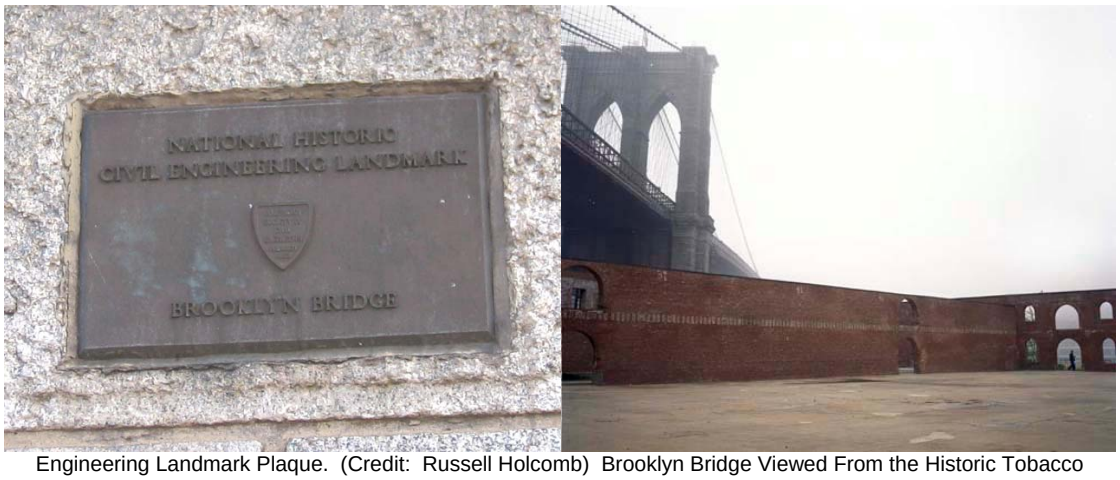
East River Bridges

A $2.9 billion reconstruction program is underway to rehabilitate all four East River crossings. In 2004, these bridges carried some 507,589 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 137,563 vehicles per day in 2004. The $470 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, as well as the painting of the entire suspension bridge.



Engineering Landmark Plaque. (Credit: Russell Holcomb) Brooklyn Bridge Viewed From the Historic Tobacco Inspection Warehouse at the Empire-Fulton Ferry State Park. (Credit: Jonathan Smith)

In addition, the bridge is scheduled to be seismically retrofitted 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. Construction is scheduled to begin in the summer of 2006 and conclude in the summer of 2008.

Pausing During a Saddle Inspection Atop the Bridge's Manhattan Tower: Oilers Samuel Garcia Jr., George Rivera, and Thomas Mcauliffe; Executive Director of Bridge Preventive Maintenance and Repair Thomas Whitehouse; Director of East River Bridges Preventive Maintenance Mohammed Sharif; and Deputy Director of Bridge Preventive Maintenance Paul Schwartz. (Credit: Anatoly Orlov)

MANHATTAN BRIDGE

The youngest of the three suspension bridges that traverse the East River, the Manhattan Bridge carries some 345,129 commuters – 79,129 vehicles and 266,000 mass transit riders - between Manhattan and Brooklyn daily. It was designed by Leon Moisseiff and completed in 1909. The bridge supports a subway transit line upon which four different train lines operate.

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

The $817 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 2011. The reconstruction will end with a seismic retrofit of the bridge (Contract #15), slated for completion in 2012. Work completed on the bridge to date includes reconstruction and painting of the south and north spans, 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.

"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 scheduled for completion in May 2006, **Contract #10** will bring the following improvements: rehabilitation of the north main span; refurbishment of the approach spans, tunnels and truss bearings; installation of a dedicated bicycle way on the bridge's north side, and painting. 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 includes 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 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.

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.

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

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; and upgrading of the lower roadway lane control signals. The work on the lower roadway is scheduled to begin in October 2006 and 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.

In 2005, 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, as well as on all of the other substructures and retaining walls on the approach spans. This cleaning will be followed by masonry joint pointing and repairs to the damaged granite stones of these structures. Other significant tasks underway at the end of 2005 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.

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.

Waterblasting to Remove Existing Microsurfacing From the South Upper Roadway.
Manually Removing the Microsurfacing.

Preparing the Deck for New Microsurfacing on the South Upper Roadway.

Placing the New Microsurfacing on the South Upper Roadway. Newly Resurfaced Roadway.

The Brooklyn Tower Canopy. Removing the Canopy.

In preparation for the major steel removal and replacement work on the lower roadway, which will begin in October of 2006, the contractor is proceeding with steel fabrication, has completed the installation of a temporary underdeck platform, and is preparing to commence abrasive blasting operations to remove the paint from the existing steel connection areas.

These upgrades will not only restore the structural integrity of the Manhattan Bridge, but will also allow it to carry an increasing number of pedestrians and bicyclists. This will reduce automobile congestion and its related air pollution in New York City.

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 $764 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 2006, and will end with a seismic retrofit of the bridge, slated for completion in 2012. 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 180,369 vehicles per day in 2004.

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

Electricians Atop the Bridge. (Credit: Peter Basich)

Contract #6

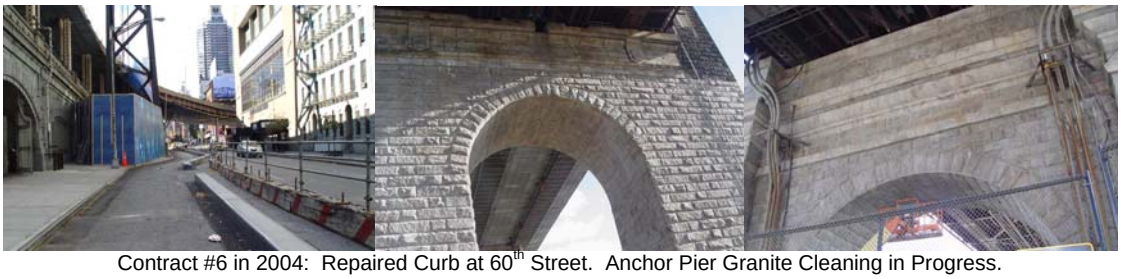
Contract #6, which began on October 31, 2003, will include the following: condition investigation of the eyebar heads and pins, replacement of the protective screening and the aviation warning lights, drainage improvements, rehabilitation of the overhead sign structures in Manhattan, the upgrading of 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 $38 million project is expected to be complete by the end of 2006.

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.

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.

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

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.

The work is performed within an entirely sealed Class 1A containment system (under negative pressure) which prevents 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.

Protected Roadway. View of Roadway Platform.

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. Installation of cables and platform, on the inner roadway of the Queens approach, was also underway.

Painted Area.

Newly Painted Section Along the Upper Roadway. Containment on the Queens Side Tower.
(Credit: Peter Basich)

On October 18, 2005, at approximately 1:00 PM, a street light's electrical wiring started a fire in the painting contractor's containment over the upper roadway. No injuries were reported. The containment was undergoing abrasive blasting at the time of the fire and all debris and blast media were continuously being vacuumed during the blasting operations. Declared a four-alarm blaze, the fire drew 168 firefighters and 39 units. It took firefighters about two hours to get the blaze under control, pumping water from ground hydrants through a series of bridge pipes to douse the flames. The fire caused burnt debris, blasting grit, and loose paint to fall onto the upper roadway. Until the fire was extinguished and the structure inspected for damage, all lanes of the bridge remained closed. Notifications were made to the regulatory agencies of the release to land, air and water. The contractor mobilized its work force and commenced clean-up of the roadway and the damaged containment upon clearance from the Fire and Police Departments. By approximately 5:00 PM, after the lower roadways were cleared of debris, traffic was restored. Clean-up operations of the upper roadways were completed by 10:00 PM. Structural steel repairs on the upper roadways continued through the night. Traffic was restored to the upper roadway by 5:00 AM on October 19, 2005. The painting work resumed on December 7, 2005, after the receipt of the contractor's safety plan and the hiring of a safety consultant.

Inspecting the Bridge After the Fire.

Scheduled work for spring 2006 in Manhattan includes the removal of old paint from the upper roadway from the Manhattan anchor pier to the Roosevelt Island west tower, and from the main span's inner and under lower roadways above Roosevelt Island; followed by the painting of these areas. Scheduled work in Queens includes the removal of old paint from the approach at the inner roadways, followed by painting of the approach.

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 2005, approximately 46% 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.

Queensboro Bridge Work Platform. Painters Arriving at the Platform.
(Credit: Michele N. Vulcan)

WILLIAMSBURG BRIDGE

The largest of the three suspension bridges that traverse the East River, the Williamsburg Bridge carries some 210,000 daily commuters – 110,000 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, continues with Contract #8, which began in March 2003 and is scheduled for completion in 2006, and will end with a seismic retrofit of the bridge, slated for completion in 2011.

