



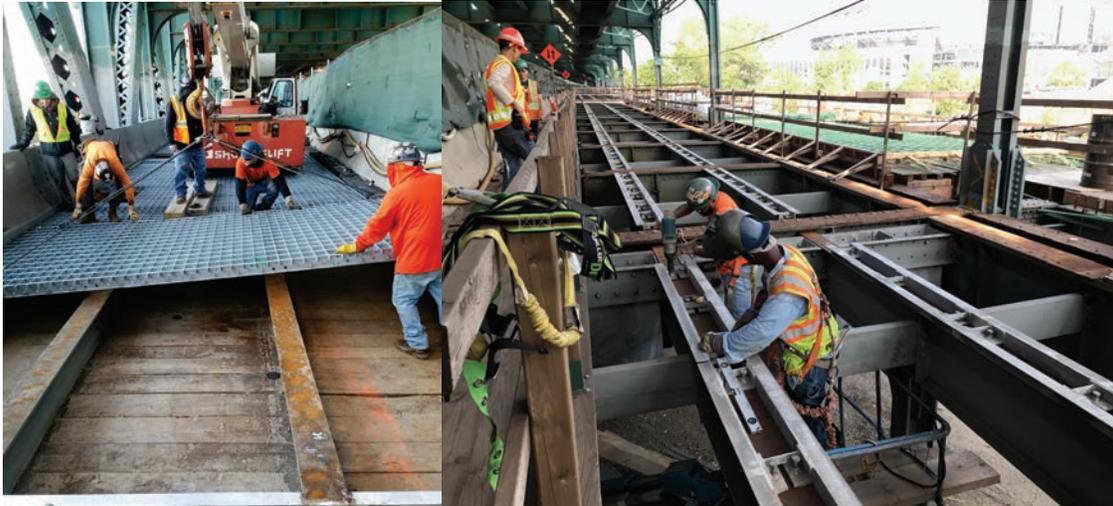
2017 NYC DOT



Bridges & Tunnels Annual Condition Report



NEW YORK CITY DEPARTMENT OF TRANSPORTATION DIVISION OF BRIDGES 2017 BRIDGES AND TUNNELS ANNUAL CONDITION REPORT



Contractors Installing the New Bascule Span Grid Deck on the Roosevelt Avenue Bridge in Flushing in March 2017. The Bridge is Permanently Set in a Closed Position Since the Late 1950's. Installing Haunch Angles at the West Viaduct Roadway Deck in July 2017.

Bill de Blasio, Mayor

Polly Trottenberg, Commissioner

**Joseph H. Jarrin, Executive Deputy Commissioner for
Strategic and Agency Services**

Margaret Forgione, Chief Operations Officer

Robert Collyer, P.E., Chief Bridge Officer

George Klein, P.E., Deputy Chief Engineer, Maintenance, Inspections & Operations

David Dunn, P.E., Deputy Chief Engineer, Bridge Capital Design & Construction

Dorothy Roses, Executive Director, Management & Support Services

Anilkumar Vyas, P.E., Deputy Chief Engineer, Engineering Review & Support

Joannene Kidder, Chief Staff Manager/Executive Director, Community Affairs

Contents

Acknowledgements		iii
Commissioner’s Message		iv
Section 1	2017 Executive Summary	1
Section 2	2017 Division Overview	4
Section 3	2017 Accomplishments and Planned Projects	
	Bridge Capital Design & Construction	14
	East River Bridges	15
	Movable Bridges	26
	Roadway Bridges	53
	Brooklyn and Manhattan	53
	Bronx, Queens and Staten Island	103
	Design-Build	142
	Component Rehabilitation	152
	Engineering Review & Support	179
	Maintenance, Inspections & Operations	189
Section 4	2017 Bridge Capital Program – Appendix A	216
Section 5	2017 Flag Conditions – Appendix B	232
Section 6	2017 Inventory – Appendix C	238
	Inventory Sorted by Structure Number	252
	Inventory Sorted by Borough and Community Board District	279
	Inventory Sorted by Feature Carried	306
	2017 Tunnel Inventory	333
	Staten Island Culverts	334
Section 7	Components of the Preventive Maintenance Program	335
Section 8	Maintenance Personnel Resources – 2017 vs. 1900	344
Section 9	Bridge Inspection Equipment List	346
Section 10	2017 Personnel Recognition and Service Awards	347
Section 11	2017 Glossary of Bridges	351
Section 12	Suggested Reading	382
Section 13	2017 Inventory Location Maps	398

Acknowledgements

Research and Analysis

For their contributions and assistance in the preparation of this report, the Division of Bridges would like to thank the following: Hasan Ahmed, Krishan Baweja, Robert Collyer, Udayakumar Dommaraju, David Dunn, Beatriz Duran, Rita Gulberg, Paul Kahn, George Kern, Joannene Kidder, George Klein, Kevin McAnulty, NYSDOT, Ronald Rauch, Javed Riaz, Vera Ribakove, Dorothy Roses, Paul Schwartz, Dinesh Shah, Rahul Shah, Anilkumar Vyas, and Bojidar Yanev.

