



NEW YORK CITY COMPTROLLER
BRAD LANDER

Maura Hayes-Chaffe

Deputy Comptroller for Audit

Audit Report on the New York City Department of Transportation's Controls over Street Marking Refurbishments

MH22-074A | June 30, 2023





THE CITY OF NEW YORK
OFFICE OF THE COMPTROLLER
BRAD LANDER

June 30, 2023

To the Residents of the City of New York:

My office has audited the New York City Department of Transportation (DOT) to determine whether streets identified as requiring pavement marking refurbishment—repainting of faded or otherwise compromised street markings—received a refurbishment in a timely and equitable manner. We perform audits such as this to evaluate the effectiveness and oversight of City agency operations.

The audit found that DOT's protocols for identifying and prioritizing refurbishment inspection locations were generally adequate and equitable. However, only 68% of the locations listed on DOT's 2021 Prioritization List were inspected in 2021. The audit also found that DOT does not adequately enforce work order deadlines. Although the agency completed 90% of refurbishment work orders created in 2021, 35% were not completed by their assigned due dates. Several discrepancies were also identified in the work order data, suggesting issues with DOT's ability to accurately track the status of work orders.

This audit makes four recommendations intended to improve the effectiveness of DOT's refurbishment program, including that DOT develop the capability to generate accurate quantity estimates for work orders; maintain documentation to account for all work orders; and periodically reconcile its Prioritization List and work order database.

The results of the audit have been discussed with DOT officials and their comments have been considered in preparing this report. DOT's complete written response is attached to this report.

If you have any questions concerning this report, please email my Audit Bureau at audit@comptroller.nyc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "B. Lander".

Brad Lander
New York City Comptroller

TABLE OF CONTENTS

Audit Impact	1
Summary of Findings.....	1
Intended Benefits.....	1
Introduction	2
Background	2
Objectives.....	3
Discussion of Audit Results with DOT	3
Detailed Findings	4
DOT Inspected 68% of the Locations on its 2021 Prioritization List	4
Refurbishment Work Orders Not Completed on Time	7
DOT Does Not Accurately Set or Enforce Work Order Deadlines.....	8
DOT Does Not Track the Disposition of All Work Orders.....	9
No Inequities Based on Median Household Income Were Identified.....	10
RECOMMENDATIONS	12
Recommendations Follow-up	13
SCOPE AND METHODOLOGY	14
ADDENDUM	

Audit Impact

Summary of Findings

The New York City (NYC) Department of Transportation (DOT) Design and Construction unit's (D&C) protocols for identifying and prioritizing refurbishment inspection locations were generally adequate and equitable. The audit also found that DOT completed 90% of the refurbishment work orders created in 2021.

However, the audit also found that D&C was only able to inspect 68% of the locations listed on the 2021 Prioritization List in Calendar Year 2021, and 35% of the completed work orders were not completed by their assigned due dates. DOT does not appear to enforce work order deadlines.

In addition to the above, the audit identified several discrepancies in the work order data, suggesting issues with DOT's ability to accurately track the status of all work orders.

Intended Benefits

This audit identified areas in which DOT could improve the effectiveness of their refurbishment program.

Introduction

Background

DOT's mission is to provide for the safe, efficient, and environmentally responsible movement of people and goods in the City of New York (City). DOT operates over 13,250 signalized intersections and over 315,000 streetlights and maintains over 350 million linear feet of markings on City streets and highways (pavement), including retroreflective lines, symbols, and word messages; color surface treatments; and the means to clean and prepare pavement surfaces for reliable markings adhesion.¹

Pavement markings guide drivers, cyclists, and pedestrians. They may alert roadway users to danger, separate and direct the flow of traffic, indicate regulations, and convey other important information. They are used extensively in urban street design and are regularly adjusted to serve the efficiency, safety, and environmental needs of individual neighborhoods and communities. Street markings remain an integral part of the Vision Zero street safety plan.²

DOT manages its pavement marking operations through several different personnel units within its Transportation Planning and Management Division (TPM). The Design and Construction unit (D&C) within TPM is responsible for production and upkeep of plans to maintain pavement markings and oversees related project management work.

D&C's Asset Management group (AM) is responsible for providing a data driven means of identifying and prioritizing streets anticipated to need pavement marking refurbishment. Generally, at the beginning of a calendar year, AM begins the process of creating its Prioritization List using Geographic Information System (GIS) software. The Prioritization List identifies locations that need to be inspected for possible refurbishment.

DOT overlays the interactive map with various data to identify locations for refurbishment and to assign priority levels for the remaining locations. It considers, for example, the length of time since last markings were installed, estimated traffic volume, the presence of heavy vehicle routes, and presence of bike routes and speed bumps. AM excludes recently refurbished streets and locations already scheduled for projects in the upcoming season.

Once these variables are entered into the map, DOT generates a table that contains a dataset listing the elements applicable to each location. DOT then generates a list of locations, factoring in the length of street segments where markings are more likely to be worn. The list is then used to assign locations that need to be inspected in the upcoming weeks.

D&C aims to inspect as many locations from the Prioritization List, and complete as many of the needed refurbishment work orders, as possible by the end of the calendar year. Inspections are

¹ DOT's pavement markings are measured in linear feet of 4" width equivalent.