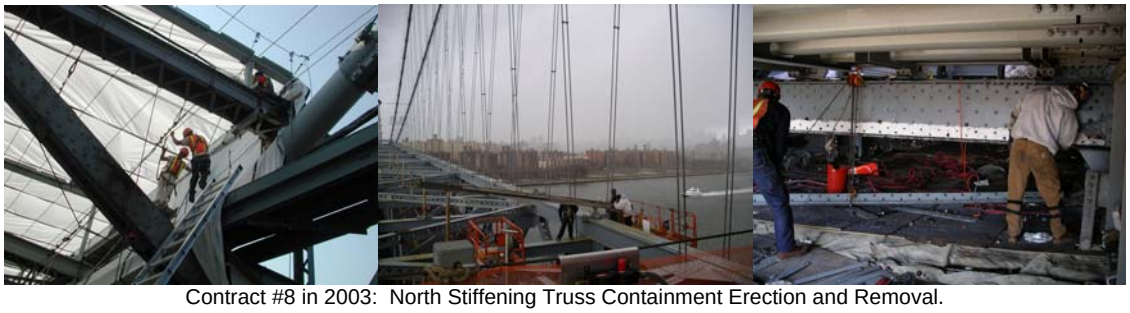
Williamsburg Bridge. Bridge Subway Structure. (Credit: Peter Basich).
Contract #8 Looking South at a Cable Band Retensioning Crew.

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.

Contract #8

Contract #8 began on March 3, 2003, and is scheduled to finish in September 2006. This $173 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.



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.

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.

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.

Replacing the Manhattan Approach Footwalk Expansion Joint Covers.

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.

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: Adjusting the Suspender Cables. Cable Band Bolt Retensioning. (Cable Band Credit: Bojidar Yanev) Demolition of the Brooklyn South Comfort Station Balcony.

Work anticipated to be completed in 2006 includes the replacement of truss bearings at the main towers, the installation of the new maintenance traveler system, the implementation of a south inner roadway contra-flow system, and the replacement of the asphalt overlay system along the south outer roadway.

Installing Brooklyn Main Tower Aviation Lights. FHWA Engineering Intern River Hwang Inspecting the Cable Wrapping.

Such improvements will not only restore the structural integrity of the Williamsburg Bridge, but will also allow it to carry an increasing number of pedestrians and bicyclists, thereby reducing automobile congestion and its concomitant air pollution in New York City.

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 2005, the number of openings declined further to a total of only 162 openings.

In addition, significant and costly traffic congestion results from the operation of this outmoded drawbridge. In 2004, the Mill Basin Bridge carried 145,760 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 2005, on a New York State-mandated scale from 1 to 7, this bridge had a condition rating of 3.22, 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.

Mill Basin Bridge

Under the Department's current proposal, the Mill Basin Bridge will be replaced with a new, 13 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, 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 winter 2009, 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 on 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 (UNIONPORT BRIDGE) OVER WESTCHESTER CREEK

This double leaf bascule bridge opened in 1953. In 2004, the bridge carried 60,908 vehicles per day. The 17 span 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 January 2007. 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 bridge superstructure, substructure and approaches, replacement of the existing mechanical and electrical systems for the bascule span, and reconstruction of the bridge operator house.

Onsite construction will be carried out in five stages. Incentive and disincentives will be used to expedite the completion of the project. Construction is expected to be completed in January 2010.

Unionport Bridge in 1953.

HAMILTON AVENUE BRIDGE OVER THE GOWANUS CANAL

The Hamilton Avenue Bridge opened in 1942. In 2004, the bridge carried 60,240 vehicles per day. The $55 million reconstruction of this bridge will use the "float out the old/float in the new" technique. The new bascule spans with trunnion towers will be shop-assembled and tested off-site, then will be floated in 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.

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 2004, the bridge carried 40,558 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.

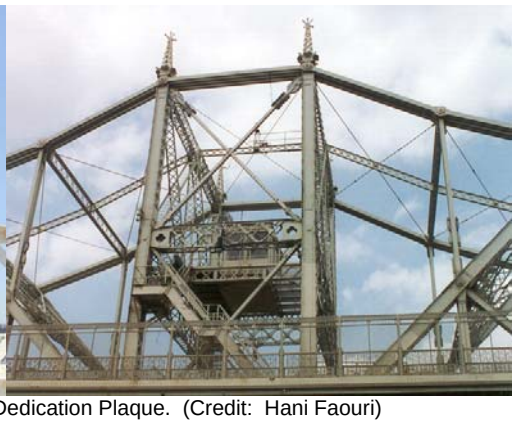
East View of Macombs Dam Bridge Swing Span and Camelback Truss. (Credit: Peter Basich)
Architectural Detail of the Bridge. (Credit: Michele N. Vulcan)
Closeup of a Gate House. (Credit: Peter Basich)

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.

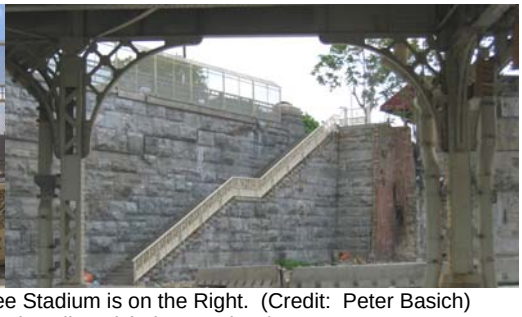
The second stage of construction began on November 2, 2001, after the conclusion of World Series play at Yankee Stadium. It consisted of the installation of structural components as well as the deck replacement of the middle one-third area of the bridge. This stage was completed on February 20, 2002, 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 2005, the contractor worked on window replacement, touch-up painting, restoration of park land, removal of actuators and replacement with temporary actuators, finishing the signage, sidewalk replacement, and the construction of a concrete wall at 161st Street. Expected completion of the project is July 2006.



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)

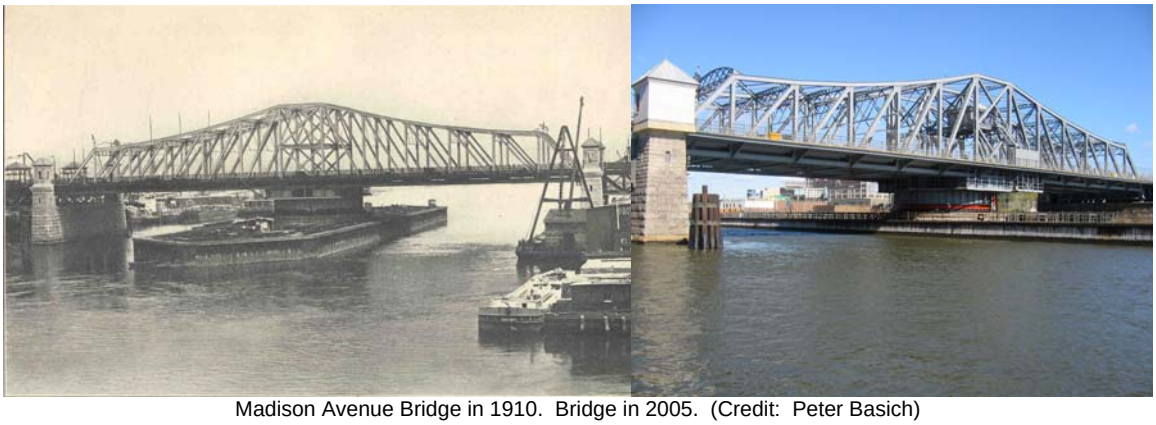
The bridge is also being assessed for seismic vulnerabilities. A seismic retrofit of this bridge will include strengthening the existing foundations and superstructure steel members. Retrofitting work will be completed throughout the length of the structure from the 155th Street Viaduct to the Jerome 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 2013 and end in January 2016.

MADISON AVENUE BRIDGE OVER HARLEM RIVER (BRONX/MANHATTAN)

This rehabilitation project began in 1994. The work included rehabilitating the swingspan and approaches, and replacing the bridge's barriers, handrails, fencing, mechanical and electrical systems. The bridge's electrical system was vandalized in August 2000. Both submarine cables and most of the bridge wiring had to be replaced. More than $2.5 million in damage was done by the vandals for the salvage value of the copper wiring they removed. A temporary drive was installed to make the bridge operational. In late June 2002, the bridge was successfully partially opened utilizing the interim drive machinery, except for the end lifts. This was the first time the bridge had opened under its own power in several years. The remaining work on the Bronx approach traffic signals and the submarine cables was completed in 2004. Test openings of the bridge in the counter-clockwise direction were performed in the summer of 2005, to check for any interference or binding in high temperatures.

