



sanitation

Kathryn Garcia Commissioner

125 Worth Street
Suite 720
New York, NY 10013
nyc.gov/sanitation

646.885.4974
kgarcia@dsny.nyc.gov

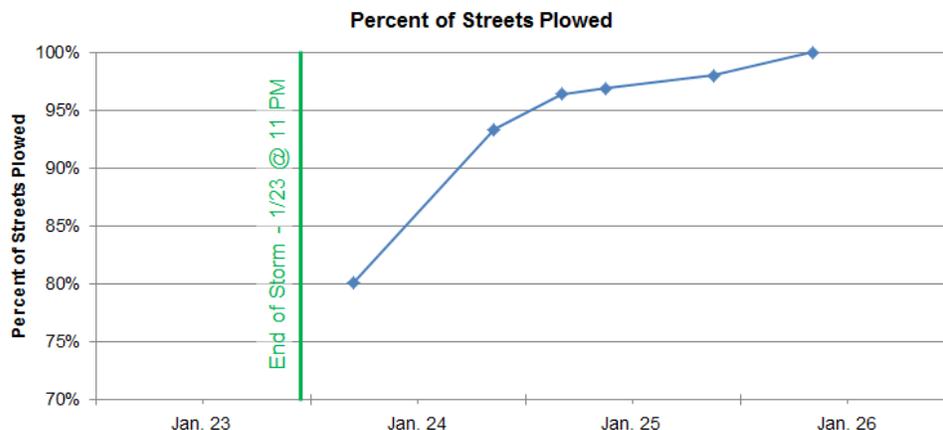
memo

To: Anthony Shorris, First Deputy Mayor
From: Kathryn Garcia
Re: After Action Report – January 2016 Blizzard

Executive Summary

New York City experienced a historic blizzard beginning on Friday, January 22 at 10:00 PM and concluding on Saturday, January 23 at 11:00 PM. Total accumulations at Central Park measured 26.8 inches, making it the second largest snow storm recorded by the National Weather Service at that location since 1869. Measurements from other parts of the city were significantly higher, with snow accumulations of up to 34 inches in Jackson Heights, and record snow accumulations at JFK and LaGuardia Airports. At periods during the storm, snow fell at 3 inches per hour and drivers experienced low visibility in whiteout conditions.

The Departments of Sanitation, its contractors, and other city agencies consistently deployed more than 2,500 pieces of snow fighting equipment during the storm. Overall, the Department was very effective in responding to the storm. Highways and arterial roadways were cleared to blacktop by early Sunday morning, just hours after the snow had stopped falling. As of 7:00 AM on Sunday, more than **80 percent** of the streets had been cleared. By 7:00 AM Monday morning, **97 percent** of all streets citywide had been cleared.



This memorandum is an accounting of the Department’s response to the storm, innovations that worked and recommendations for further

improvement.

Pre-Season Planning

For the 2015-2016 snow season, the Department redesigned snow routes in Queens, and that borough was added to the successful snow sector program. In the 2014-2015 snow season, the Department had deployed snow sector routes in Manhattan and Staten Island, as well as one district each in the Bronx, Brooklyn, and Queens. Sector routes combine streets formerly designated as secondary and tertiary into compact routes that keep plows on these streets from the start of the storm. The smallest roadway and dead end streets are assigned to haulster routes, which use smaller, more agile pieces of equipment. Keeping equipment in neighborhoods throughout the storm allowed plows to keep up with heavily accumulating snow in the majority of the city. However, in certain areas, the snow accumulated faster than the plows could keep up.

