Metropolitan Transportation Authority – Metro-North Railroad

Mitigation for Extreme Weather Conditions and Flooding

Report 2023-S-5 | February 2025

OFFICE OF THE NEW YORK STATE COMPTROLLER
Thomas P. DiNapoli, State Comptroller

Division of State Government Accountability

Audit Highlights

Objectives

To determine whether the Metro-North Railroad (Metro-North) performed a systemwide risk assessment to identify potential risks to its system from extreme weather conditions and flooding and developed plans to mitigate their effects. We also determined whether Metro-North tested and updated the plans and inspected/maintained the equipment to ensure they can be deployed when needed. The audit covered the period from April 2009 to May 2023.

About the Program

Metro-North is a Metropolitan Transportation Authority (MTA) agency that provides commuter railroad service to customers throughout New York and Connecticut on its Hudson, Harlem, and New Haven Lines, and in New York's Orange and Rockland counties on its Port Jervis and Pascack Valley Lines.

In September 2007, the MTA established the Blue Ribbon Commission on Sustainability and the MTA (Blue Ribbon Commission) to develop sustainability-related recommendations for the MTA and its operating agencies. In April 2009, the MTA released the Blue Ribbon Commission's Final Report, which predicted that, without an adequate investment in adaptation measures, climate change will have even greater adverse impacts on the MTA's vital infrastructure, operations, and revenue streams in the future. The primary risks to the metropolitan region and the MTA service area include more extreme precipitation events, coastal storms and storm surges, flooding, and, in the longer term, rising sea levels.

Severe winter weather can create hazardous travel conditions throughout the Metro-North region and possibly hamper Metro-North's ability to provide regular train services. Metro-North territory is particularly vulnerable to high winds due to trees and overhead power lines. Flooding from hurricanes and tropical storms can cause Metro-North to suspend service.

Metro-North has developed a Winter Storm Plan and a Coastal Storm and Hurricane Plan, which include standard operating procedures to be implemented prior to a storm's arrival, during the storm, and for recovery and post-recovery.

Key Findings

- Metro-North did not perform a systemwide risk assessment. Further, Metro-North does not have procedures to address all types of severe weather events and did not perform an assessment of its Harlem Line related to flooding due to heavy rains.
- Metro-North's Winter Storm Plan and Coastal Storm and Hurricane Plan do not account for weather conditions such as extreme cold/heat, tornadoes, heavy rains, and lightning.
- We found that equipment designed to be deployed during severe weather events was not always inspected, tested, or maintained in compliance with Metro-North procedures and plans. Specifically:
  - 15 of 28 (54%) snow melters (used to heat the area around switches to keep them operative during inclement weather) were not inspected, as required. Four were not inspected in both documented winter seasons, and 11 were not inspected in the 2021-2022 winter season.

- 13 of 15 (87%) pieces of snow-fighting equipment that required a preventive maintenance (PM), including a backhoe tractor and air compressors, did not have one for each of the three seasons in our sample.
- 50 of 65 (77%) sampled pieces of equipment such as a snow tractor, snow blowers, and snow brooms did not receive a PM. While Metro-North officials stated that equipment valued at less than $5,000 does not require a PM because it is more economical to replace the equipment than to repair it, they did not provide documentation to support this statement. Moreover, cost should not be the only consideration because, without PM, the equipment may not work as intended during a weather emergency.

Key Recommendations

- Conduct periodic systemwide assessments of the Metro-North system to observe new or possible increased weather-related risks that could affect the system.
- Revise or develop weather plans that include lightning, extreme heat/cold, heavy rains, and tornadoes.
- Ensure that all required PM events are completed, and update and review the equipment database to ensure equipment maintenance, testing, and inspections are recorded.

Office of the New York State Comptroller
Division of State Government Accountability

February 6, 2025

Janno Lieber
Chair and Chief Executive Officer
Metropolitan Transportation Authority
2 Broadway, 20th Floor
New York, NY 10004

Dear Mr. Lieber:

The Office of the State Comptroller is committed to helping State agencies, public authorities, and local government agencies manage their resources efficiently and effectively. By so doing, it provides accountability for the tax dollars spent to support government operations. The Comptroller oversees the fiscal affairs of State agencies, public authorities, and local government agencies, as well as their compliance with relevant statutes and their observance of good business practices. This fiscal oversight is accomplished, in part, through our audits, which identify opportunities for improving operations. Audits can also identify strategies for reducing costs and strengthening controls that are intended to safeguard assets.

Following is a report of our audit of Metropolitan Transportation Authority – Metro-North Railroad, entitled *Mitigation for Extreme Weather Conditions and Flooding*. The audit was performed pursuant to the State Comptroller's authority under Article X, Section 5 of the State Constitution and Section 2803 of the Public Authorities Law.

This audit's results and recommendations are resources for you to use in effectively managing your operations and in meeting the expectations of taxpayers. If you have any questions about this report, please feel free to contact us.

Respectfully submitted,

Division of State Government Accountability

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Glossary of Terms

Term	Description	Identifier
MTA	Metropolitan Transportation Authority	*Auditee*
AMMS	Advanced Maintenance Management System	*Key Term*
CWP	Continuous work platform	*Key Term*
EMTF	Emergency Management Task Force	*Key Term*
Metro-North	Metro-North Railroad	*Agency*
PDL	Power Director's Log	*Key Term*
PM	Preventive maintenance	*Key Term*
Zero Hour	Projected arrival time of 39-mph sustained winds	*Key Term*

Background

The Metropolitan Transportation Authority (MTA) is a public benefit corporation chartered by the New York State Legislature in 1965. One of six MTA agencies, Metro-North Railroad (Metro-North) was formed in 1983 to operate commuter railroad service to New York City's northern suburban counties and southern Connecticut. East of the Hudson River, Metro-North operates the Hudson, Harlem, and New Haven Lines out of Grand Central Terminal serving New York and Connecticut. West of the Hudson, Metro-North contracts with New Jersey Transit to operate the Port Jervis and Pascack Valley Lines serving Orange and Rockland counties out of Hoboken Terminal.

In September 2007, the MTA established the Blue Ribbon Commission on Sustainability and the MTA (Blue Ribbon Commission) to develop sustainability-related recommendations for the MTA and its operating agencies. In April 2009, the MTA released the Blue Ribbon Commission's Final Report, which predicted that, without an adequate investment in adaptation measures, climate change will have even greater adverse impacts on the MTA's vital infrastructure, operations, and revenue streams in the future. The primary risks to the metropolitan region and the MTA service area include more extreme precipitation events, coastal storms and storm surges, flooding, and, in the longer term, rising sea levels. The report recommended that the MTA have a climate change adaptation master plan in place by 2015, one that includes realistic timetables and financing options.

Severe winter weather can create hazardous travel conditions throughout the Metro-North region and possibly hamper Metro-North's ability to provide regular train services. Metro-North territory is particularly vulnerable to high winds due to trees and overhead power lines. Flooding from hurricanes and tropical storms and other torrential rainstorms can cause Metro-North to suspend service due to flooding and debris.

Metro-North has developed a Winter Storm Plan and a Coastal Storm and Hurricane Plan, which include standard operating procedures to be implemented prior to a storm's arrival (96 hours for coastal storms, 72 hours for winter storms), during the storm, and for recovery and post-recovery. The Coastal Storm and Hurricane Plan indicates Metro-North maintains deployable flood mitigation devices to be used at locations across the territory that are at risk of water infiltration during the storms. Those devices are to be installed and/or inspected 8 hours prior to Zero Hour (projected arrival time of 39-mph sustained winds). The Winter Storm Plan also includes procedures for pre-season preparations of the snow-fighting equipment.

MTA Headquarters maintains an all-agency weather vendor contract and facilitates MTA territory weather briefings (forecasts). Prior to May 2023, the calls were held once a week on Mondays; after May 2023, the calls are held twice a week on Mondays and Thursdays. Metro-North officials also advised that the MTA contracted with a new weather vendor. Metro-North's invitees to those meetings include Government and Communication Relations, Station Operations, Operations/Transportation, Maintenance of Way, and Safety—including Emergency Management. Metro-North's Operations Control Center also monitors the weather on a day-to-day basis.

The Office of System Safety is the main point of contact at Metro-North, where weather reports are monitored for extreme weather situations. If a severe situation is developing, the office will alert the Metro-North Senior Operations officials who need to be apprised. When warranted, a Senior Operations official will convene the Emergency Management Task Force (EMTF). There might be several EMTF meetings scheduled throughout the day, and the notes taken during those meetings record the actions planned to address the weather situations. When winds over 30 mph or heavy rainfall is forecasted, Metro-North officials will place a tree-cutting/ removal crew on standby.