A project for seismic retrofit, electrical, mechanical, masonry and miscellaneous work is scheduled to be performed between March 2012 and September 2013. 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

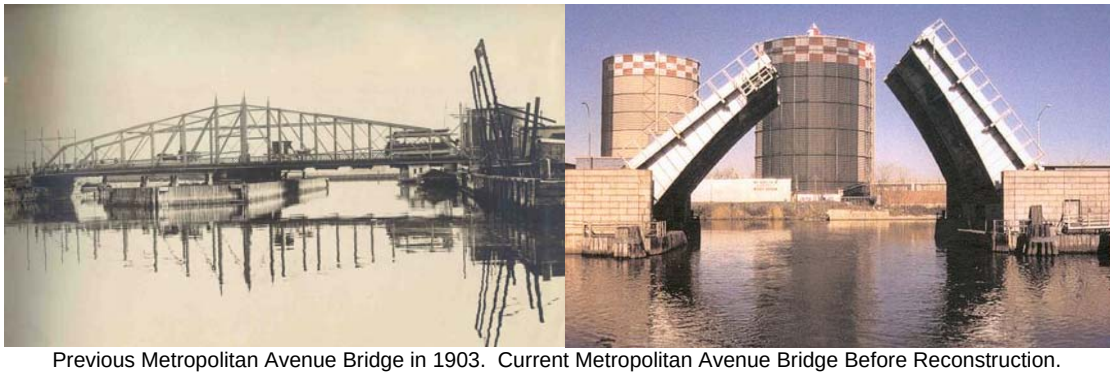
analysis, the construction duration will be longer since it will require construction of new foundations for the swing span located in the Harlem River. In 2004, the bridge carried 48,723 vehicles per day.



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 2004, the bridge carried 38,529 vehicles per day. A $39 million rehabilitation project began in October 2003. The estimated construction duration will be 33 months with approximately 5 months lead time. The project's scope of work includes 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. Looking North at the Demolition of the Bridge Operator House. Looking East at the Rebuilding of the 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 was completed. 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 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.

Demolition of the Northwest Flanking Span of the Metropolitan Avenue Bridge. Looking West at the Installation of Sheet Piles on the Northeast Approach Slab. Looking West at the Removal of the Northwest Sidewalk.

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 is currently operational 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.

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

Bridge Opening With New Machinery.

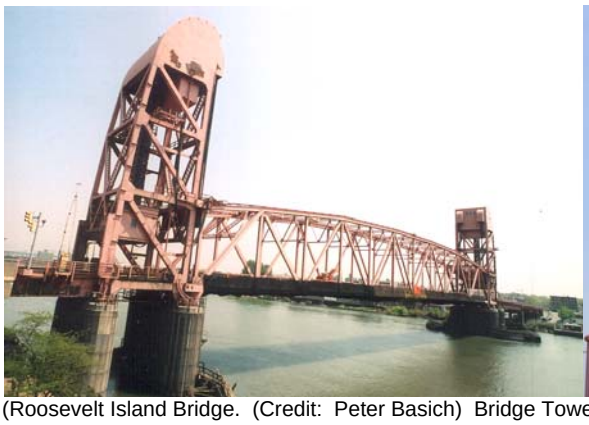
Onsite construction will be carried out in three stages. Incentives and disincentives are tied to the completion of Stage I and Stage II and the opening of each half of the bridge to traffic. The maximum project incentive is $900,000. There is no maximum value associated with the disincentives. Construction is expected to be complete in mid-2006.

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

This lift bridge opened in 1955. In 2004, the bridge carried 9,100 vehicles per day. In 2005, the lift span opened 150 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.

Roosevelt Island Bridge Under Construction in 1952.

Currently in its final design phase, the reconstruction of the bridge is scheduled to start in December 2006. 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.



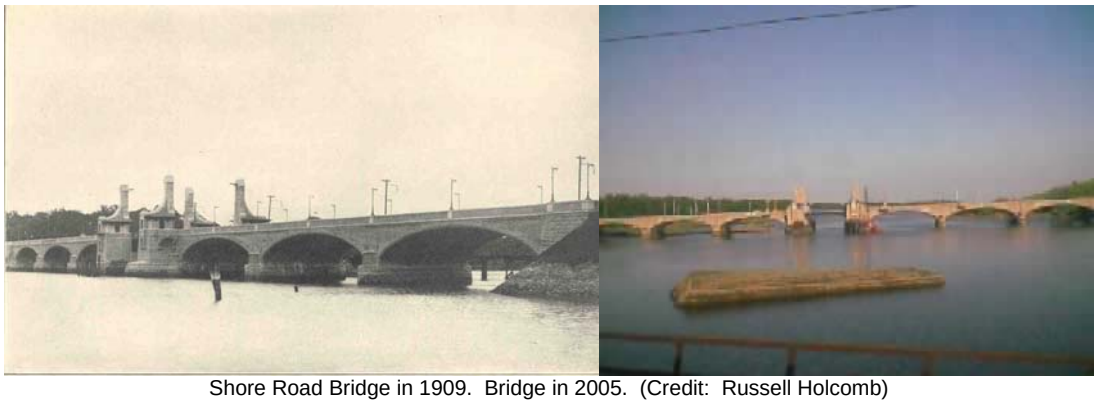
(Roosevelt Island Bridge. (Credit: Peter Basich) Bridge Tower. (Credit: Michele N. Vulcan)

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 October 2009.

SHORE ROAD BRIDGE OVER THE HUTCHINSON RIVER (BRONX)

This bridge, built in 1908, was originally called the Pelham Parkway Bridge over Eastchester Bay. In 2004, the bridge carried 18,292 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.

As of the end of 2005, various alternatives for the new bridge were being evaluated for further design. An environmental impact study is expected to begin in 2006. The project to construct a new Shore Road Bridge is scheduled for construction between August 2011 and November 2015.



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 47,053 vehicles per day in 2004. 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 will include complete replacement of the approaches and the swing span. Elimination of the center median on the main span will greatly improve the traffic flow on the bridge. This bridge will use a center spherical roller thrust bearing for supporting the span and for seismic loads. The bearing will be the largest of this type made for this purpose. The existing pivot pier will also be 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, New Temporary Bridge on Right.
(Credit: Daniel Hom)

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.

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)

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. (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.

If all construction work is completed five months ahead of schedule, the contractor will receive a maximum incentive of $3.75 million for Milestone D. As a disincentive, the contractor will be penalized from $25,000 to $37,500 each day the milestone date is exceeded with no set maximum penalty. Completion of the project is scheduled for June 2006.

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 74,700 vehicles per day in 2004. 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 March 2007, this project is slated for completion in March 2012.

Willis Avenue Bridge

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 2004, the 145th Street Bridge carried approximately 25,994 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, the repairs of span #3, and the tieback borings. The new swing span is currently being assembled in Albany, New York and is scheduled to be barged down the Hudson River for a final float-in during November 2006.

Replacing Span #3. Swing Span Truss Assembly.

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

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. 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.

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, Hamilton Avenue 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.

THREE TUNNEL PROJECT

Rehabilitation work continued on the Battery Park Underpass, and the Park Avenue and First Avenue tunnels in Manhattan. The contract includes 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 is scheduled for completion in early 2006.

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

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 Weidlinger Associates 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.

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 $976,956 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 two of the bridges with new bridges built with higher clearances, thereby reducing the number of times the bridges must be opened.

