

INNOVATIONS & ACCOMPLISHMENTS

East River Bridges

A \$3.14 billion reconstruction program is underway to rehabilitate all four East River crossings. In 2005, these bridges carried some 498,213 vehicles per day. In 2002, working in coordination with the NYPD and other law enforcement agencies, the Division implemented enhanced security measures on these bridges. This work is ongoing.

BROOKLYN BRIDGE

The Brooklyn Bridge carried some 132,210 vehicles per day in 2005. The \$547 million reconstruction commenced in 1980 with Contract #1, and will continue with Contract #6, currently in the design phase and scheduled for completion in 2013. This contract will include the rehabilitation of both approaches and ramps, the painting of the entire suspension bridge, as well as the seismic retrofitting of the structural elements that are within the Contract #6 project limits.



Engineering Landmark Plaque. (Credit: Russell Holcomb) 1899 Plaque Near the Franklin Truss of the Bridge, Marking the Site of George Washington's First Presidential Mansion, Franklin House. (Credit: Hany Soliman)



Historic Landmark, 1954 Reconstruction, and Two Cities Landmark Plaques. (1954 & Cities Credit: Michele N. Vulcan)

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The fitting of the remaining bridge elements requiring seismic retrofitting will be carried out under a separate contract by the end of 2013. Work completed on the bridge to date includes reconditioning of the main cables, replacement of the suspenders and cable stays, rehabilitation of the stiffening trusses, and the replacement of the suspended spans deck. The next work scheduled for the bridge is a project to replace the existing travelers with a state of the art technology system. A Notice to Proceed was issued to the contractor with a start date of November 22, 2006. Construction is scheduled to conclude in the summer of 2009.

MANHATTAN BRIDGE

The youngest of the three suspension bridges that traverse the East River, the Manhattan Bridge carries some 396,863 commuters – 80,363 vehicles and 316,500 mass transit riders - between Manhattan and Brooklyn daily. It was designed by Leon Moisseiff and completed in 1909. The bridge supports seven lanes of vehicular traffic as well as a subway transit line upon which four different train lines operate.



Manhattan Bridge. (Credit: Yuliy Zak). View From the Beach. (Credit: Jonathan Smith)

The \$829 million reconstruction commenced in 1982 with Contract #1, progressed with Contract #10, and continues with Contract #11, currently in construction and scheduled for completion in 2008. This work will be followed by Contract #14 to rewrap the cables and replace the suspenders and necklace lighting. Completion is expected in 2012. The reconstruction will end with a seismic retrofit of the bridge (Contract #15), slated for completion in 2013. Work completed on the bridge to date includes reconstruction of the south and north upper roadways, reconstruction of the north and south subway lines, installation of a truss stiffening system to reduce twisting, restoration of the historic arch, colonnades and Manhattan Plaza structures, reconstruction of the south walkway, and installation of a new north bikeway. The reopening of the south walkway and north bikeway is notable in that it marks the first time in 40 years that pedestrians and bicyclists have access across the bridge between Brooklyn and downtown Manhattan.

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"The Spirit of Commerce" Sculpture and the Underside of the Arch. Part of the Colonnades.
The "Native American Buffalo Hunt" Sculpture Panel. (Credit: Peter Basich)

Contract #10

Begun in March 2001, and completed in July 2006, **Contract #10** brought the following improvements: rehabilitation of the north upper roadway; tunnels and truss bearings; installation of a dedicated bicycle way on the bridge's north side, replacement of truss C and D bearings on the approach spans, and installation of permanent maintenance platforms below the subway tracks on the approach spans. The Manhattan Bridge bicycle path was closed in the 1960's because it fell into such disrepair that it became unsafe. The restored south walkway and north bikeway reflect the original design of the bridge.



Contract #10 Temporary Truss Jacking Frame Used in the Work to Replace the Existing Truss Bearings.
Replacement of Steel Stringers and Floorbeams on the North Upper Roadway Main Span. Installing a New
End Frame on the Main Span Side of the Brooklyn Tower.



Contract #10 Painting Containment Structures on the Cables of the Manhattan
Approach Span. Construction of the New Bikeway Approach Ramp in
Manhattan.

The scope of work included a new Intelligent Transportation System (ITS). The ITS, providing coverage from Bowery Street in Manhattan to Tillary Street in Brooklyn, consists of Closed Circuit Televisions (CCTV), and Variable Message Signs (VMS). This provides full coverage for the Manhattan Bridge upper and lower roadways, including the south walkway and north bikeway. Ranging radar detectors determine the volume and occupancy of the traffic on the bridge, and the CCTV is utilized to confirm any incident. Operators at the Traffic Management Center in Long Island City obtain data and video from the ITS. This enhances the management of traffic on the

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bridge and its vicinity and improves response to incidents. A total of 19 cameras and 7 VMS are installed on the bridge.

The north lane of the lower roadway was closed to traffic in June 2001 for use as a construction staging area. At the same time, the south lane of the lower roadway was reopened to traffic. Subway service was restored to the south tracks on July 22, 2001. On that same day, service was temporarily discontinued on the north tracks until February 22, 2004.

Effective August 1, 2002, the bridge's north upper roadway was closed for a scheduled 12-month period, and the north lane of the lower roadway was reopened during peak hours. The roadway was re-opened to traffic on June 1, 2003, 61 days ahead of schedule, thus earning the contractor a \$3 million incentive.



Contract #10 Removing an Existing North Upper Roadway Floorbeam on the Main Span of the Bridge. Installing the New Grid Deck for the North Upper Roadway on the Brooklyn Side Span. Preparing the Brooklyn Elevated Structure Grid Deck for Concrete Placement.



Contract #10 Placing Concrete on the Manhattan Side Span Grid Deck of the North Upper Roadway. Placing and Finishing Concrete on the Grid Deck of the Brooklyn Elevated Structure.



Contract #10 Placing the Microsurfacing Overlay on the Main Span. Placing the Asphalt Overlay on the Brooklyn Approach Span.

A Notice to Proceed for the additional work for NYCT on the bridge's north side tracks was issued to the contractor with a start date of September 9, 2002.

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Contract #10 Installation of New Floorbeams & Stringer Panels for the Subway Support Steel. Placing the Waterproof Protection Layer on the Anchorage Roof Inside the North Track Envelope.

Full access to the north tracks, originally scheduled in the MOU for January 11, 2004, was given to NYCT on December 15, 2003. Power to the third rail was energized on January 16. NYCT restored revenue service on the north tracks on February 22, 2004.



Contract #10 Installation of New Ties for the North Subway Track. Torquing the Bolts for the Installation of the Upper Laterals for the Truss Stiffening System. Installation of a Permanent Maintenance Platform Under the Bridge on the Brooklyn Approach Span.

During 2003, the replacement of truss C and D bearings on the approach spans in Brooklyn and Manhattan was completed. Also, permanent maintenance platforms below the North and South subway tracks on the approach spans were installed.



Placing Concrete for the New Interior of the Manhattan Colonnade and Arch. Preparing Subgrade for the Brooklyn Approach Ramp of the New North Bikeway and for the Path to the Bikeway Along Sands Street.



Placing Concrete on Manhattan Approach Ramp of New North Bikeway. Finishing Concrete for the Sidewalk Along Forsyth Street. Landscaping Work in Progress Along the Brooklyn Approach Ramp of the North Bikeway.

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Installing Protective Fencing for the Bikeway. 2005: Completing the Landscaping at the Brooklyn Approach Ramp for the North Bikeway.

Contract #10, which began in March 2001, was substantially completed on July 11, 2006.

Contract #11

A Notice to Proceed for the reconstruction of this bridge was issued to the contractor with a start date of January 14, 2005. **Contract #11** will include the following improvements: reconstruction of the lower roadway; rehabilitation of the anchorages; rehabilitation of the travelers; installation of new lighting on the north upper roadway and lower roadway; upgrading of the lower roadway lane control signals, installation of a fire protection system, and rehabilitation of the tower canopies and balconies. The work on the lower roadway began in October 2006 and is scheduled to be completed in October 2007. The contractor will be paid an incentive of \$65,000 per calendar day for early completion with a maximum incentive of \$3.9 million. Late completion will carry a disincentive of \$65,000 per calendar day with no limit on the maximum amount. This \$148 million project is expected to be complete in 2008.



Contract #11 in 2005: Masonry Cleaning of the Brooklyn Granite Pier and of the North Face of the Brooklyn Anchorage. Installing Conduit for the New North Upper Roadway Street Lighting.



Contract #11 in 2005: Waterblasting to Remove Existing Microsurfacing From the South Upper Roadway. Manually Removing the Microsurfacing.

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Contract #11 in 2005: Preparing the Deck for New Microsurfacing on the South Upper Roadway.



Contract #11 in 2005: Placing the New Microsurfacing on the South Upper Roadway. Newly Resurfaced Roadway.



Contract #11 in 2005: The Brooklyn Tower Canopy. Removing the Canopy.

In 2005 and 2006, the rehabilitation of the interior of the anchorages proceeded with the contractor repairing and replacing concrete slabs, patching spalled concrete areas, and performing vacuum-injected epoxy crack repairs to mitigate the problem of moisture seeping into the anchorage chambers. In addition, masonry cleaning work was performed on the exterior of the anchorages, piers, and abutments, as well as on the retaining walls on the approach spans. This cleaning was followed by masonry joint pointing and repairs to the damaged granite stones of these structures. Other significant tasks underway in 2006 were the installation of new street lighting on the lower and north upper roadways, and the rehabilitation of the canopy and balcony areas at both towers.



Contract #11 in 2006: Pointing Joints on East Face of Brooklyn Anchorage. Masonry Cleaning Inside Archway of Brooklyn Anchorage. Installing Conduit and Wire for New Lower Roadway Lighting.

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Contract #11 in 2006: Ironworkers Removing Existing Rivets in Preparation for Replacement of Lower Roadway. Installing Steel-Faced Curb for Sands Street Realignment. Erecting Scaffold to Build Painting Containment at Base of Brooklyn Tower.



Contract #11 in 2006: Removal of Existing Suspender Rope From Cable Band on Main Span. Sawcutting Lower Roadway Deck on Manhattan Approach Span.

In preparation for the major steel removal and replacement work on the lower roadway, which began in October of 2006, the contractor fabricated steel (floorbeam, stringers, grid deck, and barrier), completed the installation of a temporary underdeck platform, and performed abrasive blasting operations to remove the paint from the existing steel connection areas. Effective October 15, 2006, the lower roadway was closed to traffic for one year. The first floorbeam was removed on October 17, 2006 at the Manhattan approach.



Contract #11 in 2006: Sequence of Removing Existing Floorbeam at Brooklyn Tower.

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Contract #11 in 2006: Sequence of Installing New Double Floorbeam at Brooklyn Tower.



Contract #11 in 2006: Lower Roadway Grid Deck Concrete Pour in December 2006.

QUEENSBORO BRIDGE

At the time of its completion in March 1909, the Queensboro Bridge (popularly referred to as the 59th Street Bridge), was the longest continuous cantilever-truss bridge in the world. While its starring role in the hierarchy of bridges has since been eclipsed by longer and larger structures, the Queensboro Bridge's importance to the mobility and unity of New York City remains undimmed. The bridge was designated as a national landmark on November 23, 1973. The \$772 million reconstruction commenced in April 1981 with Contract #1, continues with Contract #6, which began on October 31, 2003, and is scheduled for completion by the end of June 2007, and will end with a seismic retrofit of the bridge, slated for completion in 2013. Work completed on the bridge to date includes the rehabilitation of the lower inner roadways, the lower outer roadways, and the restoration of the Guastavino arches and Bridgemarket area. The south outer roadway is open to automobile vehicular traffic, and the north outer roadway is open to pedestrians and bicyclists. The work on this vital link between Manhattan and the outer boroughs will enable this 75,000-ton workhorse to better provide the citizens and commerce of New York City with a second century of reliable, prosperous transport. The Queensboro Bridge carried some 178,610 vehicles per day in 2005.

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Queensboro Bridge. (Credit: Michele N. Vulcan)
Close-up of the 1909 Dedication Plaque. (Credit: Peter Basich)

Contract #6

Contract #6, which began on October 31, 2003, will include the following: condition investigation of the eyebar heads and pins, replacement of the protective screening and the aviation warning lights, drainage improvements, rehabilitation of the overhead sign structures in Manhattan, the upgrading of roadway lighting (by replacing all low-pressure sodium lights on the bridge and ramps with high-pressure sodium lights), cleaning and miscellaneous repairs of the anchor piers, the geometric improvement of Crescent Street, bikeway and walkway improvement, and repair of the south upper roadway concrete overfill and overlay, the promenade platform, the traveler platform, the sidewalk between 61st and 62nd Streets, and the underside of the 59th Street overpass. The work will also include the rehabilitation of the Sanitation Department area's arch infill, and modifications to the maintenance facility beneath the Manhattan approach plaza. In addition, the kiosk in the plaza on the Manhattan side of the bridge will be restored. This small historical structure is in an advanced state of disrepair and has been damaged by repeated vehicular impacts. This \$42 million project is expected to be complete by the end of June 2007.



Views of the Queensboro Plaza Kiosk. Proposed Rehabilitation of the Arch Infill for the Sanitation Department.



Contract #6 in 2004: Repairing the Steel of the 59th Street Arch Ceiling. Starting Curb Replacement at 60th Street. Improving the Drains at the Vehicle Storage Area.

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Contract #6 in 2004: Repairing Spalled Concrete at the 59th Street Overpass. Sanitation Arch Infill Work Progressing at 60th Street. Repaired Sidewalk Between 61st & 62nd Streets.



Contract #6 in 2004: Repaired Curb at 60th Street. Anchor Pier Granite Cleaning in Progress.

In 2004, work was completed at the retaining wall at York Avenue. In 2005, work was completed on the kiosk bollards on the Manhattan plaza, the sidewalk between 61st and 62nd Streets, the rehabilitation of the Sanitation Department area arch infill, and the modifications to the maintenance facility beneath the Manhattan approach plaza.



Contract #6 in 2005: Bent Column Ready for Jacking. Decorative Fence. Repairing the Drainage Pipes.



Contract #6 in 2005: Manhattan Plaza Bollards. Full Width Deck Repair on South Inner Roadway. New Luminaire on North Upper Roadway.



Contract #6 in 2005: Rehabilitated Sanitation Department Arch Infill.

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Contract #6 in 2005: Traveler Platform. New Window.

In 2006, work was completed on the protective screening, the aviation warning lights, the drainage improvements, the repair of the south upper roadway concrete overfill and overlay, the underside of the 59th Street overpass, and the condition inspection of the eyebar heads and pins.



Contract #6 in 2006: Microsurfacing the North Upper Roadway. Repairing the 59th Street Overpass.

The kiosk in the plaza on the Manhattan side of the bridge was originally built in 1908 and is constructed primarily of terracotta panels set between ornate cast iron columns, with copper roofs and cast iron fascias. The interior walls and Gustavino timbrel arch ceiling are covered with glazed tile. The open front (now glassed in) originally served as the entrance and exit to the old subway station. There is no floor in the kiosk, as it served only to shelter the stairways leading to the station below. The restoration of the kiosk was completed in September 2006.



Restored Queensboro Kiosk Ceiling and Other Elements.



Restored Queensboro Bridge Kiosk.

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Protective Coating

The \$168 million Queensboro Bridge painting contract commenced in January 2004. The Department and its contractor strictly adhere to the safety requirements regarding lead paint removal as approved by the United States Environmental Protection Agency and the Occupational Safety and Health Administration, New York City Departments of Health and Environmental Protection, and the New York State Departments of Health and Environmental Conservation.



Platform Installed for Painting of the Queensboro Bridge. (Credit: Vadim Sokolovsky)
Working Inside the Containment. Protected Roadway.

The work is performed within an entirely sealed Class 1A containment system (under negative pressure) which acts as an added safety measure to prevent any materials from escaping into the air. Filtration of the enclosed air prevents paint waste dust from being released. The Department has placed several air monitoring stations in the area around the bridge. The Department performs continuous monitoring and testing of the soil and air quality as well as noise levels in the area surrounding the containment enclosure to minimize impacts and ensure the safety and quality of life for workers and residents nearby.



View of Roadway Platform. Painted Area.

By the end of 2005, the contractor completed cleaning and painting the Manhattan and Queens anchor piers; the Manhattan approach; ramp A; the off ramp and ramp B over the Silver Cup Studio parking lot; the off ramp over Queens Plaza South towards 13th Street; approaches B and C from 23rd Street to Thompson Avenue (except over the railroad tracks); the Queens approach underside of the lower roadways (from 21st Street to Vernon Boulevard); the main bridge underside of the lower and upper roadways from PP123 to PP68; and the main bridge above the upper roadway from PP77 to PP109.



Protective Coating in 2005: Newly Painted Section Along the Upper Roadway. Containment on the Queens Side Tower. (Credit: Peter Basich) Queensboro Bridge Work Platform. Painters Arriving at the Platform. (Credit: Michele N. Vulcan)

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By the end of 2006, the contractor completed cleaning and painting the Queens approach at the inner roadways from PP0 to PP39; at the main span's inner and under upper roadways above Roosevelt Island and one half of span #2 from PP75 to PP37; the main span trusses above the upper roadway from the Manhattan anchor pier to the Roosevelt Island west tower has been completed from PP0-PP15, PP30-PP47, and PP109-PP123; and the ramps on the Queens side over the LIRR tracks. Installation of cables and platform, on the main span under the lower roadway from PP17 to PP37, was also underway.



Protective Coating in 2006: Upper Roadway in Progress. (Credit: Peter Basich) Inside the Containment on the North Side of the Inner Roadway. Installed Platform Above South Outer Roadway.



Protective Coating in 2006: Inside the Containment Rigging at Span #1. Finish Coat on the Trusses at Span #5 on the Upper Roadway. Class 1A Containment Installed on the Trusses at Span #2, And the Working Platform Above the South Outer Roadway.

Scheduled work for spring 2007 includes the tower interiors, the upper roadway trusses on the remaining portion of span #2 and over Roosevelt Island; the Queens approach at the inner roadways from PP39 to PP90, and the main span's inner and under upper roadways from the Manhattan anchor pier to the middle of span #2 – PP37.

Active measures are taken to reduce noise at its source, such as the use of mufflers, sound screens, low noise producing equipment, and noise blankets. Light shields are utilized to reduce glare from work lights. By the end of 2006, approximately 67% of the contract work was complete. All staging areas are behind a screened fencing. This project is expected to be completed in January 2009, and will result in the total re-painting of the bridge.

WILLIAMSBURG BRIDGE

The largest of the three suspension bridges that traverse the East River, the Williamsburg Bridge carries some 207,030 daily commuters – 107,030 in vehicles and 100,000 via mass transit - on eight traffic lanes, two heavy rail transit tracks, and a pedestrian footwalk, between Manhattan and Brooklyn. The bridge supports a subway transit line upon which three different train lines operate (J, M, and Z). The \$989 million reconstruction commenced in 1983 with Contract #1, and continues with Contract #8, which began in March 2003 and is scheduled for completion by the end of 2007.

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Williamsburg Bridge. Bridge Subway Structure. (Credit: Peter Basich).
Contract #8 Looking South at a Cable Band Retensioning Crew.

In order to minimize disruption to the riding public and ensure that traffic is maintained across the bridge, the rehabilitation of the Williamsburg Bridge was divided into several contracts. In the contracts completed to date, all four main cables have been completely rehabilitated, the south and north roadways of the bridge have been replaced and the BMT subway structure across the bridge was completely reconstructed.



View From the South Footwalk.

Contract #8

Contract #8 began on March 3, 2003, and is scheduled to finish by the end of 2007. This \$190 million project will see the rehabilitation of the tower bearings, the truss system, the steel structure of all eight towers, and the north comfort station houses, the replacement and/or adjustment of the cable suspenders, the installation of maintenance travelers (inspection platforms) under the main span, as well as painting of the stiffening trusses. Architectural work will include the restoration of decorative lights on the main towers and in the Manhattan Plaza. Work inside the anchorage houses on both the Manhattan and Brooklyn sides will include the construction of new stairs, a hoisting system, ventilation and lighting, and oiling platforms. The project will also include the installation of several Intelligent Transportation System (ITS) components, including variable message signs and closed circuit television cameras.

Painting of the south side stiffening trusses, which began on June 1, 2003, was completed on September 6, 2003. Painting of the north side stiffening trusses, which began on September 6, 2003, was completed on November 25, 2003. Steel replacement on both main towers began in 2003 and will continue through spring of 2006. Steel replacement on both the intermediate towers and the upper and lower chords of the stiffening trusses began in 2003 and was completed in 2005.