Metro-North snow-fighting and coastal storm equipment is tested and maintained by the Work Equipment unit and the records, including preventive maintenance (PM) and work orders, are kept in the Advanced Maintenance Management System (AMMS). According to Metro-North officials, a PM is performed at least annually for equipment valued at $5,000 and above. However, no PM is conducted for equipment or tools that cost less than $5,000. The officials indicated that a pre-season check is done for all equipment, regardless of its cost.

Metro-North's electrical system along the Hudson Line was severely damaged and left in a state of disrepair due to Superstorm Sandy in October 2012. Metro-North began 11 capital projects, totaling $446,176,941, to repair the damage and to fortify its system to withstand potential extreme weather events like Superstorm Sandy that could happen in the future.

Audit Findings and Recommendations

Metro-North has not performed a systemwide risk assessment of its transportation system and facilities to identify weather-related risks. Further, a post-Superstorm Sandy consultant study, issued in June 2013, recommended that Metro-North perform elevation work to protect its new construction infrastructure from future storm surge flooding along the Hudson and New Haven Lines. However, Metro-North did not provide documentation to support that it addressed the recommendation.

While the MTA published a systemwide Climate Resilience Roadmap in April 2024, after the end of our audit fieldwork, it does not address all aspects of Metro-North's systems that are susceptible to damage from extreme weather conditions and flooding.

Although Metro-North developed a means to predict what portions of its system are prone to coastal flooding based on storm surge predictions, it does not address the Harlem Line facilities and infrastructure.

The Coastal Storm and Hurricane Plan addresses near-term weather conditions but does not account for seasonal preparations. Moreover, Metro-North does not have stand-alone extreme cold or extreme heat plans, and there is no adverse weather plan for lightning and tornadoes. However, officials indicated that they take actions to address other extreme weather events such as heat and cold even though they do not have a written plan. In the absence of written procedures, there is less assurance that appropriate actions will be taken in the event of a weather event.

The Winter Storm Plan requires Metro-North to perform an annual PM, repair, and testing of snow-fighting equipment. However, we found that Metro-North has not always been following those requirements. These maintenance and testing activities help ensure equipment will work properly in the event it is needed; not performing these steps may increase the risk that equipment will not function as intended.

Systemwide Risk Assessment

According to the Federal Railroad Administration, the rail industry is vulnerable to climate-related weather events and must address the issue of infrastructure resiliency. Adverse conditions, such as excessive heat, flooding, sea level rise, tornadoes, hurricanes, and wildfires are exacerbated by climate change and threaten the safety and reliability of the rail network.

Superstorm Sandy demonstrated the vulnerability of Metro-North facilities to coastal flooding and disruption in service. While Metro-North took actions to identify weather-related risks to its system, it did not conduct a systemwide risk assessment.

After Superstorm Sandy, Metro-North hired consultants to provide Design Flood Elevation (the minimum elevation to which a structure must be elevated or flood-proofed) recommendations to be used in new construction and for developing flood mitigation improvements for railroad facilities. The consultants' June 2013 report contained project-based solutions to mitigate future storms, including that Metro-North adopt a flood elevation 4 feet above the current storm event elevation to

protect its infrastructure from future storm surge flooding along the Hudson and New Haven Lines. The report's recommendations are based on the assessment of readily available data relating to storm surge, wave heights, sea level rise, and design standards. We requested, but were not provided with, any documentation to support that the recommendations were addressed.

Metro-North also developed a Track & Assets Inundation Map Book in 2014, which could be used to predict what portions of its system are under the threat of flooding based on storm surge predictions made by the National Oceanic and Atmospheric Administration. The book is supplemented with the Inundation Database, which shows what Metro-North assets would be in peril given an expected storm surge. However, this information is limited to the Hudson and New Haven Lines. According to the officials, the Harlem Line was not included because it is not in a coastal flooding zone, but the Harlem Line is not exempt from flash flooding, which can occur following steady, heavy rain. Metro-North officials also provided an excerpt from their Rail Controllers Manual that indicates they have installed a High-Water Notification system on part of the Harlem Line, which includes an alarm mechanism to alert responsible parties when the water level is about to reach the tracks and when it reaches the tracks. However, Metro-North did not provide us with a mitigation plan.

Metro-North officials also indicated that they participated in the MTA's 20-Year Needs Assessment, but our review of the 2015–2034 assessment showed that it did not address adverse weather mitigation projects or timelines for planning.

In response to our preliminary findings, Metro-North officials stated that the 20-Year Needs Assessments for both 2020–2039 and 2025–2044 include projects that address mitigation. According to Metro-North officials, both include projects to repair and replace culverts, assets that are key to Metro-North's management of extreme weather. Additionally, the MTA is conducting a hydrology study that addresses undergrade bridges along the Hudson and Harlem Lines that are susceptible to flood events. However, the 2020–2039 Needs Assessment was not provided. According to MTA officials, it was not publicly issued.

Metro-North did not provide a systemwide risk assessment during the fieldwork for this audit. Metro-North officials we interviewed advised us they were not aware of a systemwide risk assessment. During the audit, MTA Construction and Development officials conducted a systemwide assessment of the MTA and its agencies, including Metro-North, to address the vulnerability of its infrastructure to long-term climate risks, including future coastal storms, sea level rise, heavy rainfall, and all temperature extremes. The results of the assessment are intended to inform capital planning decisions and design standards for new or replacement assets and equipment.

On April 25, 2024, MTA Construction and Development issued its Climate Resilience Roadmap, which focused on four main climate threats: coastal surge, torrential rain, sea level rise, and extreme heat. The roadmap proposes expenditures of around $6 billion across the MTA in 10 goal areas, two of which impact Metro-North. These include the goals to reduce Metro-North flooding and to protect outdoor infrastructure

from heat. Projects to reduce flooding at Metro-North are expected to require over $1 billion in funds, and projects to address heat are estimated to require less than $50 million, across three systems (MTA Subway, Long Island Rail Road, and Metro-North). However, the roadmap does not lay out resolutions for all risks—only for some—and does not enumerate each project to be undertaken. This is expected to be disclosed in future 5-year capital programs.

No other assessments were conducted of Metro-North's system plans to address other types of adverse weather conditions such as lightning and tornadoes. As a result, Metro-North may not be prepared to address other adverse weather conditions that may hamper its system.

Recommendation

1. Conduct periodic systemwide assessments of the Metro-North system to observe new or possible increased weather-related risks that could affect the system.

Weather-Related Equipment

We found that equipment designed to be deployed during severe weather events was not always inspected, tested, or maintained in compliance with Metro-North procedures and plans.

The Winter Storm Plan includes winterization procedures for the Maintenance of Way Department. Four sub-units of the Maintenance of Way Department are Power, Track, Structures, and Communication and Signals. The Winter Storm Plan states each sub-unit's responsibilities and the Chief Officer staff for the winter season. The Coastal Storm and Hurricane Plan contains guidelines for planning and responding to specific events, including passenger evacuation and deployable flood devices.

To determine whether the equipment was maintained, inspected, and tested and was compliant with the Winter Storm Plan requirements, we reviewed the PM and testing records for the 2020-21, 2021-22, and 2022-23 winter seasons (October–April) at three of the four sub-units (excluding Communication and Signals). We selected a judgmental sample of 10 of 37 locations where snow melters are located; 28 of the 95 snow melters were assigned to these 10 locations. We also selected random samples from an inventory list of 933 equipment items in AMMS. For each item, the list included the type of equipment. Altogether, there were 17 types of equipment (including chainsaws, generators, snow blowers, water pumps, tractors, and snow brooms). We selected random samples of between one and 10 items from each of the 13 types where there was more than one piece of equipment and included all four items in the remaining categories. In total, 65 items were selected to review for maintenance, testing, and inspection records. We also reviewed snow removal contract documents and determined they were awarded prior to the seasons, as required.

Snow Melters

Power is responsible for the maintenance and testing of snow melters (equipment that heats the area around switches to keep them operative during inclement weather) along the Harlem and Hudson Lines and part of the New Haven Line. Power begins its winterization preparation each October, when work crews visit their assigned territories to check the heating elements and controls to ensure the snow melters are fully operational. During the remainder of the winter season (November–April), snow melters are tested weekly for repairs and any arising issues.

We reviewed inspection reports provided for the 10 locations for the three seasons and found there were no inspection reports for the 2020-21 season. Power officials stated their record-keeping process did not start until 2022.

Furthermore, for the 28 snow melters reviewed, we also noted that 15 (54%) were not inspected:

- 4, located in Highbridge, were not inspected for the 2021-22 and 2022-23 seasons.
- 11, installed in three locations, were inspected for only one season in 2022-23.
- 13, installed in six locations, had inspection reports for both seasons, 2021-22 and 2022-23.