Summary of Vessel Openings 1991 - 2005

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Brdn Ave. (Q)	282	107	141	0	0	105	15	0	3	0	28	0	0	0	1
Brdwy (B/M)	12	3	10	6	7	24	7	2	0	6	27	83	49	16	2
Brcknr Expwy (Estrn Blvd) (B)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brcknr Expwy (Unnprt Brdg) (B)	743	635	554	594	431	386	363	257	345	385	420	332	300	309	253
Carroll St. (K)	517	627	669	704	432	245	142	110	174	102	80	124	186	49	22
Grand St. (K/Q)	419	549	224	254	239	189	37	23	24	17	50	19	10	8	5
Grnpoint Ave. (K/Q)	1014	860	587	549	498	557	626	669	787	688	641	659	738	1093	1045
Hmltn Ave. (K)	1466	1331	1300	1336	1246	1191	1157	996	982	933	832	946	824	757	677
Hntrs Point Ave. (Q)	264	106	141	0	0	113	15	0	1	0	36	0	0	0	0
Htchnsn River Pkwy (B)	8	0	0	0	37	31	32	75	46	5	120	30	5	37	10
Macombs Dam (B/M)	0	0	0	6	5	13	3	0	0	0	0	0	0	0	0
Mdsn Ave. (B/M)	3	1	5	5	0	0	0	0	0	0	0	0	0	7	0
Metrpltn Ave. (K)	301	356	225	310	272	407	423	448	513	279	366	339	342	153	0
Mill Bsn (K)	867	879	1151	1250	954	903	628	591	433	336	317	142	173	164	162
Pulaski (K/Q)	584	426	224	239	206	195	291	332	383	276	208	308	599	694	734
Rsvlt Islnd (M/Q)	0	0	0	0	0	0	0	4	0	58	48	125	63	669	150
Shore Rd (Pelham Pky) (B)	1968	1996	2138	2222	2190	2167	2158	2274	2162	2168	2222	1897	1910	2011	1683
Union St. (K)	502	547	657	713	432	236	144	103	144	85	101	62	24	21	11
Ward's Isnd Pdstrn (M)	0	0	2	0	1	0	2	1	0	0	279	0	0	7	2
Willis Ave. (B/M)	15	6	8	18	24	17	9	0	4	4	40	0	7	25	2
3rd Ave. (B/M)	3	1	7	19	20	18	9	0	2	1	1	0	0	0	0
3rd St. (K)	410	549	663	732	432	256	149	112	157	178	117	212	152	99	43
9th St. (K)	864	984	927	836	0	0	0	0	192	513	808	733	547	457	360
145th St. (B/M)	2	0	0	9	24	24	3	0	0	1	6	0	0	9	0
W.207th St. (B/M)	0	0	1	6	4	12	7	2	0	6	14	4	6	10	1
TOTAL	**10244**	**9963**	**9634**	**9808**	**7454**	**7089**	**6220**	**5999**	**6352**	**6041**	**6761**	**6015**	**5935**	**6595**	**5163**

Roadway Bridges

INNOVATIONS

Innovations in the design and construction of Roadway Bridges continued in 2005. 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.

Stainless steel clad rebars and galvanized steel rebars, to reduce concrete deck deterioration, were utilized in pilot projects such as the Congress Street Bridge over the Brooklyn-Queens Expressway, and the East Third Street Bridge over the Bay Ridge LIRR.

ANDREWS AVENUE BRIDGE OVER LIRR (QUEENS)

The Andrews Avenue Bridge was built in 1937. A Notice to Proceed for the $3.7 million replacement of this bridge was issued to the contractor with a start date of August 4, 2003. The bridge was completely closed beginning in winter 2004, and the new bridge was fully re-opened to traffic on November 24, 2004. The new bridge, designed by the Division's In-House Design Section, accommodates two 3.6-meter traffic lanes and two 2.5-meter wide sidewalks to better serve the community. The old four-span bridge was completely removed and replaced with a single span concrete-filled grid deck with multiple weathering steel stringers and girders supported by precast modules for the abutments and wing walls. This was the first use of this material in a NYCDOT bridge project. The proposed geometry of the south approach roadway required the construction of a retaining wall at the edge of a soccer field, lumber yard, and other private properties, due to the rise in profile. The precast wall required the excavation of only half a meter as compared to about two meters with the use of conventional cast-in-place concrete. The installation of these wall units greatly minimized the disturbance to the adjacent private properties, and enabled installation of the precast units in a relatively short time, even in winter. Precast wall units also improved the aesthetics of the playground and the area within the project limits. The use of precast concrete modules assured better quality concrete, and ease of installation reduced the total construction time from 15 months to 9 months. The use of weathered steel for bridges over railroads eliminates expensive costs involved in maintenance painting. This project was substantially completed on February 1, 2005.

Andrews Avenue Bridge Prior To Reconstruction. Installing Pre-Cast T-Wall for the Modular Abutments. Constructing the Third Level of the Pre-Cast Abutment. (Credit: Syed Alam)

Installation of the Grid Deck. Newly Completed Andrews Avenue Bridge (Credit: Syed Alam)

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

On a New York State-mandated scale from 1 to 7, these six bridges possess a condition rating of "fair" (3.001 – 4.999). In 2005, the Fresh Creek Bridge was 3.22; the Gerritsen Inlet Bridge was 3.60; the Paerdergat Basin Bridge was 3.28; the Rockaway Parkway Bridge was 4.06; the Nostrand Avenue Bridge was 4.10; and the Bay Ridge Avenue Bridge was 3.67. 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; 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 summer 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 fall 2007, 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 summer 2008, 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 summer 2008, 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 summer 2008, 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 bridge (with complete replacement of the superstructure and substructure). It will be constructed on a new off-line alignment conforming to current standards. The new split bridge will be within the right-of-way of the parkway. This project is scheduled to begin construction in the spring of 2007, and to last for approximately four years.

Paerdegat Basin Bridge

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. 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 November 2006, and is expected to be complete in November 2007.

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.

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 is no longer capable of preventing water from infiltrating the structural concrete. If this situation continues unabated, the concrete will become severely damaged due to the water's freeze/thaw action and its corrosive effect on the reinforcing steel. Installing new joint material will reestablish 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 will be 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 will be open to traffic. The eastbound cantilevered level was completed in November 2004. Work on the westbound cantilevered level is scheduled to resume in spring 2006. The project is expected to be complete in November 2006.

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 2006, and is expected to be complete by April 2008.

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 June 2009, and is expected to be complete in November 2010.

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 is expected to be completed in March 2007. 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)

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 will include a replacement of a water trunk main under the railroad track which is within the limits of the bridge reconstruction. The replacement of the water

trunk main will be funded by NYCDEP. The existing bridge is a four span structure with a steel pier bent and reinforced concrete abutments. The bridge spans over NYCTA Brighton Beach line. The rehabilitation will include removal of the existing bridge in its entity and the construction of a new bridge. The new bridge will be a single span flexible type integral abutment bridge built compositely with a steel stringer and a concrete deck. The project work will be accomplished in three stages. The water trunk main will be 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 is expected to be completed in April 2006.

Lincoln Road Bridge in 2003. (Credit: NYSDOT)

CORTELYOU ROAD BRIDGE OVER NYCT (BROOKLYN)

This $3.7 million project was constructed in three stages. Two-way traffic was maintained by providing one lane in each direction during construction, and no detours were required. The existing bridge was a one span steel through-girder, floorbeam and steel stringer bridge with very short approach spans. Two steel column bents, rising out of the passenger platforms, support each end of the main span. The reconstruction replaced the existing deck slab and steel stringers with modified floorbeams and through-girders. Construction began in April 2002, and was substantially completed on June 11, 2005.

Cortelyou Road Bridge in 2003. (Credit: NYSDOT)

Reconstructing the Sidewalk Area & Approach Roadway During Stage I. Stage II Work in Progress.

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 2006, and is expected to be complete in April 2008.

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 2008.

Crooke & Newkirk Avenue Bridges. (Credit: NYSDOT)

GLENMORE AVENUE, PITKIN AVENUE, SUTTER AVENUE, AND LIBERTY AVENUE BRIDGES OVER LIRR BAY RIDGE (BROOKLYN)

This $12 million project reconstructed four bridges over the LIRR tracks in Bay Ridge. A Notice to Proceed for the reconstruction of the Glenmore Avenue, Pitkin Avenue, and Sutter Avenue Bridges over LIRR Bay Ridge was issued to the contractor with a start date of January 14, 2003. The reconstruction of Liberty Avenue over LIRR Bay Ridge commenced after the completion of these bridges. Glenmore Avenue, Sutter Avenue, and Liberty Avenue were fully closed to pedestrian as well as vehicular traffic during construction. The Pitkin Avenue bridge was constructed in two stages. One traffic lane in each direction and one sidewalk were open at all times during construction.

Glenmore & Pitkin Avenue Bridges in 2002. (Credit: NYSDOT)

Sutter Avenue Bridge in 2003. (Credit: NYSDOT) Liberty Avenue Bridge in 2004.

The reconstruction of the Glenmore Avenue Bridge was substantially completed on July 16, 2004. The reconstruction of the Sutter Avenue Bridge was substantially completed on October 19, 2004. The reconstruction of the Pitkin Avenue Bridge was substantially completed on October 27, 2005.

Demolishing the Old Glenmore Avenue Bridge. Installing Tiebacks at the East Abutment.

New Bearings Installed at the Central Pier & East Abutment of the Glenmore Avenue Bridge. Erecting Structural Steel. Placing the Deck Slab Concrete.

Demolishing the Old Sutter Avenue Bridge. Erecting Structural Steel. Installing Stay-in-Place Forms.