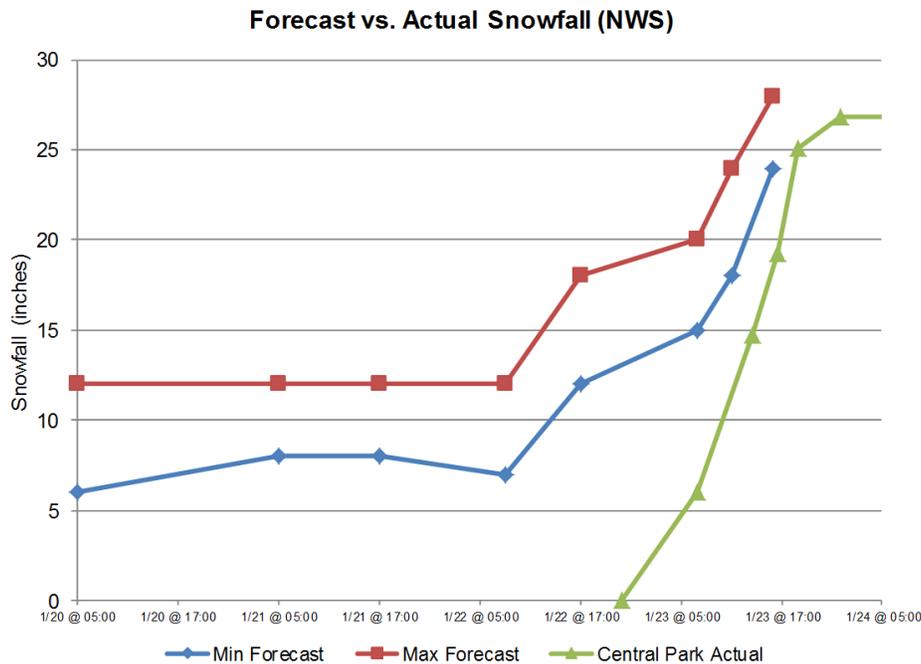
	Salt Spreaders	Haulsters	Plowable Trucks	Front End Loaders	Skid Steers	Melters	TOTAL	% of Total Equipment
Manhattan	65	12	380	37	11	10	515	16%
Brooklyn	119	22	706	67	15	9	938	29%
Bronx	82	11	306	41	9	5	454	14%
Queens	173	21	710	62	12	8	986	31%
Staten Island	58	16	210	29	3	4	320	10%
Citywide	497	82	2,312	236	50	36	3,213	100%

During the prior year, the Department increased its salt spreader fleet – large spreaders by 14% and small spreaders by 17% - to manage large storm events. The Department also continues to incorporate skid steers into the snow-fighting arsenal. A handful of streets, particularly in Brooklyn, required this equipment to maneuver in very tight blocks.

Weather

On January 18, 2016, the Department received initial forecasts of a snow event for Friday into Saturday. During the course of the week, the forecasts changed in terms of timing, duration and snow accumulations. As of 7:00 AM on Friday, January 22, most forecasters, including the National Weather Service, were calling for snowfall in the 8 to 12 inch range.

On Friday evening, the North American Mesoscale model run predicted the storm would swing further north, leading the NWS and other forecasters to increase predicted snowfall totals to 12 to 18 inches. However, by Saturday it became clear that the storm would be much more intense, with increasing accumulation forecasts over the course of the day Saturday. The final snowfall accumulation in Central Park was 26.8 inches, the second largest storm total for that location since 1869. It was also the largest storm ever measured at both JFK and La Guardia airports.



Planning and Staffing

As the forecasts identified a very large snow event, the Department prepared staffing plans to split the force (for 24 hour coverage) and began attaching plows to all available equipment. By Friday evening all collection activities had ceased and spreaders were pre-deployed despite continuing forecasts of minimal snowfall during the overnight hours. This allowed the Department to quickly deploy resources when the storm arrived several hours prior to forecast. Throughout the storm and over multiple shift changes the Department experienced very few personnel losses, i.e., almost all sanitation workers arrived at work in a timely fashion even during blizzard conditions. Effective messaging to the workforce that each route needed to be done in the proper order and completed at least twice per shift allowed the majority of the city to be open by Sunday morning.

Storm Response

Overall, the Department responded very well to this snow storm. Plow and spreader operators worked in treacherous conditions with heavy winds and whiteout conditions. At times, snowfall rates exceeded two to three inches per hour. Some zones, including Manhattan and Brooklyn South, completed nearly every street by daybreak on Sunday just hours after the storm had ended. Other zones, especially Queens West and Queens East, had completed critical highway and arterial routes but nevertheless had several hundred blocks impassible – approximately 1.5 percent of the city. Staten Island, Brooklyn North, and the Bronx fared relatively well.

