



New York City Weigh-in-Motion Automated Enforcement Program

2024 Report



Letter from the Commissioner

Dear Fellow New Yorkers,

The New York City Department of Transportation's (NYC DOT) top priority is safety, and that includes building and maintaining safe transportation infrastructure. One of the distinct challenges that governments across the United States face is that of aging infrastructure. Much of America's transportation infrastructure was built in the early to mid-20th century when there were fewer vehicles on the road, and those vehicles were smaller and lighter-weight. The shift in the size, weight, and volume of motor vehicles has exacerbated the challenge of maintaining aging transportation infrastructure, and NYC DOT is using every resource at its disposal to address this challenge, including cutting-edge technology. Overweight vehicles cause significant wear and tear on our roads and this report chronicles how NYC DOT has used weigh-in-motion technology to achieve a dramatic 60 percent reduction in the number of overweight vehicles on the 1940s-era City-owned portion of the Brooklyn-Queens Expressway (BQE), between Atlantic Avenue and Sands Street.

Weigh-in-motion technology utilizes roadway sensors to weigh passing vehicles and adjacent cameras to capture the license plates of vehicles that are overweight. Using this technology, those who violate the state vehicle weight limit are issued a \$650 violation. Prior to the use of this technology, NYC DOT found an average of 7,920 overweight vehicles driving in the Queens-bound direction on the City-owned portion of the BQE each month. During the first year of the use of weigh-in-motion technology, this figure dropped to 3,041 vehicles on average.

New York City is the first city in America to use weigh-in-motion technology for weight enforcement, and its incredible effectiveness here and in other international cities, demonstrates the viability of the technology and how its use could be expanded to protect and extend the lifespan of other transportation infrastructure in New York City, New York State, and across the country.



Construction of BQE, 1940s

I want to thank the New York State Senate, the New York State Assembly, and Governor Kathy Hochul for their vision and leadership by passing and signing into law S2740B/A2316 of 2021 that authorized NYC DOT to utilize this technology to protect the BQE's triple cantilever. I look forward to working with legislative leaders and the governor to expand the use of this technology to safeguard additional NYC DOT infrastructure and hope our partnership and the results it has yielded can serve as a national model for other cities and states.

Sincerely,

Ydanis Rodriguez
Commissioner
New York City Department of Transportation

Executive Summary

In 2021, the New York state legislature and Governor Kathy Hochul enacted a law granting New York City the authority to implement a first-in-the-nation automated enforcement program, using weigh-in-motion (WIM) technology, to deter overweight trucks from traveling on the New York City-owned section of the Brooklyn-Queens Expressway (BQE), located in Kings County, New York, between Atlantic Avenue and Sands Street. Using sensors embedded in the roadway, this system weighs trucks as they are passing over the roadway, and issues violations to those operating above legal weight limits.

Constructed before modern highway safety standards were established, this section of the BQE corridor, referred to as “BQE Central,” has been identified by the NYC DOT to be past its design life, and in need of major repair or rehabilitation. At the time of construction of BQE Central, bridge design loads were lower, and it has been demonstrated that trucks not only have grown heavier over the decades but frequently exceed legal weight limits. This type of overloading on the structure contributes to accelerated deterioration.

After using weigh-in-motion technology to measure and monitor the frequency of trucks passing over the structure, NYC DOT partnered with the New York State Legislature to secure authority to combine this existing technology with enforcement elements to issue violations to vehicles traveling above legal weight limits on the structure. Deterring overweight trucks from using this section of the BQE is part of a larger suite of efforts undertaken by the NYC DOT to extend the useful life of the aging structure. As the City works to identify a long-term solution to address the structural deterioration, geometric deficiencies, and connectivity challenges presented by the structure, NYC DOT will continue to leverage the WIM automated enforcement system.

The WIM automated enforcement system has proven to be effective at deterring overweight trucks from using the roadway. As of November 2024, overweight vehicles detected on the roadway with the WIM system installed had decreased by 60 percent. The system is currently installed only in the Queens-bound direction and will be expanded to include the



Staten Island-bound direction in 2025, further protecting the roadway. Given the success of this effort, NYC DOT has interest in seeking broader legislative authority to deploy WIM systems on other facilities throughout the City of New York. Expanding the system will help reinforce existing vehicle weight restrictions citywide and protect additional pieces of critical infrastructure. NYC DOT will work with New York State agency partners and the New York State Legislature to explore these opportunities.