² Vision Zero is NYC's citywide initiative to eliminate death and serious injuries from traffic incidents.

conducted by D&C staff and work orders are assigned to contractors responsible for completing the refurbishment.

This audit reviewed inspections and work orders completed in relation to the Prioritization List for 2021, which was the most recent full year of work completed when the audit started.

According to DOT, almost 49 million linear feet in pavement line markings were completed during CY2021. In that year, DOT spent over \$35 million on associated operations, which included pavement marking refurbishment, pavement markings for newly resurfaced roadways, for Street Improvement Projects (SIPs) needed to improve the safety and operations of City streets, for new signal and stop sign installations, for speed humps, for right and left turn traffic calming, and for changes implemented in roadway geometry or function.³

Objectives

The objectives of this audit were to determine whether streets identified as requiring pavement marking refurbishment received a refurbishment in a timely and equitable manner.

Discussion of Audit Results with DOT

The matters covered in this report were discussed with DOT officials during and at the conclusion of this audit. An Exit Conference Summary was sent to DOT on May 8, 2023, and discussed with DOT officials at an exit conference held on May 16, 2023. On June 2, 2023, we submitted a Draft Report to DOT with a request for written comments. We received a written response from DOT on June 22, 2023.

In its response, DOT agreed with one of the audit's four recommendations (#3), disagreed with one (#4), and partially agreed with two (#1 and #2).

DOT's written response has been fully considered and, where relevant, changes and comments have been added to the report.

The full text of the DOT response is included as an addendum to this report.

³ Refurbishment marking refers to the repainting of street markings that are faded or otherwise compromised. This audit focused exclusively on refurbishment marking.

Detailed Findings

The audit found the results of D&C's protocols for identifying and prioritizing refurbishment inspection locations generally adequate and equitable, and found no adverse correlation between a community district's socioeconomic status (based on median household income) and the percentage of locations inspected and work orders completed within that district.

However, the audit found that D&C only conducted inspections for 68% of the locations listed on the 2021 Prioritization List by the end of 2021, leaving 32% uninspected.⁴ Much of the needed refurbishment identified during inspections was not completed on time or during the relevant period, and 10% of the work orders created during this period had still not been completed by February 2023.

Of the inspections conducted related to the Prioritization List in 2021, 61% identified the need for refurbishment, which resulted in the creation of work orders. In addition to these work orders, D&C created additional work orders based on observations conducted by field personnel. D&C was not able to complete refurbishment work in 10% of the identified locations.

DOT was able to complete 90% of the refurbishment work orders within an average time frame of 10 days, but 35% of the completed work orders were not completed by their assigned due dates, and more than half (58%) remained open for longer than 30 days past their estimated completion dates.

D&C provided explanations for not inspecting all locations on the Prioritization List and reasons why work by contractors was delayed. The audit also identified other possible causes of delay. These are discussed below in more detail, along with further information concerning discrepancies found in DOT's data.

DOT Inspected 68% of the Locations on its 2021 Prioritization List

Auditors analyzed the data maintained in the Prioritization List for 2021 to identify the percentage of listings that were inspected. In 2021, DOT had 7,993 locations listed on the Prioritization List. Inspections were conducted on 5,426 (68%) of them; overall, 2,567 (32%) of the locations were not reached during 2021.⁵

The actual number of inspections performed against locations listed varied by borough. While Queens accounted for the highest number of total inspections, performance against the locations listed was lowest; only 54% of the Queens locations on the Prioritization List were inspected

⁴ According to D&C, the Prioritization List is meant to provide guidance to inspectors on how they prioritize their refurbishment inspections, and locations lower on the Prioritization List are not prioritized over Marking After Refurbishment and Street Improvement Project work.

⁵ The audit reviewed the list of locations provided in the Prioritization List, as presented. Reported percentages are based on the list provided, despite the existence of several discrepancies in the data that are also discussed below.

during 2021. Staten Island fared best, with 85% of all locations on the Prioritization List inspected during the year.

The need for refurbishment also varied by borough. In Brooklyn, 78% of inspections identified the need for refurbishment and resulted in the creation of a work order. In contrast, only 34% of the inspections conducted in Staten Island identified a need for refurbishment. This resulted in the creation of 963 work orders in Brooklyn and 434 in Staten Island.