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Contract #8 in 2003: North Stiffening Truss Containment Erection and Removal.
South Truss Bottom Chord Rehabilitation.



Contract #8 in 2004: Looking East at the Brooklyn Main Tower Temporary Work Platforms. Manhattan Main Tower Temporary Platform Erection. Strengthening Plate Operation on Brooklyn Main Tower.



Contract #8 in 2004: Pier Stationed & Barge Mounted Cranes at Brooklyn Main Tower Pier. Steel Arch Replacement. Looking West at the North Truss Top Chord Steel Rehabilitation.



Contract #8 in 2005: Preassembling and Erecting Brooklyn Intermediate Tower Arch Steel.

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Contract #8 in 2005: Rehabilitation of the Brooklyn Main Tower Steel. Torch Cutting on the Tower.



Contract #8 in 2005: Removing the Existing Steel of the Brooklyn Main Tower. Inspecting a Rebar Cage at the Manhattan Main Tower. Installing a Column at the Brooklyn Main Tower.

Installation of the strengthening plates on the four river-side column legs of each of the main towers was completed in 2004. This operation began with the hoisting of the plates from the roadway to the highest level of each tower and was completed during weekends on which the transit tracks were removed from service. This work included over 800,000 pounds of steel attached through over 30,000 individual bolt holes drilled into the existing steel.



Contract #8 in 2005: Torque Testing Bolts at the Brooklyn Intermediate Tower. Erecting a Leg of the Brooklyn Main Tower. Erecting Brooklyn Main Tower Leg Bearing Support Steel. Replacing the Manhattan Approach Footwalk Expansion Joint Covers.

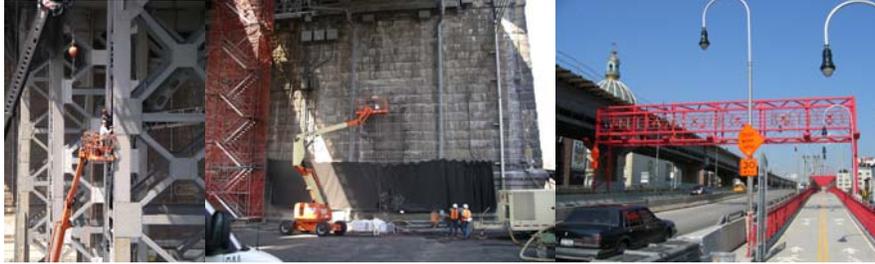
During the fall of 2005 the work of replacing the footwalk expansion joint cover plates began and the 24 joints on the Manhattan approach and south foot walk were completed. The work on the seven joints on the north foot walk was completed in early 2006.

Twenty-eight wire rope cable suspenders and 56 tension rods were replaced during 2004 on the suspended main span. All of the suspenders were systematically adjusted in 2005 to optimize the profile of the bridge. In addition, the truss bearings at the anchorages were replaced in 2005.

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Contract #8 in 2004: High Strength Bolt Torque Inspection. Cable Band Bolt Retensioning. Steel Bracing Replacement Operation at the Brooklyn Intermediate Towers.



Contract #8 in 2004: Ironworkers Bolting up New Steel on Intermediate Tower. Cleaning the Brooklyn Anchorage Exterior Granite Surface. Entrance to North Walkway. (Walkway Credit: Peter Basich)



Contract #8 in 2005: Cable Band Bolt Retensioning. (Credit: Bojidar Yanev) Demolition of the Brooklyn South Comfort Station Balcony. Installing Brooklyn Main Tower Aviation Lights. FHWA Engineering Intern River Hwang Inspecting the Cable Wrapping.

Rehabilitation of the north comfort stations began on February 21, 2006. The south outer roadway of the bridge was closed on June 1, 2006 for the removal and replacement of the asphalt overlay. Work was completed on the Manhattan side on June 6, 2006, and on the Brooklyn side on June 14, 2006. Installation of the balconies on both main towers began on June 22, 2006. The first traveler platform for the bridge was brought to the contractor's facility in Carteret, New Jersey on December 05, 2006.



Contract #8 in 2006: North Comfort Station. Manhattan Anchorage Joint Cleaning and Painting. Pointing of Comfort Station Roof.

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Contract #8 in 2006: Truss A Removal, Manhattan and Brooklyn Towers. Asphalt Paving.



Contract #8 in 2006: Water Blasting. Curb Angle Cleanup and Tack Coat. Core Drilling The Brooklyn North Comfort Station.



Contract #8 in 2006: Touchup Painting on the North Truss. First Traveler Platform. Bearing Survey.

Work anticipated to be completed in 2007 includes the installation of the top chord transverse bearings at the main towers, the installation of the new maintenance traveler system, the implementation of a south inner roadway contra-flow system, the seismic retrofit of the intermediate tower bases, and the replacement of the intermediate tower truss bearings.

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Movable Bridges

As NYCDOT completes reconstruction work on the East River Bridges, more attention is being devoted to other key City-owned bridges, such as the movable bridges. Building on the success of the East River Bridge projects, the Department is implementing many of the innovative concepts originated during the rehabilitation of East River Bridges on these other major reconstruction projects.

BELT PARKWAY BRIDGE OVER MILL BASIN (BROOKLYN)

When the Mill Basin Bridge was constructed during the first half of the 20th century, New York City's inland waterways were among the most heavily navigated thoroughfares in the country. However, as maritime traffic in New York City steadily decreased since the mid-1960s, the need for movable bridges lessened as well. In 1941, during its first full year of operation, the Mill Basin Bridge was opened 3,100 times; by 1953, that figure decreased to 2,173; by 2006, the number of openings declined further to a total of only 174 openings.

In addition, significant and costly traffic congestion results from the operation of this outmoded drawbridge. In 2005, the Mill Basin Bridge carried 143,158 vehicles per day. The average opening and closing time for the bridge (and others like it) is ten minutes. Thus, this structure's operation has a negative and significant effect on the efficiency of New York City's vehicular traffic flow.

In 2006, on a New York State-mandated scale from 1 to 7, this bridge had a condition rating of 3.10, or "fair." While the bridge is not in any immediate danger of structural failure, its reconstruction is required in order to maintain mobility and public safety on this vital artery.

The existing bridge is a 14 span structure, consisting of a double leaf steel bascule span. The substructure is made of reinforced concrete abutments and piers supported on precast concrete or timber piles.



Belt Parkway Bridge Over Mill Basin.

Under the Department's current proposal, the Mill Basin Bridge will be replaced with a new, 15 span, high-level, fixed bridge with a composite steel superstructure and reinforced concrete substructure on pile footings. The bridge will be constructed next to the existing structure so as to maintain traffic during the construction period. It will feature three lanes of vehicular traffic, as well as a 12-foot wide shoulder in each direction. A new sidewalk/bicycleway will also be constructed on the eastbound portion of the structure, and the stopping sight distance for the bridge and approach roadway will be improved.

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Currently in its final design phase, the reconstruction of the Mill Basin Bridge is scheduled to start in 2011, and to last approximately 4 years. The new bridge will be constructed off-line while maintaining three traffic lanes in each direction and a bike/pedestrian path on the eastbound side of the existing bridge during construction. The existing bridge will be demolished after the new bridge is fully opened to vehicular traffic.

BRUCKNER EXPRESSWAY (NB & SB SERVICE ROAD) OVER WESTCHESTER CREEK (UNIONPORT BRIDGE)

This double leaf bascule bridge opened in 1953. In 2005, the bridge carried 60,605 vehicles per day. The 17 span (three waterway and fourteen concrete approach) structure carries five lanes of the Bruckner Boulevard Expressway service road traffic over Westchester Creek. Currently in its final design phase, the reconstruction of the bridge is scheduled to start in July 2008. The estimated construction duration will be a total of 36 months with approximately 18 months lead time. The project's scope of work includes rehabilitation of the existing steel of the bascule and flanking spans, replacement of the concrete superstructure of the flanking and approach spans, rehabilitation of the substructures, replacement of the existing mechanical and electrical systems for the bascule span, reconstruction of the bridge operator and control houses, and replacement of the existing fender system, drainage system, street lighting, traffic signal facilities, and gates.

Onsite construction will be carried out in six stages. Incentives and disincentives will be used to expedite the completion of the project. Construction is expected to be completed in July 2011.



Unionport Bridge in 1953.

HAMILTON AVENUE BRIDGE OVER THE GOWANUS CANAL

The Hamilton Avenue Bridge opened in 1942. In 2005, the bridge carried 59,885 vehicles per day. As part of the \$55 million reconstruction of this bridge, the new bascule spans with trunnion towers will be shop-assembled and tested off-site, then will be shipped to the site and erected on the rehabilitated piers. This will reduce the roadway closure time for the construction of each span from 14 months to only 2 months. Other reconstruction work will include: the rehabilitation and seismic retrofitting of the existing piers; the replacement of all electrical and mechanical and control equipment; the removal and replacement of the approach slabs of both sides of the bridge; the rehabilitation of the backwalls and abutments; and the renovation and extension of the bridge operator house.

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Hamilton Avenue Bridge. (Credit: NYSDOT)

The bridge's appearance will also be enhanced artistically. A permanent new lighting art structure will be installed on the bridge buildings that will be viewable by pedestrians, motorists, mariners and the general public as part of the Percent For Art Program administered by the Department of Cultural Affairs.



Mock-up of the Hamilton Avenue Light Sculpture. (Credit: Gholamali Mozaffari) Open Bridge. (Credit: NYSDOT)

In Stage I, the Manhattan-bound span will be closed from July 1, 2007 to August 31, 2007, and it will be replaced. In Stage 2, the Brooklyn-bound span will be closed from July 1, 2008 to August 31, 2008, and it will be replaced. Each of these two main stages of the contract includes an incentive for early completion of \$25,000 of per day with a cap of \$300,000. There is a disincentive of \$25,000 for each day the contractor is late in finishing a stage with no limit to the amount of penalty. A Notice to Proceed for the reconstruction of this bridge was issued to the contractor with a start date of August 4, 2005. The project is expected to be complete in January 2009.

MACOMBS DAM BRIDGE OVER THE HARLEM RIVER (BRONX/MANHATTAN)

The Macombs Dam Bridge, which has one of the longest swing spans in the world, was opened in 1895. In 2005, the bridge carried 40,112 vehicles per day. The \$145 million reconstruction of this landmark bridge includes the West 155th Street viaduct, the west approach plaza over the Harlem River Drive and Seventh Avenue, the swing span over the Harlem River, the deck and camelback trusses over Metro-North Railroad and Conrail, the Major Deegan interchange (consisting of the east approach and four ramps), and the Jerome Avenue viaduct. Each of the three stages of the contract included an incentive for early completion of \$50,000 of per day with a cap of \$2 million. There was a disincentive of \$100,000 for each day the contractor would be late in finishing a stage with no limit to the amount of penalty. The rehabilitation work will not only strengthen the structure, it will also return the bridge's appearance to its turn of the century grandeur.

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East View of Macombs Dam Bridge Swing Span and Camelback Truss. (Credit: Peter Basich)

Architectural Detail of the Bridge. (Credit: Michele N. Vulcan)

Closeup of a Gate House. (Credit: Peter Basich)

As part of this project, the historic John Hooper Fountain, which dates from 1894, was fully rehabilitated in 2000. After studying detailed old photographs, the globe and weather vane were recast and replicated. Cast aluminum was used with high impact glazing similar to the lanterns installed in Central Park in the 1980's. Just east of the fountain, a garden of rose bushes was added for the community's pleasure. Other additions included a new paved island, new curbs, and a steel fence. Bollards were installed at the western end of the island to protect the fountain from vehicular traffic.

The first stage of construction was completed on March 31, 2001. It included the installation of structural components, as well as the deck replacement of the northern one-third area of the bridge and the West 155th Street viaduct. This milestone date was met even though 31 calendar days were lost from the work period due to the post season play of the New York Yankees. Essentially twelve months' worth of work was compressed into the five worst weather months of the year.

The second stage of construction began on November 2, 2001, after the conclusion of World Series play at Yankee Stadium. It consisted of the installation of structural components as well as the deck replacement of the middle one-third area of the bridge. This stage was completed on February 20, 2002, 39 days ahead of schedule.

The third and final stage of construction began on October 7, 2002. Work included replacement of the structural deck, and rehabilitation of the superstructure steel and the concrete substructure members on the southern portion of the bridge. In addition, truss members in both the swing span and camelback portions of the bridge were reinforced. This stage was completed on March 31, 2003. In 2003 and 2004, electrical and mechanical components and equipment were installed, and the brakes were replaced. In 2005 and 2006, the contractor worked on window replacement, touch-up painting, restoration of park land, removal and replacement of actuators, finishing the signage, sidewalk replacement, the construction of a concrete wall at 161st Street, and extended testing. Expected completion of the project is April 2007.

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Close-up of the 1894 Dedication Plaque. (Credit: Hani Faouri)
View of the Swing Span Control House. (Credit: Michele N. Vulcan)



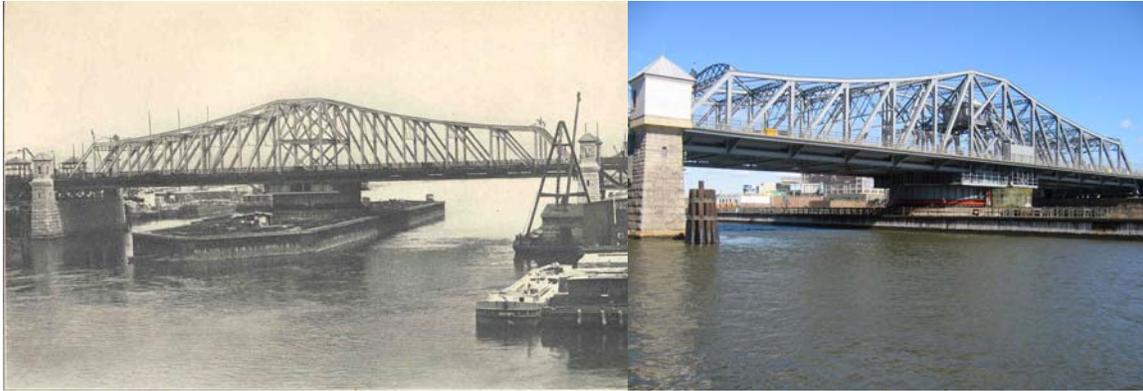
View of the Roadway From Above the Control House – Yankee Stadium is on the Right. (Credit: Peter Basich)
Bridge Protective Fencing and Staircase. (Credit: Michele N. Vulcan)

The bridge is also being assessed for seismic vulnerabilities. A seismic retrofit of this bridge will include strengthening the existing foundations and superstructure steel members. Retrofitting work will be completed throughout the length of the structure from the 155th Street Viaduct to the Jerome Avenue Approach. This will include installation of mini-piles in the existing piers that support the swing span, strengthening of the steel columns and floor beams of the 155th Street Viaduct and installation of lock-up devices to disseminate loads during a seismic event. The seismic retrofit project is currently scheduled to start in July 2014 and end in January 2017.

MADISON AVENUE BRIDGE OVER HARLEM RIVER (BRONX/MANHATTAN)

A project for seismic retrofit, electrical, mechanical, masonry and miscellaneous work is scheduled to be performed between March 2013 and September 2014. A preliminary seismic assessment indicates that a new center pivot pier may need to be constructed to support the swing span to meet seismic demands. If this assessment is confirmed by a further detailed analysis, the construction duration will be longer since it will require construction of new foundations for the swing span located in the Harlem River. In 2005, the bridge carried 48,397 vehicles per day.

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Madison Avenue Bridge in 1910. Bridge in 2005. (Credit: Peter Basich)

METROPOLITAN AVENUE BRIDGE OVER ENGLISH KILLS (BROOKLYN)

This bridge is a double leaf bascule constructed in 1931. The five span structure carries four lanes of traffic over the English Kills. In 2005, the bridge carried 35,113 vehicles per day. A \$39 million rehabilitation project began in October 2003. The project's scope of work included rehabilitation of the existing bridge superstructure, substructure, and approaches, replacement of the existing mechanical and electrical systems for the bascule span, and reconstruction of the Bridge Operator House.



Previous Metropolitan Avenue Bridge in 1903. Current Metropolitan Avenue Bridge Before Reconstruction.

Stage I reconstruction of the bridge began on March 15, 2004. The bridge was divided in two distinct halves, north and south, with the first stage of rehabilitation commencing on the north half.



Looking West at the Open Metropolitan Avenue Bridge Before Splitting of the Leaves. Open Bridge With Split Leaves. Looking North at the Demolition of the Bridge Operator House.

The north half grid deck, the east and west approach spans, the existing operator house and the existing pier walls and wingwalls were demolished. An existing rest pier, cribbing, and contaminated soil were also removed to facilitate subsurface construction. Steel repairs were completed, as well as seismic retrofitting of the trunnion columns. A new operator house was constructed and bridge control equipment was delivered and placed inside the house. A new submarine cable was placed, and the bridge's grid deck was replaced and filled with a lightweight concrete. New machinery and bedplates with a housing were installed in the pit areas. The

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flanking spans and on grade approach slabs were reconstructed. New pier walls and wingwalls were constructed on the east and west sides of the bridge, and new warning and barrier gates were installed on both approaches.



Looking East at the Rebuilding of the Operator House. Demolition of the Northwest Flanking Span of the Metropolitan Avenue Bridge. Driving Test Piles.



Looking West at the Installation of Sheet Piles on the Northeast Approach Slab. Looking West at the Removal of the Northwest Sidewalk. Completed New Rack Assembly in Structural Support at the Fabricator's Shop.



Working on the Approaches. Metropolitan Bridge Under Construction.

Stage II reconstruction of the bridge began on February 16, 2005. This stage included the demolition and reconstruction of the south half of the structure and mechanical systems. During the bridge rehabilitation, two of the four travel lanes were maintained and carried east and westbound traffic over the span. The bascule span was kept operational throughout the staged construction through the use of a temporary operating system. The bridge was re-opened to all lanes of traffic at 5 AM on November 18, 2005. The bascule span now operates under the newly installed machinery, control systems and new electric service. Staged construction was completed 60 days ahead of the contract schedule, making the contractor eligible for the full incentive for early completion.

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Completion of the North Side of the Metropolitan Avenue Bridge. Stage II Construction.



Rehabilitated Dolphins Wrapped With New Steel Cables. Old Bridge Operator House. New Bridge Operator House.



Bridge Opening With New Machinery And New Warning And Safety Gates.

Onsite construction was carried out in three stages. Incentives and disincentives were tied to the completion of Stage I and Stage II and the opening of each half of the bridge to traffic. The contractor received the maximum project incentive of \$900,000. The reconstruction of this bridge was substantially completed on September 18, 2006.

ROOSEVELT ISLAND BRIDGE OVER EAST RIVER/EAST CHANNEL (MANHATTAN/QUEENS)

This lift bridge opened in 1955. In 2005, the bridge carried 9,929 vehicles per day. In 2006, the lift span opened 54 times for vessels. The 8 span structure carries two lanes of traffic over the East River/East Channel. It is the only vehicular access to Roosevelt Island from the Borough of Queens.

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Roosevelt Island Bridge Under Construction in 1952.

The reconstruction of the bridge is scheduled to start in March 2007. The estimated construction duration will be a total of 36 months with approximately 8 months' lead time. The project's scope of work includes rehabilitation of the existing bridge superstructure, substructure and approaches, replacement of some of the existing mechanical and all of the electrical systems for the lift span, rehabilitation of the bridge operator house, installation of safety fences on the sidewalk, replacement of the street lighting, resurfacing of the approach roadways, installation of pigeon proofing systems and re-painting the entire structure. The project will also include the installation of a dedicated right-hand turn into the southbound Vernon Boulevard in Queens, and the construction of a new back-up generator building under the Queens approach.