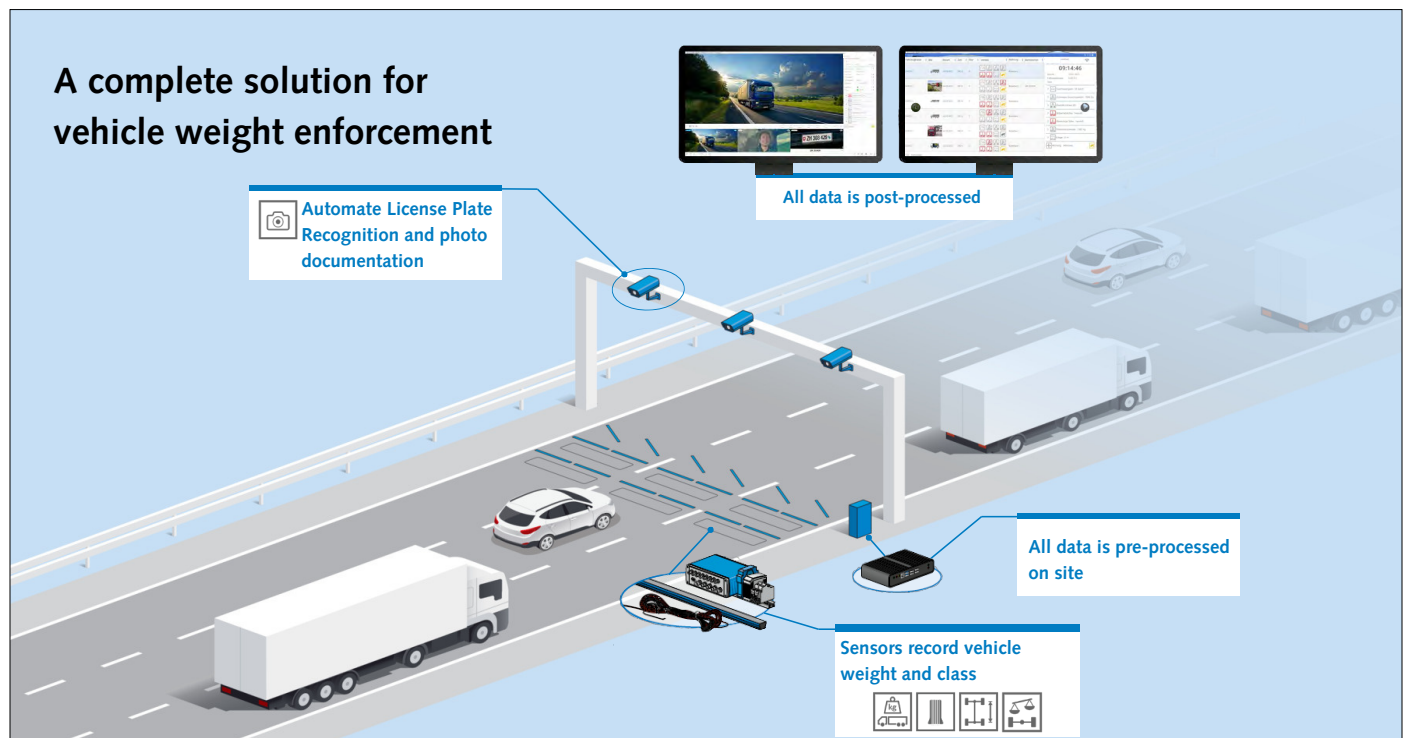
This report covers development and implementation of the WIM automated enforcement program, and data summarizing the first year the program issued violations, between November 2023 and November 2024.

What is Weigh-In-Motion Automated Enforcement?

Weigh-in-motion sensors obtain data related to vehicles on roadways and are used to identify overweight vehicles. WIM systems include a set of load receptors embedded in the roadway, along with supporting instruments which measure and calculate factors including individual tire loads, vehicle speed, vehicle axle spacing, and vehicle class. The system can then process, display, store, and transmit this information.

Weight information for the vehicle identified by the WIM system is combined with images from cameras to determine the specifics of the particular vehicle. This information is combined and transmitted to trained NYC DOT personnel who verify that the violation meets the appropriate criteria.