Additionally, prior to the 2023 winter season, snow-melter inspections were recorded on daily work order forms that did not describe the individual snow melter or work completed. As of the 2022-23 winter season, the Power sub-unit created the Snow-Melter Inspection Report detailing the location, individual heaters, and a brief checklist. However, the maintainers did not complete the inspection report with all the required information. Metro-North officials explained that the reason the snow-melter and heating element forms were incorrect was probably due to employee error. Metro-North officials explained they were just rolling out the new form and they need to get employees to fill out the new form properly.

In addition, we noted that 75 of the 95 snow melters, which are operated remotely, are managed through the Power Director's Log (PDL). The PDL records any arising issues diagnosed on the tracks for workers to service and repair throughout the year. We reviewed PDL records from January 2021–May 2023 and found that Power completed repairs based on when the Rail Train Controller granted access to the track (i.e., not the set time frame) and the standards are outdated (dated 1999). However, eight of the sampled snow-melter locations recorded an entry in the PDL; six of eight entries were resolved in the same day, and the remaining two noted updates until being closed within 3–7 days.

Four of the remaining 20 snow melters are in the Highbridge and Croton Yards and are manually operated and recorded in a daily work log. Metro-North officials could not locate documents for the four snow melters. We requested information on where the other 16 were located, but officials did not provide any documentation.

Snow-Fighting Equipment

The Metro-North Work Equipment unit manages snow-fighting equipment for Track and Structures, as well as other units. Work Equipment maintains, tests, and inspects the equipment and documents that work in AMMS. We sampled 65 of 933 pieces of snow-fighting equipment for winter preparedness from January 2021–May 2023 and found that 15 required a PM to be performed for all three seasons. However, we noted that 13 of 15 (87%) pieces of equipment did not receive PMs for all three seasons:

- Seven pieces of equipment (five air compressors, one backhoe tractor, and one air blower) did not have a PM done during all three seasons.
- Five had only one PM performed during the audit scope.
- One had two PMs over the 3-year period.
- Two had a PM done during all three seasons.

Furthermore, for the 50 of 65 (77%) sampled pieces of equipment (e.g., snow tractor, snow blowers, and snow brooms) that did not have a PM, Metro-North officials stated equipment that cost less than $5,000 does not require a PM. Officials advised it is more economical to replace the equipment than repair it. However, without a PM, the equipment may not work as intended. Moreover, cost should not be the only consideration.

They also added that the equipment is checked before each season; however, they did not provide documentation to support their statement. For equipment that needs repair, a work order is opened in AMMS and the equipment is either repaired or replaced.

Metro-North also uses contractors to assist in snow duties during the winter season at various locations. Officials provided two 4-year contracts covering 2017–2024 documenting the suppliers contracted in New York and Connecticut. Contractors remain on standby throughout the winter season and are notified 24–48 hours prior to a storm to clear station platforms and yards.

We determined there is a lack of communication between Work Equipment staff and equipment end users regarding notification that equipment is due for PM. For example, when we asked why equipment was not brought in for repairs, the response was that the user group did not notify Work Equipment. Additionally, when equipment is serviced, the information needs to be fed back to Work Equipment so it can be entered into AMMS.

In the absence of inspection reports and PMs, snow melters and other weather-related equipment may not work as expected or may not last their useful lives and Metro-North may not be prepared against severe weather.

Recommendations

2. Ensure that all required PM events are completed, and update and review the equipment database to ensure equipment maintenance, testing, and inspections are recorded.
3. Formally document what equipment requires a PM report based on its value or replacement costs.
4. Document pre-season checks or repairs for equipment valued below $5,000 in AMMS.

Weather Monitoring

Metro-North's Winter Storm and Coastal Storm and Hurricane Plans include objectives and preparedness actions for winter storms, coastal storms, and hurricanes. The plans also contain a timeline for when actions are to be taken during those severe weather events as well as decision points and actions for recovery and post-recovery, including lessons learned. However, the plans do not include information for seasonal preparation. According to Metro-North officials, it is their practice to put tree-cutting crews on standby when winds over 30 mph or heavy rainfall is forecasted.

We selected 10 extreme weather events from the years 2021 and 2022 and reviewed Metro-North's preparedness and response to these weather events. Our sample included five winter storms, three coastal storms, and two other weather conditions (thunderstorms and tornadoes). We interviewed Metro-North officials and reviewed documentation they provided such as EMTF meeting notes and Daily Operations Reports (logs all the incidents that occur during the day pertaining to the trains' operations) to determine whether they contained information related to the weather and whether any actions were necessary.

Metro-North officials said they use their plans as guidance but not as a checklist to address each storm and severe weather condition, as they continuously monitor each forecasted weather event to determine what steps to apply. In response to our preliminary findings, Metro-North officials conceded that they will implement a process to annotate steps not enacted based on operational conditions.

Emergency Management Task Force

When a severe weather event poses a threat to the system, an EMTF is convened. According to the plans, the first EMTF should be convened in the 96–72 hours prior to Zero Hour (projected arrival time of 39-mph sustained winds) for coastal storm events, and calls and meetings should occur in the 72–48 hours prior to Zero Hour for winter storm events.

To determine whether the EMTF was convened during a severe weather event and within the required time frames, we reviewed 10 severe weather events from January 1, 2021 through December 31, 2022. Our review showed that an EMTF was not

convened for two of the 10 weather events. Metro-North provided only the Daily Operations Reports for those two dates, which did not detail the actions taken. We also noted that the first EMTF was not convened within the required time frame for four of five events, including two winter storms and two coastal storms.

In their response, Metro-North officials disagreed with us, stating that, in addition to the predicted amount of snowfall or freezing rain, they include the rate of snow, type of snow, and location of freezing rain and the impact on revenue service before convening an EMTF. Notwithstanding their response, we maintain our position that two of the events (lightning and tornado) required an EMTF.

In response to our preliminary findings, Metro-North officials also stated that the EMTF does not need to be convened 96 hours in advance. They stated that they prefer to wait to determine the impact of the weather conditions. Notwithstanding, the requirement is for the EMTF to meet within a specific time frame. In response to the preliminary findings, Metro-North officials disagreed that there are no criteria for convening the EMTF. They added that several “decision points” may drive the need for the EMTF. However, Metro-North officials conceded that they will implement a process to annotate steps not enacted based on operational conditions.

Tree-Cutting Program

According to Metro-North officials, it is their practice to put tree-cutting crews on standby when winds over 30 mph or heavy rainfall is forecasted. We reviewed the documents related to the tree-cutting program for the 10 sampled extreme weather events, and found that, for four, Metro-North did not put tree-cutting crews on standby. For example, the February 2, 2021 weather event was a severe snowstorm, which met the unwritten tree-cutting program criteria, but there was no documentation that a tree-cutting crew was on standby. Metro-North officials stated that they evaluate each weather circumstance and put tree-cutting crews on standby for potential severe weather if they believe it to be necessary. Officials indicated that it would not be appropriate to do everything written in the plans for each weather event and that one reason a tree-cutting crew may not be on standby is the cost.

When steps in plans are skipped and procedures are not adequately detailed, Metro-North may not be prepared to address severe weather conditions. Without a written plan or criteria to guide Metro-North on when to put tree-cutting crews on standby, Metro-North has a risk of not being ready to address conditions that may impede operations.

Other Weather-Related Events

Metro-North claims to have a heat plan, but it does not specify the temperature or duration of the heat condition that would warrant EMTF involvement. We note that its sister agency, Long Island Rail Road, has a specific heat plan to be followed when the temperature is at least 90 degrees for 3 days. Further, when the forecasted temperature will exceed 80 degrees, another railroad will use this to evaluate for the issuance of a heat order, which slows the speed of trains.

Metro-North does not have written plans for weather events such as extreme heat/cold, heavy rain, tornadoes, and lightning. However, Metro-North officials indicated that they would take actions to address those other weather conditions through warning notifications sent by their Safety Department.

Recommendations

5. Establish whether the weather plans are a requirement or merely guidance. If guidance, document steps that are not followed.
6. Develop procedures that establish when the EMTF should be convened and document the reasons when the EMTF is not convened when severe weather is forecasted.
7. Develop written criteria to guide Metro-North officials as to when tree-cutting crews should be put on standby for potential severe weather situations and incorporate it into the Winter Storm Plan and the Coastal Storm and Hurricane Plan.
8. Revise or develop weather plans that include lightning, extreme heat/cold, heavy rains, and tornadoes.

Capital Projects

In October 2012, Superstorm Sandy left Metro-North's electrical system along the Hudson Line severely damaged and in a state of disrepair. Subsequently, Metro-North began 11 capital projects, totaling $418,940,447, to repair the damage and to fortify its system to withstand potential extreme weather events like Superstorm Sandy.