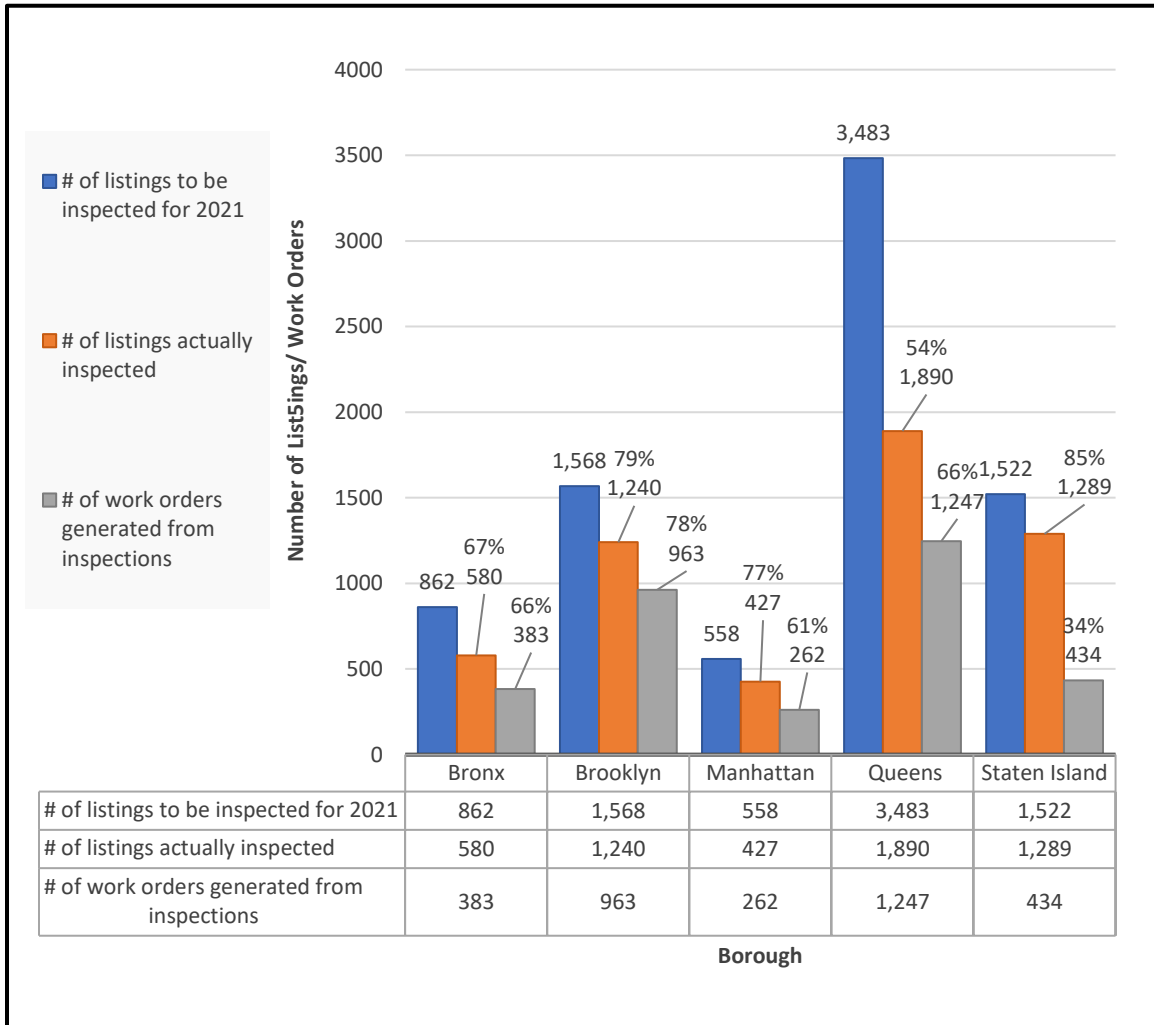
Factors that affected the number of inspections conducted and work orders created for each borough included the number of inspectors available and assigned to the borough, the condition of the street markings, and the need for inspectors to prioritize other work. Work orders were not created if the markings were found by DOT inspectors to be in good condition.

According to DOT officials, its D&C unit lost a large portion of their staff—around 30% in recent years—and the repercussions of COVID-19 and NYC fiscal constraints have made it difficult to fill these positions. DOT's pavement marking operations have been impacted by these trends. Vacancies are a continuing problem faced by New York City agencies.⁶

A summary of inspections and work orders created by borough is shown below in Chart I.

⁶ According to the NYC Comptroller's Policy paper, *Understaffed, Underserved Impact of Staff Vacancies on Agency Performance*, issued March 2023, agencies with high vacancy rates are struggling to meet their performance metrics.

Chart I: 2021 Prioritization Listings, Inspections and Associated Work Orders Created



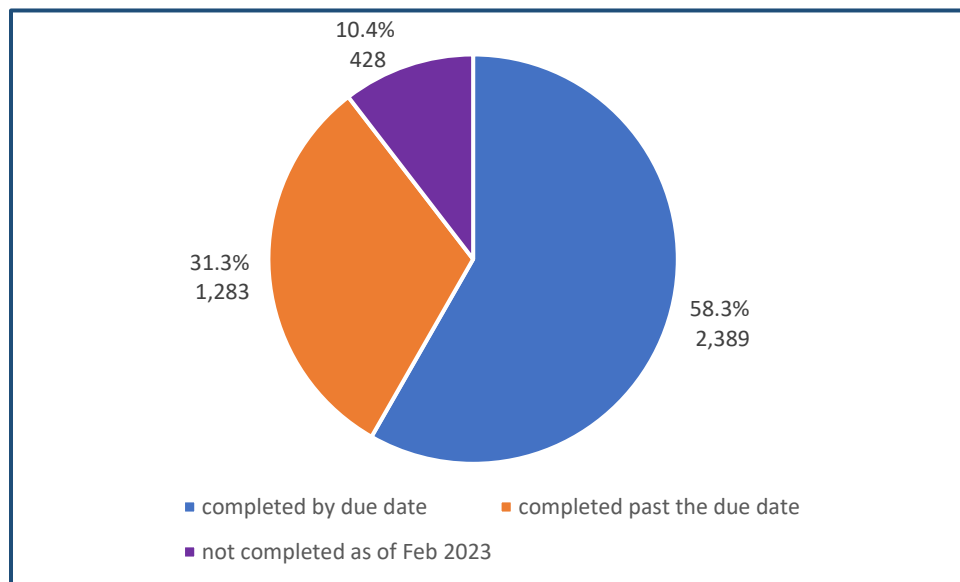
In its response, DOT presents figures different from those that were shared with auditors during the course of the audit, without explanation or supporting documentation to account for these differences. In the absence of such evidence, the auditors are unable to confirm the veracity of these new figures and have no basis for modifying this finding.