(Roosevelt Island Bridge. (Credit: Peter Basich) Bridge Tower. (Credit: Michele N. Vulcan)

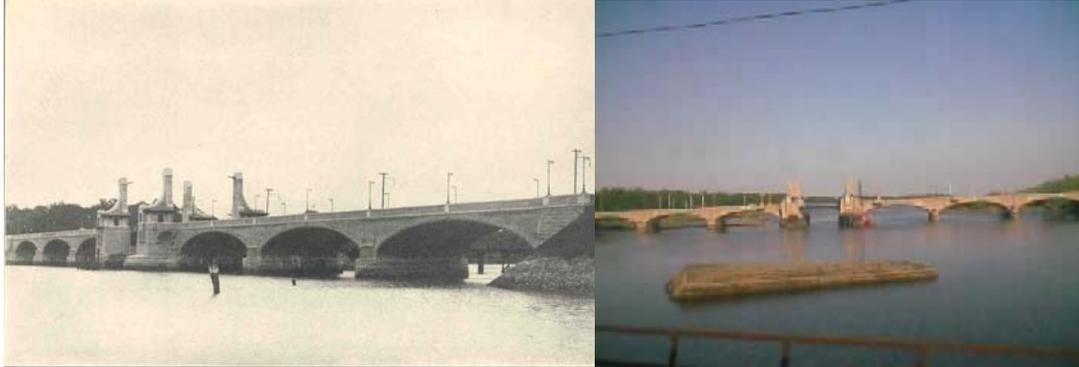
Onsite construction will be carried out in three stages. Vehicular traffic will be maintained during all of the stages. Incentives and disincentives will be used to expedite the completion of the project. Construction is expected to be completed in March 2010.

SHORE ROAD BRIDGE OVER THE HUTCHINSON RIVER (BRONX)

This bridge, built in 1908, was originally called the Pelham Parkway Bridge over Eastchester Bay. In 2005, the bridge carried 17,972 vehicles per day. The \$5 million interim rehabilitation of the existing bridge superstructure and substructure will enable the Department to keep it operational while a new bridge is being designed and built adjacent to the existing bridge. The existing bridge will be demolished once the new bridge is in service. The rehabilitation project began in April 2001, and all traffic lanes were reopened to traffic on April 24, 2002, three days earlier than scheduled. The interim rehabilitation of this bridge was substantially completed on June 17, 2002.

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As of the end of 2006, various alternatives for the new bridge were being evaluated for further design. The preferred alternative is a mid-level, single leaf bascule movable bridge which will be constructed to the south of and parallel to the existing bridge. An environmental impact study is expected to begin in early 2007. The project to construct a new Shore Road Bridge is scheduled for construction between October 2012 and January 2017.



Shore Road Bridge in 1909. Bridge in 2005. (Credit: Russell Holcomb)

THIRD AVENUE BRIDGE OVER THE HARLEM RIVER (BRONX/MANHATTAN)

The Third Avenue Bridge carried some 60,152 vehicles per day in 2005. The bridge was built in 1899 and was last rehabilitated in the 1950's. The design of the approximately \$120 million reconstruction project of this rim bearing swing bridge was completed in October 2000. Construction began in July 2001. Reconstruction included complete replacement of the approaches and the swing span. Elimination of the center median on the main span greatly improved the traffic flow on the bridge. The new bridge uses a center spherical roller thrust bearing for supporting the span and for seismic loads. The bearing is the largest of this type made for this purpose. The existing pivot pier was also reinforced for seismic loads. A temporary bridge, adjacent to the current one, was in place for five months to maintain two lanes of traffic into Manhattan while the swing span was being replaced.



Third Avenue Bridge in 1914. Old Third Avenue Swing Span on Left, Temporary Bridge on Right.
(Credit: Daniel Horn)

In 2004, the project's land work was advanced by the construction of a crossover ramp from Third Avenue in the Bronx to the existing swing span and into the staged ramp construction in Manhattan. This enabled the Bruckner Boulevard ramp to be reconstructed about four months early and concurrent with the work to demolish the existing swing span. Meanwhile, fabricated steel and machinery were shipped from northwest Alabama to the Port of Chickasaw in Mobile, where the new 4.8 million pound swing span was erected and prepared for a 1,800 mile journey to New York City.

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By mid-2004, all of the river foundations were completed, the existing swing span was demolished and removed from the site, and a temporary bridge was erected and used for two lanes of Manhattan-bound traffic. This bridge was in service from June 13, 2004 through December 5, 2004. During the summer of 2004, all of the existing river piers were demolished and reconstructed on the new foundations for the new swing span, which was delivered to Harlem in July and parked along the Manhattan side of the Harlem River where final machinery and structural components were installed.



Starting the Removal of the Old Swing Span. (Credit: Daniel Hom) New Swing Span Passing Under the Williamsburg Bridge

On October 29, 2004, the new swing span was floated-into final position. Six tugboats pushed the span, which was supported on two barges, to within 2 inches of the center pier and bearings. Personnel worked with the rising tide and hydraulic jacks to position and then set the span. After positioning, and working with the now falling tide, 480,000 gallons of water were pumped into ballast tanks to sink the barges and lower the new span truss onto its bearings.



Preparing for the Float-in of the New Swing Span. (Credit: Keith Burrowes) New Swing Span in Position. (Credit: Michele N. Vulcan)



Finishing the New Deck. (Credit: Michele N. Vulcan) Almost Completed New Span and Temporary Bridge. (Credit: Daniel Hom)

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By December, the new span had received two of its five lanes of traffic, the temporary bridge was removed from service and floated out, the Bruckner Ramp was 90% completed and ready for opening in early 2005, and the auxiliary bridge machinery systems were installed and ready for turning the bridge for mariners through the hydraulic machinery. The vertical clearance restriction imposed during construction for the navigational traffic in the Harlem River ended as of early January 2005. The bridge was opened to five lanes of traffic at 5 AM on February 10, 2005.



Traffic on the Bridge. The Operator House. Sidewalk, Guardrail, and Protective Fencing. (Credit: Michele N. Vulcan)

The new 18 span bridge supports five traffic lanes (one more than the old one), and the horizontal clearance of each of the navigation channels was increased from 100 feet to 116 feet. In addition, the sidewalks on the new bridge are 8 feet wide rather than the old 6 feet.

During 2005, the contractor continued work on the mechanical and electrical systems, the new fenders, the pier's granite stones, the storage building, the Bronx and Manhattan approaches, and the submarine cable.



New Third Avenue Bridge.

The contract provides for incentives of \$25,000 and \$37,500 per day, respectively, for each day that milestones C and D are early, with a maximum incentive of \$3.75 million. There are similar disincentives if the milestones are exceeded, with no maximum. The reconstruction of this bridge was substantially completed on November 14, 2006, and we are currently assessing the incentive/disincentive.

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WILLIS AVENUE BRIDGE OVER THE HARLEM RIVER (BRONX/MANHATTAN)

Measuring 3,212 feet in length and opened to traffic on August 23, 1901, the Willis Avenue Bridge remains one of New York City's most heavily traveled bridges. The bridge is a bowstring truss swing bridge which spans the Harlem River, and connects Manhattan's First Avenue and 125th Street to Willis Avenue and 132nd Street in the Bronx. Engineered by Thomas C. Clarke, the bridge was designed to relieve traffic congestion on the Third Avenue Bridge.



Willis Avenue Bridge in 1909. Bridge in 2005. (Credit: Reza Taheri)

A major hub between the FDR Drive in Manhattan, the Major Deegan Expressway and the Bruckner Expressway in the Bronx, the Willis Avenue Bridge carried approximately 66,708 vehicles per day in 2005. Ten local and interstate bus lines use the bridge as a principal route from New York City to points throughout the northeastern United States.

Because of substandard curves which are present on the structure's approaches, the Willis Avenue Bridge has been one of the City's most accident-prone crossings. Between 1992 and 1994, there were 809 vehicular accidents on the bridge, for an average of 269 per year. Under the Department's proposed reconstruction program, these substandard curves will be eliminated.

Because of the advanced age and condition of the Willis Avenue Bridge, the City of New York proposes to replace the existing bowstring truss swing bridge with a new swing span bridge constructed just to the south of the existing bridge. Elimination of the center median on the main span will greatly improve the traffic flow on the bridge. Due to begin in August 2007, this project is slated for completion in December 2012.



Willis Avenue Bridge

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145TH STREET BRIDGE OVER THE HARLEM RIVER (BRONX/MANHATTAN)

The existing 145th Street Bridge is a swing type bridge with three throughtrusses. An eight-span structure, it carries four lanes of vehicular traffic over the Harlem River Drive, the Harlem River and Oak Point Link Railroad. Spans one and two were constructed in 1957 when the bridge was extended to span the Harlem River Drive. Spans six, seven and eight were reconstructed in 1990 in place of the original Bronx flanking span to provide a right-of-way for the Oak Point Link. In 2005, the 145th Street Bridge carried approximately 25,802 vehicles per day. This makes it one of the most essential routes for vehicles and pedestrians traveling between Manhattan and the Bronx. Vehicles, which cross this rim bearing swing bridge each day between the two boroughs, include buses, trucks and cars.



Bridge Operator House in 1958. 145th Street Bridge.

A Notice to Proceed for the \$69.4 million reconstruction of this bridge was issued to the contractor with a start date of July 15, 2004. Fabrication of steel components for the approach and new swing span continued in Pennsylvania. Fabrication and assembly of mechanical and electrical components began in 2005. Installation of mini-piles at the rest and center piers of the bridge began in November 2004, and was completed in March 2005. In 2005, the contractor also completed the survey and the tieback borings. In 2006, the contractor replaced most of the north half of the bridge in the approaches as well as on spans 1, 2, 3, 6, 7, and 8. The new swing span was assembled in Albany, New York in late 2005, and is scheduled to for float-in in early February 2007.



2005: Replacing Span #3. Swing Span Truss Assembly.



2005: Precast Deck Units at the Fabrication Facility. Placing the Bottom Chord of the Swing Span on the Supporting Towers.

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2006: Assembling the New Swing Span in Albany.

Stage I reconstruction of the bridge began on March 16, 2006. The Manhattan-bound roadway and sidewalk were closed and one lane of traffic in each direction, as well as pedestrian access, were maintained on the south half of the bridge.



2006: Continued Assembly of the New Swing Span. Removing Steel Girders Over the Harlem River Drive.



Testing the Concrete for Pier 3: FHWA Summer Intern Keisha Esprit on Left, and Assistant Civil Engineer Khalid Mohammed on Right. Ms.Esprit Taking Notes on the Concrete Placement. Aerial View of Construction.

The barge carrying the new swing span arrived at the Third Avenue Bridge site on October 31, 2006. Effective November 1, 2006, the bridge was fully closed for four months. Demolition activities began started around 2:00 a.m. on November 8. A sound barrier was erected prior to the start of the demolition.



Swing Span Leaving Albany. Passing Lower Manhattan.

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Approaching the Brooklyn Bridge. NYPD Launch Monitoring the Barge Passing Under the Manhattan Bridge. (Manhattan Credit: Bojidar Yanev)



Swing Span Passing Under the Williamsburg and Queensboro Bridges. (Credit: Peter Basich)

The contractor completed the removal of the swing span in December 2006, and it was transferred off site.



Barge Carrying Crane Passing The Open Madison Avenue Bridge on the Way to Dismantle the Old 145th Street Swing Span. Dismantling the Truss.

The project will include the complete replacement of the swing span and six approach spans, seismic retrofitting, partial reconstruction of substructures and the reconstruction of the approach roadways, sidewalks, and bridge railing. The design for the bridge utilizes elements pre-fabricated off-site so as to allow a very quick replacement of the existing bridge in 3 stages totaling 18 months. Traffic will only be impacted for the 15-month period of March 16, 2006 to June 18, 2007. The project is slated for completion in September 2007.

These upgrades will restore the structural integrity and extend the useful life of the 145th Street Bridge.

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FLOAT OUT/FLOAT IN

A technique referred to as “float out the old/float in the new” is being incorporated into replacement schemes for many movable bridges. Under this scheme, the old spans are floated out in their entirety and the new spans are floated in. Having the new spans constructed off-site and barged to the project allows for quick and efficient replacement of the removed span. Current projects that will incorporate this technique are: 145th Street Bridge, Borden Avenue Bridge, and Grand Street Bridge. The float-in of the new swing span of the Third Avenue Bridge was successfully performed in October 2004. The float-in of the new swing span of the 145th Street Bridge is scheduled for early February 2007. The float-in of the new east leaf of the Hamilton Avenue Bridge is scheduled for summer 2007, and the float-in of the new west leaf is scheduled for summer 2008.

THREE TUNNEL PROJECT

Rehabilitation work was completed on the Battery Park Underpass, and the Park Avenue and First Avenue tunnels in Manhattan. The contract included the rehabilitation of the mechanical and electrical systems, as well as the ventilation, fire, lighting and drainage systems. This project, (particularly the Battery Park Underpass, which was used as a route to remove debris), was greatly impacted by the World Trade Center disaster, and the subsequent default of the electrical subcontractor. The project was substantially completed in November 2005.



Looking Towards the Battery Park Underpass, and the Park Avenue and First Avenue Tunnels. (Credit: NYSDOT)



Installing the 38th Street Median for the Park Avenue Tunnel. Completed Median.



New First Avenue Tunnel Portal.

INNOVATIONS & ACCOMPLISHMENTS

BRIDGE SEISMIC DESIGN AND RETROFITTING

The seismic retrofitting of bridges in New York City is part of the inspection and rehabilitation program mandated by Congress and administrated by the FHWA through the local authorities. During the period of 1993 to 1996, four major bridge owners in the New York City area (NYCDOT, NYSDOT, MTA, and the Port Authority of New York and New Jersey) retained seismologists to study hard rock seismic ground motions. The rock motions generated by these studies differed from each other and from the AASHTO spectrum as modified by NYSDOT. The differences were such that the resulting retrofit costs varied widely, depending upon which motions were adopted. To resolve this issue, NYCDOT, in association with NYSDOT and the FHWA, retained a consultant to assemble an expert panel to develop recommendations for rock motions that would be adopted uniformly by the New York City region. The panel consisted of a team of six internationally recognized experts in the fields of seismology, geology, earthquake engineering, ground motion, and geotechnical studies. There were several brainstorming workshops held in New York, where the senior officials from NYCDOT, NYSDOT, and the FHWA provided their input to the panel members. NYCDOT also invited other city agencies to participate in the process.

The expert panel came up with definitive recommendations regarding rock motions, time histories, ground motions and bridge performance criteria to be used for critical, essential or other bridges undergoing structural analyses. The panel detail findings are described in the report entitled "New York City, Seismic Hazard Study and its Applications, Final Report, December 1998." This report is now extensively used by NYCDOT, NYSDOT, the FHWA, their consultants, and other agencies in the New York area for bridge projects. Thus, NYCDOT's leading role and efforts to establish ground motion standards have brought uniformity in seismic design to the New York City area. This will result in savings in bridge retrofit costs.

In 1997, the Division began a unique project aimed at conducting a seismic evaluation and subsequent retrofit of the Macombs Dam and 145th Street Bridges over the Harlem River. It is also intended to develop schemes for the strengthening of the unreinforced masonry piers on these movable bridges. The project's findings may be applied to other NYC bridges that have similar masonry substructures.

The 1998 Seismic Design Criteria generated by NYCDOT and adopted by all local bridge entities includes a requirement that they be revisited every 3-4 years. In 2002, a panel of seismologists prepared a report to update the existing 1998 criteria. This report was reviewed by NYCDOT, NYSDOT, FHWA, and also by a few consultants working on NYCDOT projects. A meeting was held on November 13, 2002, and was attended by NYCDOT, NYSDOT, and FHWA. It was unanimously agreed to continue to follow the existing 1998 seismic design criteria at least until the new USGS national hazard maps are finalized and incorporated in a national code.

On June 3, 2004, in a meeting attended by NYCDOT, NYSDOT and FHWA, it was unanimously agreed to adopt the new hard rock ground motions recommended by the panel of seismologists.

Data from geotechnical bridge studies performed within the five boroughs of NYC has been compiled. A series of generalized subsurface soil and bedrock profiles will now be developed to be representative of the range of soil profiles, overburden thickness, and rock types found within NYC. Free-field analyses of those profiles will be performed using the new hard rock motions. The goal is to determine possible revisions of the criteria defining soil and rock profile types, their generic amplification factors and design response spectra, for compatibility with NYC subsurface conditions. The last step in the review process will include a review of the seismic performance (bridge "survival") requirements; and establishing areas of design where revisions are necessary.

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BRIDGE CLASSIFICATION

The Coast Guard regulations, which govern the operation of the City's movable bridges, define the owner's responsibility to the mariner by classifying a bridge as "open on demand" or "open on advance notice." An "on demand" bridge provides an immediate opening to any vessel wishing to pass the bridge. An "advance notice" bridge opens after the mariner requests an opening several hours in advance. "On demand" bridges must be staffed at all times. "Advance notice" bridges are staffed only when necessary. DOT redesigned the work process in order to reduce personnel costs to the City and improve the delivery of services to the maritime community.

In October 2000, the Department implemented the United States Coast Guard-approved changes, establishing a four-hour notice for the Harlem River bridges, and a two-hour notice for the remaining "advance notice" bridges. The "on demand" classification remains for three bridges. The revised advance notice requirements allowed the formation of mobile crews with overlapping responsibilities, meeting the mariners' needs and, in some instances, improving service by providing two mobile crews to expedite a vessel's travel along a waterway.

The reduction in planned personnel will save approximately \$998,030 annually. In addition, bridge operational capabilities, general maintenance, and debris and snow removal have been enhanced through the more efficient utilization of existing personnel.

The remaining task is the conversion of the three remaining bridges to "on demand" status. This will be achieved by the replacement of the Shore Road over Hutchinson River and the Belt Parkway over Mill Basin bridges with new bridges built with higher clearances, thereby reducing the number of times the bridges must be opened. The third bridge, Hamilton Avenue, does not require a higher elevation.

INNOVATIONS & ACCOMPLISHMENTS

Summary of Vessel Openings 1992 - 2006

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Brdn Ave. (Q)	107	141	0	0	105	15	0	3	0	28	0	0	0	1	0
Brdwy (B/M)	3	10	6	7	24	7	2	0	6	27	83	49	16	2	18
Brecknr Expwy (Estrn Blvd) (B)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brecknr Expwy (Unnprt Brdg) (B)	635	554	594	431	386	363	257	345	385	420	332	300	309	253	250
Carroll St. (K)	627	669	704	432	245	142	110	174	102	80	124	186	49	22	28
Grand St. (K/Q)	549	224	254	239	189	37	23	24	17	50	19	10	8	5	2
Grnpoin Ave. (K/Q)	860	587	549	498	557	626	669	787	688	641	659	738	1093	1045	905
Hmltn Ave. (K)	1331	1300	1336	1246	1191	1157	996	982	933	832	946	824	757	677	1077
Hntrs Point Ave. (Q)	106	141	0	0	113	15	0	1	0	36	0	0	0	0	0
Htchnsn River Pkwy (B)	0	0	0	37	31	32	75	46	5	120	30	5	37	10	2
Macombs Dam (B/M)	0	0	6	5	13	3	0	0	0	0	0	0	0	0	0
Mdsn Ave. (B/M)	1	5	5	0	0	0	0	0	0	0	0	0	7	0	9
Metrpntn Ave. (K)	356	225	310	272	407	423	448	513	279	366	339	342	153	0	104
Mill Bsn (K)	879	1151	1250	954	903	628	591	433	336	317	142	173	164	162	174
Pulaski (K/Q)	426	224	239	206	195	291	332	383	276	208	308	599	694	734	433
Rsvlt Islnd (M/Q)	0	0	0	0	0	0	4	0	58	48	125	63	669	150	54
Shore Rd (Pelham Pky) (B)	1996	2138	2222	2190	2167	2158	2274	2162	2168	2222	1897	1910	2011	1683	1704
Union St. (K)	547	657	713	432	236	144	103	144	85	101	62	24	21	11	9
Ward's Islnd Pdstrn (M)	0	2	0	1	0	2	1	0	0	279	0	0	7	2	8
Willis Ave. (B/M)	6	8	18	24	17	9	0	4	4	40	0	7	25	2	41
3 rd Ave. (B/M)	1	7	19	20	18	9	0	2	1	1	0	0	0	0	6
3 rd St. (K)	549	663	732	432	256	149	112	157	178	117	212	152	99	43	31
9th St. (K)	984	927	836	0	0	0	0	192	513	808	733	547	457	360	480
145 th St. (B/M)	0	0	9	24	24	3	0	0	1	6	0	0	9	0	0
W.207 th St. (B/M)	0	1	6	4	12	7	2	0	6	14	4	6	10	1	12
TOTAL	9963	9634	9808	7454	7089	6220	5999	6352	6041	6761	6015	5935	6595	5163	5347

INNOVATIONS & ACCOMPLISHMENTS

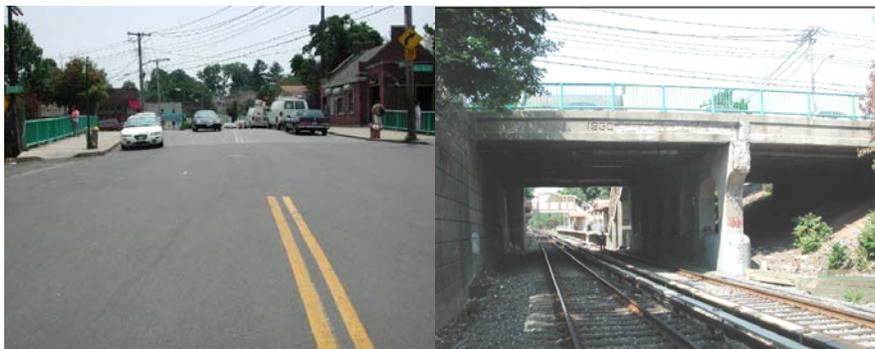
Roadway Bridges

INNOVATIONS

Innovations in the design and construction of Roadway Bridges continued in 2006. The continued use of weathered steel for bridges over railroads eliminates expensive costs involved in maintenance painting. Where feasible, the continued use of precast elements in bridge reconstruction reduces construction duration and the resulting negative impacts on the traveling public.