Figure 1: Direct Enforcement WIM System Schematic



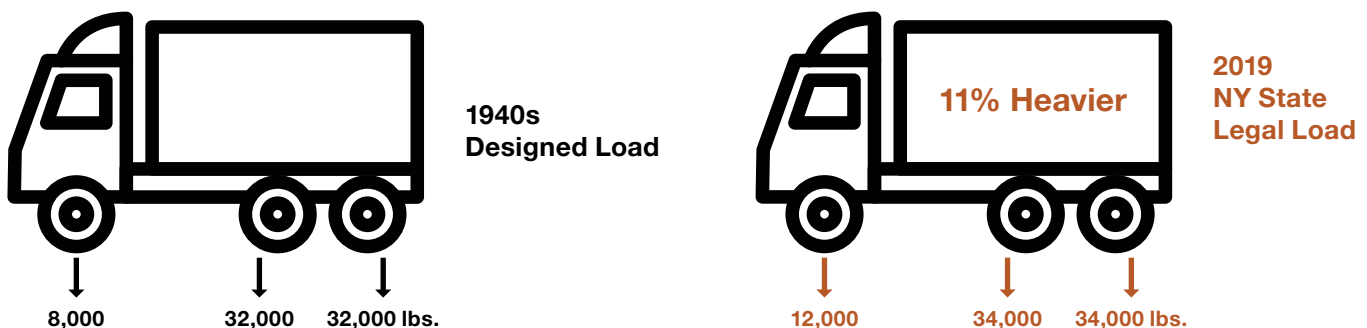
New York City Weigh-in-Motion Automated Enforcement Program

Overweight Trucks Strain Aging Infrastructure

As our infrastructure like roads and bridges age, they become more vulnerable to the effects of overweight trucks. At the time of completion of much of our major 20th century infrastructure, trucks were lighter than current allowable loads. For example, when BQE Central was constructed in the 1940s, trucks were approximately 11 percent lighter than current legal loads (Figure 2). A major contributor to road damage stems from vehicles carrying excessive weight beyond these higher legal loads, particularly the heavy axle loads of these vehicles.

Existing truck weight limits are outlined in the New York State Vehicle and Traffic Law section 385 and NYC Traffic Rules section 4-15 (34 RCNY 4-15). Traditionally, enforcement of truck weight limits requires law enforcement to pull over a truck suspected to be overweight, which requires sufficient space, and to weigh it with a portable scale. In areas with more space, trucks can be weighed on a static scale. Given the operational challenges presented by manual enforcement, particularly in a crowded urban environment like New York City, and the volume of trucks traveling overweight, traditional enforcement has not proven to be effective at deterring overweight trucks.

Figure 2: Comparison of Loading between the Time Periods of Design (1940) – Modern Day (2019)



The inefficiencies of manual enforcement led several states to use WIM as a screening tool to limit the number of trucks needed to be weighed by scale. Enforcement using WIM technology has also been used in several countries outside of the United States for over a decade, including the Czech Republic and Russia, with other countries, including France and Brazil, currently developing their own programs.

Based on the success of other screening systems using WIM, data obtained from WIM sensors installed on the BQE between 2019 to 2021, and the effectiveness of the existing camera-based speed and red-light enforcement programs, NYC DOT sought authorization to implement an automated enforcement program using WIM technology for weight enforcement.



BQE Triple Cantilever, looking north

The Brooklyn-Queens Expressway

The BQE is a 12.1-mile highway stretching from Southern Brooklyn to Eastern Queens. The vast majority of the BQE is under the jurisdiction of the State of New York, but the City of New York is responsible for an approximately 1.5-mile (12 percent) stretch of the highway in Brooklyn. BQE Central spans approximately from Atlantic Avenue to Sands Street and is managed by NYC DOT. This section of the BQE includes a cantilevered structure that includes two levels of roadway, and a level forming the Brooklyn Heights Promenade, a historic park. The cantilevered structure is supported by a retaining wall that also serves to hold back the earth, and in turn, the Brooklyn Heights neighborhood behind it. Beyond the triple cantilever structure, a double cantilever structure extends to Washington Street to the north and Joralemon Street to the south. Additional multi-girder and concrete bridges are part of the interstate north of Washington Street.