To determine whether the capital projects were completed on time and within the contract award amount, we selected a judgmental sample of three projects, with a total value of $136,869,148. According to Metro-North, two of the three sampled projects represent Phases 1 and 2 of the same contract to replace existing signal power infrastructure, third-rail sectionalizing switches, and snow-melter infrastructure along the Hudson Line. It would also improve Power and Communication and Signals components systemwide (e.g., elevate and make watertight) to protect against the effects of a major storm. The contract for these projects was awarded on May 2015 to be completed 50 months later, in July 2019, at a cost of $105,521,300.

We determined that the Project Status Reports and the contract documents for Phases 1 and 2 contained different information regarding the substantial completion of the projects. While the contract required the project to be completed by July 2019, the Project Status Reports showed an actual substantial completion date of December 2022—41 months later than the contract. Additionally, the Project Status Reports for the month of September 2022 indicated that the total combined estimate at completion for both phases was $139,133,557 while the funding for the projects was $131,591,836—a difference of $7,541,721.

According to the supporting documents, limited access to work areas affected the contractor's productivity and the contractor's trough work for the project was not efficient. However, there is no information on what Metro-North did to address these conditions and prevent their recurrence. The project was also impacted when the contractor reprioritized work to support Metro-North for emergency repairs necessitated by Hurricane Ida in September 2021 and the COVID-19 pandemic.

The third project consists of the procurement of mitigation equipment—two hi-rail vacuum trucks that clear materials from track beds and a powered continuous work platform (CWP) purchased to help reduce the risk of flooding. The two vacuum trucks were supposed to be delivered to Metro-North on December 1, 2016, but were delivered on December 20, 2016. We also noted that the project started 184 days late.

The CWP contract specifications called for the project to begin 10 days after the notice of award date and to be completed 18 months later. However, we found that the project started 68 days after the notice of award and that Metro-North took possession of the CWP more than 11 months after the estimated completion date.

According to Metro-North officials, the purchase of the CWP was delayed while the agency awaited a waiver from the Federal Transit Administration. However, there was no indication why the vacuum truck project did not start or complete on time.

In response to the preliminary findings, Metro-North officials noted that the vacuum truck project was managed by Metro-North Force Account. At the closing conference on December 21, 2023, we requested documentation to support this statement. Officials stated that they would research the matter and get back to us.

Every day that passes with these projects not completed leaves Metro-North's assets vulnerable and increases potential exposure to another flooding or storm event, and further asset damage.

Recommendations

9. Improve capital project management by ensuring controls over the budget and the project timeline are sufficient to keep capital projects within their initially agreed-upon parameters.
10. Ensure the contractor/project manager focuses their efforts on catching up on the timeline instead of accepting schedule slippage.
11. Ensure that capital projects include the necessary accommodation to provide expedient access to work areas.

Audit Scope, Objectives, and Methodology

The objectives of this audit were to determine whether Metro-North performed a systemwide risk assessment to identify potential risks to its system from extreme weather conditions and flooding and developed plans to mitigate their effects. We also determined whether Metro-North tested and updated the plans and inspected/maintained the equipment to ensure they can be deployed when needed. The audit covered the period from April 2009 to May 2023.

To accomplish our objectives and assess related internal controls, we interviewed management and staff responsible for assessing the transportation system, identifying capital projects needed to protect it, and developing plans to mitigate the effect of extreme weather conditions and flooding. In addition, we interviewed officials responsible for the maintenance, inspection, and testing of equipment that will be used during weather events (e.g., hurricane, snow, extreme cold) to determine whether Metro-North performed a systemwide risk assessment to identify the potential damage to its system. We also reviewed Metro-North's plans for addressing extreme weather and flooding events and the recommendations generated from lessons learned meetings held after actual events to determine whether the recommendations were implemented. We observed available equipment at Metro-North locations as identified by the plans and reviewed the maintenance records to determine whether Metro-North maintained, inspected, and tested the equipment to ensure it will work when needed. We also reviewed a sample of Metro-North's capital projects regarding mitigation of extreme weather conditions to determine whether they were completed on time, on budget, and in compliance with the scope of work.

We used a non-statistical sampling approach to provide conclusions on our audit objectives and to test internal controls and compliance. We selected judgmental and random samples. However, because we used a non-statistical sampling approach for our tests, we cannot project the results to the respective populations. Our samples, which are discussed in detail in the body of our report, include:

- A random sample of a total of 65 pieces of equipment from an AMMS inventory list of 933. We selected 60 pieces from 13 types of equipment where there was more than one piece of that type and one piece of equipment from the other four types, as well as a backhoe tractor—the only one of its type.
- A random sample of 10 locations based on a population of 37 locations where snow melters are installed. We also reviewed the maintenance records to ensure that the equipment was maintained, inspected, and tested.
- A judgmental sample of three of 11 capital projects related to mitigation of severe weather to determine whether they were completed on time, within contract award amount, and in compliance with the scope of work. The three judgmental capital projects were selected based on the status of "completed" or "construction" in the Project Status Reports and the dollar value.

For the 10 severe weather dates that affected the tri-state area during the period January 1, 2021 through December 31, 2022, we reviewed related records to determine whether Metro-North had taken necessary steps to address those weather conditions according to its plans.

We obtained the data used to select our samples and conducted our audit work and determined it was sufficiently reliable for the purposes of our audit objectives.

We relied on data from the National Oceanic and Atmospheric Administration, which is recognized as an appropriate source, and used this data to identify significant weather events, which is a widely accepted purpose. Therefore, this data is sufficiently reliable for the purposes of this report without requiring additional testing.

Statutory Requirements

Authority

The audit was performed pursuant to the State Comptroller's authority as set forth in Article X, Section 5 of the State Constitution. And Section 2803 of the Public Authorities Law.

We conducted our performance audit in accordance with generally accepted government auditing standards. Those standards require 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 based on our audit objectives.

In addition to being the State Auditor, the Comptroller performs certain other constitutionally and statutorily mandated duties as the chief fiscal officer of New York State, including some duties on behalf of public authorities. For the MTA, these include reporting the MTA as a discrete component unit in the State's financial statements and approving selected contracts. These duties could be considered management functions for purposes of evaluating organizational independence under generally accepted government auditing standards. In our opinion, these duties do not affect our ability to conduct an independent audit of the MTA Metro-North's mitigation for extreme weather conditions and flooding.

Reporting Requirements

We provided a draft copy of this report to MTA Metro-North officials for their review and comment. We considered their comments in preparing this final report. Their comments are attached in their entirety at the end of the report. In response to our draft report, MTA officials "acknowledged" five of the 11 recommendations, indicating they were aware of the conditions and have taken actions to address them. They disagreed with five recommendations and agreed to implement one recommendation. Our responses to certain MTA comments are embedded within MTA's response as State Comptroller's Comments.

Within 180 days after final release of this report, as required by Section 170 of the Executive Law, the Chair and Chief Executive Officer of the MTA shall report to the Governor, the State Comptroller, and the leaders of the Legislature and fiscal committees, advising what steps were taken to implement the recommendations contained herein, and where recommendations were not implemented, the reasons why.

Agency and State Comptroller's Comments

2 Broadway
New York, NY 10004
212 878-7000 Tel

Janno Lieber
Chairman and Chief Executive Officer

Metropolitan Transportation Authority
State of New York

November 7, 2024

VIA E-MAIL
Ms. Carmen Maldonado
Audit Director
The Office of the State Comptroller
Division of State Government Accountability
59 Maiden Lane, 21st Floor
New York, NY 10038

Re: Draft Report #2023-S-5 (Mitigation for Extreme Weather Conditions and Flooding)

Dear Ms. Maldonado:

This is in reply to your letter requesting a response to the above-referenced draft report.

I have attached for your information the comments of Catherine Rinaldi, President, Metro-North Railroad and Jamie Torres-Springer, President, MTA Construction & Development, which address this report.

Sincerely,

Janno Lieber

c: Laura Wiles, MTA Chief of Staff
Monica Murray, Auditor General, MTA Audit Services

2 Broadway
New York, NY 10004
212 878-7000 Tel

Metropolitan Transportation Authority
State of New York

November 7, 2024

VIA ELECTRONIC MAIL
Mr. Janno Lieber
Chair and Chief Executive Officer
Metropolitan Transportation Authority
2 Broadway, 20th Floor
New York, New York 10004

Re: Response to the Office of the New York State Comptroller Report No. 2023-S-05 - Mitigation for Extreme Weather Conditions and Flooding - MTA Metro-North Railroad

Dear Chair Lieber:

Thank you for providing us with an opportunity to respond to the Office of the New York State Comptroller's ("OSC") subject draft report (the "Report"), issued October 8, 2024, regarding the mitigation efforts undertaken by the MTA to protect MTA Metro-North Railroad ("Metro-North") from extreme weather conditions and flooding events.[1]

As an initial matter, we wish to highlight the significant strides the MTA has taken over the past two decades to enhance its emergency preparedness and response capabilities and implement well-informed strategies to proactively mitigate the potential damage to its assets and systems from future extreme-weather events, including but not limited to those caused by climate change. During this time, the MTA significantly strengthened its internal bench of dedicated emergency preparedness resources not only at MTA Headquarters but also within and across the various MTA operating agencies. These professionals have been partnering for many years with New York City Emergency Management ("NYCEM") and local emergency management departments, as well as other regional and government partners (e.g., New York State Division of Homeland Security and Emergency Services, Amtrak, United States Transportation Command), in active working groups dedicated to emergency management, business continuity, and resiliency planning.