ANNADALE ROAD BRIDGE OVER SIRT SOUTH SHORE (STATEN ISLAND)

This project will replace the existing two span bridge with a single span bridge, including the removal of the existing pier, the replacement of the existing north abutment and the rehabilitation of the existing south abutment. In addition, the work will include removal and replacement of the existing concrete deck, sidewalks and curbs, and the replacement of the existing bridge railing system. The bridge will be replaced in three stages. One lane in each direction will be open to traffic at all times during construction. Pedestrian traffic will be maintained by the use of a temporary pedestrian bridge. Construction is expected to begin in May 2007 and is expected to be completed in August 2009.



Annadale Road Bridge in 2001. (Credit: NYSDOT)

BELT PARKWAY BRIDGES OVER FRESH CREEK, GERRITSEN INLET, PAERDEGAT BASIN, ROCKAWAY PARKWAY, NOSTRAND AVENUE, BAY RIDGE AVENUE, AND MILL BASIN (BROOKLYN)

On a New York State-mandated scale from 1 to 7, these seven bridges possess a condition rating of “fair” (3.001 – 4.999). In 2006, the Fresh Creek Bridge was 3.26; the Gerritsen Inlet Bridge was 3.60; the Paerdegat Basin Bridge was 3.22; the Rockaway Parkway Bridge was 4.06; the Nostrand Avenue Bridge was 4.10; the Bay Ridge Avenue Bridge was 3.31; and the Mill Basin Bridge was 3.10. While none of the bridges are in any immediate danger of structural failure, their reconstruction is required in order to maintain mobility and public safety on this vital artery.

Under the Department’s current proposal, the existing 5 span, 264.5 foot Fresh Creek Bridge will be replaced with a new 3 span, 309-foot bridge; the existing 11 span, 520-foot Gerritsen Inlet Bridge will be replaced with a new 3 span, 496-foot bridge; the existing 4 span, 150-foot Rockaway Parkway Bridge will be replaced with a new single span 95-foot bridge; the existing 3 span 140-foot Nostrand Avenue Bridge will be replaced with a new single span 98-foot bridge;

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and the existing single span 58-foot Bay Ridge Avenue Bridge will be replaced with a new single span, 58-foot bridge. The stopping sight distance for the bridge and approach roadways will be improved except for the Bay Ridge Avenue Bridge, where improvement is not needed.

The reconstruction of the Fresh Creek Bridge, currently in its final design phase, is scheduled to start in 2007, and will last for approximately 3 years. The bridge and the approach roadways will be constructed in four stages, while maintaining three traffic lanes in each direction and a bike path on the eastbound side during construction.

The reconstruction of the Gerritsen Inlet Bridge, currently in its final design phase, is scheduled to start in 2009, and will last for approximately 4 years. The bridge and the approach roadways will be constructed in four stages, while maintaining three traffic lanes in each direction and a bike/pedestrian path on the eastbound side during construction.

The reconstruction of the Rockaway Parkway Bridge, currently in its final design phase, is scheduled to start in 2007, and will last for approximately 3 years. The bridge and the approach roadways will be constructed in five stages, while maintaining three traffic lanes in each direction during construction.

The reconstruction of the Nostrand Avenue Bridge, currently in its final design phase, is scheduled to start in 2009, and will last for approximately 2½ years. The bridge and the approach roadways will be constructed in five stages, while maintaining three traffic lanes in each direction during construction.

The reconstruction of the Bay Ridge Avenue Bridge, currently in its final design phase, is scheduled to start in 2009, and will last for approximately 1½ years. The bridge will be constructed in five stages, while maintaining three traffic lanes eastbound and two traffic lanes westbound during Stage I, and two traffic lanes in both directions during Stages II, III, IV, and V during construction.



Fresh Creek, Gerritsen Inlet & Bay Ridge Avenue Bridges in 2002. (Credit: NYSDOT)



Rockaway Parkway & Nostrand Avenue Bridges in 2002. (Credit: NYSDOT)

The Paerdegat Basin Bridge will be replaced by a new split bridge. It will be constructed on a new off-line alignment conforming to current standards. The new bridge will be within the right-of-way of the parkway. This project is scheduled to begin construction in 2007, and to last for approximately four years.

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Paerdegat Basin Bridge. Mill Basin Bridge.

When the Mill Basin Bridge was constructed during the first half of the 20th century, New York City's inland waterways were among the most heavily navigated thoroughfares in the country. However, as maritime traffic in New York City steadily decreased since the mid-1960s, the need for movable bridges lessened as well. In 1941, during its first full year of operation, the Mill Basin Bridge was opened 3,100 times; by 1953, that figure decreased to 2,173; by 2006, the number of openings declined further to a total of only 174 openings.

In addition, significant and costly traffic congestion results from the operation of this outmoded drawbridge. In 2005, the Mill Basin Bridge carried 143,158 vehicles per day. The average opening and closing time for the bridge (and others like it) is ten minutes. Thus, this structure's operation has a negative and significant effect on the efficiency of New York City's vehicular traffic flow.

The existing bridge is a 14 span structure, consisting of a double leaf steel bascule span. The substructure is made of reinforced concrete abutments and piers supported on precast concrete or timber piles.

Under the Department's current proposal, the Mill Basin Bridge will be replaced with a new, 15 span, high-level, fixed bridge with a composite steel superstructure and reinforced concrete substructure on pile footings. The bridge will be constructed next to the existing structure so as to maintain traffic during the construction period. It will feature three lanes of vehicular traffic, as well as a 12-foot wide shoulder in each direction. A new sidewalk/bicycleway will also be constructed on the eastbound portion of the structure, and the stopping sight distance for the bridge and approach roadway will be improved.

Currently in its final design phase, the reconstruction of the Mill Basin Bridge is scheduled to start in 2011, and to last approximately 4 years. The new bridge will be constructed off-line while maintaining three traffic lanes in each direction and a bike/pedestrian path on the eastbound side of the existing bridge during construction. The existing bridge will be demolished after the new bridge is fully opened to vehicular traffic.

A computerized traffic simulation model is under development in connection with the Division's plans to reconstruct seven bridges on the Belt Parkway. This model will serve as a useful tool to establish the impact of construction on the traveling public and to help determine appropriate construction schedules. In addition, it will enable us to rapidly evaluate the impact of a variety of combinations of construction staging. The final schedule of construction for these bridges will depend on the outcome of the traffic simulation model analysis.

BROOKLYN-QUEENS EXPRESSWAY (WB) & (EB) OVER CADMAN PLAZA AND FULTON STREET (BROOKLYN)

The Brooklyn-Queens Expressway over Cadman Plaza and Old Fulton Street, oriented East to West, and located just west of the Brooklyn Bridge, consists of two separate two-span superstructures founded on concrete abutments and piers sharing a common footing on H piles.

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The bridge was constructed in 1948.

The westbound side is a two-span continuous steel stringer, concrete deck superstructure supported by concrete abutments and a solid concrete center pier. The stringers are supported by fixed bearings at the center pier and with expansion bearings at the abutments. The bridge deck is a reinforced concrete slab overlaid with an asphalt wearing surface.

The eastbound side is a two span continuous steel rigid frame structure of built-up riveted girders. The girders are concrete-encased and rigidly framed into the framing at both abutments and center pier. The existing railings are substandard, and the granite veneer on the substructures has been removed from both of the abutment stems and the south side wing walls.



BQE Bridge Over Cadman Plaza in 2002 – Upper Level is Eastbound, Lower Level is Westbound.
(Credit: NYSDOT)

The project will include removing the existing wearing surface, demolishing and removing the existing bridge railings, safety walks, concrete deck, deck expansion joints, concrete approach slabs, and the top portion of existing abutment and pier stems. Construction will include new top portions for the abutment stems and pier caps, new abutment expansion bearings and pier fixed bearings, new shear stud connectors on top flanges at existing stringers, new exodermic deck on steel stringers, new approach slabs, half-size permanent concrete barriers at both fascias, new deck plug joints, a new wearing surface, and a new waterproof membrane over the concrete deck surface.

The project is currently in its final design phase. Construction is expected to begin in August 2007, and is expected to be complete in August 2008.

BROOKLYN-QUEENS EXPRESSWAY (WB) OVER FURMAN STREET & BROOKLYN-QUEENS EXPRESSWAY (EB) OVER BROOKLYN-QUEENS EXPRESSWAY (WB) (BROOKLYN)

A Notice to Proceed for the \$1.1 million project to reconstruct the transverse expansion joints on the Brooklyn-Queens Expressway (BQE) in Brooklyn Heights between Orange and Joralemon Streets was issued to the contractor with a start date of May 3, 2004. The first (lower) cantilevered level carries the westbound vehicular traffic. The second (intermediate) cantilevered level carries the eastbound vehicular traffic, and the third (top) cantilevered level supports the Brooklyn Heights promenade.

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BQE Bridge in 2003 – Upper Level is Eastbound, Lower Level is Westbound. (Credit: NYSDOT)

This section of the BQE was originally constructed approximately 50 years ago and due to the aging process, the original joint material was no longer capable of preventing water from infiltrating the structural concrete. If this situation were to continue unabated, the concrete would have become severely damaged due to the water's freeze/thaw action and its corrosive effect on the reinforcing steel. Installing new joint material reestablished the watertight seals while allowing for the necessary expansion of the superstructure, thus extending the useful life of the structural concrete that supports the westbound and eastbound roadways of the BQE. There are a total of 100 joints; 50 joints on the first cantilevered level, and 50 joints on the second cantilevered level within the project limits. Each joint is 33½ feet in length for a total 3,350 feet of joint replacement. The work was performed only during the nighttime hours of 12:01 AM to 5:00 AM under two lane closures, with the third lane open to traffic. At all other times, all three lanes in both the westbound and eastbound directions were open to traffic. The eastbound cantilevered level was completed in November 2004. Work on the westbound cantilevered level resumed in spring 2006. The project was substantially completed on November 16, 2006.



Working on The Transverse Expansion Joints.



Finishing and Inspecting the Repairs.

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CITY ISLAND ROAD BRIDGE OVER EASTCHESTER BAY (BRONX)

The existing City Island Road Bridge was built in 1901 and is the only vehicular, bicycle and pedestrian access between the mainland Bronx and City Island. The bridge is part of City Island Road, which is located within Pelham Bay Park and crosses over Eastchester Bay. With seven spans and six piers in the water, the bridge has outlived its useful life and requires extensive continuous maintenance.



Original Bridge in 1873.

The existing bridge will be replaced along the same alignment with a new single span, single tower cable-stayed bridge which will be a unique structure type in the NYC area. The new bridge will be approximately 17 feet wider than the existing one to accommodate three standard 12-foot wide traffic lanes, a 6-foot wide bicycle lane and a 6-foot wide pedestrian walkway on each side. The tower and concrete counterweight for backstay anchorage of the new bridge will be located in Pelham Bay Park. The new bridge will be designed to current standards and with its wider roadway width, will allow future repair and rehabilitation to be carried out while maintaining one 12-foot lane in each direction. In order to maintain traffic during the demolition of the existing bridge and construction of the new bridge, a temporary bridge will be constructed on the south side of the existing bridge.



City Island Road Bridge. Vertical Clearance Posting. (Credit: NYSDOT)

The construction phase for this project is scheduled to begin in fall 2008 with an approximate duration of 3 years.

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Rendering of New City Island Road Bridge.

CLAREMONT PARKWAY BRIDGE OVER METRO NORTH RR (BRONX)

The Claremont Parkway Bridge was built in 1889, with major reconstruction in 1938. This project, currently in its final design phase, will include removal of the entire superstructure and approaches. The new bridge will consist of pre-stressed concrete box beams supporting a reinforced concrete deck and approach slab, concrete sidewalks and reinforced concrete parapet walls with protective fencing, and reconstructed approach roadways. A portion of both existing abutments will be removed to accommodate the new bridge profile. The utility work will include the installation of two new water mains, a gas main, and electrical conduits. The bridge will be constructed in four stages, with one traffic lane open in each direction at all times during construction. Construction is expected to begin in October 2007, and is expected to be complete by April 2009.



Claremont Parkway Bridge. (Credit: NYSDOT)

CONCOURSE VILLAGE AVENUE BRIDGE OVER METRO NORTH (BRONX)

This project will include demolishing the existing bridge deck, removing loose encasement on the structural members, localized steel repairs, and restoring the encasement. A new concrete deck will be installed, and new approach slabs, an east parapet, steel faced curbs, and concrete sidewalks will be built. The existing granite blocks will be repointed as necessary. The bridge will be reconstructed in four stages, with one 4.3 meter wide southbound lane maintained during construction. Construction is expected to begin in October 2010, and is expected to be complete in April 2012.

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Concourse Village Avenue Bridge. (Credit: NYSDOT)

CONGRESS STREET BRIDGE OVER BROOKLYN-QUEENS EXPRESSWAY, AND LINCOLN ROAD BRIDGE OVER BMT SUBWAY (BROOKLYN)

A Notice to Proceed for the reconstruction of these bridges was issued to the contractor with a start date of April 26, 2004. The project originally contained three bridges, but the Seeley Street Bridge was removed from the contract in September 2004.

The existing Congress Street Bridge was a two span structure over the Brooklyn-Queens Expressway (BQE). The major substandard feature of the bridge was its vertical clearance over the BQE. There was evidence of vehicular impacts on the bridge superstructure. The rehabilitation included reconstructing a new bridge superstructure with high strength steel that added 12 inches of additional vertical clearance. Epoxy coated reinforcement was used for concrete deck reinforcement, and the bridge substructure was rehabilitated to conform to seismic requirements. The reconstruction of this bridge was accomplished in two stages. The existing bridge carried one-way east bound traffic, which was maintained for the duration of the construction. The reconstruction involved BQE lane closures at certain times. Traffic Enforcement Agents were posted for the duration of the BQE lane closures to ensure the smooth flow of traffic. The Congress Street Bridge was substantially completed on August 5, 2005, some two months ahead of schedule.

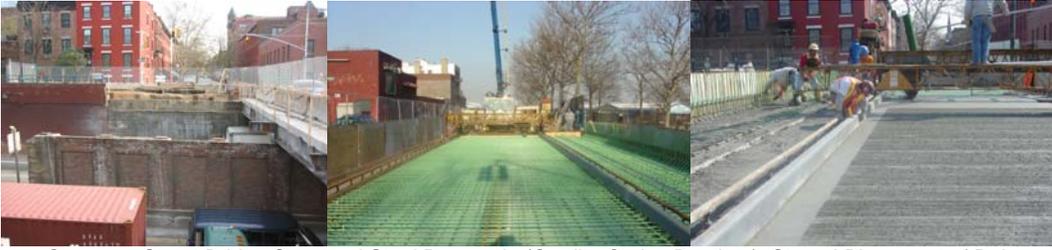


Old Congress Street Bridge. Bridge Deck Demolition. (Demolition Credit: Carlos Ramirez)



Congress Street Bridge Deck Demolition and Structural Steel Removal. (Credit: Carlos Ramirez)

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Congress Street Bridge Structural Steel Removal. (Credit: Carlos Ramirez) Stage I Placement of Rebar for Concrete. Concrete Placement for Deck Slab.



Completed Congress Street Bridge.

The Lincoln Road Bridge project included a replacement of a water trunk main under the railroad track which was within the limits of the bridge reconstruction. The replacement of the water trunk main was funded by NYCDEP. The existing bridge was a four span structure with a steel pier bent and reinforced concrete abutments. The bridge spans over NYCTA Brighton Beach line. The rehabilitation included removal of the existing bridge in its entirety and the construction of a new bridge. The new bridge is a single span flexible type integral abutment bridge built compositely with a steel stringer and a concrete deck. The project work was accomplished in three stages. The water trunk main was replaced during the first stage. Effective May 19, 2005, the bridge was fully closed to traffic, as agreed to by the community, in order to shorten the construction duration by 11 months. The Lincoln Street Bridge was substantially completed on June 20, 2006.



Lincoln Road Bridge in 2003. (Credit: NYSDOT) Bridge Fully Closed to Traffic in May 2005. Pier Piling Operation in July 2005.



Placing Stay-in-Place Forms for The Lincoln Road Bridge Concrete Deck in March 2006. Concrete Placement for The Deck Slab in April 2006. Placing Fresh Asphalt in May 2006.

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Completed Lincoln Road Bridge.

CROOKE AVENUE AND NEWKIRK AVENUE BRIDGES OVER BMT SUBWAY (BROOKLYN)

The existing four span Crooke Avenue Bridge was constructed in 1916. A recent inspection revealed significant deterioration of the superstructure. This project, currently in its final design phase, will include removal of the superstructure in the right of way only, approaches and two piers. The new single span bridge will consist of pre-stressed concrete box beams supporting a reinforced deck and approach slabs, concrete sidewalks, reinforced parapet walls with protective fencing and reconstructed approach roadways. The top portion of the abutments will be removed and reconstructed. The utilities will be relocated within project limits. The new bridge will also meet current NYCT sight distance and horizontal clearance standards. The bridge will be constructed in two stages, with one vehicle lane and one sidewalk maintained. Construction is expected to begin in November 2007, and is expected to be complete in April 2009.

The Newkirk Avenue Bridge is a three span structure between East 16th Street and Marlborough Road. This project, currently in its final design stage, will include the removal of the entire superstructure, including pier caps, girders, deck slabs and approaches. The new three span bridge will consist of steel stringers and light weight concrete deck. The exterior and middle columns will be replaced with new steel columns. The existing steel caps on the steel pier columns will be replaced. The top portion of the abutments will be removed and reconstructed. New utilities will be installed. Pedestrian access to the Newkirk Avenue station will be maintained during the three stage construction. During Stage III of construction the bridge will be closed to vehicular traffic. Construction is expected to begin in November 2007, and is expected to be complete in May 2009.



Crooke & Newkirk Avenue Bridges. (Credit: NYSDOT)

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GRAND CONCOURSE BRIDGE OVER EAST 161ST STREET (BRONX)

This \$52 million project will include the rehabilitation of the Lou Gehrig Plaza and the reconstruction of the Grand Concourse from East 161st Street to East 166th Street, as well as landscaping improvements. In addition, artwork will be included under the Percent For Art Program administered by the Department of Cultural Affairs. The underpass and its approaches will be closed to traffic during the Yankees' off-season only. The reconstruction will be completed in 14 stages with two traffic lanes in each direction maintained at the Grand Concourse. A Notice to Proceed for the project was issued to the contractor with a start date of January 3, 2006. Construction of the west side of the Grand Concourse was nearly complete by the end of 2006. The reconstruction project is expected to be complete by September 2009.



Grand Concourse Bridge over East 161st Street. View of West Portal. Existing Lou Gehrig Plaza.



Rendering of New Lou Gehrig Plaza. Existing Grand Concourse. Rendering of New Grand Concourse.

Soil boring operations began on January 3, 2006, and were completed on January 6, 2006. Stage I reconstruction of the bridge began on March 27, 2006. Stage IB reconstruction of the bridge began on June 21, 2006.



Transporting Trees From East Median for Replanting. Uncovering Live ECS Cables Above Tunnel Roof Before Bridge Demolition. Excavation for Replacement of Sewer Pipes.

Stage II reconstruction of the bridge began on October 26, 2006. The underpass was closed to traffic as part of this stage, which will be in place through April 1, 2007.

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Demolition of the Bridge. Removing Concrete at the Springline of the South Abutment Stem. Formwork and Concrete Placement at South Abutment.

Installation of precast panels began in the intersection of the Grand Concourse and 161st Street on December 19, 2006.



Installing the Precast Panels.