Pitkin Avenue Bridge During Construction. Completed Pitkin Avenue Bridge (Completion Credit: Fred Arzideh)

Effective November 11, 2004, the Liberty Avenue Bridge was closed to traffic for rehabilitation, as agreed to by the community. In August 2005, an extended conveyer belt was used to pour concrete on the bridge because of height restrictions caused by the presence of trains overhead. This belt can transport materials such as concrete, sand, and backfill, and is convenient when height constrictions prohibit the use of a pump or crane. It has a horizontal reach of up to 130 feet and is operated by one person with a remote. The belt can move 360 cubic yards of material in one hour.

Concrete Pour on Liberty Avenue Bridge.

Erection of Structural Steel at Liberty Avenue Bridge. View Under the New Bridge. Looking West at the New Bridge.

The reconstruction of the Liberty Avenue Bridge was substantially completed on November 15, 2005.

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 bridge is scheduled to begin in November 2006, and 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 Plaza

Existing Grand Concourse

Rendering of New Grand Concourse

GUN HILL ROAD BRIDGE OVER METRO NORTH RR (BRONX)

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, 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) View of Bridge at the MPT Stage. Demolition of the Existing Bridge Deck. (Deck Credit: Muhammad Siddiqui)

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. Construction is expected to be complete in December 2008.

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

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 are conducting this inspection, which is scheduled for completion in the summer of 2006, at an estimated cost of $2.2 million. The Division administers and supervises this work.

The resultant report will be 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.

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

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 will commence 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 will include 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 will include 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 will be completed in three stages, with one lane of vehicular traffic maintained in each direction during construction. On Manhattan College Parkway, the work will also be 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. These two bridges are expected to be complete in late spring 2006.

On West 239th Street, the work will be 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. This bridge is expected to be completed by May 2006.

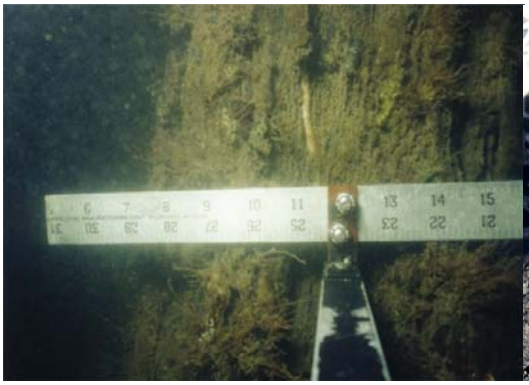
Work on the West 252nd Street Bridge will include the demolition of the existing concrete arch bridge deck, and replacing it with a new prestressed concrete box beam superstructure. In addition, the reconstruction of this bridge will include installing a new 300 mm diameter water main, improving the 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. The four bridge project is expected to be complete in February 2007.

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.

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 is scheduled for completion by May 2006. The construction work is expected to commence in March 2007.

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 December 2006, and is expected to be complete in May 2008.

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) Temporary Bridges in Place in December 2004.

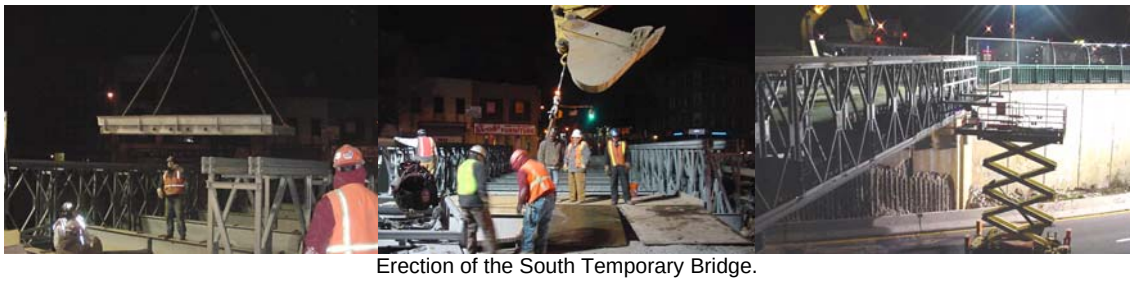
The contract provides for several NYPD Traffic Agents to maintain the flow of traffic at the Steinway Street intersections affected by the bridge for the duration of the replacement. Variable Message Signs (VMS) will be utilized to advise motorists of impending nightly lane closures on the Grand Central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

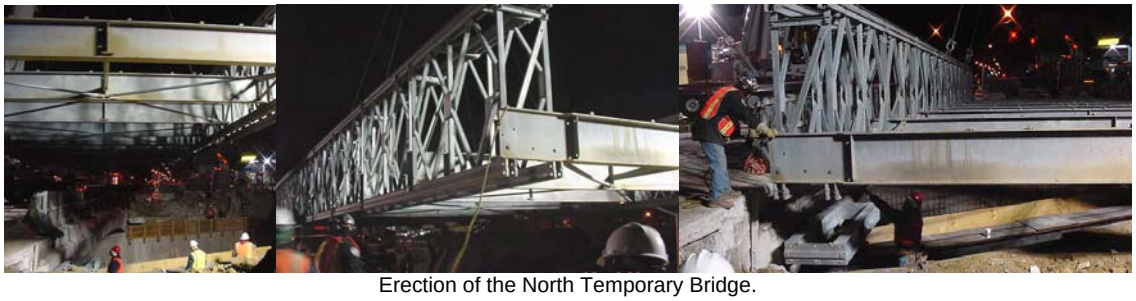
In the interim period between August 2004 and December 2004 and as a precautionary measure, a decision was made by the Department to completely close the remaining two-thirds of the existing bridges to both vehicular and pedestrian traffic. As a result, traffic detour routes along north and south Astoria 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 provision for a pedestrian walkway) in the location where the first one-third of the existing bridges were removed. These temporary bridges will be utilized to carry two lanes of traffic along the northbound direction on Steinway Street over the Grand Central Parkway and will result 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.



Erection of the South Temporary Bridge.



Erection of the North Temporary Bridge.

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, and is currently conducting preparatory work for the removal of the remaining two-thirds portion of the bridges.

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.

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 will be demolished and reconstructed. This stage is expected to be complete in October 2006. All traffic will then be shifted to the newly reconstructed portion, which will carry two lanes of vehicular traffic in each direction, as well as a pedestrian walkway. In the second stage the final one-third will be rebuilt after removal of the temporary bridges. The project is scheduled for completion in October 2007.

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 2005, 13 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 is scheduled to perform 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.

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.

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.

Construction is expected to begin in the summer of 2007, and is expected to be complete in the summer of 2110.

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 November 2006, and is expected to be complete by November 2008.

Woodside Avenue Bridge. (Credit: NYSDOT)

EAST 3RD STREET AND 52ND STREET BRIDGES OVER LIRR (BROOKLYN)

This $4 million project reconstructed these two bridges, built in 1906. The bridges span a railroad track owned by LIRR, and presently used by New York and Atlantic Railway for freight service. A Notice to Proceed for the reconstruction of these bridges was issued to the contractor with a start date of May 5, 2003. The work included building new superstructures of steel stringers, reinforced concrete decks, parapets with protective screenings, and steel faced curbs and concrete sidewalks. The bridges were constructed in two stages, with one traffic lane in each direction and one sidewalk open at all times during construction. The reconstruction of the East 3rd Street Bridge was substantially completed on October 25, 2004. The reconstruction of the 52nd Street Bridge was substantially completed on January 11, 2005.

East 3rd Street Bridge Before Reconstruction. Removing the Stringer Encasements. Removing the West Side Bridge Deck.

Demolition of the East 3rd Street Bridge South Abutment. Installing Structural Steel. Placing Concrete for the Approach Slabs.

Installing Galvanized Rebar for the Approach Slab. East 3rd Street Bridge After Reconstruction.

52nd Street Bridge Before Reconstruction. Demolition of the Bridge Deck. Installation of Temporary Supports.

Installation of Structural Steel on 52nd Street Bridge. Placing Concrete on the Bridge Deck.

New 52nd Street Bridge East Sidewalk.

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 March 2007, and is expected to be complete in November 2008.

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

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

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.

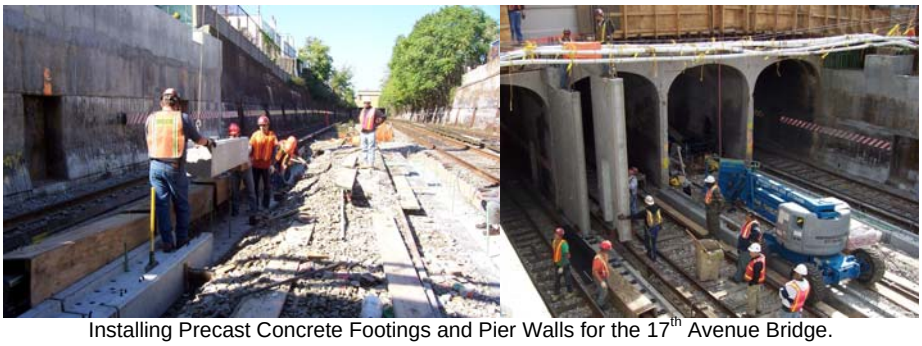
The 18th Avenue Bridge is also an arch barrel bridge, constructed in 1912-1913 between 63rd and 64th Streets. Age, weather and increased traffic had affected the bridge. The roadway slab, concrete abutments and concrete piers were severely deteriorated. The bridge had outlasted its useful life. The scope 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.