Refurbishment Work Orders Not Completed on Time

In 2021 and 2022, DOT completed 3,672 (90%) of the 4,100 refurbishment work orders that were created in 2021 based on both the Prioritization List and the observations of field personnel.⁷ On average, contractors completed assigned refurbishment projects within 10 days, and over half of these were completed in no more than two days. However, as of February 2023, DOT contractors had still not completed 428 (10%) of the work orders created to refurbish locations identified on the Prioritization List for 2021, and only 65% of work orders were completed within the established due dates. Fifty-eight percent of the past due work orders were not completed until more than 30 days past the deadline.

Thirty-five percent of the work orders assessed during the audit were completed outside of the due date, indicating that DOT did not enforce Article 4, Section 4.24 of its refurbishment contracts on behalf of the City. This section of the contract requires contractors to complete assigned work by the date of completion identified in a Work Order Group, plus any authorized extension of time. Of the 3,672 work orders both created and completed during Calendar Year 2021, only 2,389 were completed by the work order due dates. Chart II below shows the disposition of the 4,100 work orders created in Calendar Year 2021.

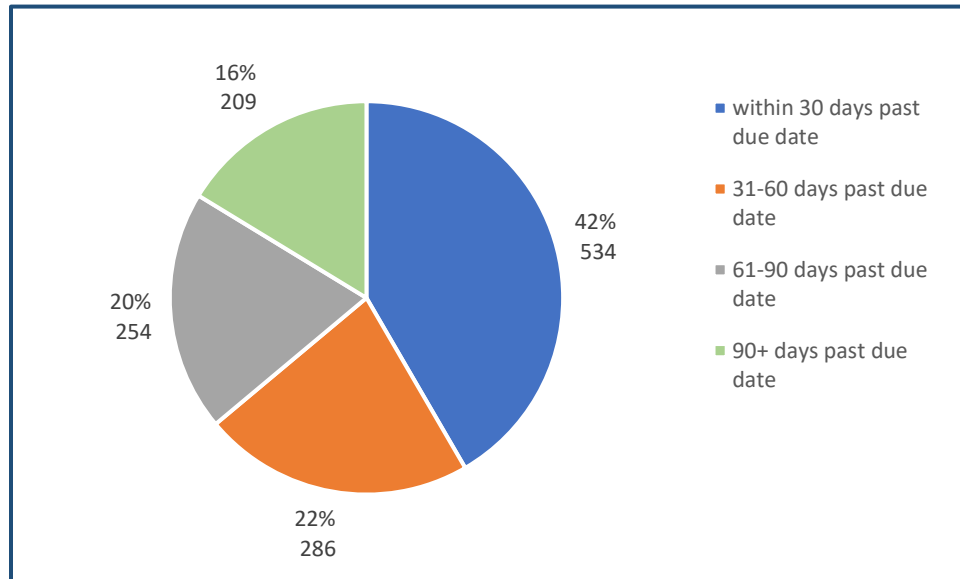
Chart II: Disposition of Work Orders Created in Calendar Year 2021



⁷ DOT provided their 2021 Work Order data which the auditors filtered to identify refurbishment work orders and found that there were 3,540 work orders created and completed in 2021. DOT also provided 132 refurbishment work orders that were created in 2021 but not completed until 2022.

Chart III below shows a breakdown of the past due work orders that were completed, and the number of days by which they exceeded due dates. Forty-two percent of past due work orders were completed up to 30 days past the due date; 22% were up to 60 days past the due date; 20% exceeded the due date by up to 90 days; and 16% exceeded the due date by more than 90 days.

Chart III: Calendar Year 2021 Work Orders Completed Past their Due Dates



D&C provided several reasons why work orders may not be completed on time, including re-scheduling based on weather, contractors changing the order in which work orders are completed based on location (e.g., proximity to other refurbishment work orders to spend less time on travelling), contractor capacity, staffing and supply chain issues.

However, the audit also found other possible causes of delay. For example, DOT does not consistently enforce work order timeframes; does not track the disposition of all work orders; and does not maintain related documentation. While D&C states only system administrators have the ability to delete work orders, they do not retain any record of deleted work orders or the reasons for such deletions.

These issues are addressed in more detail below.