GUN HILL ROAD BRIDGE OVER METRO NORTH RR (BRONX)

The existing Gun Hill Road Bridge was constructed in 1918. A recent inspection by the Division revealed that the superstructure of the bridge has outlived its useful service life. The effects of age and weather have rendered reconstruction necessary. This project will include the removal of the existing superstructure and the top portion of the existing concrete abutments, and the construction of new approach slabs, roadway, and sidewalks. The work will also include replacing the water and gas mains, as well as other utilities, erecting new steel girders, installing new utility supports, placement of a new reinforced concrete deck, and constructing new concrete parapets with pedestrian fencing. The bridge will be reconstructed in three stages, with two lanes of traffic maintained during construction. A Notice to Proceed for the \$7.4 million reconstruction of this bridge was issued to the contractor with a start date of December 1, 2004.



Gun Hill Road Bridge in 2002. (Credit: NYSDOT) 2005: View of Bridge at the MPT Stage. Demolition of the Existing Bridge Deck. (Deck Credit: Muhammad Siddiqui)

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2005: Project Engineer Muhammad Siddiqui Inspecting the Stay-in-Place Formwork for the New Gun Hill Road Bridge Deck. Installing Deck Reinforcement. Concrete Placement.

Effective March 9, 2005, the southbound off ramp of the Bronx River Parkway at Gun Hill Road was closed to traffic for a three year duration. Stage II reconstruction of the bridge began on November 3, 2005. At the end of 2006, the project was in Stage III which consists of the reconstruction of the northern 1/3 of the bridge. Construction is expected to be complete in November 2007.



January 2006: Stage 2 Construction Zone, South Side of Bridge. March 2006: Looking West From The East Abutment at The Utility Supports for The Gas mains. July 2006: Stage 2 Construction Zone, Prior to Girder Removal.



July 2006: Looking East - Placing Concrete for The east Abutment Backwall and a Quality Assurance Engineer Inspecting The Work. September 2006: Stage 2 Construction Zone, Placing Concrete for The Deck.

INSPECTION OF THE HIGH BRIDGE PEDESTRIAN BRIDGE OVER THE HARLEM RIVER (BRONX/MANHATTAN)

In support of the Department of Parks and Recreation (DPR), the Division prepared a detailed scope of work for the comprehensive in-depth inspection of this eleven span landmark structure, the oldest (circa 1848) bridge over the Harlem River. The bridge is under DPR's jurisdiction.

A Notice to Proceed was issued to the contractor with a start date of July 18, 2002. Engineering consultants conducted this inspection, which was completed in the summer of 2006, at an estimated cost of \$2.5 million. The Division administered and supervised this work.

The resultant report was furnished to DPR to pursue rehabilitation of the structure. Its goal is to open the historic promenade level for public use by pedestrians and cyclists and, once again, link the Bronx and Manhattan portions of High Bridge Park. The final condition assessment report was distributed on September 8, 2006.

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High Bridge Pedestrian Bridge. (Credit: Michele N. Vulcan)



State Assemblymember Adriano Espaillat, DEP Commissioner Emily Lloyd, Congressman José Serrano, DPR Commissioner Adrian Benepe, and DOT Commissioner Iris Weinshall on the Bridge at the November 2006 Announcement of the Completion of the Study.

HILL DRIVE BRIDGE OVER PROSPECT PARK LAKE (BROOKLYN)

The landmark Hill Drive Bridge was built in 1890. The existing bridge is a three span simply supported steel girder/beam structure, with the center arch span crossing Prospect Park Lake, and the other two spans consisting of masonry cellular structures with multiple interior masonry-bearing walls and non-composite concrete deck and concrete sidewalk. The substructure of the bridge consists of solid gravity abutments with U-type wing walls and piers.

This project will include the replacement of the existing masonry cellular abutments with new reinforced concrete abutments clad with existing stone and new brick masonry; the removal, storage, and reinstallation of the existing stone wing walls with a new reinforced concrete core; the replacement of the existing stringers and floor beams with new steel stringers; the supplementation of the existing arch girders with new cover plates; the reinstallation of the steel arch girders at their current locations to replicate original construction; and the replacement of the existing masonry arches spanning between floor beams by masonry cladding on the underside of the new arched concrete deck. The concrete deck, approaches, sidewalk, and roadway will be replaced within the project limits.

The ornamental cast iron and stones will be rehabilitated and reinstalled, replicating all the historic features and aesthetics of the original bridge. New bridge lighting and drainage systems will be installed. The park landscape will be restored, and trees identified by the Prospect Park Alliance as rare and/or historic shall remain undisturbed during construction.

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The project is currently in its final design phase. Construction is expected to begin in June 2007, and is expected to be complete in 2009.



Hill Drive Bridge in 2001. (Credit: NYSDOT)

MANHATTAN COLLEGE PARKWAY, WEST 232ND STREET, WEST 239TH STREET, AND WEST 252ND STREET BRIDGES OVER HENRY HUDSON PARKWAY (BRONX)

This \$6.6 million project will reconstruct four bridges over the Henry Hudson Parkway. A Notice to Proceed was issued to the contractor with a start date of February 23, 2004. The reconstruction of the West 239th Street and West 252nd Street Bridges commenced after the substantial completion of the Manhattan College Parkway and West 232nd Street Bridges. Work on the Manhattan College Parkway, West 232nd Street, and West 239th Street Bridges included the demolition and removal of the existing pavement and roadway slab down to the concrete arch of each bridge, and replacing it with a new deck on a protected membrane waterproofing system. In addition, the reconstruction of these bridges included drainage, repointing the existing stone masonry, new signage and pavement markings, improving the under deck lighting systems, and private utility work.



Manhattan College & West 232nd Street Bridges in 2001. (Credit: NYSDOT)
West 239th Street Bridge in 2001 & West 252nd Street Bridge in 2002.
(Credit: NYSDOT)

On West 232nd Street, the work was completed in three stages, with one lane of vehicular traffic maintained in each direction during construction. On Manhattan College Parkway, the work was

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also completed in three stages, with one lane of vehicular traffic maintained in the westbound direction during construction.

The West 232nd Street Bridge re-opened to traffic on August 20, 2004, some three months ahead of schedule. The Manhattan College Parkway Bridge re-opened to traffic on October 29, 2004, some six weeks ahead of schedule. The reconstruction of the Manhattan College Parkway and West 232nd Street Bridges was substantially completed on September 28, 2006.



Old Fence on the Manhattan College Parkway Bridge. Newly Installed Picket Fence.



Manhattan College Parkway Bridge Deck During Construction. Completed Bridge.



Old Fence on the West 232nd Street Bridge. Deck During Construction. Completed Bridge.

On West 239th Street, the work was completed in three stages, with one lane of vehicular traffic maintained in the each direction during construction. Stage I reconstruction (northern half) of the bridge began on April 25, 2005. Stage II reconstruction began on September 22, 2005. The bridge re-opened to traffic on April 20, 2006. The reconstruction of the West 239th Street Bridge was substantially completed on December 5, 2006.

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West 239th Street Bridge Before Reconstruction. During Construction. Installing the New Picket Fence.



Newly Installed Steel-Backed Timber Guide Rail at West 239th Street Bridge. Completed Bridge.

Work on the West 252nd Street Bridge will include the demolition of the existing concrete arch bridge deck, and replacing it with a new prestressed concrete box beam superstructure. In addition, the reconstruction of this bridge will include installing a new 300 mm diameter water main, improving the under deck lighting systems, private utility work, partial removal of the pier and abutments, new roadway lighting, and adjustment of the existing drain inlets, manholes, and catch basins. The work will be completed in four stages, with one lane of vehicular traffic maintained in the eastbound direction during construction. The work on this bridge began on January 3, 2006.



West 252nd Street Bridge Before Reconstruction.

The removal of the existing bridge sections over the northbound Henry Hudson Parkway was performed at night on October 25 and 26, 2006. The removal of the sections over the southbound Henry Hudson Parkway was performed at night on October 31 and November 1, 2006.

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Wire Sawing the Deck and Removing the Existing Bridge Sections Over the Parkway.



West 252nd Street Bridge Formwork and Rebar Fabrication at the Pier and West Abutment.
Concrete Placement in Progress.

At the end of 2006, the demolition of the north half of the bridge was nearly complete. The four bridge project is expected to be complete in January 2008.

MARINE BORER REMEDIATION (MANHATTAN & BROOKLYN)

Marine borers pose an immediate and serious danger to the thousands of piles and other structures of timber built in the marine environment. In New York Harbor, as the water quality improved due to many years of clean up efforts, marine borer (limnoria, teredo, etc.) activity has increased significantly in recent years. The recent inspections of timber structures by various local agencies (such as The Port Authority of NY & NJ, NYS Department of Transportation, NYC Department of Sanitation, and NYC Economic Development Corporation) indicate increasing damage to their structures resulting from marine borer activity. These agencies are implementing measures to protect the structures against marine borers.

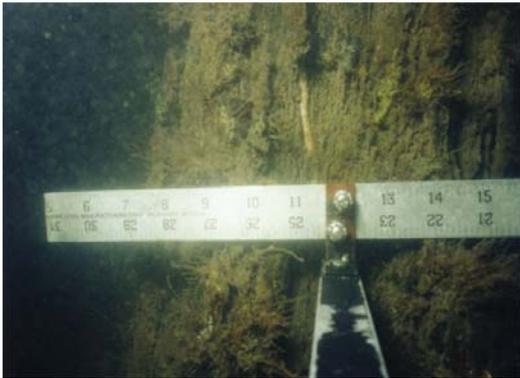
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Marine Borer – Limnoria Species



Marine Borer – Teredo Species



Medium Limnoria Infestation



Teredo Damage (holes up to ¼" diameter)

In October 1999, the Department began a study to assess the existing damage caused by marine borers as well as the potential for future damage at several waterfront DOT structures, including the supporting structures of the relieving platforms along the FDR and Harlem River Drives, and the timber piles and structures of the Carroll Street and Ocean Avenue bridges in Brooklyn. The underwater inspection of timber piles supporting the FDR Drive began on May 8, 2000. Inspection of the Brooklyn sites was conducted during the week of October 23, 2000. The inspections were completed in October 2000, and the Marine Borer Evaluation Report was published in June 2001. Using the results of the underwater inspections, preliminary plans were developed for the implementation of repairs and remediation measures to protect the structures from attack. These preliminary plans were completed in December 2001. The final design is in progress, and will include plans to mitigate the impact of construction on the bodies of water. The construction work is expected to commence in 2008.

SHORE ROAD CIRCLE BRIDGE OVER AMTRAK (BRONX)

This project will include the removal of the existing two span bridge and the construction of a new single span bridge structure with a reinforced concrete deck over steel girders. The work will also include the construction of new reinforced concrete abutments and wing walls, as well as new parapet walls with protective steel fences. The bridge will be reconstructed in three stages, with one lane of traffic maintained in each direction during construction. Construction is expected to begin in June 2007, and is expected to be complete in December 2008.

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Shore Road Circle Bridge in 2003. (Credit: NYSDOT)

STEINWAY STREET BRIDGES OVER GRAND CENTRAL PARKWAY WB & EB (BROOKLYN-QUEENS EXPRESSWAY) (QUEENS)

This \$16 million project will replace two bridges, originally built in 1937, that connect over the Grand Central Parkway. A Notice to Proceed for the reconstruction of these bridges was issued to the contractor with a start date of July 1, 2002.



Steinway Street Bridges in 2002. (Credit: NYSDOT)

The contract provides for several NYPD Traffic Agents to maintain the flow of traffic at the Steinway Street intersections affected by the bridge for the duration of the replacement. Variable Message Signs (VMS) will be utilized to advise motorists of impending nightly lane closures on the Grand Central Parkway.

During 2004, the contractor completed all pre-stage construction activities and commenced Stage I construction activities. On July 23, 2004, during the demolition process to remove the first one-third of the existing bridge in preparation for installing the new bridge components, a portion of the existing north bridge collapsed onto the westbound roadway of the Grand Central Parkway. In a coordinated emergency effort by the NYPD, NYCFD, NYCDOT and the contractor, the Grand Central Parkway was completely closed for a period of twenty hours during which time the first one-third of the existing bridges' superstructures over the eastbound and westbound Grand Central Parkway was removed and carted away from the construction site.

In the interim period between August 2004 and December 2004 and as a precautionary measure, a decision was made by the Department to completely close the remaining two-thirds of the existing bridges to both vehicular and pedestrian traffic. As a result, traffic detour routes along north and south Astoria Boulevard were established with appropriate placement of signs, barricades and traffic control devices in an effort to facilitate the movement of traffic through the construction zone. NYPD Traffic Enforcement Agents were along deployed at critical location along the detour routes to assist in the smooth flow of traffic around the construction zone.

Also during this period a decision was made by the Department to have the contractor install temporary vehicular bridges capable of carrying the Standard HS 20 Highway Loading (with a

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provision for a pedestrian walkway) in the location where the first one-third of the existing bridges were removed. These temporary bridges were utilized to carry two lanes of traffic along the northbound direction on Steinway Street over the Grand Central Parkway and resulted in the elimination of the northbound detour route that was established when the bridges were closed to traffic in July 2004.

The design and construction of these temporary bridges began in September 2004. The bridges were opened to two lanes of northbound traffic, as well as pedestrians, on January 10, 2005.



2004: Erection of the South Temporary Bridge.



2004: Erection of the North Temporary Bridge.



Temporary Bridges in Place in December 2004. Opening of the Temporary Bridges.



Aerial View of Steinway Street in January 2005.

The original contractor was defaulted by the City in March 2005. The surety then took over the responsibility for completing all of the remaining construction work, and, with the concurrence of the Agency, selected a replacement contractor. The new contractor re-started construction activities at the project site in September 2005.

INNOVATIONS & ACCOMPLISHMENTS



2005: Utility Workers Excavating a Trench In Order to Deactivate the Feeder Cables in the Manholes Along Steinway Street. Driving a Sleeve for the Installation of Piles at the Center Fill Area.



2005: Preparing to Install Piles at the Southern End of the South Bridge. Removing the Utility Conduit Pipes From the Western Side of the Steinway Street Bridges.

The bridge will be constructed in two stages. In the first stage, the remaining two-thirds of the bridges was demolished and reconstructed.



2006: Demolition of the Existing Structure. Steel Erection Over the Grand Central Parkway.



Steel Erection Over the Grand Central Parkway.

INNOVATIONS & ACCOMPLISHMENTS



Concrete Placement of Abutment Wall. Inspecting the South Bridge Deck Placement.

This bridge structure was opened to pedestrian and vehicular traffic on October 26, 2006, five days ahead of schedule, earning the contractor the full acceleration payment of \$132,000. All traffic was then shifted to the newly reconstructed portion, which carries two lanes of vehicular traffic in each direction, as well as a pedestrian walkway. The traffic routes along north and south Astoria Boulevard were restored to their regular pattern on October 30, 2006. In the second stage the final one-third will be rebuilt after removal of the temporary bridges in early 2007. The project is scheduled for completion in October 2007.



Two-Thirds Bridge Structure Open to Traffic in October 2006. Restored Traffic Route Along Astoria Boulevard.

WESTCHESTER AVENUE BRIDGE OVER THE HUTCHINSON RIVER PARKWAY (BRONX)

This two span bridge supports a transit structure overhead and has substandard clearance over the highway below. In 2006, 10 unauthorized overheight vehicles struck the bridge's girders. A project to install an ITS solution, which includes an overheight vehicle detection system that flashes signs directing vehicles identified as being over 9' in height to exit the parkway, was substantially completed on December 3, 2004. It also includes cameras that are activated by acoustics and that will document future damage to the bridge as well as the offending vehicles' descriptions and plate numbers for recoupment of costs by the City. The contractor completed extra work associated with landscaping in the spring of 2006. A separate project is underway to reconstruct the bridge and lower the Parkway.

The early warning system is installed at strategic locations along the Hutchinson River Parkway north and south of the Westchester Avenue Bridge. This electronic sensor device uses a laser beam that scans horizontally at a predetermined height (9 feet for southbound and 10 feet for northbound). Once an over-height vehicle is detected by the sensor device, it then sends a signal to two successive variable message signs (i.e., warning and exit) to alert the driver to exit the parkway prior to the Westchester Avenue Bridge. In addition, ground mounted stationary signs are also installed to aid the electronic warning system.

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If the over-height vehicle continues and hits the Westchester Avenue Bridge, a Bridge Damage Surveillance System (BDSS) installed on the bridge structure obtains records of the incident. The system consists of acoustic sensors that are installed at the lowest part of the bridge structure, infrared video cameras, and an on-site computer system. If an impact on the steel structure is detected by the acoustic sensors, the video information (i.e., license plate and side view images of the over-height vehicle) is stored into the system computer for analysis and evaluation by DOT.



Westchester Avenue Bridge in 2001. (Credit: NYSDOT) Overheight Sensor Unit on the Hutchinson River Parkway. (Credit: Roly Parroco)



New Vehicle Detection System



Video Stills From the Westchester Avenue Bridge BDSS.

The Westchester Avenue Bridge's vertical clearance over the Hutchinson River Parkway is sub-standard. Due to the number of truck and bus vehicles that mistakenly enter the Hutchinson River Parkway, where commercial vehicles are not allowed, the fascia steel girders of the bridge have been severely impacted and damaged numerous times. The planned lowering of the parkway will make it possible to eliminate the existing sub-standard vertical clearance of the bridge over the parkway without adversely impacting the NYCT elevated structure and its transit train operations. The total length for the lowering of the parkway will be 1000 feet (north and south), with a maximum lowering of the parkway of 2.5 feet under the Westchester Avenue Bridge.

INNOVATIONS & ACCOMPLISHMENTS

The rehabilitation of the bridge will include the replacement of the existing reinforced concrete deck slab with a new reinforced concrete deck, steel faced curbs, a new parapet wall and protective screenings, concrete sidewalks, rehabilitation of the damaged steel fascia girders, and replacement of the diaphragms and other bridge elements, including a new steel water main.

This rehabilitation project is currently in final design. Construction is expected to begin in December 2008, and is expected to be complete in September 2011.

WOODSIDE AVENUE OVER LIRR (QUEENS)

This project, currently in its final design phase, will include the removal of the existing three span bridge and the construction of a new single span structure. The superstructure and abutments will be completely redesigned to comply with current seismic requirements. The bridge will be reconstructed in six stages. Construction is expected to begin in September 2010, and is expected to be complete by September 2012.



Woodside Avenue Bridge. (Credit: NYSDOT)

EAST 8TH STREET ACCESS RAMP OVER BELT PARKWAY (BROOKLYN)

The East 8th Street access ramp provides vehicular access to the westbound Belt Parkway from Coney Island Avenue and the surrounding area, south of the Belt Parkway. The bridge also serves pedestrian traffic crossing the Belt Parkway. The bridge is a four span, simply supported, multi-girder steel superstructure with a reinforced concrete deck. The abutments and wingwalls are also reinforced concrete, as are the three piers. The entire substructure is supported on reinforced concrete pile caps and steel piles. The project will include the replacement of the superstructure with new steel stringers, a cast-in-place deck including a new sidewalk, a new steel bridge railing with protective screen fencing, and the replacement of the tops of the existing pier columns and abutments. In addition, the piers will be modified by adding two columns on new steel piles, and underdeck and ramp lighting will be installed, as well as new catch basin frames. The ramp will be closed to both vehicular and pedestrian traffic for the duration of the reconstruction. Traffic will be diverted to local streets. Construction is expected to begin in October 2007, and is expected to be complete in June 2009.

INNOVATIONS & ACCOMPLISHMENTS



East 8th Street Bridge in 2002. (Credit: NYSDOT)

15TH AVENUE, 18TH AVENUE, 17TH AVENUE, AND 20TH AVENUE BRIDGES OVER NYCT (BROOKLYN)

A Notice to Proceed for the \$17.7 million reconstruction of these four bridges was issued to the contractor with a start date of September 29, 2003. The 15th Avenue Bridge is an arch barrel bridge, constructed in 1912-1913 between 63rd and 64th Streets. Age, weather and increased traffic had affected the bridge. The roadway slab, concrete abutments and concrete piers were severely deteriorated. The bridge had outlasted its useful life. The scope of this project included the removal of the existing pavement, sidewalk, piers, columns, roof beams, portions of the abutments and the concrete arches over the NYCT tracks. The reconstruction included portions of the abutments, installation of precast reinforced concrete pier wall and deck panels, construction of a reinforced concrete deck on top of precast deck panels, and the installation of a 300 mm water main, 408 mm gas main and electric facilities. The approach slabs and bridge joints were replaced. In addition, new roadways, sidewalks, steel faced curbs, and a concrete parapet with pedestrian fencing and street lighting were constructed. The 15th Avenue Bridge was substantially completed on February 8, 2005.