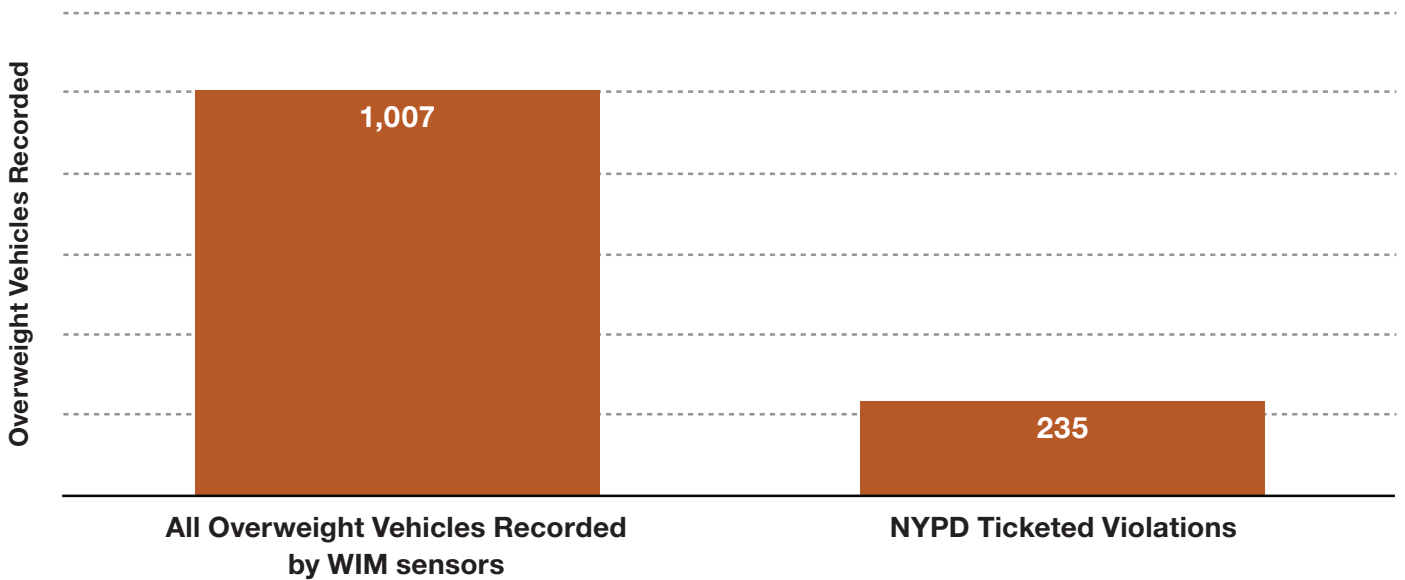
The BQE continues to serve as a critical connector for people and goods throughout the region, carrying over 130,000 vehicles per day, including 13,000 trucks. Constructed during the middle of the 20th Century, BQE Central remains safe, but is past its design life. NYC DOT is committed to keeping BQE Central safe for the traveling public, and undertakes rigorous monitoring and performs interim repairs and maintenance on the structure as needed.

In 2019, then-Mayor Bill de Blasio convened a panel (the “BQE Expert Panel”) of leaders with expertise in urban planning, engineering, construction, traffic modeling, and historic preservation to evaluate potential options for addressing the condition of BQE Central. NYC DOT worked with C2Smart, a local transportation research center, two of whose members participated in the BQE Expert Panel, to identify the most appropriate sensors for a WIM pilot program. Sensors were installed in BQE Central’s roadbed to collect both gross and axle weight information of the vehicles using the corridor. Data collected over several months showed the structure carried an average of over 20,000 overweight trucks, with some months detecting upwards of 30,000 overweight trucks. With this data, NYC DOT attributed the accelerating deterioration of BQE Central in part to the overwhelming number of overweight trucks traveling on the structure.

Following a recommendation of the BQE Expert Panel, Mayor de Blasio signed Executive Order 51 of 2020, which created the New York City Police Department (NYPD) BQE Truck Enforcement Task force, through which the NYPD concentrated enforcement efforts to ensure drivers adhered to the weight restrictions on BQE Central.