DOT Does Not Accurately Set or Enforce Work Order Deadlines

When asked about untimely completions, DOT indicated that it does not enforce due dates because agency officials do not know the exact amount of linear feet of markings needed to complete work orders when they are issued to contractors. DOT inspectors perform only a preliminary inspection (either in person or using aerial photography) and determine whether

marking refurbishment is needed for a given location; they do not determine the amount of linear feet of street markings that will be refurbished.

For example, a work order for a street segment may include one intersection and a small number of markings, or multiple intersections and a larger number of markings. However, actual quantities of linear feet are mostly determined post-installation. DOT indicated that providing hard work order deadlines is not feasible until they are also able to perform reliable estimates of the number of linear feet needed to be refurbished for each work order. Accurately estimating contractor capacity is also needed to accurately estimate completion times for work orders.

DOT informed the auditors that they are in the planning phase of establishing a Markings Management System, which is intended to improve shortcomings of the existing work order management software in MS Access—including workflows aiding data entry accuracy and facilitating use of engineering quantity estimates. DOT informed the auditors that some combination of AutoCAD (computer-aided drawing software) and the MMS would be used in the future to generate needed quantity estimates. After the exit conference, DOT stated that it is actively working with developers to obtain the new software and actively hiring engineers to provide work order quantity estimates starting with Marking After Resurfacing Work Orders.

These are positive developments. Establishing genuine targets for the completion of refurbishment work orders would help to hold contractors accountable for delays in refurbishing faded or missing street markings; it would also help ensure that delays that do occur are addressed.

DOT Does Not Track the Disposition of All Work Orders

Auditors found discrepancies related to missing, incomplete, and deleted work orders and were therefore unable to obtain reasonable assurance that all refurbishment work orders generated during the audit scope period were accounted for.

According to Comptroller's Directive #1, all transactions and significant events need to be clearly documented and that documentation must be readily available for use or examination. Additionally, the Directive calls for all documentation to be properly managed and maintained. Management-approved controls should also ensure that processed data is accurate and reliable.

DOT currently manages and stores work order information on a Microsoft SQL Server via Microsoft Access. DOT uses the work order database to identify the entire workflow assignment and payment to the contractors.

During an attempt to reconcile the work orders in DOT's Prioritization List with the work order dataset that was provided, the auditors identified discrepancies related to missing and incomplete work order numbers, including work orders with no work order numbers, and work order numbers with no associated work orders.

Upon further analysis and consultation with DOT officials, the auditors verified the following:

- 197 work orders were created in 2021 but were not included in DOT's 2021 work order dataset provided to the auditors. According to DOT officials, there are several possible reasons the work orders might not have been completed, including: (1) conflicts between resurfacing, Street Improvement Projects, construction, or utility projects; (2) an inspector

could have created but not issued a WO# for unknown reasons; (3) an inspector could have created the WO# then left the unit; (4) a WO# could have been created for work that was later found to no longer be needed; (5) the contractor could have lost the work order; (6) the contract could have expired and the work order not returned by the contractor; or (7) duplicate work order markings.

- An additional 132 work orders were created in 2021, but according to DOT officials they were not initially shared with the audit team because the original query parameters used to create the work order dataset did not include enough data ranges, resulting in discrepancies.
- 215 work orders were prepared in years other than Calendar Year 2021.
- 15 work orders did not have identifiable years listed.
- 18 work order listings were renumbered to be incorporated with an associated work order.
- 32 discrepancies pertained to work orders that most likely were deleted from the database, according to DOT officials.

DOT stated that they do not maintain any documentation identifying which work orders were deleted, or the reasons for deletion.

In addition to the above-noted discrepancies, auditors identified gaps in work order number sequences, specifically 308 gaps that accounted for 2,678 missing work order numbers. A sample of 30 missing work order numbers that fell within the gaps was selected and sent to DOT with request for an explanation. DOT officials responded that 19 of the 30 work orders were created in either 2020 or 2022, two were created in 2021 but not shared with the auditors because DOT used an incorrect query as noted above, and nine were “most likely deleted.”

Analysis of this sample as well as the auditors’ reconciliation indicates that DOT is unable to account for all generated work orders. A concern is that valid work orders could be accidentally deleted without notice or record and, as a result, necessary refurbishment work could remain unresolved, ultimately becoming a street safety issue.

No Inequities Based on Median Household Income Were Identified

DOT’s prioritization protocols did not result in any community district’s exclusion for possible refurbishment. Auditors obtained the Prioritization List for CYs 2019, 2020, and 2021, and found a total of 15,367 listings divided among 59 community districts.⁸ Every community district has listings that appeared on the Prioritization List. To determine whether there was a correlation between a district’s socioeconomic status (based on median household income) and the

⁸ Based on DOT Prioritization List for Calendar Years 2019, 2020, and 2021, there are a total of 15,817 listings. The listings were divided as follows: 15,367 listings within 59 community districts, 338 listings within 12 park community districts, and 112 blank and/or unidentifiable community districts. When calculating the averages, auditors did not factor in the park community districts or the blank/unidentifiable community districts without a number because those areas did not have attainable information on household income levels which were essential to the auditors’ test for equity.

percentage of locations inspected and work orders completed, auditors analyzed (1) the percentage of listings that were inspected, and (2) the percentage of refurbishment work orders that were completed by community district. Based on that analysis, auditors found that the degree to which street marking projects (i.e., refurbishment work orders) were identified and completed varied slightly among the community districts. However, auditors identified no adverse correlation between the socioeconomic statuses of the districts and the variances identified.