15th Avenue Bridge in 2002. (Credit: NYSDOT). Final Touches on Completed Bridge.

The 18th Avenue Bridge is also an arch barrel bridge, constructed in 1912-1913 between 63rd and 64th Streets. Age, weather and increased traffic had affected the bridge. The roadway slab, concrete abutments and concrete piers were severely deteriorated. The bridge had outlasted its useful life. The scope of this project included sewer work, the removal of a portion of the existing abutments, columns, roof beams, piers and the arches over the NYCT tracks. Cast-in place concrete piles, a steel superstructure, and new integral abutments were installed. The water main, gas main, and sewer were removed and relocated. A new concrete deck, approach slabs, and sidewalks were also part of this reconstruction project. The bridge was constructed in four stages, with one lane open in each direction at all times, as well as pedestrian access to local businesses. The 18th Avenue Bridge was substantially completed on May 16, 2005.

INNOVATIONS & ACCOMPLISHMENTS



18th Avenue Bridge in 2003. (Credit: NYSDOT) Bridge Nearing Completion.



Finishing the Road. Completed 18th Avenue Bridge.

Similar construction at the 17th Avenue and 20th Avenue Bridges began after the completion of the 15th and 18th Avenue Bridges. The reconstruction of the 17th Avenue Bridge began on May 17, 2005. Effective July 13, 2005, the bridge was closed to vehicular traffic. The work included the demolition of the existing concrete arch superstructure and the existing concrete piers to top of footings. The superstructure was replaced with a new four span reinforced pre-cast pre-stressed rigid frame with new reinforced pre-cast pre-stressed concrete piers and slabs. Utilities were upgraded by installing additional 300 mm water main, gas main and electrical ducts. The bridge was re-opened to vehicular and pedestrian traffic on December 13, 2005, 29 days ahead of schedule. The 17th Avenue Bridge was substantially completed on February 24, 2006. The sidewalks were reopened to pedestrian use 16 days ahead of schedule earning the contractor the maximum incentive payment of \$150,000. The total 17th Avenue Bridge project was completed 45 days ahead of schedule.



17th Avenue Bridge in 2002. (Credit: NYSDOT) Prior to Reconstruction in 2005.
Inspecting the Bridge Before Construction.



Demolition of the 17th Avenue Bridge Deck. Casting the New East Abutment Wall.
Installing Precast Concrete Footings.

INNOVATIONS & ACCOMPLISHMENTS



Installing Pier Walls for the 17th Avenue Bridge. Installing Precast Deck Panels.
Placing the Reinforced Concrete Bridge Deck.



Completed 17th Avenue Bridge and Fence.

Work on the 20th Avenue Bridge began on May 15, 2006 after the utility company performed extensive work on the gas main. The bridge is expected to be complete in September 2007. The scope of this project includes the demolition of the existing six span reinforced concrete rigid frame six span reinforced concrete rigid frame and replacing it with a single span integral abutment reinforced-concrete composite superstructure. New combined sewer pipes, manholes, and water main will also be installed. At the end of 2006, the contractor was working on the new sewer pipes and manholes, and installing casings for pile driving for the new abutment, soldier piles, and lagging.



20th Avenue Bridge in 2002. (Credit: NYSDOT) Stage I Sewer Work.



Removing The 20th Avenue Bridge Arch Overburden.

The four bridge project is scheduled for completion in November 2007.

INNOVATIONS & ACCOMPLISHMENTS

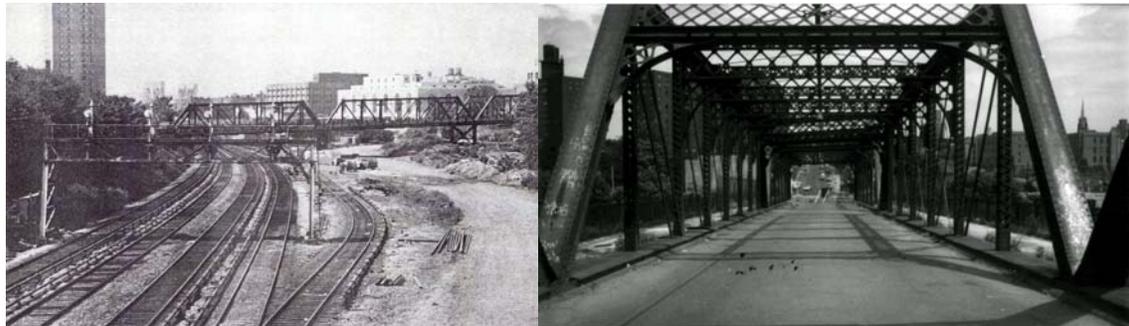
EAST 78TH STREET PEDESTRIAN BRIDGE OVER FDR DRIVE (MANHATTAN)

The current bridge is a nine span reinforced concrete structure over the FDR Drive. This project, currently in its final design phase, will include the removal of the entire superstructure; concrete deck, floor beams, parapet, girders, railing, protective screening, encased steel beams in the ferry house, existing concrete stair case on the esplanade side, existing substructure of piers, and ramp walls and wall of the ferry house, as well as a portion of the pier foundations below grade. The new fourteen span bridge will include steel piers with caisson foundations, a ramp retaining wall, and new superstructure using welded structural tubing, steel railing, and hand rails, as well as hand-protective screening. A new cast-in-place reinforced concrete deck will be installed. The proposed west ramp will be enclosed with a stone masonry wall to match the existing park wall. The new bridge will comply with ADA regulations.

During construction, pedestrian traffic will be detoured to the 71st and 81st Street pedestrian bridges. Construction is expected to begin in October 2007, and is expected to be complete in October 2008.

153RD STREET BRIDGE OVER METRO NORTH (BRONX)

This project, currently in the design and environmental impact assessment stage, will include a two-span, single tower, cable stayed vehicular bridge. It will be the first of its kind in New York City. The new four lane bridge will extend East 153rd Street in the Bronx across the Mott Haven rail yards from Morris Avenue to the Grand Concourse just north of Hostos Community College in the Melrose Section of the Bronx. This bridge will complete a link the street lost in the early 1980's when the old turn-of-the-century bridge was closed and demolished because of its age and deterioration. Construction of the new bridge is tentatively scheduled to begin in October 2007 and be completed in October 2010.



Original 153rd Street Bridge. Bridge in Early 1980's.

The new bridge will significantly ease congestion on the current east-west streets in the South Bronx, along 149th and 161st Streets as well as on the local streets in this neighborhood. With this bridge, East 153rd Street will be a continuous east-west thoroughfare from the commercial hub of Third Avenue to the Civic Center area of the Grand Concourse. It will serve the new revitalization projects of Melrose Commons, the Concourse Shopping Plaza and the Bronx Criminal Court Complex.

The bridge's graceful design, similar to the Tampa Bay Bridge in Florida, will create a very prominent landmark for this neighborhood. The cable-stayed structure will contain a tower rising above East 153rd Street to add to the Bronx skyline, with ribbons of steel cables holding up the roadway structure. The roadway will run between the two towers, and the sidewalk and bicycle lanes will be located on cantilever sections outside of the towers. This will reduce the overall depth of the superstructure by reducing the floor beam depths.

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Rendering of New 153rd Street Bridge

EAST 183RD STREET BRIDGE OVER METRO NORTH (BRONX)

This project will include the removal of the existing single span bridge and the construction of a new single span bridge structure with a reinforced concrete deck over steel girders. The work will also include the rehabilitation of existing abutments and wing walls. The bridge will be closed during construction and will be reconstructed in a single stage. Construction is expected to begin in September 2007 and is expected to be completed in December 2008.



East 183rd Street Bridge in 2002. (Credit: NYSDOT)

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Design-Build

In 2006 the Department continued to use the Design-Build process to expedite capital bridge rehabilitation. These contracts retain the same company for both design and construction on selected projects. It is evident that there are many advantages to the Design-Build program, including the use of one consolidated procurement rather than two or more, resulting in significant time savings; the ability to commence construction before design completion; the avoidance of project escalation costs as construction commences two or three years earlier than with the conventional design-bid-build method; minimization of design change orders; and better coordination between design and construction, as critical field issues are addressed expeditiously. In addition, the design is custom made and reflects the capabilities and strength of the specific contractor; the Department establishes a single point of contact for communicating its goals and objectives; and overall costs are reduced substantially.

BELT PARKWAY BRIDGE OVER MILL BASIN (BROOKLYN)

In April 2006, the American Council of Engineering Companies of New York selected the replacement of the median barrier on the Belt Parkway Bridge over Mill Basin for a Gold Award in the structural systems category in its 2006 Engineering Excellence Awards. The emergency project on this bridge, which began on December 23, 2002, was substantially completed on April 5, 2003. The new barrier has already proved its worth by saving lives on more than one occasion. Recent accidents at the site have resulted in property damage only.



Aerial View of the Belt Parkway Over Mill Basin Bridge.

The next significant work on this bridge consisted of the replacement of the rapidly deteriorating bridge grid deck. A Notice to Proceed for this project was issued to the contractor with a start date of October 25, 2005. The design was completed, and grid panel fabrication was underway at the end of 2005.



Mill Basin Bridge Deck. Contractors, Tamara Berlyavsky, and Ronald Rauch inspecting the Deck in 2005.

INNOVATIONS & ACCOMPLISHMENTS

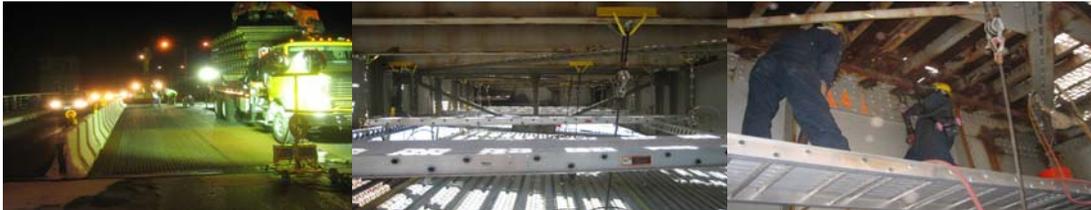


Installing the Hangers, Tubes, and Decking of the Underdeck Shielding. Marine Work.



Project Team Traveling to the Barges Under the Bridge, Including Engineer-in-Charge Leo Gitis, Ali Mosaffari, Deputy Director of Design-Build Beatriz Duran, and Director of Design-Build/Emergency Contracts Chris Sklavounakis. Quality Assurance Engineer Khalid Mohammed. Tamara Berlyavsky Preparing to Inspect the Work.

Panel replacement began in spring 2006, and was completed on November 10, 2006. The project work expanded to address safety flags involving fender system work, as well as steel repair work.



Work Zone Protection Barrier. Below Deck Access For Panel Replacement. Removing Rivets.



Sawcutting And Removing Deck Panels. Surface Preparation After Panel Removal.



Hand Demolition at Toe Joint.

INNOVATIONS & ACCOMPLISHMENTS



Landing Panel On The Span. Welding New Panel At Toe Joint.

The replacement of the bridge grid deck was substantially completed on December 22, 2006. The contract provided incentives/disincentives of \$10,000 per calendar day, with a maximum incentive amount of \$300,000, to ensure timely completion of the construction activities that impede traffic. The contractor earned the maximum amount. The new deck will serve traffic needs until April 2012. At that time, a new bridge carrying the Belt over Mill Basin will have been built and the existing one will be demolished.

RIKERS ISLAND BRIDGE OVER RIKERS ISLAND CHANNEL (QUEENS)

This project, currently in the preliminary engineering phase, involves replacing the superstructure of this rapidly deteriorating bridge. Cores taken from the bridge deck in 2003 revealed that the estimated useful life of the deck would soon expire, thus making bridge rehabilitation necessary. In 2005, the bridge carried approximately 13,811 vehicles per day.



Rikers Island Bridge in 2001. (Credit: NYSDOT)

The Division had previously completed the replacement of the bridge's substructure in 1998. The salty environment of the channel significantly contributes to the deterioration of the superstructure. This continued deterioration could also negatively impact the recently completed substructure work. The Division considered Design-Build to be the best project delivery method for this project, as it can expeditiously bring projects to the construction stage, and is the preferred method in all cases where time is of the essence. As the bridge exclusively serves the Rikers Island Correctional Facility, this project will require coordination with the Department of Corrections. Construction is expected to begin in 2015, and is expected to be complete in 2017.

As an interim measure, a project was planned to rehabilitate the bridge deck. The Notice to Proceed was issued to the contractor with a start date of August 24, 2005.

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Looking North at a New Bridge Slab And The Roadway Repairs. Painting Under the Bridge.



Performing Underdeck Repairs. Working Inside the West Rebar Box Frame. Beam Repair.

The project work expanded to include superstructure painting as well as repairs of the pier caps. The painting was completed in 2006, and the pier cap repairs will be completed in summer 2007. The rehabilitation of the bridge deck was substantially completed on December 22, 2006.

BRUCKNER EXPRESSWAY BRIDGE (NB) OVER AMTRAK & CSX (BRONX)

A tanker truck carrying home heating fuel overturned and caught fire on the bridge on the evening of October 4, 2005. The traffic on the bridge, and on the Amtrak and CSX railroad lines below, was adversely affected. The bridge was inspected and core samples of the concrete from the fire-affected deck were tested. Division crews assisted in emergency repairs and clean-up, re-setting all expansion plates on the abutment, and performing deck repair. The crews worked continuously, and the roadway was re-opened in time for the morning rush hour on October 6, 2005.



Bruckner Expressway Bridge in 2002. (Credit: NYSDOT)

INNOVATIONS & ACCOMPLISHMENTS



The Tanker Truck. Repairs and Cleanup. (Credit: Bojidar Yanev)

To protect the trains and railroad facilities below the bridge after the October 4, 2005 tanker truck fire, contractor crews began the nighttime installation of protective timber shielding under the bridge on October 5, 2005. The project was completed on November 8, 2005. The Division's Surveying Unit assisted the Inspections Unit in monitoring the deflection of the bridge.

The fire on the bridge weakened its members. While the immediate results of the fire were addressed by in-house forces, the aftereffects remain unresolved. The most recent inspection conducted on September 14, 2006 revealed that at least four girders have sagged and they are hit by CSX railroad cars below. The concrete deck has separated from the steel girder and there is a one to two inch gap between the top of the flange and the bottom of the haunches. In addition, the diaphragms between the girders have been burned and their capacity has been weakened. Urgently required repairs are being handled by the When and Where contractor. The contractor began the installation of additional timber bracing of the bridge's timber shielding in January 2007. This will be followed up by the replacement of the bridge which will be done under a Design-Build contract scheduled for Fiscal Year 2008.

CROSS ISLAND PARKWAY BRIDGE OVER FORT TOTTEN ENTRANCE (QUEENS)

A recent inspection by the Division revealed that the superstructure of the bridge has outlived its useful service life. The effects of age and weather have rendered reconstruction necessary. This project will include a new superstructure; pushing back the abutments to establish a longer bridge; adding one lane in each direction on 212th Street; geometric alignment improvements; and signal and lighting modifications. This project is currently in the preliminary engineering stage. Construction is expected to begin in summer 2009, and is expected to be complete in 2011.



Cross Island Parkway Bridge in 2002. (Credit: NYSDOT) Aerial View.

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HARLEM RIVER DRIVE AT EAST 127TH STREET (MANHATTAN)

This project, currently in its preliminary design phase, involves the replacement of the existing 11 span bridge and the reconstruction of the Harlem River Drive between the Willis Avenue and Third Avenue Bridges, in addition to various highway improvements. It eliminates a major weaving problem between the southbound Harlem River Drive traffic destined for the Second Avenue exit and the Third Avenue Bridge exit ramp, and allows at-grade access for a future Park/Promenade to be developed by the Department of Parks at 127th Street between the Harlem River Drive and the Harlem River. The viaduct currently carries two northbound and three southbound traffic lanes and serves approximately 79,000 vehicles per day. This area currently has 40 times the State average number of accidents. Construction is expected to begin in spring 2014, and is expected to be complete in spring 2016.



Harlem River Drive at East 127th Street.

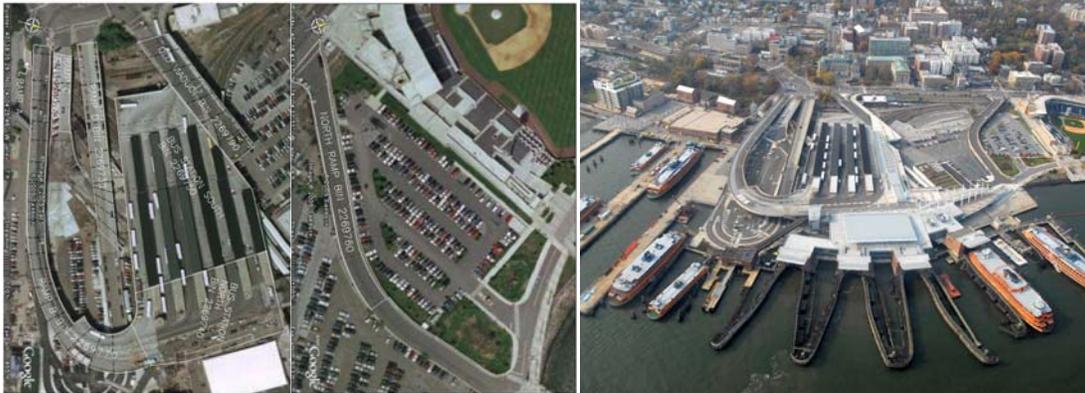
EIGHT RAMPS AND ONE PEDESTRIAN BRIDGE AT THE ST. GEORGE STATEN ISLAND FERRY TERMINAL (STATEN ISLAND)

Ferry service between Staten Island and Manhattan began in 1898, and its operations were taken over by the City's Department of Docks and Ferries in 1905. Today it is run by NYCDOT's Passenger Transport Division and services more than 19 million passengers each year, according to Captain James C. DeSimone, the ferry's Chief Operations Officer. The St. George Ferry Terminal itself recently underwent a major reconstruction project. The old drab, dingy building was converted into a well-lit, modern multi-modal facility. In addition to ferry service, the terminal also includes a very active MTA bus station and a Staten Island Railway Station. To complete the make-over of the St. George Terminal, the Division's Design Build Unit is undertaking a major rehabilitation project to upgrade vehicular access to the site.

Currently a series of eight ramps carry bus and passenger car traffic in and out of the facility. Seven of the eight ramps were constructed in 1948, with the eighth dating back to the early part of the 20th century. The last major structural work on these bridges was a deck replacement project in 1985 that only addressed three of the eight bridge structures. The planned design-build project will upgrade these eight structures and provide a design life of 75 years. For seven of the ramps, the project will provide new decks and eliminate joints where feasible, retrofit poorly detailed steel connections, and rehabilitate/replace deteriorated steel super- and sub-structure members, as well as install new paint systems. Lead paint removal and the installation of a new drainage system as well as a pigeon deterrent system will also be included. The eighth ramp is the existing load-restricted north ramp adjacent to the Richmond County Bank Stadium. It will be demolished and reconstructed on a more efficient alignment in order to alleviate traffic congestion at the intersection of Richmond Terrace and Wall Street. In addition, this project will replace the superstructure of a

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pedestrian bridge connecting the terminal to an office facility, and will address traffic improvements for the entire stretch of Richmond Terrace outside the terminal. Construction is expected to begin in spring 2009, and is expected to be complete by spring 2012.



Aerial Views of the Staten Island Ferry Terminal Ramps.

Component Rehabilitation

CYPRESS HILLS CEMETERY ROAD BRIDGES (WEST & EAST) OVER JACKIE ROBINSON PARKWAY (QUEENS)

The original scope of work for these bridges called for the removal and reconstruction of the bridges' concrete deck structure, concrete parapets, sidewalks, bridge approaches, and the roadway slabs. On May 21, 2001 the contractor started removal of the overlay, concrete slab, parapets and sidewalks of the East Cemetery Road Bridge. The bridge was discovered to be in a far worse condition than originally anticipated.



East and West Bridges.

On July 3, 2001, the contractor was ordered to stop work and test samples were taken on both of the bridges. The test results indicated that both bridges were beyond rehabilitation. On December 20, 2001, the Agency decided to demolish the bridges for safety reasons and the East Bridge was fully closed to vehicular traffic. Traffic was allowed on the West Bridge with load restrictions.

The contractor could not begin the demolition as planned in May 2003 due to opposition by the cemetery. The lawsuit was dismissed in July 2005. The demolition project consisted of three stages: pre-demolition preparatory work, actual demolition, and restoration and site clearing.