In March 2021, NYPD issued tickets to 235 overweight trucks, despite the WIM sensors identifying 1,007 overweight trucks in just a single travel lane (Figure 3). While this additional enforcement helped reduce the volume of overweight vehicles from 1,169 in February 2021, to 851 in September 2021, it was clear from the data that many overweight trucks using the structure were not captured by NYPD’s enforcement effort. Leveraging the expertise of C2Smart, and partnership with the New York State Legislature, in the 2021 State legislative session, NYC DOT sought authorization to establish a first-in-the-nation program that would use WIM technology to issue tickets to overweight trucks.

Figure 3:
March 2021 Overweight Vehicles Recorded by WIM sensors vs. NYPD Ticketed Violations



Legislation

In December 2021, Governor Kathy Hochul signed legislation (S2740B/A2316) authorizing a demonstration program for automated enforcement of weight restrictions on Interstate Route 278 (BQE Central) by means of mobile or stationary weigh-in-motion systems. In July 2023, Governor Hochul signed additional legislation (S6246/A6225) into law that clarified elements surrounding calibration certification of the WIM system. The authorizing legislation for the WIM automated enforcement program enables NYC DOT to install and operate up to sixteen weigh-in-motion systems on BQE Central, between the vicinity of Atlantic Avenue and the vicinity of Sands Street, and impose monetary penalties on vehicle owners whose vehicles fail to comply with gross vehicle weight and/or axle weight restrictions (Figures 4, 5).

The stated justification for the legislation referred to structural concerns surrounding the BQE, and the challenging logistics of traditional enforcement in this location. Some additional features of the legislation, which resemble NYC DOT's existing automated enforcement programs, include provisions to protect driver privacy, and a requirement that City technicians review materials produced by the WIM system. Violations carry lower penalties than those issued through traditional enforcement by police officers, and only vehicles traveling ten percent or more above gross vehicle weight limit, or twenty percent or more above the axle weight are issued a violation. Each violation carries a fine of \$650, which can be issued for exceeding gross vehicle weight and/or axle weight limits. Gross vehicle weight refers to the sum total of the vehicle's weight, including its load, while axle weight limit refers to the weight that each axle on a vehicle is carrying. A vehicle may receive up to two violations at one time if both the gross and axle weight are in excess of the legal limits.

Figure 4: New York City Truck Size Restrictions

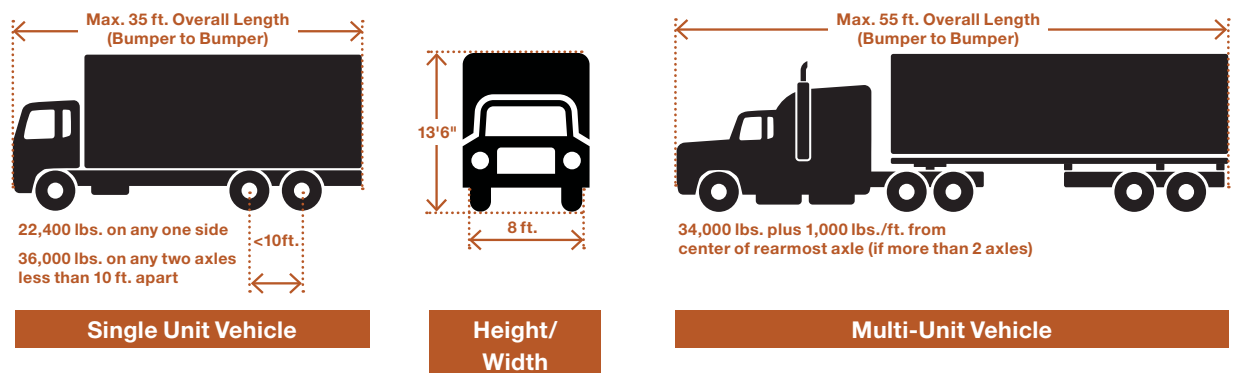


Figure 5: Legal Weights for Trucks with Pneumatic Tires¹

Wheels/Axles	Weight
Per Inch of Tire Width	800 lbs.
Any One Wheel	11,200 lbs.
Any One Axle	22,400 lbs.
Any Two Axles ²	36,000 lbs.
Three or More Axles	80,000 lbs. ³

1. A vehicle equipped with solid rubber tires is permitted up to 80% of legal load for pneumatic tires.

2. When such axles are spaced less than 10 feet, but not less than 4 feet 6 inches

3. Maximum weight limit is counted as 34,000 lbs, plus 1,000 lbs per foot of distance between the first and last axles. 80,000 lbs is the outer limit for all cases.