Photography

For the photographs used in this report, the Division of Bridges would like to thank the assistance of the following: Scott Alnwick, Darlyn Alvarez, Artemio Angeles, Charly Ayoub, Eric Callender, Frank Duic, Russell Holcomb, Yuriy Kheyman, Jagtar Khinda, Krzysztof Lamczak, Sikdar Latif, Thomas Leung, Arlindo Lima, Goncalo Lima, Emmett Linder, Hayes Lord, Kevin McAnulty, Vera Ovetskaya, Sergey Parayev, Eugene Parker, Roly Parroco, Mitul Patel, Malcolm Pinckney (NYCDPR), Earlene Powell, Herbert Rodriguez, Paul Schwartz, Richard Solomon, Salome Stulberg, Samuel Teaw, Vadim Sokolovsky, Jessica Wang, Jaclyn Whitney, Jiangong Xu, and Bojidar Yanev.

Cover Photograph

Assistant Civil Engineer Tatyana Krushelnitskaya at the Midland Avenue over Hylan Boulevard Culvert, a diver preparing to inspect the fender system at the Brooklyn Bridge Tower, and the new City Island Bridge on opening day.

Cover Design

Michele N. Vulcan, Director of Analysis – Bridges
Melanie Michel – Graphic Designer, Creative Services

Map and Inventory Preparation

Kevin McAnulty, Director, Bridge Management Unit
Fitz-Arthur Brown and Lidiya Akhmedova, Bridge Management Unit

Report Compiled and Prepared by:
Michele N. Vulcan, Director of Analysis - Bridges
New York City Department of Transportation
55 Water Street, 5th Floor
New York, New York 10041

A Message from the Commissioner



Dear Friends,

On behalf of the many dedicated men and women who staff the Division of Bridges, I am pleased to present the 2017 Edition of the New York City Department of Transportation's Annual Bridges and Tunnels Condition report as mandated under the New York City Charter. This report provides DOT with an opportunity to display the many innovations and improvements that the Division of Bridges achieved in 2017.

DOT focuses on equitable service delivery through its maintenance of critical transportation infrastructure and its commitments to safety and mobility for all New Yorkers. DOT focuses on providing all its services, including bridge maintenance, in an equitable manner.

The Division of Bridges includes 831 hard working professionals who manage the City's Capital Bridge Program, conduct bridge inspections and monitoring, and keep the entire bridge network in a state of good repair. Our inventory includes the iconic East River Bridges, Harlem River Bridges, the Belt Parkway Bridges and pedestrian bridges and elevated roadways across the five boroughs.

The Bridges Ten Year Capital Plan includes approximately \$9.4 billion for bridge reconstruction, major rehabilitation, component rehabilitation, protective coating, and Superstorm Sandy recovery efforts. The East River Bridges Program currently includes a \$103 million project for structural steel repairs of the Manhattan Bridge; an over \$300 million replacement of the upper deck of the Queensboro Ed Koch Bridge; and \$18 million in storm-related repairs to granite and historic cladding on the Brooklyn Bridge as well as a future project for rehabilitation of the landmark bridge's iconic structural arches.

DOT conducts regular maintenance of its bridges to prevent decay. Regular maintenance and strategic repairs can extend the useful life of our structures, increase the interval between major rehabilitation projects, and save money over the long term. This life cycle approach to maintaining our assets also increases safety and protects against unplanned bridge closures that can disrupt the street network.

To underscore the critical importance of infrastructure investment, City, State, and Federal governments contributed more than \$5 billion to bridge reconstruction over the past years. As a result, all but 2 of our 789 bridges are rated "Fair" or above.

This past fall, we opened the brand new City Island Bridge in the Bronx. This new structure features three 12-foot wide vehicular lanes (one for emergency vehicles), a new bicycle lane and new sidewalks.

Three large bridge rehabilitation contracts kicked off in the summer and fall of 2017. In July 2018, Bridges began work to rehabilitate the Atlantic Avenue Viaduct over the LIRR

in East New York. This project will rehabilitate this important thoroughfare which supports residential and business communities across all of Brooklyn.