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

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

Demolition of the 17th Avenue Bridge Deck. Casting the New East Abutment Wall.



Installing Precast Concrete Footings and Pier Walls for the 17th Avenue Bridge.

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

Completed 17th Avenue Bridge and Fence.

Work on the 20th Avenue Bridge began in winter 2006 after the utility company performed extensive work on the gas main. The bridge is expected to be complete in June 2007.

20th Avenue Bridge in 2002. (Credit: NYSDOT)

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 project is scheduled for completion in December 2007.

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 March 2007, and is expected to be complete in November 2007.

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 December 2006 and be completed in December 2009.

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.

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 February 2007 and is expected to be completed in April 2008.

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

Design-Build

In 2005 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.

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 will soon expire, thus making bridge rehabilitation necessary. In 2004, the bridge carried approximately 14,979 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 2012.

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. One lane of traffic is being maintained at all times. Repairs are expected to be complete by the end of 2006.

HARLEM RIVER DRIVE AT EAST 127TH STREET (MANHATTAN)

This project, currently in its final 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. The bridge will be reconstructed in six stages. During construction, two southbound lanes and three northbound lanes of traffic will be maintained. Construction is expected to begin in summer 2011, and is expected to be complete in summer 2014.

Harlem River Drive at East 127th Street.

SEVEN RAMPS 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 seven ramps carry bus and passenger car traffic in and out of the facility. Six of the seven ramps were constructed in 1948, with the seventh 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 seven bridge structures. The planned design-build project will upgrade these seven structures and provide a design life of 75 years. The project will provide new decks and eliminate joints where feasible, retrofit poorly detailed steel connections, and rehabilitate/replace deteriorated steel super and substructure members, as well as install new paint systems. In addition, the existing load-restricted north ramp adjacent to the Richmond County Bank Stadium 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. Construction is expected to begin in summer 2007, and is expected to be complete by late summer 2009.

Arial View of the Staten Island Ferry Terminal Ramps.

BELT PARKWAY BRIDGE OVER MILL BASIN (BROOKLYN)

The next significant work on this bridge will consist 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 is complete, and grid panel fabrication is underway. Construction is expected to be complete by September 2007. The contract provides 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 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.


Mill Basin Bridge Deck. Contractors, Tamara Berlyavsky, and Ronald Rauch Inspecting the Deck.

When and Where Unit

In 2005, 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, Central Drive Bridge over Transverse Road #1 (at 65th Street), 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, Henry Hudson Parkway Bridge between 94th and 98th Streets over Amtrak, Hill Drive Bridge over Prospect Park Lake, Houston Street Bridge over FDR Drive, Hutchinson River Parkway Bridge over Hutchinson River, Jackie Robinson Parkway Bridge over Metropolitan Avenue, Jamaica Avenue Bridge over Cross Island Parkway, Linden Boulevard over BCIP, Matthewson Road Bridge over MacCracken Avenue, Motor Parkway Pedestrian Bridge over Springfield Boulevard, Motor Parkway Pedestrian Bridge over 73rd Avenue, Pelham Parkway Bridge over Amtrak & Metro North, Riverside Drive over West 125th Street and Others, Roosevelt Avenue over Van Wyck Expressway, Roosevelt Island Bridge over East River/East Channel, Rust Street Bridge over Flushing Avenue, Shore Road over Hutchinson River (Bronx) (a.k.a. Pelham Bay Bridge), Wards Island Pedestrian Bridge over Harlem River, West Drive over Transverse Road #4, Willis Avenue Bridge over Harlem River, East 6th Street Pedestrian Bridge over FDR Drive, East 10th Street Pedestrian Bridge over FDR Drive, 14th Avenue Bridge over Cross Island Parkway, East 78th Street Pedestrian Bridge over FDR Drive, West 79th Street Rotunda Complex, 80th Street Bridge over 71st to 77th Avenues, 145th Street Bridge over Harlem River, 149th Street Bridge over Cross Island Parkway, West 173rd Street Pedestrian Bridge over Amtrak 30th Street Branch, West 181st Street Pedestrian Bridge over Henry Hudson Parkway NB, 191st Underground Street between St. Nicholas Avenue to Broadway IRT, and 236th Street Pedestrian Bridge over Henry Hudson Parkway.

Installing Timber Shielding and Pigeon Netting at the Belt Parkway Over Rockaway Parkway Bridge.

Installing Mesh Cover Strips Over the Drainage Gratings Along the Sides of the 191st Underground Street to Broadway.

236th Street Pedestrian Bridge over Henry Hudson Parkway: Repairing the Abutment Walls.

236th Street Pedestrian Bridge over Henry Hudson Parkway: Epoxy Grout Repairs of Cracks and Between the Stones. Waterproofing the Deck.

Reinforcing A Flagged Stringer Web at the Brooklyn-Queens Expressway Bridge Over Nassau Street.

Completing the Repairs at the BQE Bridge Over Nassau Street.

Central Drive Bridge Over Transverse Road #1: Preparing Bracing and Mesh to Protect the Bridge From Falling Debris.

Central Drive Bridge: Installing Arch Stone Bracing and Expanded Metal Mesh. Completed Repairs.

Riverside Drive Bridge Over West 125th Street: Rebuilding the Beginning Abutment East Corner Parapet Wall.

Riverside Drive Bridge: Completed Repairs.

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 145th Street Bridge over the Harlem River, Hutchinson River Parkway Bridge over the Hutchinson River, Shore Road Bridge over the Hutchinson River, Boston Post Road over the Hutchinson River, Depot Place Bridge over Conrail Hudson Division, Belt Parkway Bridge over Mill Basin, Roosevelt Island Bridge over the East River East Channel, and Hamilton Avenue Bridge over the Gowanus Canal.

Working on a Barge to Repair the Damaged Fender System at the Boston Post Road Bridge over the Hutchinson River. (Credit: Thomas Leung)

Director of the When and Where Unit Sudhir Jariwala Measuring the Diameter of Holes Drilled Through the 4-Foot Thick Walls of the Shore Road Over Hutchinson River Bridge Operator House. Drilling the Holes for Threaded Steel Rods. Working From the Barge.

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, and the Roosevelt Island Bridge over the East River East Channel.

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 2005 included the Belt Parkway Bridge over Paerdegat Basin in Brooklyn, which is in the final design stage. 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.

Other projects under include the Hempstead Avenue Bridges over Cross Island Parkway and Cross Island Parkway Service Road, Springfield Boulevard Bridge over Belt Parkway, Union Turnpike Bridge over Cross Island Parkway (and Creedmoor Center Road), Hillside Avenue Bridge over Cross Island Parkway, Linden Boulevard Bridge over Cross Island Parkway, and Sunrise Highway (Westbound) over Belt Parkway (Westbound) in Queens.

Rendering of New Belt Parkway Bridge Over Paerdegat Basin. (Credit: Alexander Berens)

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 2005 included the Willis Avenue, Broadway, 145th Street, Third Avenue, and Wards Island Pedestrian Bridges over Harlem River; Third Street, Carroll 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 Road (Unionport Bridge) over Westchester Creek in the Bronx; and the Williamsburg and Brooklyn Bridges.

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 2005 included the Queensboro Bridge, the Metropolitan Avenue Bridge, and the Williamsburg Bridge. In addition, the unit continued to provide emergency response related to environmental issues. During the October 2005 Queensboro Bridge containment fire, unit staff reported to the site and provided guidance and direction during the cleanup of the post-fire environmental contamination to ensure the timely opening of the bridge to traffic.

As part of the Environmental Committee for the Office of Environmental Assessment and Compliance, 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 performs quarterly water monitoring in compliance with the pending NYSDEC SPDES system for seven 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, 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.

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 Queensboro Bridge Painting Project; rehabilitation of the Liberty, Pitkin and Sutter Avenue Bridges; and the Metropolitan Avenue Bridge.