[1] The response to this Report is being submitted jointly by MTA Metro-North Railroad ("Metro-North") and MTA Construction & Development Company ("MTA C&D"), otherwise herein referred to as the "MTA Agencies."

Even prior to Superstorm Sandy, the MTA had made substantial investments to proactively harden its system to extreme weather events and had been consistently updating its emergency preparedness plans and activities based on the most current information available.

After Superstorm Sandy, to enhance MTA Executive-level oversight of multi-agency events, an activation-ready Situation Room was built at MTA Headquarters and an *All-Agency Coastal Storm Plan* was developed. In addition, the MTA completed nearly $8B in capital improvements related to flood resilience including but not limited to the hardening of critical facilities and elevation of critical equipment.

In the Report, a post-Superstorm Sandy consulting report was referenced, and there was question as to whether the recommendations from that report have been implemented, including but not limited to Metro-North performing elevation work to protect its new service-critical infrastructure. The suggestion that these recommendations were not implemented is incorrect.

State Comptroller's Comment – Contrary to what the MTA states, we did not suggest anything of the sort. Rather, we stated that Metro-North did not provide any documentation to support its claims and, therefore, we had no documentary support that it took the requested actions to protect its service-critical infrastructure. Moreover, our findings should not be surprising to Metro-North, as the report clearly states on page 9, "We requested, but were not provided with, any documentation to support that the recommendations were addressed." As required by standards, our report accurately reflects what Metro-North officials stated, what they did, and the documents they provided (i.e., 20-Year Needs Assessment 2015–2034). Where documentation was provided, the report gives Metro-North credit for assessing and identifying areas that are at risk from extreme weather events and developing and carrying out capital projects. If the MTA would like future reports to reflect that it took action, it should provide sufficient, appropriate evidence to that effect.

Since Sandy, multiple projects relevant to Metro-North's service-critical infrastructure have been designed and completed to mitigate the impacts of flooding. Along the Hudson Line, new DC traction-power substations in Riverdale, Croton-Harmon, and Tarrytown as well as third-rail breaker houses at the Harlem River Lift Bridge were constructed. Resilient Fiber/Signal Power infrastructure also was added along 30 miles of the Hudson Line's Right-of-Way (i.e., 92 steel platforms were installed to elevate more than 150 pieces of equipment). In addition, a section of two-track territory in Garrison was elevated by 19". The benefits of this proactive measure were evident during a recent tidal surge event on the weekend of March 9th and 10th, 2024. Historically, such surges have led to service disruptions in this area; however, thanks to the newly elevated infrastructure, there were no service disruptions and Metro-North maintained 100% on-time performance for these consecutive days. Along the Harlem Line, two one-mile sections of single-track territory (i.e., the 'Ice Pond' located between milepost 56.4 - 57.4, and the 'Great Swamp' located between milepost 61.25 - 62.25) were both elevated by 6".

In addition, as noted in the Report, Metro-North developed a database of critical infrastructure, including critical elevations and flood marks, and produced a *Track and Asset Inundation Map Book*, which is used to determine potential coastal storm surge flooding for the right-of-way and critical infrastructure along the Hudson and New Haven Lines. Metro-North also revised its design flood elevations ("DFE") utilizing ECOM and SLOSH models, FEMA Base Flood Elevation ("BFE"), asset criticality (ASCE 24), and projected sea-level rise. Metro-North's new DFE is FEMA BFE +4′.

Finally, since the creation of MTA C&D, major strides forward have been made in terms of how the MTA is proactively addressing climate change and advancing its infrastructure

vulnerability assessments, mitigation planning, and capital investments in order to create an even more resilient future for the MTA.

State Comptroller's Comment – We met with Construction and Development officials, reviewed documents provided, and visited stations to observe the projects installed to mitigate flooding. However, while the steps taken by the MTA are commendable, they do not directly address the recommendations in the Blue Ribbon report. Moreover, on September 29, 2023, this Office issued MTA–Transit: *Risk Assessment and Implementation of Measures to Address Extreme Weather Conditions* (Report 2021-S-27). The results were similar, and as we stated then, the recommendations were not implemented due to a lack of funds. Moreover, while capital projects were undertaken to address the extreme weather conditions experienced and the MTA took steps to create a roadmap, no systemwide risk assessment was released or provided to auditors.

In 2021, the MTA formed a cross-agency Stormwater Task Force, facilitated by MTA C&D, with representatives from the MTA agencies and New York City's Department of Transportation, Department of Environmental Protection, and Office of Emergency Management. Initially, the task force identified over 180 subway locations vulnerable to stormwater flooding, which led to the MTA installing stormwater flood mitigation measures at 45 stations. More recently, the task force investigated additional locations vulnerable to stormwater flooding, including but not limited to Metro-North's Mott Haven Yard in the Bronx. In 2022, the MTA established a Board Working Group that recommended the creation of a climate adaptation unit and integration of climate resiliency into long-term planning. MTA C&D immediately implemented this recommendation by establishing a Climate Planning Division within its Capital Strategy Business Unit. In 2023, that newly formed team completed a systemwide multi-hazard climate vulnerability assessment that included coastal flooding, sea level rise, heavy rainfall, and extreme weather. Findings from that assessment were captured in a *Climate Resilience Roadmap* that was published in April 2024. The roadmap identified critical resilience investments needed over the next 10 years, including but not limited to investments in Metro-North's Mott Haven Yard and Hudson Line, which are particularly vulnerable to extreme weather. These findings were used to inform the MTA's most recent twenty-year needs assessment and five-year capital plan. More specifically, the recently published MTA 2025-29 Capital Plan (future.mta.info/capitalplan) incorporates over $2B in resilience investments including focused investments on the most vulnerable interlockings along the Hudson Line and stormwater mitigation for Mott Haven Yard.

That being said, the MTA Agencies respond to the Report as follows:

MTA RESPONSE TO OSC FINDINGS

The Report contained three key findings.

Key Finding No. 1

Metro-North did not perform a systemwide risk assessment. Further, Metro-North does not have procedures to address all types of severe weather events and did not perform an assessment of its Harlem Line related to flooding due to heavy rains.

MTA Response to Key Finding No. 1

The MTA Agencies disagree with this finding, which is comprised of three components. Our response to two of the components is provided below. Our response to one of the components is provided in conjunction with Key Finding No. 2.

1. "Metro-North did not perform a systemwide risk assessment."

Metro-North disagrees with this finding.

Since 2019, Metro-North has been conducting biannual tabletop exercises ("TTX") relevant to coastal and winter storms, which have included systemwide risk assessments. The scope and exercise scenarios are selected based on past incidents and/or current risks. In past exercises, this has included discussing major inland flooding impacts due to extreme rainfall and runoff with participants providing feedback as to how their department would establish and coordinate response and recovery objectives and priorities. Metro-North also has utilized these TTX sessions to discuss and document lessons learned and best practices, which have been incorporated into Metro-North's weather plans.

In addition, in 2023, Metro-North's emergency management staff participated in an MTA-wide all-hazards risk assessment utilizing New York State Emergency Management's Hazards New York ("HAZNY") software program. HAZNY is an automated tool that helps emergency management planners assess, rank, and quantify their potential hazards. The tool assesses each hazard's risk and associated impacts and provides a risk ranking to assist in prioritize planning and mitigation efforts.

Furthermore, after significant operational disruptions related to weather disruptions, it is customary for MNR's emergency management personnel to host after-action reviews ("AAR"). Lessons-learned and implementation of agreed-upon corrective actions from these AARs are then tracked by Emergency Management and Operational Readiness. In turn, Metro-North disagrees that it has not performed a systemwide risk assessment, as it has been doing so, continuously, for several years.

Finally, as noted in the Report, in 2023, MTA C&D's Climate Planning Division conducted a systemwide multi-hazard climate vulnerability assessment to understand the magnitude and timing of climate-change impacts on MTA infrastructure. This assessment drew upon multiple data sets to forecast rising regional climate threats including but not limited to coastal surge, sea-level rise, torrential rain, and extreme heat. In April 2024, the findings from this assessment were published in a *Climate Resilience Roadmap*. The roadmap tracks the locations of infrastructure mitigated against climate risk and identifies locations where new mitigations may be required.