The Unionport Bridge carries the Bruckner Expressway over Westchester Creek, is a movable bridge, one of 24 that New York City maintains and operates. The new bridge will include a widened structure and ensure a long life span. It will include a complete replacement of the movable leaf and approach spans, providing six 12-foot traffic lanes, 10-foot shoulders, and a 5-foot sidewalk and 10-foot bike lane on the south side of the bridge. There will be a new control house, new utilities, new machinery, new fender system, new street lightings and signals.

The Brooklyn Bridge is the most iconic bridge in our inventory. On July 2, 2014, a summer thunderstorm resulted in a collapse of a portion of the granite fascia walls at Prospect Street and Washington Street in Brooklyn. During the removal of the material and the subsequent complete inspection of all of the granite walls, additional areas were identified that were compromised. All of the loose and unsecured stone was removed to a staging area for possible reinstallation. The \$20 million repair project began in late 2017, and includes the removal and replacement of the remaining masonry cladding at the walls and abutments including the removal and resetting of capstones, the removal and replacement of sidewalks along the walls, and the repair of spalls on walls as necessary. During the design phase, the original stone quarry from the 1800's that sourced granite for the original construction was located and was confirmed as remaining in operation. Where possible all existing granite will be reused and where new granite is needed, as much as possible it will be sourced from this quarry.

In Brooklyn, we are studying how to rehabilitate and reconstruct the 21 interconnected bridge structures that carry the Brooklyn Queens Expressway from Atlantic Avenue to Sands Street, including the “triple cantilever” stacked section of highway completed in 1948, topped by the iconic Brooklyn Heights Promenade. With no reconstruction work in recent history, the triple cantilever is in need of major repair with many components experiencing significant deterioration. These structures serve as Brooklyn’s only interstate and one of the most heavily traveled roads in New York City. At peak hours, 18% of the Brooklyn Queens Expressway traffic is trucks, which the surrounding street network could not serve. In addition to replacing this crumbling infrastructure, the proposed project will eliminate non-standard conditions and bring the roadway up to current safety standards by building wider lanes and full width safety shoulders to the degree feasible. To reduce the project’s cost by as much as \$100 million and its duration by nearly two years, DOT hopes to use the design-build procurement approach. In 2016, we hired consultants to conduct an extensive inspection of the structure, at a cost of \$8.1 million. This inspection, now complete, evaluated areas typically not accessible during the biennial NYSDOT inspections. The inspections concluded that while load ratings for the most part are acceptable, the rehabilitation/replacement project must begin now to ensure long-term safety and avoid service disruptions in the next 10-12 years. If significant repairs and replacements are not made by 2026, vehicle-weight limits and truck diversions will be necessary.

In the past year, the City successfully lobbied the New York State legislature for the authority to use the design-build approach for this project. Under design-build, a single team engineers and constructs the project, reducing the cost and duration of the project.

In August 2017, DOT procured the services of a consulting team to develop the options for addressing the significant challenges of the project. The consultant team is preparing the environmental approval documents in accordance with National Environmental

Policy Act (NEPA) and New York City Environmental Quality Review (CERQ), as well as developing the preliminary design for the selected solution. This team will also assist in preparation of documents related to the procurement of a Design-Build team going forward.

DOT also has a major bridge reconstruction program along the Belt Parkway. The Belt Parkway Bridge reconstruction program consists of six structures: the Fresh Creek, Rockaway Parkway, Paerdegat Basin, Gerritsen Inlet, Mill Basin, and Bay Ridge Avenue bridges. The Fresh Creek, Rockaway Parkway, and Paerdegat Basin bridges were substantially completed in August 2013. The Gerritsen Inlet Bridge reconstruction commenced in February 2013. The project will reach substantial completion in early 2018 and final completion in the summer of 2018. The new bridge improves sight distances and geometry and adds lane width and shoulders, bringing the bridge to the newest engineering standards.

Construction for the replacement of the Mill Basin Bridge began in September 2015, and remains about one and a half years ahead of schedule. In December 2017, all traffic transitioned to the new structure, allowing DOT to start to dismantle the old structure. Marine traffic now has sixty feet of vertical clearance, which means that motor vehicle traffic will no longer be delayed waiting for vessels to pass.

Looking forward, the Bridges Division plans to reconstruct four bridges on the Belt Parkway that are located in the Sheepshead Bay community. If DOT receives design-build authority, the approach will enable the agency to minimize the overall construction duration and achieve significant cost savings through tightly sequenced design and construction of these four structures.