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Pre-demolition preparatory work included installing concrete deadmen and tie back rods at the abutments and deadmen to resist the unbalanced lateral earth pressure and/or cantilevered self-weight loads. The pavement and concrete deck at the abutments and wing walls were saw cut to stabilize the substructure prior to demolition. A protective shield was installed to contain the debris and waste that would fall from the superstructure during the demolition. This stage began on October 3, 2005.



Bridge Prior to Demolition. Installing Tie Back Rods at the North Abutment of the East Bridge.

The actual demolition of the bridges also included the removal of the shielding and the concrete waste and debris from the roadway, as well as the sidewalk/shoulder on the Jackie Robinson Parkway. The demolition was performed in one weekend, beginning on March 17, 2006. The Parkway was reopened in both directions at approximately 11 PM on March 19, 2006, 18 hours ahead of schedule.



Bridge Demolition.

The post-demolition work included the restoration of the concrete median and curb on the Jackie Robinson Parkway, restoration of the abutments, and installation of new parapets and repair slopes. The project to demolish these bridges was substantially completed on June 27, 2006. Access within the cemetery is maintained by the existing underpass beneath Jackie Robinson Parkway located just east of Memory Lane.



Restored North Abutment. Completed North Parapet Wall. New East Median.

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When and Where Unit

In 2006, the following structures were worked on under the Division's When and Where contracts: Belt Parkway Bridge over Fresh Creek, Belt Parkway Bridge over Paerdegat Basin, Belt Parkway Bridge over Rockaway Parkway, Boston Post Road Bridge over Hutchinson River, Access Ramp to Brooklyn Bridge from FDR Drive Southbound over Frankfort Street, Brooklyn-Queens Expressway over Nassau Street, Bruckner Expressway over Amtrak, Delancey Street Pedestrian Bridge over FDR Drive, Promenade over FDR Drive from East 79th to East 91st Streets, Flushing Meadow Park Bridge over College Point Boulevard, Grand Concourse over East 161st Street, Gun Hill Road Bridge over Bronx River Parkway, Harlem River Drive Northbound Ramp over Harlem River (ramp to Trans-Manhattan Expressway), Henry Hudson Parkway Viaduct over West 72nd to West 79th Street, Hutchinson River Parkway Bridge over Hutchinson River, Jackie Robinson Parkway Bridge over Metropolitan Avenue, Linden Boulevard over BCIP, Pelham Parkway Bridge over Amtrak & Metro North, Riverside Drive over West 125th Street and Others, Rust Street Bridge over Flushing Avenue, Shore Road over Hutchinson River (Bronx) (a.k.a. Pelham Bay Bridge), Willis Avenue Bridge over Harlem River, East 6th Street Pedestrian Bridge over FDR Drive, East 78th Street Pedestrian Bridge over FDR Drive, West 79th Street Rotunda Complex, West 181st Street Pedestrian Bridge over Henry Hudson Parkway NB, Riverside Drive Bridge over West 155th Street, South of Tillary Street over Navy Street, Union Turnpike Bridge over Austin Street, 43rd Road Bridge over Larell Hill Boulevard, Hempstead Avenue Bridge over Cross Island Parkway, Rust Street Bridge over Flushing Avenue, Brooklyn-Queens Expressway over Cadman Plaza, Queensboro Bridge (and assorted ramps), Pulaski Bridge over Newtown Creek, Douglaston Parkway Bridge over Cross Island Parkway, Brooklyn Bridge over the Brooklyn-Queens Expressway, Columbia Heights Bridge over Brooklyn-Queens Expressway, Caton Avenue Bridge over NYCTA, Page Avenue Bridge over SIRT South Shore, and various bridges over the Amtrak 30th Street Branch.

The closed Parks Department West 151st Street Footbridge over Conrail 30th Street Branch in Manhattan was demolished in June 2006. The contractor removed the bridge and temporarily placed it in an area inside the Amtrak right-of-way. The structure was subsequently separated into halves and transported to the 207th Street yard for further dismantling. The Amtrak right-of-way was restored, as were park areas at both abutments. The contractor completed the project in July 2006 by installing replacement walkway perimeter fencing.



Director of the When and Where Unit Sudhir Jariwala Inspecting the West 151st Street Bridge Prior to Starting the Removal. Preparing for Removal.

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Dismantling the Pieces. Replacing the Fencing.



Removing Deteriorated Joint Sealer at the Page Avenue Bridge over SIRT South Shore in Preparation for its Replacement. Cleaning Steel Angle Surfaces. Installing New Joint Sealer Material.



Removing Loose Concrete From the Underdeck of the Jackie Robinson Parkway Bridge Over Metropolitan Avenue, And Installing Expanded Wire Mesh.



Repairing the Railings at the 92nd Street Pedestrian Bridge over Belt Parkway. Completed Repairs.



Douglaston Parkway Over Northbound Cross Island Parkway: Removing Loose and Deteriorated Under-Deck Concrete, and Installing Expanded Metal Mesh.

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Nighttime Installation of Steel Column Web Reinforcement at the East 111th Street Pedestrian Bridge Over the FDR Drive. Completed Repair.

MARINE WHEN AND WHERE

New York State DOT conducts the underwater inspections of our waterway structures. A contract was needed to facilitate the performance of marine repairs and to maintain structures in need. The objective is to perform marine structural repairs and maintenance together with other appurtenant work, which constitutes repairs of defective and deteriorated parts of bridge structures due to and in a water environment. The Department has neither the staffing nor the equipment to handle this type of special work. The work could not be handled under the usual time and materials When and Where contract, because the work is unique, in that it requires a consultant with underwater-licensed inspectors to supervise and inspect the work for compliance and adequacy. Furthermore, detailed note taking is necessary by the inspectors to check and approve payments for the contractor's work. A Notice to Proceed for this project was issued to the contractor with a start date of April 18, 2005.

Marine bridge repairs already completed include Hutchinson River Parkway Bridge over the Hutchinson River, Shore Road Bridge over the Hutchinson River, Boston Post Road over the Hutchinson River, West 207th Street/West Fordham Road over Harlem River (University Heights Bridge), and Belt Parkway Bridge over Mill Basin.



Repairing the Railings at the Belt Parkway Bridge Over Paerdegat Basin. Completed Repairs.

Some of these locations experience repeated damage due to heavy marine traffic and/or a narrow channel. The issuance of new flags necessitates new visits to even recently completed projects. Timber fender systems are subject to recurring hits by barge traffic, and consequently require periodic restoration. In addition to damage due to impact, timber elements are also replaced because of deterioration and attack by marine borers, whose activity has vastly increased as the water quality in the New York City area has improved.

Currently scheduled projects include the Belt Parkway Bridge over Fresh Creek, and the Belt Parkway Bridge over Paerdegat Basin, as well as newly flagged conditions at the East 78th Street Pedestrian Bridge over FDR Drive.

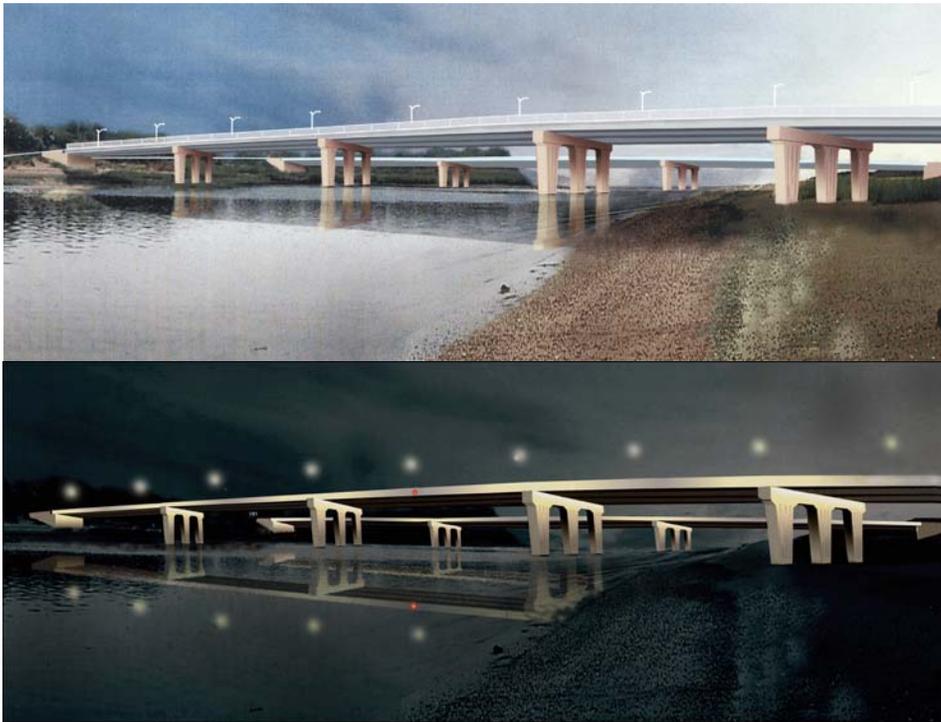
INNOVATIONS & ACCOMPLISHMENTS

Engineering Review and Support

IN-HOUSE DESIGN

In-House Design staff prepares plans and specifications for bridge replacement/reconstruction projects that enable the Division to restore bridges considered “structurally deficient” to a “very good” condition rating. This unit handles urgent Division projects, as well as special projects under construction by the Bureau of Bridge Maintenance, Inspections and Operations.

Projects underway in 2006 included the Belt Parkway Bridge over Paerdegat Basin in Brooklyn. The existing bridge with its nest of thirteen piers will be replaced by two split bridges, one each for eastbound and westbound traffic. The bridge for eastbound traffic shall have four piers whereas the bridge for westbound traffic shall have two piers. This is the first bridge to be designed by NYCDOT with trapezoidal steel box girders utilizing high performance steel and seismic isolation sliding bearings. In addition, the aesthetics of the bridge will be enhanced by its nightly illumination utilizing light emitting diodes on both fascias and piers. This project will also include wetland mitigation and landscaping in the immediate vicinity of the proposed bridges.



Rendering of New Belt Parkway Bridge Over Paerdegat Basin, In Daylight, and Under Nightly Illumination. (Credit: Alexander Berens)

INNOVATIONS & ACCOMPLISHMENTS



Rendering of Existing and Proposed Belt Parkway Bridges Over Paerdegat Basin. (Credit: Alexander Berens)

In 2006, In-House Design staff also supervised the design and subsequent repaving of the FDR Drive southbound roadway near the United Nations building between East 49th Street and East 40th Street. Because of the wavy nature of the roadway surface caused by numerous wide shallow depressions, the unit was asked to produce an immediate temporary solution followed by a conceptual permanent solution. The actual design was performed by a consultant. As the temporary solution, the FDR Drive southbound was closed completely during one weekend in April 2006, when the roadway was repaved by the Agency's Division of Roadway Repair and Maintenance. The catch basins and manholes within the project limits were cleaned, and their tops were raised to the new roadway elevation using specially fabricated adjustment collars.



Cleaned Catch Basin and Repaved FDR Drive Southbound.

Other projects underway include the Hempstead Avenue Bridges over Cross Island Parkway and Cross Island Parkway Service Road, Union Turnpike Bridge over Cross Island Parkway (and Creedmoor Center Road), and Hillside Avenue Bridge over Cross Island Parkway in Queens.

In-House Design's Electrical Group reviews and/or prepares contract documents for all electrical and street lighting work on all projects on the Division's Capital Program. Some of the contracts reviewed during 2006 included the Willis Avenue, Broadway, 145th Street, and Wards Island Pedestrian Bridges over the Harlem River; Grand Street Bridge over Newton Creek; Third Street and Hamilton Avenue Bridges over Gowanus Canal; Metropolitan Avenue Bridge over English Kills, and Belt Parkway Bridge over Paerdegat Basin in Brooklyn; Roosevelt Island Bridge over East River Channel; Bruckner Expressway NB & SB Service

INNOVATIONS & ACCOMPLISHMENTS

Road (Unionport Bridge) over Westchester Creek in the Bronx; Park Avenue Tunnel; and the East 153rd Street Bridge over Metro North.

ENVIRONMENTAL ENGINEERING

The Environmental Engineering staff of the Quality Assurance Section provides environmental oversight on all capital projects in the Division. Lead paint abrasive cleaning projects underway or completed in 2006 included the Queensboro Bridge, Manhattan Bridge, Rikers Island Bridge, 145th Street Bridge, and the Williamsburg Bridge. In addition, the unit continued to provide emergency response related to environmental issues.

As part of the Environmental Committee for the Office of Environmental Assessment and Compliance (OEAC), the unit assisted in developing environmental procedures such as spill prevention, control and countermeasures protocols, roadway spill clean-up protocols, RCRA contingency plans and the disposal of universal waste. The unit also worked with OEAC to develop and implement training for working over water as well as the Clean Water Act.

The unit performs quarterly water discharge monitoring in compliance with the NYSDEC SPDES system for bridges that cross waterways such as the Gowanus Canal, English Kills Creek and the Newtown Creek. Environmental oversight was provided to emergency work-over-water projects on the Brooklyn Bridge, Mill Basin Bridge, Roosevelt Island Bridge, Willis Avenue Bridge, Hamilton Avenue Bridge, Third Avenue Bridge, Borden Avenue Bridge, Greenpoint Avenue Bridge, and Metropolitan Avenue Bridge. This environmental oversight ensured that there was no environmental impact to the city's waterways during emergency repair projects.

The unit ensures compliance with storm water regulations, hazardous waste management, Clean Air Act requirements, Clean Water Act requirements, asbestos regulations, lead paint removal protocols, and health and safety on NYCDOT bridge projects. This includes projects such as the 145th Street Bridge and Hamilton Avenue Bridge where compliance with environmental concerns such as dredging and dewatering is required in conjunction with the installation of submarine cables.

In addition, the staff continued the implementation of a new quality assurance plan for coating inspection and application on Division bridge structures. Services are implemented through the use of consultant contracts. Coating inspection services and engineering were provided on numerous projects such as the Rikers Island Bridge, Manhattan Bridge, Williamsburg Bridge, Metropolitan Avenue Bridge, and the Queensboro Bridge Painting Project.

BRIDGE PROJECT SPECIFICATIONS

In 2006, the Engineering Support Section prepared and/or reviewed contract proposal books and/or specifications for 22 bridge rehabilitation and reconstruction contracts which included several combined or multiple-bridge contracts. Four of these contracts totaling approximately \$471 million in construction costs were either bid or advertised for bid. The three bid contracts are currently in different stages of award and registration. Out of eight contracts with an estimated construction cost of \$576 million that were submitted to the Law Department for approval, five were approved, another two are still in the approval process, and one contract was rescheduled for bid in Fiscal Year 2011. The specifications for the remaining fourteen contracts are in various stages of preparation.

Notable among the bridge contracts prepared and/or reviewed are: Brooklyn Bridge travelers replacement; Brooklyn, Williamsburg, and Queensboro Bridge preventive maintenance; maintenance of various movable bridges; reconstruction of Roosevelt Island Bridge over East

INNOVATIONS & ACCOMPLISHMENTS

River/East Channel; reconstruction of Shore Road Circle Bridge over Amtrak; replacement of Willis Avenue Bridge; reconstruction of Annadale Road Bridge over SIRT; and construction of East 153rd Street Bridge over Metro North.



Mohammad Rahman, Leonid Kestelboym, and Ramakumar Magge Inspecting the Willis Avenue Bridge Prior to Preparing The Contract Specifications.

CONVERSION OF DIVISION ENGINEERING ARCHIVES

Since the first digitizing contract of engineering records began seven years ago, we have converted over 58,000 full-size drawings and 20,000 construction photographs into digitized image and data formats, a total of 43 CD-ROMs.

The next phase of the project will consist of the digitizing of the microfilm collection. Since we began microfilming contract and other drawings in the early 1980s, we have accumulated more than 360 microfilm rolls (over 100,000 frames of film). Microfilming of records is rapidly becoming an obsolete technology as it cannot be used to perform rapid searches, sorting of information, or sending and sharing files via the Internet and/or copying electronic files to CDs.

While we await the award of this contract, we upgraded our microfilm reader/printer. This newer model has the following features and capabilities: standard PC/network connectivity to send and print images over the Agency network; digital image convertibility -- once images are scanned, they may be conveyed electronically via fax and E-mail, uploaded onto the Internet, or stored on CD-ROM; compatibility with all microfilm formats, including aperture cards submitted to us by NYSDOT; automatic switching between negative or positive film images; productivity enhancements -- automatic focusing and exposure, background erasure, automatic skew correction; and high-quality (600-dpi) resolution printing with automatic enlargement for large-format, ledger-size (11" x 17") printouts.

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Nancy Guernsey Utilizing a Digital
Microfilm Scanner.
(Credit: Mohammad Rahman)

We also updated the specifications for the preparation of record drawings and electronic media. This first major revision of the specifications in six years concentrated on the elimination of the microfilming requirement for all record drawings. The new specifications are concise, well-illustrated, and simple to follow. A copy of the specifications in PDF format is easy to transmit electronically and we do not need to print large quantities of books.

The switch to electronic media archiving will save money on drawing submissions as well, and will lead to the establishment of a unified electronic database for bridge archives.

NEW SURVEYING INSTRUMENT

The Surveying and Load Rating Unit performs the survey, inspection and load rating of bridges, monitoring of cracks and movements in bridge structures and settlement of foundations. This unit also performs corrosion potential testing in all bridge resurfacing projects. The Unit recently began using a new survey instrument. This newer model has the following features and capabilities: a 360° reflector allows immediate surveying and eliminates the previous need to carry bulky accessories; an alphanumeric style keyboard permitting an efficient rate of data entry; high-capacity portable memory cards; and automatic target recognition for faster and more accurate measurements.



Survey Crew (Engineer-in-Charge Alfred Lee, Thee-Shiun Ken, Aleksandr Kotlyanskiy, and Mariya Zhurakhinskaya) Using Their New Instruments to Monitor The Movement of Damaged Columns at The Belt Parkway Bridge Over Paerdegat Basin.

INNOVATIONS & ACCOMPLISHMENTS

CRP/EXTELL PARCEL H PROJECT

The CRP/Extell Parcel H, LP project (Riverside Drive between 59th and 72nd Streets) includes the construction of seven new bridges, a ramp, and connector roads along Riverside Drive as a part of the residential and commercial development over the former Penn Central Rail Yard. The project will also include a half tunnel section in what was formerly known as the Miller Highway Tunnel. When completed, the infrastructure network will be transferred to DOT for maintenance. The Division is providing engineering review of the design drawings, as well as quality assurance inspections, to ensure the developer's compliance with DOT's construction and design standards. The project is now in its second stage, and is 80 percent complete overall.

Bridge Maintenance, Inspections and Operations

EAST RIVER BRIDGES ANTI-ICING PROGRAM

Traditional snow and ice control practices rely heavily on the use of salt, a material known to corrode steel and accelerate the deterioration of concrete and asphalt surfaces. A new method of snow and ice control was needed to protect the City's \$2.5 billion investment in the rehabilitated East River Bridges. This method, known as anti-icing, involves the application of a chemical freezing point depressant to the roadway surface to prevent snow and ice from bonding to the roadway. Frequent plowing removes any accumulation of unbonded snow or ice before traffic is affected.

The Division's Anti-Icing Program uses the liquid chemical potassium acetate and aggregate chemical sodium acetate. The anti-icing fleet consists of twenty-two spray trucks, six plow trucks and several smaller plows. Ten of the spray trucks are combination spray/plow trucks with a 1,000 gallon tank capacity, and five are spray-spreader/plow trucks with a 360 gallon spray capacity, and a nine cubic yard spreader capacity. There are twenty chemical storage tanks, with a total storage capacity of 114,250 gallons.

New anti-icing yards storing both chemicals have been established under all four East River bridges. Supervisors monitor the bridge decks during storm events by traversing them and using thermal instrumentation installed in their vehicles to make informed decisions as to when to apply chemicals.



Installing an Anti-icing Tank Platform under the Brooklyn Bridge. Deputy Chief Engineer Russell Holcomb Observing The Work. (Credit: Peter Basich)

INNOVATIONS & ACCOMPLISHMENTS



Installing the Platform. (Credit: Peter Basich)

In the winter of 2005-2006, a total of 25,875 gallons of anti-icing chemicals were applied on the roadways of all four East River Bridges.



Anti-Icing Trucks. (Credit: Chris Gilbride)

INSPECTIONS

In 2006, Inspections covered 147 bridges and 743 spans. Emphasis was placed on ensuring public safety through the monitoring of potentially hazardous conditions and temporary repairs. The unit performed 392 monitoring inspections, and 308 special winter monitoring inspections of cellular structures, shorings, and potential fire hazards. In addition, 212 emergency inspections were conducted in response to hot line calls, in-house requests, or citizen complaints.