State Comptroller's Comment – While Metro-North has participated in activities that can be part of a systemwide risk assessment, they do not constitute an assessment in and of themselves. We therefore maintain our position. Moreover, during field work for our audit of MTA–LIRR: *Mitigation for Extreme Weather Conditions and Flooding* (Report 2022-S-6), we were told Construction and Development started a systemwide assessment, including Metro-North, in early 2023 that would be completed in the first quarter of 2024. On April 25, 2024, the MTA issued its Climate Resilience Roadmap that describes how the MTA "will adapt our systems to climate change over the next ten years"; however, no systemwide risk assessment was released or provided to auditors.

2. Metro-North does not have procedures to address all types of severe weather events

See response to Key Finding No. 2.

3. Metro-North did not perform an assessment of its Harlem Line related to flooding due to heavy rains.

Regarding the Metro-North Harlem Line, as was explained during the audit and detailed in our response to OSC's third preliminary finding, the Harlem Line was not addressed, specifically, in Metro-North's *Track and Asset Inundation Map Book* because that resource was developed in order to assess the portions of Metro-North's system most prone to *coastal* flooding from storm surge (i.e., it is correlated to tidal gauge forecasts, which are coastline- versus rainfall-based). The Harlem Line is not located along the coastline and, in turn, not subject to the risks of coastal flooding; as such, was not included.

It is important to note that the risks associated with coastal flooding pose significantly greater financial and operational threats to infrastructure than heavy rainfall due to corrosion caused by saltwater.

However, as noted above, the MTA's new *Climate Resilience Roadmap,* which is publicly available on the MTA's website (mta.info/climate/resilience), assesses Metro-North's infrastructure vulnerabilities relevant to a broad range of climate hazards including but not limited to flooding that would be caused by torrential rainfall. More specifically, the roadmap details the Harlem Line's vulnerability to flooding caused by torrential rainfall and related mitigation actions under "Goal 7: Reduce Metro-North Railroad Flooding."

State Comptroller's Comment – The fact that the Harlem Line is not prone to coastal flooding is not a reason for not studying it for other extreme weather conditions. For instance, the Harlem Line has experienced service disruptions due to heavy rain and flooding as noted in the Climate Resilience Roadmap. See the previous State Comptroller's Comment regarding the roadmap.

Key Finding No. 2

Metro-North's Winter Storm Plan and Coastal Storm and Hurricane Plan do not account for weather conditions such as extreme cold/heat, tornadoes, heavy rains, and lightning.

MTA Response to Key Finding No. 2

Metro-North disagrees with this finding and the component of Key Finding No. 1 that relates to weather procedures.

As was detailed to OSC during the audit, Metro-North has well developed weather plans for winter storms as well as coastal storms and hurricanes, which are the types of severe weather that pose the greatest potential for threats to the Metro-North system. These plans include detailed coordination procedures as well as preparedness and response considerations for with-notice (versus no-notice) weather events. Furthermore, as noted in our preliminary response, Metro-North's *Storm/Weather Classifications* document addresses heavy rain/flooding, ice/sleet, extreme cold and extreme heat. This document provides an overview of action items for Metro-North personnel to consider taking in relation to these types of conditions, on a case-by-case basis.

In addition to these Agency-level plans, Metro-North maintains various departmental and operation-based plans, procedures, checklists, and considerations that support severe weather operations and service delivery.

State Comptroller's Comment – Although MTA and Metro-North officials make several assertions in their response, the plans they provided did not address the conditions specified in our report. As Metro-North states in response to Recommendation 8, "there are not Agency-level weather plans for each of these types of conditions."

Thresholds are based on fixed parameters (e.g., sustained wind speed, air temperature, frozen precipitation accumulation, etc.), or changes in conditions (e.g., rapid changes in temperature, changes in precipitation type, etc.). Departments, such as Maintenance of Way ("MoW") and Maintenance of Equipment ("MofE"), maintain different weather-based operational and staffing plans, procedures, and guidance documents relevant to the types of severe weather conditions that impact their specific operations. There are also operational procedures, policies, and considerations for severe weather included in Metro-North's *Operations Manual*. This includes *Line Special Instructions* outlining operational changes (e.g., speed restrictions, pantograph restrictions, and other operational and infrastructure-based procedures) that are to be implemented in various types of weather conditions to provide safe and reliable service. This includes operational changes based on extreme temperature conditions (hot, cold) as well as implementation of track patrols for heat kinks or broken rails.

Separately, alerts relevant to lightning and tornado conditions (which are typically limited- or no-notice occurrences) are currently shared through the weekly and daily weather review. Additionally, weather conditions are part of the Daily Operations Report and discussed at the daily operations meeting. Metro-North also has access to a weather service that provides severe weather alerts that may contain lightning or tornado risks. Additionally, lightning is only one element of convective thunderstorms, and although it is an indicator of a storm's real-time location, focusing only on lightning overlooks additional convective weather elements (e.g., wind gusts and heavier precipitation rates), which presents a greater risk to Metro-North's infrastructure and operations. Metro-North maintains situational awareness regarding convective weather conditions and their potential occurrence through various means of weather monitoring and forecasting systems. More specifically, the MTA has contracted with Tomorrow.IO to provide weather forecasting services and access to their web-based weather monitoring platform. Metro-North has uploaded weather-based operational and decision-making thresholds and receives forecasting and observation alerts and notifications for these conditions, including heavy rains, elevated winds, and extreme temperatures. The online platform also allows Metro-North users to create custom reports and maps for agency and executive briefings. These custom Metro-North reports and maps include total precipitation accumulation, wind speed and gust, and air temperature forecasts. In addition to access to the system, Tomorrow.IO provides twice weekly briefings with their in-house meteorologists. Severe weather forecasts, briefings, and any potentially hazardous conditions are communicated to the various Metro-North departments during Daily Operations meetings, via email to the Metro-North *Weather Briefing* email distribution list, and at Emergency Management Task Force ("EMTF") activations.

Key Finding No. 3

We found that equipment designed to be deployed during severe weather events was not always inspected, tested, or maintained in compliance with Metro-North procedures and plans. Specifically:

- 15 of 28 (54%) snow melters (used to heat the area around switches to keep them operative during inclement weather) were not inspected, as required, for both documented winter seasons we assessed.

State Comptroller's Comment – The report was revised based on the response.

- 13 of 15 (87%) pieces of snow-fighting equipment that required a preventive maintenance (PM), including a backhoe tractor and air compressors, did not have one for each of the three seasons in our sample.

- 50 of 65 (77%) sampled pieces of equipment such as a snow tractor, snow blowers, and snow brooms, did not receive a PM. While Metro-North officials stated that equipment valued at less than $5,000 does not require a PM because it is more economical to replace the equipment than to repair it, they did not provide documentation to support this statement. Moreover, cost should not be the only consideration, because without PM, the equipment may not work as intended during a weather emergency.

MTA Response to Key Finding No. 3

Metro-North disagrees with several representations of this finding. For snow-melters, Metro-North had reported in their Preliminary Findings response dated 13 September 2023 that inspections were done prior to the 2023 season. MNR's snow-melter inspection report/sheet incorporates the preventive maintenance list as outlined in the procedure.

State Comptroller's Comment – As stated in the audit report, no inspection reports were provided for the 2020-21 season for the 10 locations. According to Metro-North officials, record-keeping procedures did not exist during this period. However, inspection reports were not provided for one location with four snow melters for the 2021-22 and 2022-23 seasons, and three locations with 11 snow melters had inspection reports for only the 2022-23 season.

As for work equipment, 50 of the 65 snow-fighting pieces receive "pre-season checks" but do not require Preventive Maintenance like replacing certain components before failure due to their low cost and Metro-North's *Accounting Practice Instructions*. These pieces, like a small snow blower, each costing under $5,000, are considered hand tools, being replaced or serviced as needed, and do not require documentation on pre-season checks. The report states Metro-North "did not provide documentation to support this statement" but Metro-North's *Accounting Practice Instructions* were provided in the 13 September 2023 response. It directs, "Each department designates a field custodian who is responsible for maintaining adequate field records, recording all equipment received and disposed by their department, tagging all equipment with an acquisition cost over $5,000." Documentation showing the direction to perform pre-season checks was provided. Additionally, repairs are recorded in AMMS if found during a pre-season check.

State Comptroller's Comment – While Metro-North officials provided *Accounting Practice Instructions*, this document addressed maintaining an inventory of controlled assets. It does not cover preventive maintenance of assets, and, as such, documentation showing the direction to perform pre-season checks was not provided.

Additional Comments

Any delays that occurred on the capital construction work audited by the OSC were either operational-and-addressed (i.e., access restrictions), unforeseeable (i.e., lack of employee availability due to a global pandemic), or beyond the control of the project team (i.e., Hurricane Ida damaging the work site).

