 34 accidents, seven of which involved pedestrians. ***In 2001, there was a significant decline in total accidents at this intersection to 20, five of which involved pedestrians and one that involved a cyclist. There have been no fatalities reported between 1998 and 2003.***

Implemented Improvements

In May 2003, all damaged or faded signs were repaired and warning signs installed. “Yield to Pedestrians Signs” were upgraded and “No Left Turn” signs replaced “No Left Turn 7AM-7PM” signage.

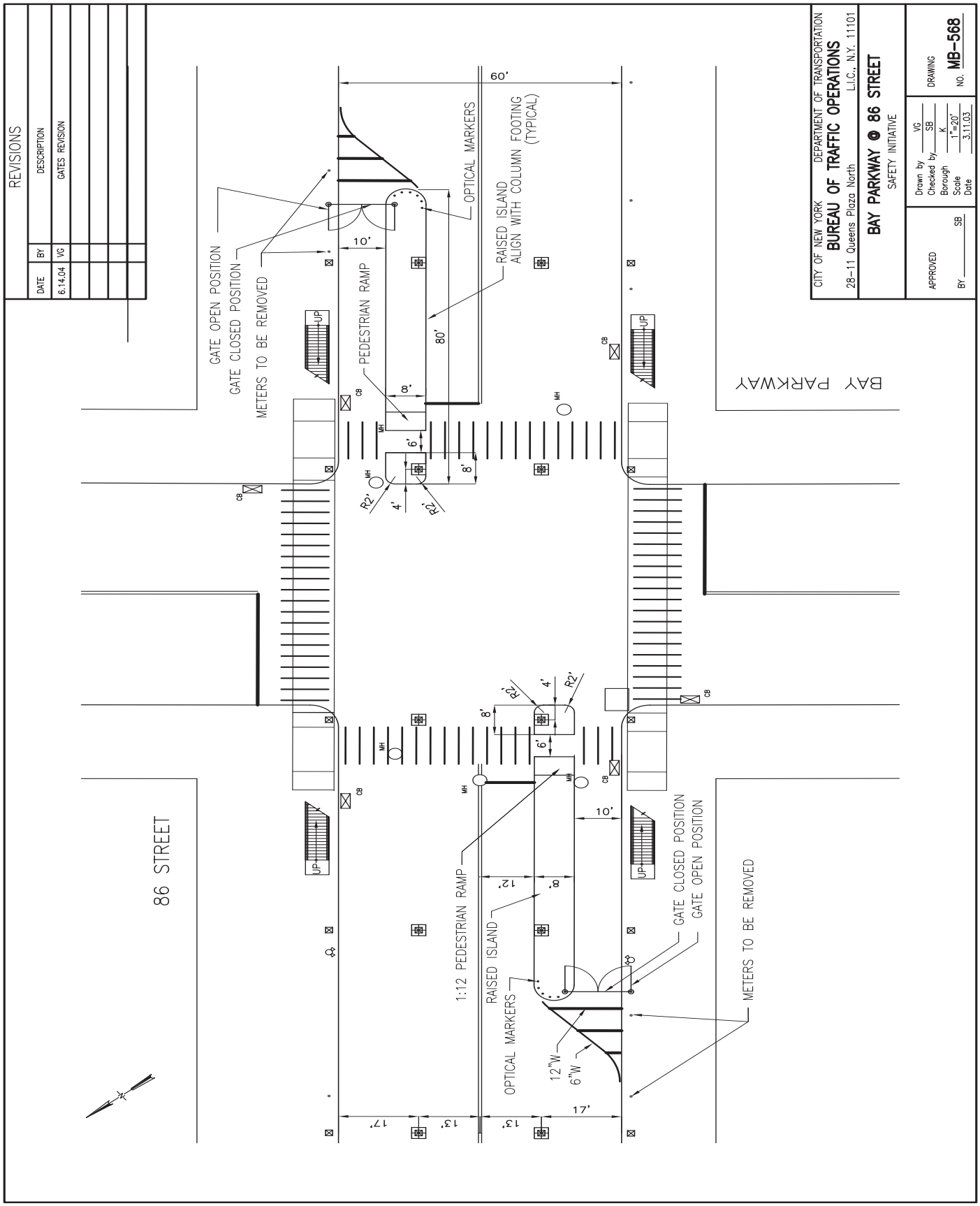
In September 2004, as a short-term improvement, the Department constructed two concrete refuge islands to provide a refuge for pedestrians. These raised islands are 80 feet in length and 8 feet wide and aligned with the column footing. Vehicles are prohibited from entering the space between the island and sidewalk through the use of metal gates that are able to be opened if needed. The gates are supplemented with roadway striping. Two parking meters were removed from each corner to allow for the installation of the island.

Raised median provides refuge and safety for pedestrians waiting for the bus and crossing the street

Metal gates, signage and striping direct vehicles to travel lane and protect pedestrian safety

In the long term, the installation of a full neckdown would provide full pedestrian protection, increase the available sidewalk space for bus shelters and requires little maintenance. These neckdowns would be installed only with a full reconstruction of the roadway.

The improvements are shown on the following page.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