As reported on the City's Department of City Planning website, the American Community Survey performed by the U.S. Census Bureau for Calendar Years 2016–2020 found that the Citywide median household income was \$67,046. That survey found that 31 (53%) of the City's 59 community districts had median household incomes that were below the Citywide median.

An analysis of the inspections completed showed that in 40 community districts, at least 68% (Citywide average) of the listings were inspected. Of these, 19 (47.5%) were districts where the median household income level was below the Citywide household median, and 21 (52.5%) were above. An analysis of the work orders completed found that in 35 community districts, at least 86% (Citywide average) of the work orders created in 2021 were completed that year. Of these, 17 (49%) were districts where the median household income level was below the Citywide household median and 18 (51%) were districts where the income level was above.

RECOMMENDATIONS

To address the abovementioned findings, the auditors propose that DOT:

1. Continue its efforts to develop the capability to generate accurate quantity estimates for Work Orders and establish a Markings Management System that would enable it to develop more suitable target dates for refurbishment work orders.

DOT Response: DOT partially agreed with this recommendation, stating “[t]his effort is in the initial phase including method development and hiring [and] is expected to initially focus on estimates for pavement Markings After Resurfacing (MAR) and not immediately for pavement marking refurbishments. MAR estimates will complete a database of quantities that will cover all of NYC and be eventually utilized for pavement marking refurbishments.”

Auditor Comment: The auditors are pleased that DOT’s system is being developed with a view towards improving its oversight of pavement marking refurbishments, which represent a large aspect of DOT’s street marking operations.

2. In the interim, consider updating target completion times set by DOT inspectors after contractors have been assigned and assessed actual refurbishment needs.

DOT Response: DOT partially agreed with this recommendation, reiterating that it is not feasible to provide realistic target completion times for work orders until it can “perform reliable estimates of the number of linear feet needed to be refurbished for each work order.” The agency stated, however, that it is hiring engineers to establish the capability to generate accurate quantity estimates and reviewing policies for establishing due dates to ensure “factors affecting the refurbishment program are considered.”

Auditor Comment: The auditors are pleased that DOT is taking steps to develop more suitable target dates for refurbishment work orders.

3. Maintain documentation to account for all work orders generated, including those created and not issued to the contractor; those issued to the contractor and still outstanding; and those that are later determined to be no longer necessary.

DOT Response: DOT agreed with this recommendation but stated it cannot be implemented until the Markings Management System (MMS) replaces the current MS Access-based software, noting that the MMS “will have audit trail and annotation capability scheduled to be ready for the calendar year 2025 construction season.”

4. Periodically reconcile its Prioritization List and work order database to help identify inaccuracies in its street marking datasets.

DOT Response: DOT disagreed with this recommendation, stating that “[t]he Prioritization List is updated regularly and is just one tool meant to provide guidance to inspectors on how they should prioritize their refurbishment inspections. It is meant to be used in conjunction with real time field inspections. It is not practical or helpful to reconcile these two systems.”

Auditor Comment: Auditors found that some of the work orders listed on the Prioritization List could not be reconciled to existing work orders, raising questions as to whether needed refurbishments were being addressed. Reconciling these two datasets would help alleviate that concern. In light of the fact that DOT anticipates it will not be able to implement recommendation #3 until 2025, auditors urge DOT to reconsider its response and implement this recommendation.

Recommendations Follow-up

Follow-up will be conducted periodically to determine the implementation status of each recommendation contained in this report. Agency reported status updates are included in the Audit Recommendations Tracker available here: <https://comptroller.nyc.gov/services/for-the-public/audit/audit-recommendations-tracker/>

SCOPE AND METHODOLOGY

We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards (GAGAS). GAGAS requires that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions within the context of our audit objectives. This audit was conducted in accordance with the audit responsibilities of the City Comptroller as set forth in Chapter 5, §93, of the New York City Charter.

The audit scope was Calendar Year 2021.

To obtain an understanding of the policies, procedures, and regulations for DOT's street marking operations, auditors reviewed and where applicable used as criteria the following resources:

- Comptroller's Directive #1
- The Street Marking Contracts between DOT and their contractors.
- DOT's Design Resurfacing Project Workflow.
- Procedures for Marking Records Retrieval Associated with Installation of Pavement Safety Markings.
- DOT's *Pavement Markings Inspection Manual*.
- Key indicators tracked by DOT relating to its street marking operations for Fiscal Years 2019–2021.
- Consultant Reports conducted on DOT's pavement marking operations.
- Reports containing the key timeliness and/or performance metrics that DOT reviews.
- Prioritization List and work orders generated for CY2021.

To further understand DOT's operations, auditors conducted interviews with the Chief Engineer of DOT's Transportation Planning & Management Division, the Chief of Construction for DOT's Transportation Planning & Management Division, the Geographic Information System (GIS) analyst responsible for identifying places that are predicted to need marking refurbishment, and the Director of Quality Control for DOT's Design and Construction unit.