Many other accomplishments are outlined in the pages ahead, but there is even more important work to be done. The Independent Budget Office recently reported that a significant number of bridges are now rated at the low end of “Fair”, meaning their need for rehabilitation is fast approaching. All of the East River Bridges are well over 100 years old, requiring continual care and attention. The remaining network of over 700 bridges serving neighborhoods across the city are subject to the continuing effects of heavy traffic and rough winters with long cycles of ice, snow, rain, sleet and de-icing activities. Aside from the East River and Movable Bridges, a replacement program of 16 bridges per year needs to be in place to maintain a 50 year life cycle. The current average life of our bridges exceeds 70 years. For New York City to create jobs and opportunities for our residents, and maintain its competitiveness with other leading global cities, we need to invest in our infrastructure.

DOT is committed to preserving all of the City’s bridges; they are crucial links in our transportation network and support millions of multi-modal trips each day. The Agency has a rich tradition of bridge design, construction, maintenance and administration, and will continue to use its resources and attract additional funds to provide safe spans that meet the needs of all 8.4 million New Yorkers.

Sincerely,



Polly Trottenberg

Commissioner

Inventory

The Division’s structure catalogue contains bridges and tunnels. In calendar year 2017, the inventory of bridge structures under the jurisdiction of the Division decreased to ^{!!}789. NYCDOT owns, operates, and/or maintains 765 non-movable bridges, ^{**}24 movable bridges, and four tunnels. Over the past 10 years, there has been a decline to zero in the number of bridges rated “Poor,” and an increase in the number of bridges rated “Good,” as shown below.

	2008	2009	2010	2011	2012	2013	2014	2015	[#] 2016	[#] 2017
Poor	3	4	4	3	1	1	0	0	0	2
Fair	455	456	462	459	460	456	456	458	461	[!] 454
Good	213	209	207	215	212	217	221	228	224	223
Vgood	116	116	113	109	114	114	111	102	107	106
Closed	1	1	1	1	1	1	1	1	2	2
Unrated										2
	788	786	787	787	788	789	789	789	794	789
^{!!}Tunnels	!!	4								
TOTAL STRUCTURES	788	786	787	787	788	789	789	789	794	793

^{*}In 2009, the newly “Poor” rated Hill Drive Bridge in Prospect Park was closed to vehicular traffic. In 2009, 93 of the Parks bridges accounted for 20.4% of the “Fair” rated structures. In 2013, 100 of the Parks bridges accounted for 21.9% of the “Fair” rated structures.

[!]In 2017, 102 of the Parks bridges accounted for 22.5% of the “Fair” rated structures.

[#] The bridge ratings reflected here are the traditional NYS bridge condition ratings from 2014 and 2015 with the exception of the bridges inspected by in-house NYCDOT forces (pedestrian bridges). The NYS bridge condition rating system is being converted to a federal system developed by AASHTO and there is no current acceptable formula to translate the results of inspections performed in 2016 and 2017 into the traditional NYS ratings. The AASHTO inspection method does not generate numerical overall bridge condition ratings. The condition ratings may be updated in the 2018 annual report.

^{!!}In 2017, the 4 tunnels were assigned Tunnel Identification Numbers and removed from the inventory of bridges.

^{**}The Belt Parkway Bridge over Mill Basin was permanently taken out of service on December 8, 2017.

NYCDOT has two bridges rated “poor.” The Harlem River Drive Ramp to the George Washington Bridge over the Harlem River Drive Southbound (aka the Trans-Manhattan Connector Ramp) is not really poor, as we reached substantial completion of a reconstruction project on May 15, 2017. The 51st Avenue Pedestrian Bridge over LIRR Main Line is scheduled by DDC to start being replaced by a new bridge in Fiscal Year 2019.



Trans-Manhattan Connector Ramp Under Construction in January 2017.