As of 7:00 AM on Sunday, more than 80 percent of the streets had been cleared. By 7:00 AM Monday morning, 97 percent of all streets citywide had been cleared.

Areas with a high percentage of completed streets were able to move equipment from critical routes to assist their sector or secondary and tertiary streets where plows were bogged down in heavy drifts. This diversion of resources was possible due to the travel ban as well as the timing of the snow's intensity in different boroughs.

In some neighborhoods, particularly in Queens, streets remained impassable on Sunday and in some places into the day on Monday, with the last 30 blocks completed on Tuesday. These hard hit neighborhoods included: Sunnyside, Corona, East Elmhurst, and Jackson Heights, as well as portions of Ridgewood, Middle Village, and Woodhaven. Snow accumulations in these areas required the use of front-end loaders to clear, as standard plows and V-plows could not push through the accumulated snow and drifts of up to five feet in depth.

Equipment

On the whole the equipment assigned to various routes was appropriate for the task. However, the pick-up plows assigned to very small streets that cannot accommodate a full size spreader or plow became overwhelmed in heavy snow and required front end loaders to clear. DSNY will utilize more front end loaders earlier in storms forecasted for extreme snow accumulations. On a positive note, the new chains purchased by the Department were very effective. There were almost no instances of broken chains. The storm also clearly identified the need for additional 4x4 vehicles for supervisors. Supervisors assigned Priuses either ended up having to ride in a spreader with the operator or were limited to cleared streets for supervision. For other tight streets, the city should consider eliminating the corner parking space as is done in Brooklyn Heights to ease the ability of plows to enter blocks. The preponderance of stuck trucks occurred at corners turning into blocks.

The volume of snow also required the Department to activate emergency piling and hauling contractors to move snow out of the streets and to melter operations. This resource was highly effective at leveraging our ability to further open up streets and bring the city back to normal.

On Sunday morning just hours after the snow had stopped, DSNY management identified several districts in Queens as needing additional equipment and manpower support and by 7:00 AM had reallocated 60 plows from Brooklyn, Manhattan, and the Bronx to Queens. Even with this additional equipment, the progress was slow as both DSNY plows and civilian vehicles were continuing to become stuck in heavy snow. Over the course of Sunday, 170 plows became stuck in snow in Queens. By Sunday afternoon, DSNY identified that front end loaders were the most effective equipment for clearing these streets and began diverting front end loaders from other boroughs to Queens. Beyond Queens, Brooklyn, Staten Island, and the Bronx all had pockets of streets that required front end loaders to clear on Sunday. By Sunday night as the other boroughs completed opening uncleared streets, all available front end loaders citywide were diverted to Queens to assist in snow clearing operations.

Recommendation to maximize effectiveness of equipment:

- Work with communities to consider parking restrictions at the corners of certain very narrow streets to facilitate the turning radius of plows.
- Purchase additional 4x4 vehicles for supervisors for use during snow events.
- For storms with predicted accumulations over 12", DSNY will predeploy plowing front end loaders, and use them earlier in storm events.
- During large events, keep the haulster full of salt for better traction.

Routes

A review of GPS data and route assignments shows that some routes were not plowed during the critical hours of accumulation by assigned plow operators, especially in parts of Queens.

This translated into streets where the depths of snow could not be plowed by standard equipment. Interviews with individual operators, supervisors, and managers to determine the cause of routes unplowed revealed that in many instances civilian automobiles blocked access to streets, the plows became stuck in heavy drifts and were unable to dig themselves out, or sanitation workers avoided streets for fear of becoming stuck. Data from the Tow Truck Task Force shows that over the first three days of the storm 183 vehicles had to be towed with 118 of those requests coming from Queens. The most common stuck vehicles were ambulances (94 tows) and private vehicles (78 tows). In addition, more than 656 DSNY vehicles became stuck, 192 during the day on Saturday and 464 on the overnight Saturday into Sunday. In very limited cases, plow operators were given the wrong route at roll call or were diverted to higher priority locations such as clearing a path for a tow truck to pull out an ambulance.

