

**ENHANCING NEW YORK CITY'S  
EMERGENCY PREPAREDNESS**  
*A REPORT TO MAYOR MICHAEL R. BLOOMBERG*

PREPARED BY THE  
NEW YORK CITY  
EMERGENCY RESPONSE TASK FORCE

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# EXECUTIVE SUMMARY

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New York City and its citizens rose to the extraordinary challenges presented by the August 14, 2003 power outage and, as a result, have a lot of which to be proud. Police officers, firefighters, emergency management personnel and health professionals worked tirelessly to get the City safely through the crisis. Their efforts ranged from helping to evacuate hundreds of thousands of individuals from pitch-black subway stations and in-service trains, to responding to a six-fold increase in serious fires and three times as many medical emergencies and 911 calls. Residents assisted coworkers and neighbors, volunteered to direct traffic at busy intersections, and remained calm and orderly. Notably, the Overall Crime Index was lower than the comparable period for the previous year. Many businesses continued to operate, and the financial markets were able to open. Because of these efforts, the City was able to limit serious injury and damage.

Despite the City's successes, it is important to learn from the experience and find ways to improve current practices. The City was fortunate this time in that the outage was of limited duration and occurred during daylight and at the end of the workweek, providing a weekend to restore City and business systems; the weather was good; many New Yorkers were vacationing out-of-town; schools were closed; and there was no mass trauma. Another event could pose significantly greater challenges.

Accordingly, on the Monday following the blackout, Mayor Michael R. Bloomberg directed Andrew Alper, President of the New York City Economic Development Corporation, and Susan Kupferman, Director of the Mayor's Office of Operations, to co-chair the Emergency Response Task Force to review the City's response to the outage and to make recommendations on how the City can be even better prepared in times of emergency. In order to ensure an independent review, the Task Force members were drawn largely from outside the Administration. The members, who included representatives from the private and non-public sectors and City officials, had a wide array of experience and expertise.

The Task Force initiated its effort by contacting every City agency in order to gauge the scope of the City's response, to garner feedback on what went right and wrong at individual agencies, and to elicit observations about the City's overall response. Despite time constraints, the Task Force conducted extensive outreach to the public, private and non-profit sectors, including to other states and municipalities, educational institutions, private industry groups, relief organizations, transportation providers and organizations, advocacy groups and academia. In addition, the Task Force conducted a public outreach survey that appeared on the City's website in English and Spanish and was available through the 311 Citizen Service Center. Over 3,700 responses were received.

The Task Force examined the impacts of the outage and resulting issues in six broad areas outlined by Mayor Bloomberg: Emergency Response; Business Continuity; The City as Employer; Communications; Transportation; and Public Health, Safety and Preparedness. The assessment resulted in thirty-five recommendations. Because every emergency event is unique and often requires moment-by-moment decision-making, the Task Force recommendations endorse flexible protocols that encourage cooperation between the public and private sectors and leverage both public and private resources.

Several of the recommendations focus on strengthening communications with City employees, the public and the business community, and among City agencies. A number of others address the effective deployment of essential and other public and private sector employees during an emergency. Specific recommendations also address the needs of the City's most vulnerable populations. Given the tight timeframe for the report, many are recommendations for further study within particular areas. Many City agencies have already begun to study the issues identified by the Task Force and to develop a number of the recommendations. The recommendations are summarized in the matrix below:

## SUMMARY OF TASK FORCE RECOMMENDATIONS

1. Strengthen the City's command center structure	2. Centralize public communication	3. Strengthen self-activating emergency plans for essential staff
4. Develop a hardened citywide communications infrastructure that has the capacity to survive public infrastructure failures	5. Strengthen the City's communication with employees	6. Develop a system to credential essential staff
7. Develop an essential skills database	8. Develop an emergency resources database	9. Conduct a backup power survey and develop a backup power installation plan
10. Enhance the City's emergency fuel management plan	11. Strengthen communications with businesses	12. Ensure City agencies have evacuation plans and drill regularly on plans
13. Develop guidance on emergency kits for the workplace	14. Explore revisions to the building code to ensure evacuation safety and mitigation of emergency-related hazards	15. Backup power systems at telecommunications facilities should be reviewed
16. The overall 911 system should be reviewed to eliminate single points of failure	17. Review emergency dispatch and communications operations to improve the capacity for coordinated dispatch, and incident command and management	18. Integrate vehicle location and routing capability into emergency dispatch operations
19. Agency radio communications efforts should leverage citywide efforts	20. Consider public-private initiatives to create redundant wireless telecommunications systems to ensure communication in an emergency	21. Communications and response protocols need to be formalized between the City and telecommunications carriers
22. Emergency communications systems should be reviewed	23. Ensure multiple means of transmitting emergency broadcasts from City Hall	24. Develop a transportation plan that steers pedestrians and vehicles to pre-determined thoroughfares
25. Ease overcrowding at the Manhattan ferry piers	26. Implement alternatives to provide for traffic control at signalized intersections	27. Identify transportation hubs and maximize the use of available transportation to get essential employees to work