Maximum weight limit for vehicles is 80,000 pounds or less, depending upon axle spacing. Bridges or viaducts may have lower weight limits posted. The legal weights are outlined above. See Section 4-15 (b) (6) thru (10) of the Traffic Rules for more details.

All vehicles must obey posted capacity or height clearance of all structures.

As with other NYC DOT automated enforcement programs, the legislation requires calibration checks to the WIM system. Weighing instruments that are used in New York State for law enforcement purposes (i.e., vehicle scales and wheel load weighers) are also required to undergo a similar certification process. While equipment used for NYC DOT’s other automated enforcement programs are calibrated annually, WIM sensors are required to be calibrated and certified every six months by the New York State Department of Agriculture and Markets. During the calibration certification period, the WIM system must be temporarily taken out of service and violations cannot be issued. The initial certification took place during the warning period, between October 27 and October 29, 2023. Recertification occurred between April 26 and April 28, 2024, and again between November 1 and November 13, 2024.

Outreach & Education

The authorizing legislation also mandated a 90-day warning period at the start of the program, providing a grace period for drivers during which written warnings, rather than notices of liability, would be issued to drivers operating vehicles detected to be over legal weight limits.

System installation and administrative setup for the Queens-bound WIM system were completed in August 2023, at which point the warning period began. During this time, NYC DOT undertook broad outreach, particularly to the freight industry, to alert them to the new system. In addition to the warnings issued, the most frequent repeat offenders identified during the warning period were sent letters by NYC DOT to explain the new program. NYC DOT also used media interviews and social media to share information about this new system with the public.

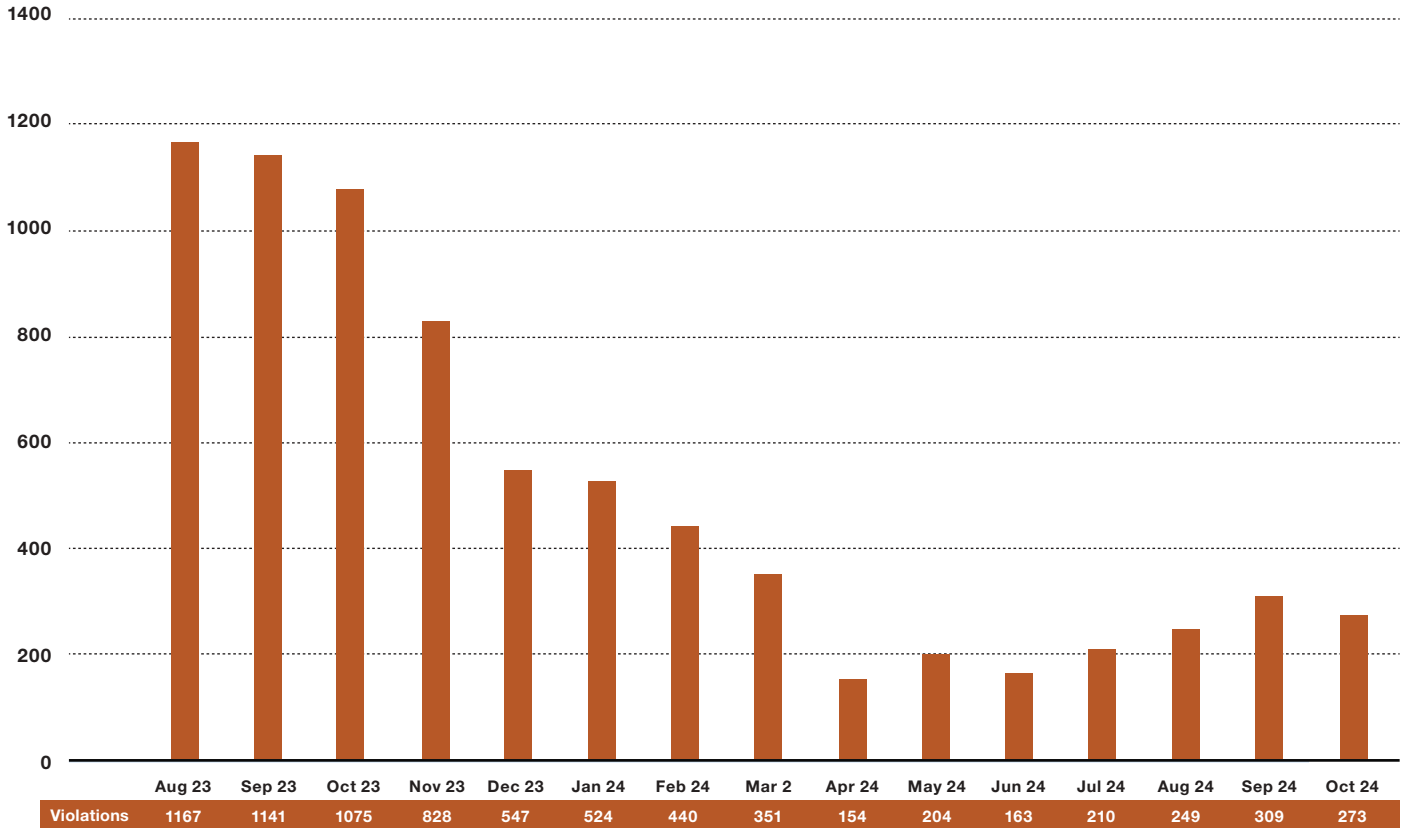
NYC DOT began to issue violations using the WIM system installed in the Queens-bound direction of the BQE on November 13, 2023. Due to limitations set forth in the authorizing legislation for siting sensors as well as the geometry of the roadway, identifying an appropriate location in the Staten Island-bound direction for sensor installation was more complex than in the Queens-bound direction. It is anticipated that sensor installation and administrative components of the system will be complete in the Staten Island-bound direction in early 2025, at which point, another 90-day warning period will begin.