In terms of the noted delays to substantial completion for Phases 1 and 2, each phase had its own substantial completion date, and the delays associated with each were separate and distinct. The original substantial completion date established for Phase 1 was June 2017. However, due to extenuating circumstances, including but not limited to arbitration with the contractor, an extension of time was granted to the contractor for substantial completion by May 2019. Phase 1 was completed on time with this awarded extension. As a result of this extension, the *Notice to Proceed* for Phase 2 was sent in May 2019. At that time (prior to the Covid-19 pandemic), it was still estimated Phase 2 would take 25 months to complete and substantial completion was estimated

for June 2021. However, as a result of the global pandemic, which changed the way businesses had to operate in order to keep the population safe, Phase 2 had to implement modified work procedures (e.g., required social distancing) and was impacted by reduced employee availability. To complicate matters further, in September 2021, when construction on Phase 2 was 79% complete, the active work site was damaged by Hurricane Ida. As a result, the contractor had to remove debris, purchase additional material, and reconstruct part of the work before substantial completion could be achieved, which occurred in December 2022.

As noted in the Report, additional factors that resulted in delays for Phase 1 included limited access to the work site and difficulties during trough work. That said, Metro-North strongly disagrees with the Report's statement that "there is no information on what Metro-North did to address these conditions and prevent their recurrence." Substantial improvements were put into place, during the course of the audited project, to expedite work that was behind schedule due to the limited access and constraints related to trough work. Specifically:

- Metro-North Operations made improvements to the track shoulder area, which reduced the number of track crossings needed by allowing the installation of trough work to be conducted almost entirely on one side of the tracks. Some of these shoulder improvements also reduced the total number of track outages needed, as the trough could safely be constructed further from the track.
- The number of track outages needed was also reduced by infrastructure within the Bronx being installed within roadway areas, east of the tracks.
- To support the contractor in moving equipment and materials to the work site more expeditiously, additional staging areas and access points were identified for use by the contractor and higher capacity Metro-North equipment was utilized to cycle equipment to the work site.
- To increase productivity, the contractor was permitted to utilize an elevated raceway system in specific areas where in-ground trough/conduit systems would have considerably reduced efficiency/ productivity.
- Priority was given to Contract 39881 to obtain workday as well as continuous track outages, as well as flagging resources and Force Account trades.

It is also worth noting that the audited Sandy project was initiated prior to the creation of MTA C&D. Post-transformation, MTA C&D became the sole agency responsible for the planning, development, and delivery of the entire MTA Capital Program. This transformation occurred at a time when most infrastructure and construction projects were coming to a grinding halt due to the pandemic.

State Comptroller's Comment – The reference to "most infrastructure and construction projects were coming to a grinding halt due to the pandemic" is not applicable to the delays for two projects related to the Hudson Line's Power and Communication and Signal improvements. As noted in the MTA's response, the original substantial completion date established for Phase 1 was June 2017, which is almost 3 years before the pandemic. Similarly, the Phase 2 notice of award was May 2019, also 10 months before the pandemic.

Despite this, MTA C&D immediately began to modernize its management of the MTA's capital program. For example, it doubled down on containing costs by implementing cost-saving measures such as upfront scoping and value engineering, enhanced oversight of force-account costs, and dedicated efforts to increase competition for contract awards. It also accelerated project

delivery by strategically bundling work, utilizing a greater variety of project-delivery methods, incorporating new technologies, and expanding the use of "A+B" bidding to incentivize schedule reductions.

These changes have resulted in a stronger, more effective capital program, and MTA C&D's track record supports these results. In 2023, the MTA awarded more than $8 billion in new commitments, with those awards coming in 6.2% below the engineer's estimate, saving nearly $300 million. Since 2020, bids from third-party contractors have come in, on average, 6% below our estimates, resulting in an overall bid savings of $890 million. Since 2021, MTA C&D also has reduced project schedules by an average of 4 months on new contract awards, compared with the engineer's estimate. From long-range planning to project development to contract award and construction delivery, MTA C&D has been driving forward significant improvements in management of the MTA's Capital Program since its formation by using the right delivery models, maximizing contractor and consultant performance, bundling projects, defining the right scope, simplifying construction specifications, improving coordination with third parties, tackling cost premiums, optimizing internal resources, leveraging data and technology, and more.

MTA RESPONSE TO OSC RECOMMENDATIONS

Recommendation No. 1

Conduct periodic systemwide assessments of the Metro-North system to observe new or possible increased weather-related risks that could affect the system.

MTA Response to Recommendation No. 1

Metro-North **acknowledges** this recommendation. As noted in the Report, MTA C&D's Climate Planning Division conducted a systemwide multi-hazard climate vulnerability assessment in 2023 and published the *Climate Resilience Roadmap* in April 2024. The roadmap tracks the locations of infrastructure mitigated against climate risk and identifies locations where new mitigations may be required. Furthermore, as was noted in the MTA's response to OSC Audit 2023-S-5, even prior to the issuance of this Report, it was the MTA's intention for C&D's Climate Planning Division to continue to review and update its systemwide vulnerability assessment, in coordination with the various MTA operating agencies, including but not limited to Metro-North, at a cadence that coincides with the MTA's capital planning process.

Recommendation No. 2

Ensure that all required PM events are completed, and update and review the equipment database to ensure equipment maintenance, testing, and inspections are recorded.

MTA Response to Recommendation No. 2

Metro-North **acknowledges** this recommendation and notes that it already ensures that Preventative Maintenance ("PM") is scheduled and completed when the equipment is made available based on its work schedule. Management will track and document these schedules and work with the user departments to make sure equipment is available for PM. Management will continue to ensure data for all PM that is performed is entered into the AMMS database when it is performed.

Recommendation No. 3

Formally document what equipment requires a PM report based on its value or replacement costs.

MTA Response to Recommendation No. 3

Metro-North **disagrees** with this recommendation and notes that in the preliminary response our *Accounting Practice Instructions* was provided to the auditors, which details the threshold requirement for assets and maintaining field records.

State Comptroller's Comment – While Metro-North officials provided *Accounting Practice Instructions*, this document addressed maintaining an inventory of controlled assets. It does not cover preventive maintenance of assets, and, as such, documentation showing the direction to perform pre-season checks was not provided.

Recommendation No. 4

Document pre-season checks or repairs for equipment valued below $5,000 in AMMS.

MTA Response to Recommendation No. 4

Metro-North **disagrees** with this recommendation and notes that, every season an email is sent to the responsible equipment owners directing them to conduct pre-season checks on all equipment, which includes equipment valued at less than $5,000. If needed, necessary repairs are documented in AMMS. The guidelines for equipment with a value below $5,000 are based on the provided *Accounting Practicing Instructions* and was provided. Metro-North management and supervision will continue to capture the work orders in the AMMS database that indicates when repairs are completed on equipment valued at less than $5,000. Most of those items valued at less than $5,000 are considered hand tools and simply replaced when worn out or serviced as needed.

State Comptroller's Comment – The document provided relates to accounting for inventory of "controlled" assets costing $5,000 or more and does not address pre-season checks or repairs. Metro-North therefore does not have procedures for documenting pre-season checks or repairs for equipment valued below $5,000.

Recommendation No. 5

Establish whether the weather plans are a requirement or merely guidance. If guidance, document steps that are not followed.

MTA Response to Recommendation No. 5

Metro-North **disagrees** with this recommendation and notes that it develops and updates its severe weather planning and coordination documents with the goal of promoting a common understanding of the preparedness, mitigation, and response objectives and priorities. This ensures the safety of our customers and employees during inclement weather events and provides for a more resilient transportation service and system. The plans are designed to provide risk-informed planning and decision-making thresholds and considerations to help senior leadership better prepare and manage the response to any potential hazardous or severe weather conditions.

State Comptroller's Comment – Metro-North's expansive response and its response to our initial preliminary indicate the plans are guidance that incorporate lessons learned.

The goal of these severe weather plans is to produce integrated, coordinated, and synchronized responses to ensure continued situational awareness for all Metro-North operations.

Metro-North's severe weather plans incorporate lessons learned and best practices based on previous storms and leverages this information in the form of mitigation and response actions and consideration. Weather forecasts and observed conditions are not binary, and not all conditions can be directly correlated to a prescribed response or predetermined action. For example, forecasted total snow fall is not just a number value. There are many attributes of snowfall that differently impact operations and safety. This includes temperature, moisture content, duration, intensity, location, changes in precipitation type, etc. A 14" total snow fall has a tremendously different dynamic if it occurs in two hours rather than over two days. Not all of Metro-North's weather-based operational, planning, and response thresholds can be directly tied to a value in all cases.

There are some weather variables that can be directly tied to operational actions or decisions, which include forecasted storm surge or sustained wind values. Metro-North maintains operational thresholds for both of these weather variables, which includes suspension of service when sustained wind conditions exceed 39 mph or the implementation of a straight interlocking plan and removal of switch motors in New Haven Yard when storm surge is forecasted to exceed the known critical flood elevation (*Metro-North Coastal Storm and Hurricane Contingency Plan*).