Contract Acceleration

Acceleration measures are a contract provision used in some reconstruction projects that is implemented through a contract pay item. This contract provision provides a mechanism to implement measures to accelerate the contractor’s work to maintain critical path milestones. This

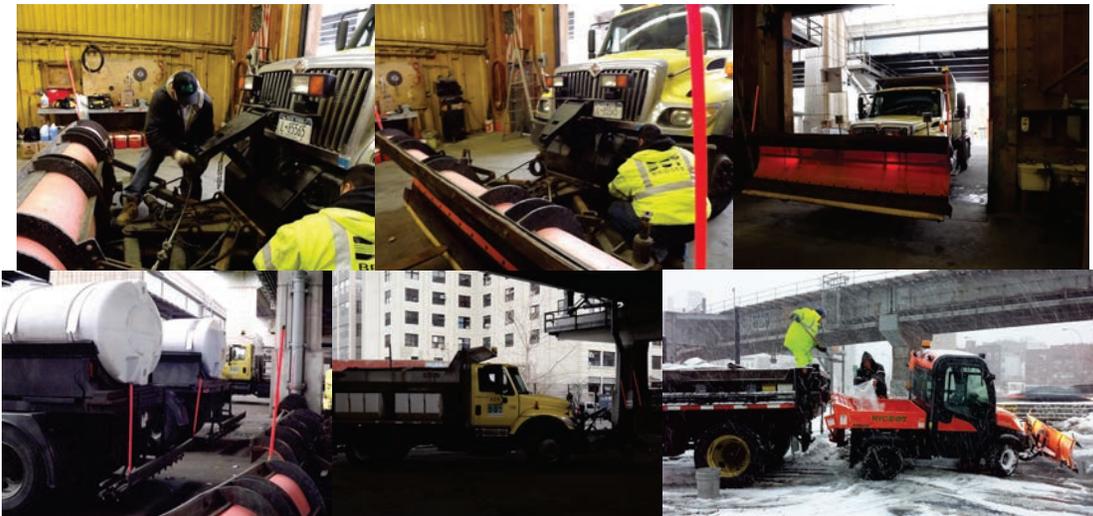
provision does not apply to measures undertaken by the contractor to make up for time it lost in the progress schedule. Only the NYCDOT representative invokes this provision when the contract schedule is compromised due to unforeseen conditions during construction that are out of the contractor's control, and when it is deemed in the City's interests to accelerate.

Incentive and disincentive (I/D) clauses are another contract provision used in some reconstruction projects that are implemented through a contract pay item. Under this provision, the contractor is compensated a certain amount of money for each day if the identified work in a critical milestone is completed ahead of schedule and is assessed a deduction for each day the contract overruns the allocated time. The amounts for the I/D clauses are based upon such items as traffic safety, maintenance and road user delay costs, Resident Engineering & Inspection (REI) expenses and cost of traffic enforcement agents. These amounts are implemented in accordance with guidelines established by Federal Highway Administration (FHWA).

East River Bridges Anti-Icing Program

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 application trucks, five 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.

In the winter of 2016 - 2017, a total of 19,448 gallons of potassium acetate and 157 tons of sodium acetate were applied on the roadways of all four East River Bridges.



Preparing the Plows and Spray Trucks. (Credit: Thomas Whitehouse) Loading Solid Chemical for Spot Applications on the Williamsburg Bridge Walkway/Bicycle Path. (Credit: Paul Schwartz)

Marine Borer Remediation

In October 1999, the Department began a study to assess the present 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

EXECUTIVE SUMMARY

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. An updated underwater inspection was performed within the limits of the proposed contract in 2009. The construction work commenced in April 2012, and was expected to be complete in August 2016. However, the construction activities were extended to March 2017, due to site condition and change in scope.

The contract was terminated for convenience by the City on March 21, 2017 with only 73% of the contract (by amount) completed. Only 10,440 piles out of 14,905 piles were repaired. Between March 27 and May 11, 2017, the consultant then performed a diving inspection of the accessible unrepaired piles, and issued a final report.

2017 Awards

In 2017, the outstanding work of the Division was recognized by the receipt of several awards.

In June 2017, Deputy Commissioner/Chief Bridge Officer Robert Collyer was named the American Society of Highway Engineer's Person of the Year.

In December 2017, the Hundred Year Association of New York selected Highway Transportation Specialist Andrew Hoang for a 2017 Isaac Liberman Public Service Award. This award is presented annually to civil service employees of the City of New York who perform exceptionally on the job.



June 2017: Chief Operations Officer Margaret Forgione, Deputy Commissioner/Chief Bridge Officer Robert Collyer, Polly Trottenberg, and Senior Program Manager Tanvi Pandya. December 2017: President of the Hundred Year Association of New York Clinton W. Blume III, Awards Committee Member Casey Kemper, Highway Transportation Specialist Andrew Hoang, Awards Committee Chairman Avery Eli Okin, and Department of Citywide Administrative Services Commissioner Lisette Camilo.

The dedication and hard work of all members of the Division ensures that the Department is stronger than ever and more capable than ever to meet the challenges of maintaining a diverse and impressive bridge infrastructure.