To evaluate DOT's monitoring of the degree to which its contractors complete street marking projects in a timely manner, auditors obtained and analyzed DOT's CY2021 work order dataset. In order to be able to rely on that data, auditors obtained actual work orders, contractor field reports, field inspection reports, and pavement marking bill information for a sample of 30 work orders. Auditors also compared information stored in the work order dataset to information stored in DOT's Prioritization List as well as 311 information pulled from NYC Open Data and 311 information provided by DOT.

While attempting to reconcile work order data included in the Prioritization List with the work order dataset, the auditors identified records on the Prioritization List that stated that a work order had been created based on an inspection but either did not have a work order number provided or had an incomplete work order number. The auditors also found records where the work order number was listed on the Prioritization List as a result of an inspection but was not found in the

work order dataset. Auditors provided DOT officials with these records and requested clarification on why those records were not found in both datasets.

In terms of the analysis conducted on the gaps found within DOT's datasets, auditors combined all the refurbishment work order numbers from the various data sets, sorted the numbers from lowest to highest, and removed any duplicates. Auditors then identified gaps in the work order sequence and selected the range of work order numbers between RM-19115 and RM-25815 in an attempt to avoid work orders that may have been created before and after the audit scope.

The auditors selected a sample of 30 work order numbers that fell within the gaps. To ensure that gaps of 30 or greater were included in the sample, the auditors identified those gaps (there were 19), and selected the fifth work order number that fell in the sequence of those gaps. The auditors then excluded the ranges for gaps of 30 or greater and identified the gaps ranging from 1 to 29. There were 289 remaining gaps, which the auditors then divided by 11 and picked the 26th work order record to select 11 work order numbers, thus obtaining a sample size of 30 records.

To further understand DOT's prioritization process, auditors obtained, reviewed, and analyzed the Prioritization Lists for CYs 2019, 2020, and 2021 and the associated algorithm used by DOT when creating those lists. Auditors also observed a demonstration of the prioritization process. Additionally, in relation to the auditors' equity analysis, auditors used the NYC Planning Community District Profiles website to obtain statistical information on the median household income of the community districts.

To ascertain whether there was a correlation between a district's socioeconomic status and the percentage of locations inspected or work orders completed, auditors analyzed the following two indicators by community district based on the 2021 Prioritization List: (1) the percentage of listings that were inspected (listing to inspection ratio), and (2) the percentage of created work orders that were completed (work order completion rate).

The collective results of all the above tests done, while not statistically projected to their respective populations, provide sufficient, competent evidence to support the audit's findings and conclusions regarding DOT controls to ensure that streets identified as requiring the painting of street markings are painted in a timely manner.



June 22, 2023

M. Hayes-Chaffe
Office of the Comptroller
1 Centre Street
New York, NY 10007

Re: Draft Audit Report MH22-074A, Dated June 2, 2023, The Department of Transportation's Controls over Street Marking Refurbishments

Dear Ms. Hayes-Chaffe:

The New York City Department of Transportation ("NYC DOT") is in receipt of the Office of the New York City Comptroller's Draft Audit Report (MH22-074A) on the New York City Department of Transportation's Controls over Street Marking Refurbishments.

Please accept the following as the Agency's written response to the Draft Audit Report:

On behalf of NYC DOT Commissioner, Ydanis Rodriguez, NYC DOT partially agrees with the draft report's summary conclusions, findings, and recommendations. NYC DOT agrees that there are no inequities based on median household income in their refurbishment of markings and all community districts are prioritized for markings equally. Although NYC DOT holds contractors to due dates considered safety-critical, lack of material quantity estimates at the time of assignment of a work order prevents comprehensive accurate date setting for the program in the work order database. As stated in the report, 65% of the work orders issued were completed by the due date assigned, and on average, contractors completed assigned refurbishment projects within 10 days, and over half of these were completed in no more than two days. None-the-less, the audit found that NYC DOT completed 90% of the refurbishment work orders created in 2021.

Background (Page 2):

Comment: The last sentence of the background should be replaced with the following:

"In Calendar Year 2021, NYC DOT spent over \$35 million on associated operations, which included pavement marking for refurbishment, for newly resurfaced roadways, for Street Improvement Projects (SIPs) used to make safety and operational enhancements to NYC streets, for new signal and stop sign installations, for speed humps, for right and left turn traffic calming, and for changes implemented in roadway geometry or function."

**Audit Findings:****Finding (Page 4):** DOT Inspected 68% of the Locations on its 2021 Prioritization List

The Prioritization List is just one tool meant to provide guidance to inspectors on how they should prioritize their refurbishment inspections. It is meant to be used in conjunction with Inspector real time field observations. Locations found to be lower on the Prioritization List are not prioritized over Marking After Refurbishment, field observations and Street Improvement Project safety work. Additionally, the Prioritization List is divided into phases with the major roadways as part of phase 1. With 68% of the list completed in 2021 all major roadways on the prioritization list were inspected. The Prioritization List serves as a guide with respect to locations that may need to be refurbished. As illustrated in the audit, although Inspections were completed at 5,426 locations only 2,166 work orders were warranted – illustrating only 40% of the locations on the list needed to be refurbished. This is why the Prioritization List cannot be used in isolation and why NYC DOT is still dependent on Inspectors to identify locations for refurbishment in the field which results in 100% work order creation. While NYC DOT created 2,166 work orders from the Prioritization List in 2021, they created a total of 6,100 work orders during the same time period. This indicates that 3,934 additional work orders were created from other sources.