BRIDGE PROJECT SPECIFICATIONS

In 2005, the Engineering Support Section prepared and/or reviewed specifications for 22 bridge rehabilitation and reconstruction contracts which included nine combined or multiple-bridge contracts. Three of these contracts totaling approximately $105 million in construction costs were bid and are currently in different stages of award and registration. One contract with an estimated construction cost of $28 million that was approved by the Law Department in 2004 will have to be resubmitted for approval as its advertisement has been delayed and some changes have been made to it. Another Contract is in the Law Department approval process. The specifications for the remaining seventeen contracts are in various stages of preparation.

Notable among the bridge contracts prepared and/or reviewed are the Belt Parkway Bridge over Gerritsen Inlet; East 153rd Street Bridge over Metro North; Rehabilitation of the Grand Concourse Bridge over 161st Street (includes the Grand Concourse from 161st to 166th Streets); Belt Parkway Bridge over Bay Ridge Avenue; Belt Parkway Bridge over Nostrand Avenue; Belt Parkway Bridge over Rockaway Parkway; Roosevelt Island Bridge over East River/East Channel; Hamilton Avenue Bridge over the Gowanus Canal; Rikers Island Bridge; Belt Parkway Bridge over the Fresh Creek Basin; Woodside Avenue Bridge over LIRR; and Belt Parkway Bridge over Paerdegat Basin.

CONVERSION OF DIVISION ENGINEERING ARCHIVES

Since the first digitizing contract of engineering records began six 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. 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.

EMERGENCY MONITORING OF RETAINING WALL ALONG HENRY HUDSON PARKWAY

On May 12, 2005, a privately owned 100-foot retaining wall above Riverside Drive and Henry Hudson Parkway (near 181st Street) collapsed in Washington Heights, burying cars under rocks, dirt and tree, and shutting down one of Manhattan’s busiest arteries during rush hour. The retaining wall, built in 1908, buttresses the land surrounding the apartment buildings. Water building up behind the nearly century-old retaining wall likely caused it to crumble.

The Collapsed Retaining Wall Near 181st Street.

Near the collapsed wall, there is an approximately 1,500 foot long gravity stone retaining wall owned by the City, which is also in aged condition. A surveying group was assigned to perform periodic monitoring of movement of the wall until a hired consulting firm takes over the job.

Survey Crew (Mariya Zhurakhinskaya, Aleksandr Kotlyanskiy, Alfred Lee, and Thee-Shiun Ken) Conducting Periodic Monitoring of the Retaining Wall. (Credit: Eric Ken)

The survey crew from DDC installed forty-one reference points along the wall. Division personnel utilized surveying equipment to obtain the necessary information for calculating the coordinates for each reference point. By comparing the coordinates of the most recent reading with the initial reading on each reference point, we can determine the movement of the wall.

RETAINING WALL INSPECTION

In 2001, a study was completed that identified, located, determine the ownership, and made condition assessments of the retaining walls under the City's jurisdiction, and inventoried the retaining walls associated with the arterial highways and streets within the City's five boroughs, as well as the retaining walls associated with the City-owned bridges. The walls were photographed and located on a GIS map.

After the May 2005 retaining wall collapse on the Henry Hudson Parkway, the Bureau began an urgent project to manage the inspection and condition assessment of the City-owned retaining walls. The Engineering Review Section assembled a scope and task description for the inspection of 622 walls by a consultant. The inspection identified the poorly rated walls which will need immediate repair to prevent their collapse. Seventeen such walls were identified, and their rehabilitation will be handled by DDC.

Carpenters Ruben Urena, Thomas Gilmore, and Adam Muhleisen Preparing Forms to Temporarily Shore Up the Damaged Retaining Wall at Decatur Avenue and 197th Street. (Credit: Michele N. Vulcan) The Completed Shoring.

TRUMP/NEW WORLD PROJECT

The Trump/New World 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. 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 75 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 the Queensboro and Williamsburg 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.

In the winter of 2004-2005, a total of 52,000 gallons of anti-icing chemicals were applied on the roadways of all four East River Bridges.

INSPECTIONS

In 2005, Inspections covered 114 bridges and 627 spans. Emphasis was placed on ensuring public safety through the monitoring of potentially hazardous conditions and temporary repairs. The unit performed 339 monitoring inspections, and 366 special winter monitoring inspections of cellular structures, shorings, and potential fire hazards. In addition, 288 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 is being prepared for field verification in early 2006, along with the selected portable computers.

Substantial Completion Inspection of Pitkin Avenue Bridge Over LIRR. (Credit: Fred Arzideh)
Division Personnel Inspecting Paerdegat Bridge Utilizing a Barge. (Credit: Avelino Leyco Jr.)

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 TESTING

The monitoring of cracks in the Manhattan Bridge anchorages utilizing displacement gauges by Strain Monitoring Systems continued in 2005. 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.

CLEANING

In 2005, 9,279 cubic yards of debris were removed from bridges and their surrounding areas, and 869 drains were cleaned.

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, Cryptococosis 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. Chicken wire or heavier wire fabric is attached to metal studs to create panels which are used, much like a drop ceiling, to keep the pigeons out. The panels rest horizontally on top of the bottom flanges of the steel beams, and vertically along the top of the abutment walls. The pigeons are caged out. This method is currently in use under the Brooklyn Bridge approach (over Cadman Plaza East), Shore Parkway over Bay Ridge Avenue, the Pulaski Bridge approach (over Clay Street), the Belt Parkway Bridge over Bay Parkway, and the Belt Parkway Bridge over Bay Ridge Avenue. In addition, a pigeon deterrent system involving low voltage wires was installed 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 a year 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.

In 2005, pigeon dropping removal and/or pigeon proofing were performed at the Park Avenue Tunnel over East 34th Street, the Livonia Avenue Pedestrian Bridge over LIRR, the Roosevelt Island Bridge over the East River and East Channel, the Broadway Bridge over the Harlem River, the 207th Street (University Heights) Bridge over the Harlem River, Cadman Plaza and Pearl Street Arch at the Brooklyn Bridge, Belt Parkway Bridge over Mill Basin, Belt Parkway Bridge over Bay Parkway, Belt Parkway Bridge over Bay Ridge Avenue, Cadman Plaza over the Brooklyn-Queens Expressway, the Hutchinson River Parkway Bridge over the Hutchinson River, Queens Boulevard Bridge over the Long Island Expressway, and the 80th Street Bridge over the Long Island Expressway.

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 2005, the following bridges were painted: Astoria Boulevard Bridge (Eastbound) over BQE (Westbound), Belt Parkway Bridge over Bedford Avenue, Belt Parkway Bridge over Fresh Creek, Belt Parkway Bridge over Rockaway Parkway, Braddock Avenue Bridge over Cross Island Parkway, Brooklyn-Queens Expressway over Prospect Street, Brooklyn-Queens Expressway over Washington Street, Bruckner Boulevard Overpass over 133rd to 135th Streets, Bulova Avenue Bridge over BQE West Leg, Carroll Street Bridge over the Gowanus Canal, Clintonville Street Bridge over Cross Island Parkway, Cropsey Avenue Bridge over Belt Parkway, Cross Island Parkway Bridge over Dutch Broadway – 115th Avenue, East Tremont Avenue Bridge over Bronx River, Elliot Avenue Bridge over Queens Boulevard, Grand Concourse Bridge over Burnside Avenue, Grand Concourse Bridge over East 167th Street, Grand Concourse Bridge over East 204th Street, Hempstead Avenue Bridges over Cross Island Parkway, Highland Boulevard Bridge (NB) over Vermont Avenue, Hunters Point Avenue Bridge over Dutch Kills, Knapp Street Bridge over Belt Parkway, Northern Boulevard Bridge over Alley Creek, Pennsylvania Avenue Bridge over Belt Parkway, Queens Boulevard Bridge over Access Road to BQE (SB), Queens Boulevard Bridge over Jackie Robinson Parkway, South Conduit Boulevard Bridge over Southern Parkway, Union Turnpike Bridge over Austin Street, Whitelaw Pedestrian Bridge over Conduit Avenue, Winchester Boulevard Bridge over Cross Island Parkway, Woodhaven Boulevard Bridge over Queens Boulevard, Yankee Stadium Pedestrian Bridge over East 153rd Street and Metro North, 3rd Avenue Bridge over Gowanus Canal, 3rd Avenue Bridge over LIRR Bay Ridge, 3rd Street Bridge over Gowanus Canal, East 12th Street Bridge over Belt Parkway, 14th Avenue Bridge over Cross Island Parkway, 25th Street Pedestrian Bridge over FDR Drive, 49th Street Bridge over BQE West Leg, 65th Place Bridge over Brooklyn-Queens Expressway, Pedestrian Bridge over East 128th Street, 147th Street Bridge over Cross Island Parkway, and 149th Street Bridge over Cross Island Parkway.