From the preliminary GPS data, it appears that by the time the night shift rolled out on Saturday evening, many streets that ultimately went unplowed had already received accumulations above the capacity of a standard collection truck with plow, as nearly 20 inches of snow had fallen by that time in much of the city.

We also analyzed the demographics of the sanitation workers assigned in each district to identify whether experience or home location may have played a role. Our assumption was that inexperienced operators may have lacked familiarity with proper plowing techniques or confidence necessary to successfully fight a historic blizzard. Surprisingly, nearly 60 percent of the stuck trucks were driven by sanitation workers with over 7 years of experience.

Recommendations to improve coverage and route effectiveness:

- Implement vehicular travel limitations earlier for large accumulation events to limit the number of stuck civilian vehicles.
- Improve the chains for FDNY ambulances and require volunteer ambulances to have chains.
- Provide additional snow training to all levels of sanitation workers, supervisors, and superintendents.
- Improve procedures for diverting plows from assigned routes to ensure that the sector is cleared before the snow becomes overwhelming.
- Computerize route assignments.

Shift Change

Shift change is always a challenge during winter weather events due to the volume of vehicles requiring refueling and repositioning as well as the need to move on the order of 5,500 sanitation workers either into or out of the garages. During the evening shift change period on Saturday, January 29, Queens had some of the highest accumulation rates of the entire storm. Between 5:00 PM and 8:00 PM, Queens East and West received five and six inches of snow, respectively. The remaining districts received between one and four inches of snow over the same period.

Recommendations to improve shift changes:

- Develop additional temporary parking for sanitation workers, e.g., close a block near garages in industrial areas that will not impact residential parking.

- Fuel more vehicles in the field or at other locations such as salt piles to reduce the congestion at the garages.

Cross Walks/Bus Stops/Pedestrian Overpasses/Step Streets

Snow laborers and DOT assistance have been a critical part of dealing with bus stops, cross walks, pedestrian overpasses and step streets. DOT's use of both an increased number of skid steers and laborers cleared these areas far more quickly than if DSNY had been solely responsible. In terms of snow laborers, recruitment lagged at the beginning of the week, but by the end of the week, DSNY was managing over 3,200 laborers. This stretched the Department's ability to properly supervise the laborers and get the most productivity out of them.

Recommendations to improve snow response for pedestrian areas:

- Identify and purchase additional skid steers to further mechanize the clearing of bus stops and cross walks.
- Pretreat step streets.
- Partner with volunteer teams to engage community groups in clearing these areas.
- Cap the number of snow laborers utilized to ensure proper supervision. Making the position somewhat "selective" will help drive people to participate early in the storm to get the work.
- Develop a more robust transportation plan for snow laborers to re-deploy laborers to districts where they are needed.
- Clarify a property owners responsibilities' for cross walks, muni meters, and fire hydrants.

Situational Awareness

PlowNYC and the department's internal GPS system proved critical for situational awareness. It allowed the department to more quickly identify areas in need and move additional equipment to meet it. However, over long duration events, reporting needs to provide more timely information to account for changing conditions and accumulations in the field.

As the number of streets needing to be cleared dwindled, coordination with elected officials and other community members became critical to meet the public's expectations.

Recommendations to improve transparency and information flow:

- Shift to reporting on the percent of streets completed after the last flake falls to provide a better picture of whether a street is passable.
- Integrate other sources of information more seamlessly from 311, OEM, social media, and elected officials, and improve public messaging in prioritizing plowing requests.

Tertiary Contractors

DSNY employed four tertiary contracts in Staten Island, the Bronx, and parts of eastern Queens. These four contractors were responsible for 9,046 street segments. While one

contractor successfully met his contractual requirements, citywide, only 53 percent of the segments were completed over the course of the first 24 hours of the storm. One of the contractors walked off the job at 0200 Sunday morning. The equipment utilized by the contractors was overwhelmed in the high snow.