Results of the WIM Automated Enforcement Program

NYC DOT's first-in-the-nation WIM automated enforcement program has proven to be effective at reducing overweight trucks, with 60 percent fewer overweight trucks detected on BQE Central during its first year in operation. During the first seven months of automated enforcement, a monthly average of 3,354 overweight trucks crossed the triple cantilever. In the months leading up to the launch, a monthly average of 7,920 overweight trucks had traveled the same portion of the highway. The decline comes as the overall number of vehicles, including trucks, remains steady, with the share of overweight trucks falling from an average of 5.1 percent of all trucks in 2023 on the roadway to an average of 2.2 percent for 2024.

The authorizing legislation for the WIM program requires reporting of the locations and dates during which the WIM system was used for issuing violations, the total number of trucks weighed using the system and total number of violations recorded in the aggregate on a daily, weekly, and monthly basis. The City is also required to report the total number of violations that were either ten percent or more above the gross vehicle weight or twenty percent or more above the axle weight limit, and the total number of notices of liability issued by the WIM system. In some instances, a violation is not issued to a vehicle due to issues relating to image quality or insufficient license plate owner information.

Figure 7:
Monthly Violation Totals
 (Beginning with Warning Period August – November 2023)
 and ending October 28, 2024



Comparison of Truck Traffic Over the Course of the Year November 13, 2023–October 28, 2024

	All Trucks			Overweight Trucks Identified by WIM			Overweight Trucks in 10% Excess of Gross Vehicle Weight Limit, or 20% in Excess of Axle Weight Limits			Violations Issued		
	Daily	Weekly	Monthly	Daily	Weekly	Monthly	Daily	Weekly	Monthly	Daily	Weekly	Monthly
Nov 23 ¹	5,186	29,387	88,160	128	723	2,170	27	155	265	14	80	241
Dec 23	4,489	34,791	139,165	91	709	2,834	18	137	547	7	51	203
Jan 24	4,553	35,284	141,137	101	781	3,125	18	131	524	5	40	159
Feb 24	4,705	34,109	136,434	94	682	2,727	15	110	440	8	61	243
Mar 24	4,408	34,160	136,638	82	637	2,546	11	88	351	9	67	267
Apr 24 ²	6,813	47,692	95,384	120	839	1,677	11	77	154	8	53	105
May 24	4,596	35,620	142,480	86	666	2,664	7	51	204	5	39	155
Jun 24	4,768	35,758	143,031	98	735	2,938	5	41	163	4	32	128
Jul 24	4,615	35,769	143,076	145	1,121	4,483	7	53	210	5	37	147
Aug 24	5,364	41,571	166,285	148	1,151	4,603	8	62	249	7	51	202
Sep 24	4,425	33,189	132,757	177	1,330	5,320	10	77	309	8	61	242
Oct 24	3,949	29,618	118,470	172	1,289	5,156	9	68	273	7	56	223
Nov 24 ²	0	0	0	0	0	0	0	0	0	0	0	0