Supervisor Bridge Painter Osvaldo Lima Checking the Progress of Bridge Painters Brian Kavanagh, Thomas Jones, and Michael Scohi on the East 12th Street Bridge Over Belt Parkway. (Credit: Sergiy Parayev)
Queensboro Bridge Work Platform & Containment. (Queensboro Credit: Daniel Lima)

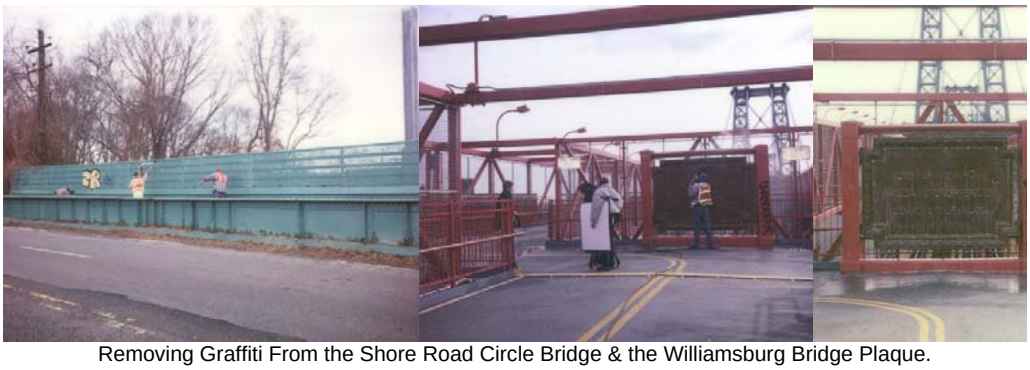
Director of Bridge Painting Leon Levit (in White Hard Hat), Supervisor Bridge Painter Hughie Flood, and Bridge Painters Frank Hollen, Robert Avellino, Willie Tyler, and Andrew Law Discussing the Completion of the Painting Project at the Pedestrian Bridge over East 128th Street.
(Credit: Sergiy Parayev)

During 2005, the following structures were also painted: Borden Avenue Bridge Operator House, DEP Plant at Bowery Bay, Linden Place Pumping Station at 31st Street, DEP Plant at Port Richmond (Staten Island), DEP Plant at Red Hook, Greenpoint Avenue Bridge Operator House, Riverside Drive Facility at West 158th Street, Railings of Rust Street Bridge over Flushing Avenue, Triborough Bridge Pumping Station at Astoria Boulevard and East 31st Street, Union Street Bridge Operator House, and 3rd Street Bridge Operator House.

GRAFFITI REMOVAL

In 2005, 4,403,955 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)



Removing Graffiti From the Shore Road Circle Bridge & the Williamsburg Bridge Plaque.
(Credit: Cesar Pazmino)

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

During 2005, graffiti was also removed from the following structures: Annadale Road Overpass at Richmond Parkway, Belt Parkway Bridges, Belt Parkway Bridge over 26th Avenue, Belt Parkway overpasses between Exit 1 and Exit 3, Brooklyn Bridge Park, Brooklyn-Queens Expressway at the 48th Street Exit, Bronx Boulevard between East 240th Street and East 241st Street, Bruckner Boulevard between Pugsley Avenue and Chatterton Avenue, Canterbury Avenue/Loop Road, Cross Bay Boulevard Bridge over Conduit Avenue, Cross Island Parkway, Horace Harding Boulevard between 136th and Lawrence Streets, Horace Harding Expressway, Hutchinson River Parkway Bridge over Hutchinson River, Jerome Avenue, Long Island Expressway Overpass at 136th Street, Long Island Expressway Overpass at 148th Street, Markwood Road Bridge over Jackie Robinson Parkway, Mosholu Parkway, Prospect Avenue between Terrace Place and Seeley Street, Pulaski Bridge over Newtown Creek, Seeley Street Bridge over Prospect Avenue, Westchester Avenue Overpass at Bronx River Parkway, Westside Highway, Woodhaven Boulevard between Union Turnpike and Metropolitan Avenue, East 3rd Street between Foster Road and Elmwood Avenue, 4th, 5th, 6th, 7th, 8th, and 13th Avenue Bridges between 61st and 65th Streets, 27th Avenue Pedestrian Bridge over Belt Parkway, 59th Avenue and Seabury Street, 102nd Street Bridge over Hawtree Basin, 163rd Street Pedestrian Bridge over Hawtree Basin, 174th Street Underpass between Walton and Selwyn Avenues, and 191st Underground Street to Broadway.

Bridge Painters Vlatko Zic, Frank Duic, and Drago Milin Removing Graffiti From Woodhaven Boulevard.

Bridge Painter Drago Milin Removing Graffiti From the Grand Central Parkway at 27th Avenue.

RESEARCH AND PRESENTATIONS

In 2005, research work and/or case histories of the Division were presented in the following proceedings:

ASCE Metropolitan Section Construction Group Winter Seminar: Transportation Projects, New York City, 7 – 8 February 2005. Norrish III, C., and Liebowitz, J. *NYCDOT Belt Parkway/Ocean Parkway Design Build Project*.

ASCE Metropolitan Section Construction Group Winter Seminar: Transportation Projects, New York City, 7 – 8 February 2005. Sklavounakis, C. *NYCDOT Design-Build Experience*.

2005 ASCE Structures Congress: Metropolis & Beyond, New York City, 20 – 24 April 2005. Dr. Bojidar Yanev, the Division's Executive Director of Inspections and Bridge Management, was member of the organizing committee and chaired the session on bridge rehabilitation.

22nd Annual International Bridge Conference, Pittsburgh, Pennsylvania, 13 – 15 June 2005. Norrish III, C., Sklavounakis, C., Novak, A., and Atkins, P. *Replacement of the Belt Parkway over Ocean Parkway*.

4th KISTEC International Seminar on Safety of Infrastructures: Smart Structure Technologies for Maintenance of Infrastructures, Gyeong-ju, Korea, 22 July 2005. Yanev, B. *From Emergency Management to Health Monitoring of the New York City Bridges*. Dr. Yanev also co-chaired the session on monitoring and maintenance of bridges and buildings.

Third New York City Bridge Conference, New York City, 12 – 13 September 2005. Perahia, H. *City Island Cable-Stayed Bridge in New York City*.

Third New York City Bridge Conference, New York City, 12 – 13 September 2005. McGuire, R., Toro, G., Kishore, K., Patel, J., Jain, S., Fanjiang, G., and Gajer, R. *Seismic Hazard Analysis for New York City Bridges*.

Third New York City Bridge Conference, New York City, 12 – 13 September 2005. Sklavounakis, C., Atkins, P., Norrish III, C., and Liebowitz, J. *Replacement of the Belt Parkway Bridge Over Ocean Parkway*.

Coates, A., Bluni, S., Connolly, P., Patel, J., and Chandiramani, B. "Swinging Into Action, " Civil Engineering, December 2005.

Dr. Yanev wrote Chapter 11, "Bridges" in "Part III: Survey and Assessment of Structural Conditions" of the manual *Structural Condition Assessment*. John Wiley & Sons, 2005.

Dr. Yanev made a presentation on bridge life-cycle management to the committee for the construction of the bridge at the Messina Straits, Rome, 26 May 2005.

Dr. Yanev was the invited keynote speaker and presented papers at the SPIE 12th Annual International Symposium on Smart Structures and Materials in San Diego, California, 6 - 10 March 2005; and at the Le Pont International Colloquium on bridge management in Toulouse, France, 24 October 2005.

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 2005 included: skid-resistant coatings to steel substrates, comprehensive surface condition management systems, blue shield waterproofing membrane, pavement preservation materials and equipment, and SPS bridge deck.

Director of Bridge Management Unit Kevin McAnulty and Engineering Intern Devin Plantamura Conducting Ultrasonic Testing of the Pins and Eyebars on the Queensboro Bridge. (McAnulty Credit: Devin Plantamura) (Credit: Kevin McAnulty)

Consultant Conducting Ultrasonic Testing on the Queensboro Bridge. (Credit: Kevin McAnulty) Engineer-in-Charge Bala Nair Atop the Bridge. (Credit: Peter Basich)

Bridge Repairer and Riveter David Collins Participating in the Demonstration of Heat Straightening Techniques for Damaged Steel Bridges at a FHWA Workshop in New Hartford, New York. (Credit: George Klein) Director of Bridge Inspection Jyotish Shah, Engineering Intern Devin Plantamura, and Executive Director of Inspections and Bridge Management Dr. Bojidar Yanev Atop the Brooklyn Tower of the Brooklyn Bridge. (Credit: Avelino Leyco)