Finding (Page 6): Refurbishment Work Orders Not Completed on Time

Response: In general, the timeframes listed on the work orders are mostly complied with, however, the portion exceeding deadlines occur because work order quantities are unknown at issuance to the contractor and may be delivered to the contractor in volume that exceeds reasonable contractor capacity for the contract scale. NYC DOT is reviewing policies for how due dates are established so that factors affecting the refurbishment program are considered. Markings is weather dependent, and the program is currently structured to be front loaded, so NYC DOT typically provides more work orders than contractor capacity at the beginning of season with higher priority locations emphasized through e-mail and verbal direction. The expectation is that all work will be completed during the marking season which runs from approximately April through November of any calendar year. To gain efficiency NYC DOT may allow contractors to bundle work in areas where they are already mobilized so productivity is optimized – leading to due dates changing outside what is documented. Also, during 2021, contractors had material shortages and there were also staff illnesses affecting both contractors and NYC DOT staff due to COVID-19.

**Finding (Page 8):** DOT Does Not Accurately Set or Enforce Work Order Deadlines

NYC DOT is in the process of hiring engineers to establish the capability to generate accurate quantity estimates for work orders. NYC DOT is also in the planning phase of establishing a Markings Management System, which is intended to improve shortcomings of the existing work order management application developed in Microsoft's aging Access software. MMS is currently scheduled to be fully completed for use by the beginning of 2025.

Finding (Page 9): DOT Does Not Track the Disposition of All Work Orders

Work orders can only be deleted by the system administrators. Inspectors do not have the capability to delete work orders. When a work order needs to be deleted, a request must be sent to the administrator. There are several scenarios where it becomes necessary to delete a work order or when work orders might not have been completed, including: (1) conflicts between resurfacing, Street Improvement Projects, construction, or utility projects; (2) duplicate or overlapping work orders; and (3) a work order number could have been created for work that was later found to no longer be necessary.

It is expected that MMS will be able to address the above concern to accurately reflect the status of any work order created and any work order subsequently deleted, including an audit trail and explanation.

Finding (Page 10): No inequities Based on Median Household Income Were Identified

No comment.

Audit Recommendations (Page 12):

1. Continue its efforts to develop the capability to generate accurate quantity estimates for Work Orders and establish a Markings Management System than would enable it to develop more suitable target dates for refurbishment work orders.

Response: Partially Agree



Department of Transportation

Ydanis Rodriguez, Commissioner

This effort is in the initial phase including method development and hiring. This is expected to initially focus on estimates for pavement Markings After Resurfacing (MAR) and not immediately for pavement marking refurbishments. MAR estimates will complete a database of quantities that will cover all of NYC and be eventually utilized for pavement marking refurbishments.

2. In the interim, consider updating target completion times set by NYC DOT inspectors after contractors have been assigned and assessed actual refurbishment needs.

Response: Partially Agree

Providing realistic target completion times for work orders is not currently feasible until NYC DOT is able to perform reliable estimates of the number of linear feet needed to be refurbished for each work order. NYC DOT is in the process of hiring engineers to establish the capability to generate accurate quantity estimates for such work orders. NYC DOT is reviewing policies for how due dates are established so that factors affecting the refurbishment program are considered.

3. Maintain documentation to account for all work orders generated, including those created and not issued to the contractor; those issued to the contractor and still outstanding; and those that are later determined to be no longer necessary.

Response: Agree

We agree with the recommendation, however, this cannot be done with the currently utilized MS Access-based software. NYC DOT is in the planning phase of establishing a Markings Management System (MMS) that will have audit trail and annotation capability scheduled to be ready for the calendar year 2025 construction season.

4. Periodically reconcile its Prioritization List and work order database to help identify inaccuracies in its street marking datasets.

Response: Disagree



Department of Transportation

Ydanis Rodriguez, Commissioner

The Prioritization List is updated regularly and is just one tool meant to provide guidance to inspectors on how they should prioritize their refurbishment inspections. It is meant to be used in conjunction with real time field inspections. It is not practical or helpful to reconcile these two systems.

Sincerely,

A handwritten signature in black ink, appearing to read "Eric Beaton".

Eric Beaton
Deputy Commissioner

Cc: **NYC DOT**
Commissioner Rodriguez
M. Forgione
P. Ochoa
R. Lynch
M. Dean
I. Yaroslavsky
N.P. Browne
J. Fuccillo
R. Livermon
J. Economos

Mayor's Office of Operations
D. Giuliano



NEW YORK CITY COMPTROLLER
BRAD LANDER

1 Centre Street, New York, NY 10007

www.comptroller.nyc.gov

 @NYCComptroller

(212) 669-3916