Recommendation to improve work previously done by tertiary contractors:

- Further evaluate the performance of tertiary contractors and consider purchasing additional haulsters to plow tertiary streets using in-house resources.

Innovative Emergency Actions

Before, during, and after the storm, the City and State took several steps to protect public safety on city roadways and encourage drivers to stay off the roads. These included:

- **MTA Buses:** The MTA pulled buses off of their routes at noon on Saturday. This was a dramatic improvement over prior major storms, as buses frequently lose traction and get stuck in the snow. Keeping the buses off of streets until Sunday morning gave DSNY a chance to completely plow most or all bus routes and ensure safe bus travel. In addition, it allowed bus service to quickly be reinstated on Sunday morning. Routes were clear and buses traveled freely.
- **Travel Ban:** The Mayor and Governor jointly issued a ban on travel beginning at 2:30 PM on Saturday. This successfully reduced the number of drivers on the road from the relatively high numbers on Saturday morning to almost zero. The travel ban gave DSNY the opportunity to continue plowing the streets through the evening relatively unimpeded. While DSNY plows did encounter some stuck vehicles particularly in Queens, we believe that the travel ban greatly reduced overall roadway traffic and allowed our plows to keep up with accumulations, especially on primary and critical routes. In the future, we would recommend instating the travel ban earlier to clear the streets ahead of the worst blizzard conditions.
- **Week-long ASP Cancellation:** Announcing the week-long ASP cancellation on Sunday was intended to give drivers the opportunity to leave their cars in place for the week and avoid throwing snow back into the streets. This approach worked well in some boroughs, especially Brooklyn and Manhattan. In Queens, however, the majority of drivers dug out their cars anyway, pushing the snow back into the streets due to the lack of alternative mass transit options.

DSNY will continue to drill down into the actual events to improve our response to large snow events.

Summary of Recommendations:

Recommendation to maximize effectiveness of equipment:

- Work with communities to consider parking restrictions at the corners of certain very narrow streets to facilitate the turning radius of plows.
- Purchase additional 4x4 vehicles for supervisors for use during snow events.
- For storms with predicted accumulations over 12", DSNY will predeploy plowing front end loaders, and use them earlier in storm events.

- During large events, keep the haulster full of salt for better traction.

Recommendations to improve coverage and route effectiveness:

- Implement vehicular travel limitations earlier for large accumulation events to limit the number of stuck civilian vehicles.
- Improve the chains for FDNY ambulances and require volunteer ambulances to have chains.
- Provide additional snow training to all levels of sanitation workers, supervisors, and superintendents.
- Improve procedures for diverting plows from assigned routes to ensure that the sector is cleared before the snow becomes overwhelming.
- Computerize route assignments.

Recommendations to improve shift changes:

- Develop additional temporary parking for sanitation workers, e.g., close a block near garages in industrial areas that will not impact residential parking.
- Fuel more vehicles in the field or at other locations such as salt piles to reduce the congestion at the garages.

Recommendations to improve snow response for pedestrian areas:

- Identify and purchase additional skid steers to further mechanize the clearing of bus stops and cross walks.
- Pretreat step streets.
- Partner with volunteer teams to engage community groups in clearing these areas.
- Cap the number of snow laborers utilized to ensure proper supervision. Making the position somewhat “selective” will help drive people to participate early in the storm to get the work.
- Develop a more robust transportation plan for snow laborers to re-deploy laborers to districts where they are needed.
- Clarify a property owners responsibilities’ for cross walks, muni meters, and fire hydrants.

Recommendations to improve transparency and information flow:

- Shift to reporting on the percent completes after the last flake falls to provide a better picture of whether a street is passable.
- Integrate other sources of information more seamlessly from 311, OEM, social media, and elected officials, and improve public messaging in prioritizing plowing requests.

Recommendation to improve work previously done by tertiary contractors:

- Further evaluate the performance of tertiary contractors and consider purchasing additional haulsters to plow tertiary streets using in-house resources.