Metro-North **disagrees** with implementing a process to annotate steps not enacted based on operational conditions. Metro-North will improve EMTF meeting and decision documentation in an effort to support post-storm reviews. Opportunities for improvement will be documented during the AAR process and follow up actions and updates to agency-level severe weather plans will be completed by Emergency Management and Operational Readiness ("EMOR"). EMOR will also work with Department representatives to ensure that their department and operational-level plans are updated based on the findings from the AARs.

State Comptroller's Comment – While it disagrees on the need to document steps not implemented, Metro-North states it will "improve EMTF meeting and decision documentation in an effort to support post-storm reviews" by documenting the opportunities for improvement. However, not documenting the basis of how those opportunities were derived, such as the steps followed or not followed, appears contrary to good internal controls, which state that documentation should be complete, accurate, and timely. Among other things, documentation serves as justification for decisions and "will be of value during self-evaluations and audits."

Recommendation No. 6

Develop procedures that establish when the EMTF should be convened and document the reasons when the EMTF is not convened when severe weather is forecasted.

MTA Response to Recommendation No. 6

Metro-North **disagrees** with this recommendation. The Emergency Management Task Force Guidelines outline when an EMTF will be convened:

> *"In all significant emergency situations which do, or have the potential to, disrupt service to our customers, whether the event is predictable or not predictable, the following guidelines will apply."*

State Comptroller's Comment – Throughout this response, Metro-North disagrees with recommendations to document its decisions. However, in several instances, it was unable or unwilling to provide documentation to support its claims. This is why complete, accurate, and timely documentation is considered to be a part of a good system of internal control. As stated in NYS Internal Control Standards, "By recording the information related to such events, management creates an organizational history that can serve as justification for subsequent actions and decisions and will be of value during self-evaluations and audits."

Not all "Severe Weather" necessitates an EMTF activation. For instance, there are standing departmental and operational procedures and protocols that implement operational changes based on various weather events. These weather thresholds include excessive heat, low temperatures, ice accretion, sustained winds, wind gusts, etc. These procedures and protocols are implemented at the department or operational level and do not rely upon an EMTF activation for decision making. If the weather event is not forecasted to meet mitigation thresholds or significantly disrupt regularly planned revenue service, an EMTF activation is not needed to implement the protocols to mitigate problems for high or low temperatures or gusty winds. Metro-North has taken steps over the past several years to improve documentation of EMTF activations, and operational lessons from weather-related events and ensure those lessons learned are incorporated to agency, departmental, and operational-level plans, policies, and procedures.

Recommendation No. 7

Develop written criteria to guide Metro-North officials as to when tree-cutting crews should be put on standby for potential severe weather situations and incorporate it into the Winter Storm Plan and the Coastal Storm and Hurricane Plan.

MTA Response to Recommendation No. 7

Metro-North **agrees** with this recommendation. Clarifying language will be incorporated into the next annual publications of Metro-North's *Winter Storm Plan* and *Coastal Storm and Hurricane Contingency Plan* regarding the relevant criteria for putting tree-cutting crews on standby.

Recommendation No. 8

Revise or develop weather plans that include lightning, extreme heat/cold, heavy rains, and tornadoes.

MTA Response to Recommendation No. 8

Metro-North **disagrees** with this recommendation and its associated finding. As noted in response to Key Finding No. 2, Metro-North's *Storm/Weather Classifications* document addresses heavy rain/flooding, ice/sleet, extreme cold, and extreme heat. The classification document provides an overview of items to consider for each type of weather event. That said, there are not Agency-level weather plans for each of these types of conditions as Metro-North relies upon departmental/operational plans to mitigate these independent risks. Metro-North does not agree that it would be an improvement to develop *condition-specific* plans for the conditions listed in the recommendation.

State Comptroller's Comment – While stating that such plans are unneeded, Metro-North nonetheless expends over a page in its response expounding the various plans, procedures, checklists, and information that are available to staff during these various weather conditions—which seems contradictory to Metro-North's position that such plans are unneeded. With such a plethora of information, it is unclear how staff can quickly respond to such conditions without clear guidelines that concisely consolidate such information and provide a framework for action.

In addition, Metro-North disagrees that it would make sense for it to develop emergency management procedures/plans specific to lightning and tornadoes, which are typically limited-notice or "pop-up" events and, in turn, not forecasted with sufficient warning ahead of impact in order for an effective plan to be activated. Tornado Watches and Warnings from the National Weather Service usually occur with limited notice, and Metro-North has developed internal notification systems within its Emergency Management group to receive enhanced tornado warning notifications utilizing alerts from the National Weather Service ("NWS") in conjunction with our Everbridge Emergency Notification System ("ENS"). These ENS tornado alerts will prompt Metro-North Emergency Management staff to review weather conditions, live radar, and storm corridor forecasts and share any pertinent information with the Operations Control Center. Metro-North may issue speed restrictions for an identified area or segment of track, or in case of severe weather conditions, may implement a Code Red (i.e., a temporary stoppage of train movement) for the forecasted area.

Recommendation No. 9

Improve capital project management by ensuring controls over the budget and the project timeline are sufficient to keep capital projects within their initially agreed upon parameters.

MTA Response to Recommendation No. 9

The MTA Agencies **acknowledge** this recommendation and note that, even prior to this audit, the MTA was already taking steps to improve its capital project management controls. As part of the overall transformation, the MTA created MTA C&D by consolidating the capital program from across the MTA operating agencies into one consolidated agency to streamline processes and develop a more efficient approach to the planning and execution of the MTA Capital Program.

Since its formation, MTA C&D's Delivery Services Office ("DSO"), under the Deputy Chief Development Officer - Delivery, has undertaken the benchmarking, standardization, and optimization of C&D's project management processes and procedures (e.g., development and implementation of new Design-Build and Design-Bid-Build Change Management Procedures). This effort has been supplemented by the formation of a new Office of Corporate Performance within C&D's President's Office. In addition, MTA C&D's railroad business unit has a Project Controls Scheduling group, project team, and design consultants who work diligently to develop and analyze construction schedules during the project design phase in order to better estimate project timelines that include force-account resource priorities and site-access availabilities.

Recommendation No. 10

Ensure the contractor/project manager focuses their efforts on catching up on the timeline instead of accepting schedule slippage.

MTA Response to Recommendation No. 10

The MTA Agencies **acknowledge** this recommendation and note that, even prior to this audit, the MTA was taking proactive steps to improve its capital project management. As was detailed earlier in this response under "Additional Comments", if/when schedule slippages occur, concerted efforts are made to come up with strategically viable solutions to reduce the impact. In addition, it needs to be reiterated that the audited capital construction work relates to a legacy project initiated prior to the formation of MTA C&D; the project schedules were impacted by a global pandemic that set most industries, worldwide, behind schedule; and no matter how much effort is made by project managers and contractors to maintain a strict project schedule, major construction projects of this size and magnitude are comprised of numerous variables that have the potential to cause schedule impacts, not all of which are within the control of the project team. In turn, the MTA Agencies disagree that this recommendation is reflective of the MTA's current business processes or that additional new actions need to be taken to ensure that our project teams are focusing their efforts appropriately. Since the formation of MTA C&D, project management and scheduling teams have been proactively focused on mitigating delays (e.g., by requesting contractors to re-sequence work and provide recovery schedules) in order to deliver capital projects better, faster, and cheaper, and they will continue to do so.

Recommendation No. 11

Ensure that capital projects include the necessary accommodation to provide expedient access to work areas.

MTA Response to Recommendation No. 11

The MTA Agencies **acknowledge** this recommendation and note that, even prior to this audit, the MTA was taking proactive steps to improve its capital project management. As part of the MTA's overall transformation, MTA C&D was created by consolidating the capital program units from across the MTA Operating Agencies into one consolidated agency. This was done to streamline processes and develop a more efficient approach to the planning and execution of the MTA Capital Program. Since its creation, MTA C&D has been working with the MTA Operating Agencies, including but not limited to Metro-North, to drive coordinated planning of capital project work and identify necessary outages/accommodations ahead of project delivery.

Going forward, MTA C&D will continue to drive cross-agency coordination and collaboration in a manner that enables the most expedient access possible to work areas. That said, in some cases, operational and safety requirements, geographical constraints and/or competing priority projects (e.g., Positive Train Control) will still have the potential to impact these best efforts. Similarly, flagging assignments and force account support needs also play a crucial role in the expediency with which work areas can be accessed, as these resources must support both capital program work, train operation, and maintenance priorities. In turn, competing priorities will continue to need to be evaluated on a project-by-project basis.

* * *

We appreciate the OSC's work and their consideration of this response in issuing a final report. In the interim, should they need any additional information or have any questions, they should reach out to their designated agency contacts.

Very truly yours,

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