The unit also completed the preparation of a software and hardware upgrade of the system for bridge inspections using portable computers. The new Bridge Data System (BDS) will allow inspection reports to be generated and transmitted electronically. It will also provide access to data from the latest inspection reports on all bridges to all Division units. In addition, when an emergency arises, our inspectors will be able to send photographs and other information to the main office via a wireless connection to the internet. This feature will enable bridge repair engineers to assess the condition and dispatch repair crews with the appropriate equipment in a timely manner. The test version of the system was field verified in 2006, along with the selected portable computers. The production version of the system will be implemented in early 2007.

New York State DOT expressed interest in the system, and Division Inspection staff presented it to them in Albany. Upon completion of the present contract for the development of the BDS, a new contract for expanding its capabilities to include features helpful to bridge management and bridge rehabilitation will begin. These features include the capture of in-depth inspections by consultants as well as the bridge GIS data.

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Division Personnel Inspecting Wards Island Pedestrian Bridge Utilizing a Barge. (Credit: Avelino Leyco Jr.) Inspecting the Newly Completed Lincoln Road Bridge With the Assistance of Future Inspectors. (Credit: Fred Arzideh) Assistant Civil Engineer Andrew Hoang Inspecting the Williamsburg Bridge.

In 2002, the Division began to receive State DOT bridge inspection reports in CD-ROM format. Flag reports are now also transmitted electronically. As of September 2003, standard inspection work is funded by a federal grant. Emergency response inspections and administrative support remain city funded.

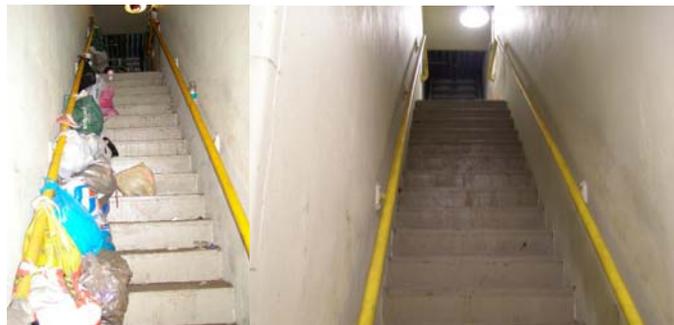
STRAIN GAUGE AND TELLTALE TESTING

The monitoring of cracks in the Manhattan Bridge Manhattan anchorage utilizing displacement gauges by Strain Monitoring Systems continued in 2006. In a demonstration project provided at no cost to the City, the reduction in the main span torsion on the Manhattan Bridge under train loads was monitored with fiber-optic strain gauges as the stiffening of the structure approached conclusion. The displacement gauges at the Manhattan Bridge Brooklyn anchorage were removed in early December 2005, in order to begin the rehabilitation of the repairs of the cracks they were monitoring. Certain cracks in the Manhattan side anchorage will remain under monitoring, as the results so far indicate that repairs are not warranted.

In 2006, telltales for crack monitoring were installed at several locations, including three pre-stressed bridges in Staten Island and the FDR Drive at 92nd Street. These devices are attached to both sides of the crack and allow us to measure the changes from one inspection to the next. There is a grid on the face of the telltale that allows for precise measurements.

CLEANING

In 2006, 11,339 cubic yards of debris were removed from bridges and their surrounding areas, and 1,208 drains were cleaned.



Emergency Stairwell of the 1st Avenue Tunnel Before and After Removal of Debris Collected by Vagrants.

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Highway Repairer Anna Fittipaldi and Assistant City Highway Repairer Luciano Cardona Pausing During Debris Removal on the Brooklyn Bridge Walkway.

PIGEON DETERRENCE

Excessive numbers of pigeons cause property deterioration, unsafe working conditions and health hazards. Besides being unsightly, accumulation of pigeon droppings and feathers is corrosive to steel structures and raises concerns about health hazards. Many disease organisms have been associated with pigeons. They harbor ectoparasites which can infest or bite humans. Pigeon droppings also harbor fungi that can trigger serious, even fatal, lung diseases such as Histoplasmosis, Cryptococcosis and Toxoplasmosis, when the spores are transmitted to humans who breathe in the harmful dust.

The Division utilizes a relatively low tech, and passive, approach to deterring pigeons. In 2006, the type of barrier used to cage out pigeons was changed from the drop ceiling method to netting. The netting is supported by steel cables that are clipped to the beams. This method is currently in use under the Brooklyn Queens Expressway (over Prospect Street), at the Pulaski Bridge, and at the deicing tank storage area under the Brooklyn Bridge at Dover Street. In addition, a pigeon deterrent system involving low voltage wires is in place at the Belt Parkway Bridge over Ocean Parkway. The wires are installed along the web of the girders and are hardly visible, yet highly effective. The system has been in operation for over two years now and no pigeons have been observed under or by the bridge ever since. The community is pleased that we addressed one of their most serious and longstanding complaints. The system requires minimum maintenance and is extremely easy to operate.



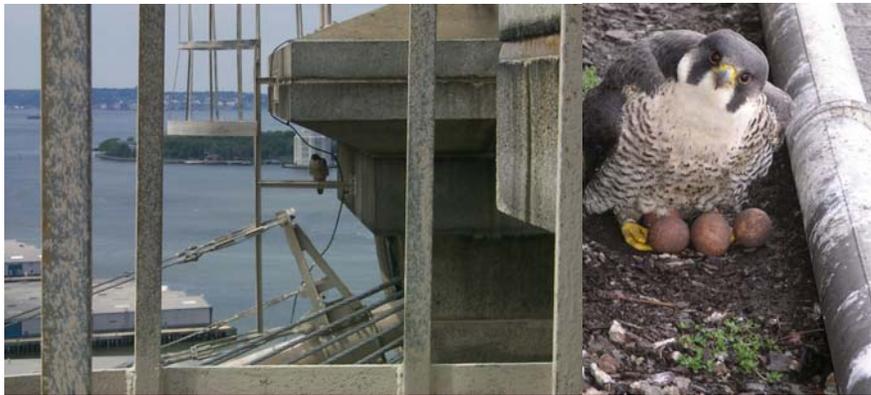
Installing Pigeon Proofing Under the Brooklyn Queens Expressway Over Prospect Street.
(Credit: Joseph Vaccaro)

INNOVATIONS & ACCOMPLISHMENTS



Installing Pigeon Proofing at the Anti-Icing Platform. (Credit: Peter Basich)

In 2006, pigeon dropping removal and/or pigeon proofing were performed at the 74th Street Bridge over Long Island Expressway, the 80th Street Bridge over the Long Island Expressway, the Hutchinson River Parkway Bridge over the Hutchinson River, the Highland Boulevard NB Bridge over Vermont Avenue, the Brooklyn Bridge, the Brooklyn Bridge over Prospect Street, the Manhattan Bridge, the 207th Street (University Heights) Bridge over the Harlem River, the Broadway Bridge over the Harlem River, the Livonia Avenue Pedestrian Bridge over LIRR, the Jackie Robinson Parkway Bridge over Austin Street, the Penton Street Bridge over SIRT South Shore, the Arden Avenue Bridge over SIRT South Shore, the Amboy Road Bridge over SIRT South Shore, the Justin Avenue Bridge over SIRT South Shore, the Tysens Lane Bridge over SIRT South Shore, the Jefferson Avenue Bridge over SIRT South Shore, the Seaview Avenue Bridge over SIRT South Shore, the Cromwell Avenue Bridge over SIRT South Shore, the Grand Concourse over 204th Street, the Grand Concourse over Bedford Park Boulevard, the Grand Concourse over Kingsbridge Road, the Greenpoint Avenue Bridge over Newtown Creek, and the Bruckner Expressway Bridge over the Bronx River.



Nature's Pigeon Deterrent—A Falcon on the Brooklyn Bridge South Side Tower.
Falcon Family on the Williamsburg Bridge. (Family Credit: Russell Holcomb).

PAINTING

In 2006, the following bridges were painted: Aqueduct Racetrack Ramp over Belt Parkway, Borden Avenue Bridge over Dutch Kills, Bronx River Parkway Bridge over Boston Road/Bronx Zoo, Cropsy Avenue Bridge over Coney Island Creek, Crotona Avenue Bridge over Bronx Pelham Parkway, East Tremont Avenue Bridge over Hutchinson River Parkway, Grand Concourse Bridge over East Tremont Avenue, Grand Concourse Bridge over Metro North, Harlem River Drive Ramp to the northbound Harlem River Drive, Henry Hudson Parkway Bridge over Broadway, Highland Boulevard Bridge (EB) over Jackie Robinson Parkway, Hylan Boulevard Bridge over Lemon Creek, Merrick Boulevard Bridges over

INNOVATIONS & ACCOMPLISHMENTS

Laurelton Parkway (NB) & (SB), Myrtle Avenue Bridge over Jackie Robinson Parkway, Page Avenue Bridge over SIRT South Shore, Park Avenue Viaduct over East 42nd Street, PS-5 Pedestrian Bridge over 10th Avenue, Richmond Avenue Bridge over Richmond Creek, Roosevelt Avenue Bridge over Flushing Meadow Park Road, Southern Boulevard Bridge over Bronx Pelham Parkway, Tudor City Place Bridge over East 42nd Street, Whitestone Expressway (SB) over Cross Island Parkway, Bay 8th Street Bridge over Belt Parkway, 71st Avenue Bridge over Cooper Avenue, 150th Street Bridge over Cross Island Parkway, 160th Street Bridge over Cross Island Parkway, and West 181st Street over Ramp to the George Washington Bridge.



Bridge Painter Anthony Attore Painting the PS-5 Pedestrian Bridge over 10th Avenue.



Bridge Painters Thomas Anzalone, Frane Capalija, and Brian Kenny Applying Primer to the Aqueduct Racetrack Ramp. Bridge Painters Frank Hollen and Brian Casey Keeping the Ground Clear. (Credit: Vincent Babajko)



Bridge Painter Willie Tyler Painting the Park Avenue Viaduct Over East 42nd Street. (Credit: Vincent Babajko) Completed Section. (Credit: Michele N. Vulcan)

During 2006, the following structures were also painted: Bruckner Expressway over Westchester Creek (Bronx) (a.k.a. Unionport Bridge) Operator House, DEP Plant at Port Richmond (Staten Island), DEP Plant at Tallman Island (Queens), Flatlands DOT

INNOVATIONS & ACCOMPLISHMENTS

Maintenance & Repair Shop, Railings of Flushing Avenue Service Road Bridge over Flushing Avenue, Railings of Flushing Avenue Service Road Turnaround Bridge over Flushing Avenue, Pulaski Street Bridge Operator House, Roosevelt Island Bridge Operator House, and Railings of West 176th Street Pedestrian Bridge over Approach to George Washington Bridge.

GRAFFITI REMOVAL

In 2006, 6,798,671 square feet of graffiti were eliminated. This program focuses its primary attention on the four East River bridges, as well as the following 21 arterial highways: Clearview Expressway, Gowanus Expressway/Belt Parkway, Major Deegan Expressway, Harlem River Drive, Van Wyck Expressway/Whitestone Expressway, Brooklyn-Queens Expressway, Jackie Robinson Parkway, Sheridan Expressway, Hutchinson River Parkway, Henry Hudson Parkway, West Shore Expressway, Richmond Parkway, Martin Luther King Jr. Expressway, Staten Island Expressway, Bruckner Expressway, Prospect Expressway, Grand Central Parkway, Long Island Expressway, Cross Bronx Expressway, Nassau Expressway, and Bronx River Parkway.



Pressure Washing Machine Used for Graffiti Removal. It is Set to 2500 psi and 212° F. Removing Graffiti From the Base of the Manhattan Bridge Facing the FDR Drive. (Manhattan Credit: Cesar Pazmino)



Bridge Painters Frank Duic and Russell Newme Feeding the Spray Pump And Preparing the Paint.

During 2006, graffiti was also removed from the following structures: Adams Street Ironworker Shop, Annadale Road, Bay 8th Street Bridge over Belt Parkway, Belt Parkway Bridges, Belt Parkway Bridge over Sheepshead Bay Road, Booth Street between Eliot Avenue and Woodhaven Boulevard, Borden Avenue Bridge, Brooklyn Bridge Park, Carroll Street Bridge over Gowanus Canal, Cross Bay Boulevard Bridge over Conduit Boulevard, Cross Island Parkway, Cross Island Parkway from Whitestone Bridge to Southern State Parkway, Cross Island Parkway Exit Ramp (SB) to the Long Island Expressway (EB), Cross Island Parkway at 76th Street/Union Turnpike, Detroit Avenue, FDR Drive (southbound) at 4th

INNOVATIONS & ACCOMPLISHMENTS

Street, FDR Drive (southbound) at 25th Street, Flushing Avenue, Francis Lewis Boulevard Bridge over Cross Island Parkway, Grand Concourse over Bedford Park Boulevard, Grand Concourse over Burnside Avenue, Grand Concourse over East Kingsbridge, Grand Concourse over East Tremont Avenue, Grand Concourse over East 170th Street, Grand Concourse over East 204th Street, Greaves Avenue Bridge over SIRT South Shore, Henry Hudson Parkway overpass in Riverside Park at 72nd Street, Jackie Robinson Parkway/Union Turnpike over Austin Street, Mazeau Street Pedestrian Bridge over Long Island Expressway, Marathon Route, Queens Boulevard Bridge over Amtrak & LIRR Yard, Remsen Street at the Brooklyn-Queens Expressway, Riverdale Avenue Wall at West 235th Street, Riverside Drive Facility at West 158th Street, Riverside Drive at 160th Street, Shore Road Bridge over the Hutchinson River, Union Street Bridge over Gowanus Canal, Ward's Island Pedestrian Bridge over Harlem River, Woodhaven Boulevard Bridge over Atlantic Avenue, 3rd Avenue Bridge over Gowanus Canal, Pedestrian Walkway at 8th Street and Ocean Parkway, 9th Street Bridge over Gowanus Canal, 39th Street Bridge (North) over Sunnyside Yards, 43rd Avenue Bridge over Conrail, 71st Avenue Bridge over Cooper Avenue, 91st Street at the southbound FDR Drive, West 158th Street Safety City, 163rd Street Pedestrian Bridge over Hawtree Basin, 167th Street Pedestrian Bridge over LIRR Port Washington Branch, and 191st Underground Street to Broadway.



Bridge Painters Removing Graffiti From the Long Island Expressway.

RESEARCH AND PRESENTATIONS

In 2006, research work and/or case histories of the Division were presented in the following proceedings:

85th Annual Meeting of the Transportation Research Board of the National Academies, Washington, D.C. 22 – 26 January 2006. Yanev, B. *Condition Assessment Experience for Suspension Cables for East River Bridges of New York.*

ASCE Metropolitan Section infrastructure Group, Infrastructure Safety and Security 2006, New York City, 27 – 28 March 2006. McGuire, R., Toro, G., Kishore, K., Patel, J., Razzaq, A., and Jain, S. *Seismic Hazard Analysis for New York City Bridges.*

Dubin, E. *Preservation Act: Whether They Swing, Retract, or Are Raised, New York City's Movable Bridges Are Receiving a Much-Needed Dose of Care.* Public Roads, March/April 2006.

International Association for Bridge and Structural Engineering: Conference on Operation, Maintenance and Rehabilitation of Large Infrastructure Projects, Bridges and Tunnels, Copenhagen, Denmark, 15 – 17 May 2006. Dr. Bojidar Yanev, the Division's Executive Director of Inspections and Bridge Management, delivered the opening paper of the conference, *The Bridge Projects and Networks of New York City*, and co-chaired one of the sessions.

INNOVATIONS & ACCOMPLISHMENTS

12th Annual Technical Conference of the New York State Interagency Engineering Council: Innovative Technology for Urban Infrastructure, New York City, 24 May 2006. Agrawal, A.K., Subrananian, K., Yi, Z., King, L.S., Hui, K., and Patel, M. *Advances in Corrosion Monitoring of Rebar Systems for Highway Bridges*.

12th Annual Technical Conference of the New York State Interagency Engineering Council: Innovative Technology for Urban Infrastructure, New York City, 24 May 2006. Fanjiang, G.N., Kishore, K., Patel, J., and Razzaq, A. *Development of Seismic Guidelines for NYCDOT Bridges*.

Third International Conference on Bridge Maintenance, Safety and Management, Portugal, 16 – 19 July 2006. Hershey, M., and Sharif, M. *East River Bridges Preventive Maintenance Program*.

In-House Presentation, 10 August 2006. Dini, S. *The Emergency Non-Electrical Air Drive System Maintenance Program on Ninth Street Bridge*.

7th International Conference on Short and Medium Span Bridges, Montreal, Canada, 23 – 25 August 2006. Baycora, A., Han, J., and Parroco, R. *The East 153rd Street Bridge: New York City's First Vehicular Cable Stayed Bridge*.

7th International Conference on Short and Medium Span Bridges, Montreal, Canada, 23 – 25 August 2006. Norrish III, C., Sklavounakis, C., Pratt, R. A., Baserga, N., and Mozzetti, C. *Replacement of the Belt Parkway Bridge Over Ocean Parkway*.

7th International Conference on Short and Medium Span Bridges, Montreal, Canada, 23 – 25 August 2006. Yegian, M. K., Jain, S. K., Kishore, K., and Patel, J. *Importance of Accurate Shear Wave Velocity in Seismic Evaluation of Bridges*.

5th International Cable-Supported Bridge Operators' Conference and LRFD Workshop on Bridge Design and Evaluation, New York City, 28 – 29 August 2006. Perahia, H. D., Patel, J., Ahmed, H., and Razzaq, A. *Rehabilitation of the Lower Roadway of the Manhattan Bridge*. Chief Bridge Officer Perahia also chaired the session on aesthetic and historic bridges.

Austrroads 6th Bridge Conference, Perth, Australia, 12 – 15 September 2006. Dr. Yanev delivered a keynote address.

MacDonald, A. *Long Road: Williamsburg Bridge Rehab Epic Close to End*. Feature Story in New York Construction News, October 2006.

Elvin, L. *Swinging on a Barge*. Cover Story in Low Bidder, November/December 2006.

In addition, Dr. Yanev continued his participation on the technical advisory panels of the National Council for Highway Research (NCHR) for the following projects: FHWA DTFH61-98-C-00094 *Seismic Vulnerability of the Highway System* and NCHRP 10-57 *Strength Evaluation of Parallel Wire Suspension Bridge Cables*. The results of the latter work were published in NCHRP Report 534 "Guidelines for Inspection and Evaluation of Suspension Bridge Parallel-Wire Cables." The experimental part of the project, consisting of controlled tests at Columbia University and field tests at the East River Bridges is now underway.

Dr. Yanev serves on the ASCE Committee working on revising the NYC Building Code. He continues to serve on the advisory panel of the NYC Department of Buildings for emergency response after citywide disasters.

In addition, the Division sponsors an in-house lecture series, inviting speakers from industry and academia several times a month. Highlight topics of the presentations in 2006 included: high load and sliding isolation bearings, timber piling, and new developments in concrete design and construction.

INNOVATIONS & ACCOMPLISHMENTS



Summer Intern Stephanie Dini (Daughter of the Late Nicolae Dini, Engineer-In-Charge, Mechanical Section, Bridge Maintenance) Presenting the Emergency Non-Electrical Air Drive System Maintenance Program on the 9th Street Bridge. (Credit: Michele N. Vulcan) Ms. Dini Monitoring the Four-Way Valve. (Credit: Vera Ovetskaya)



Chief Bridge Officer Henry Perahia and Dr. Bojidar Yanev at the 5th International Cable-Supported Bridge Operators' Conference. (Credit: Jagtar Khinda) March 2006: Earl Dubin (in Brown Shirt at Right), Structural Engineer With the FHWA New York Division Office, Instructing Division Inspection and other engineering Staff on the Inspection of Fracture-Critical Elements. This Was a One Day Course on The Use of Non-Destructive testing (NDT) Methods of Bridge Inspection And Evaluation.



Dr. Yanev Atop the Brooklyn Bridge. Preventive Maintenance Personnel Preparing to Conduct a Joint Exercise With the NYFD on the Queensboro Bridge: Executive Director of Bridge Preventive Maintenance and Repair Tom Whitehouse, Supervisor Highway Repairer Gerard Rollino, Assistant City Highway Repairer Giovanni Caballero, Assistant City Highway Repairer Lashawn Elam, and Director of Bridge Preventive Maintenance Paul Schwartz.