1. Violations began on November 13, 2023, so this data does not reflect a full month of enforcement

2. The WIM system was offline for calibration and certification during the time periods below, so this data does not reflect a full month of enforcement: April 13–April 28, 2024, and October 28–November 13, 2024.

Processing and Adjudication

As outlined in the legislation, each violation identified by the WIM system is reviewed by NYC DOT personnel to ensure completeness and accuracy. A subset of vehicles identified to be traveling ten percent or more above the gross vehicle weight and/or twenty percent or more above the axle weight limit are identified as potential violations. Examples of such violations include those where the photo is blurry or obscured, or vehicles for which we cannot find information on the vehicle ownership. After eliminating any violations that are deemed to be incomplete, the remaining are issued.

Violations are issued in the form of a Notice of Liability (NOL), which includes instructions for contesting a violation believed to be issued in error. Recipients of such a violation may contact the New York City Department of Finance (NYC DOF) online, by mail, or in person to dispute a violation.

	Total	Percent of Violations Issued
WIM Violations Issued, November 13, 2023 – October 28, 2024*	2,306	100%
Hearings Requested, November 13, 2023 – October 28, 2024	334	14.48%

	Total	Percent of Challenged NOLs
NOL Upheld at Hearing	268	80.24%
NOL Overturned at Hearing	18	5.39%
NOL Adjourned at Hearing	4	1.20%
NOL Upheld on Appeal	42	12.57%
NOL Overturned on Appeal	2	0.60%

* Due to data processing timing, NYC DOT and NYC DOF may calculate slightly different totals for a particular time period.

Revenue and Expenses

Between November 13, 2023 and October 28, 2024, NYC DOT issued a total of 2,306 violations, with 1,576 of these violations having been paid in some amount, and 1,515 paid in full. This amounts to \$1,011,919.53 in total revenue and leaves 730 violations unpaid to date. The cost to process each NOL is \$3.82, totaling \$8,808.92 for this time period. Additional information about costs and revenue is in the chart below.

WIM Program Revenue and Expense Summary (November 13, 2023–October 28, 2024)

Operating Costs	\$65,000
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Installation Costs	\$3,186,305
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Total Costs	\$3,251,305
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WIM Program Revenue	\$1,011,920

New York City does not have, and has never had, a contractor take any portion of revenue from violations. NYC DOT believes such a structure would create an incentive to issue a greater number of violations rather than focusing on behavioral change. As required by law, all net revenues from the WIM program are directed to the City's General Fund.

The authorizing legislation requires reporting on the total capital amount spent on repair or reconstruction of interstate route 278 in Kings County, and the total capital amount spent on repair or reconstruction of interstate route 278 specifically from the vicinity of Atlantic Avenue to the vicinity of Sands Street in Kings County. The New York State Department of Transportation (NYSDOT) owns the majority of the Interstate Route 278 in Kings County, between the Kosciuszko Bridge and Sands Street, and between Atlantic Avenue and the Verrazzano Bridge. All inquiries about work in these sections should be directed to NYSDOT. Below are the capital costs related to repair of interstate route 278 in Kings County between the vicinity of Atlantic Avenue to the vicinity of Sands Street.

Between 2023 and 2024, interim repairs were undertaken on BQE Central at Spans 4 (near Grace Court) and 34 (near Clark Street). These repairs were meant to ensure the continued service life of the structure. The work included removal of deteriorated asphalt, concrete, and rebar, installation of new rebar and concrete, and performance of concrete repairs inside the Joralemon Street Garage and Metropolitan Transportation Authority Fan Plant at Clark Street. The current total capital amount spent on the repair or reconstruction of the of Interstate Route 278 from the vicinity of Atlantic Avenue to the vicinity of Sands Street in Kings County is listed below:

Capital Construction Cost:

Interim Repair Construction Cost: \$25,690,979



Ydanis Rodriguez
Commissioner