## SUMMARY OF TASK FORCE RECOMMENDATIONS

<p><b>28. Pool traffic information and heighten communication</b></p>	<p><b>29. Upgrade generator testing standards and emergency preparedness for State Department of Health-regulated health care facilities</b></p>	<p><b>30. Require emergency preparedness plans for City human service vendors and programs</b></p>
<p><b>31. Expand the use of the 311 Citizen Service Center or dedicate a phone line to respond to the needs of vulnerable populations during a crisis</b></p>	<p><b>32. Develop cooperative arrangements with private sector entities to expand the inventory of comfort stations</b></p>	<p><b>33. Enhance plans for the availability of potable water</b></p>
<p><b>34. Encourage vulnerable populations, caregivers and community groups to develop individual preparedness plans for those with special needs and consider expanding the City's Ready New York campaign to address specifically the preparedness needs of these individuals</b></p>	<p><b>35. Assess the comprehensiveness of existing school safety plans and continue to provide a resource to independent and other non-public schools for emergency preparedness</b></p>	

# INTRODUCTION

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The scale of the blackout that began on the afternoon of August 14, 2003 was unprecedented. Approximately 50 million people were without power, from New York to Canada to the north and from the East Coast all the way to Detroit to the west. In New York City alone, eight million residents, as well as countless numbers of tourists and commuters, were affected. Although New York has experienced periods of total power loss in 1965 and 1977, the blackout of 2003 affected more people in a world that is radically more dependent on digital and electronic technologies and the power required to keep those technologies running.

The blackout's impacts went far beyond the loss of modern conveniences: the elderly and infirm were stranded in high-rise apartments; public safety was jeopardized at street corners where traffic signals were extinguished; residents were stuck in elevators; emergency call and dispatch centers were strained and response times increased under the swell of calls; and, when appropriate backup generation was not available, critical emergency services and life support systems were threatened.

Despite the resulting risks and complications, New York City and its citizens performed admirably and have much of which to be proud. In stark contrast to the last complete blackout in the City's history, New York remained calm, and, impressively, the Overall Crime Index was lower than the comparable period for the previous year.

The City's success on August 14<sup>th</sup> and 15<sup>th</sup> was the result of the hard work and ingenuity of many New Yorkers: citizens volunteered at busy street corners; neighbors checked on the elderly in their buildings; the police met fuel vendors on the outskirts of the City to escort them to critical facilities; and those who were responsible for vital services in both the private and public sectors worked long hours and extra shifts, some sleeping in their offices.

Much of what went well during this outage was the result of lessons learned and precautions taken following previous disasters and crises, most notably September 11, 2001, as well as planning for Y2K and the threatened transit strike. Compared to two years ago, and reflecting extensive public outreach, more New Yorkers are better equipped to deal with emergency situations. Institutions in both the public and private sectors have developed more complete business continuity plans, including installing backup power and distributing emergency kits to employees.

As a result, the City's public and private organizations were largely successful in maintaining critical operations. Many companies were open for business during the blackout, and the financial markets were able to open even while the blackout still disabled many areas of the City. Public goodwill, safety personnel, and provision of essential services made it possible for the City to maintain order and limit serious injury or damage.

The City's commendable response to the blackout does not mean that the blackout did not impose hardships, financial loss and personal loss on the City, City residents and private businesses. The economic loss to the City is estimated at between \$700 million and \$1 billion. People faced long walks home and experienced other challenges.

In several cases, serious incidents resulted from secondary effects and responses. As an example, in the first 24 hours, the number of serious fires in the City jumped more than six-fold, most of which were started by candles that were used to replace electric lighting.

Although the blackout was a serious emergency, it could have been far worse. The City was fortunate that the loss of power occurred in nice weather during daylight hours, was of limited duration, and occurred at the end of the workweek, providing a weekend for business recovery by the City and the private and non-profit sectors. Many New Yorkers were out of the City on August vacations and the schools were not in session. Although the number of calls for emergency assistance almost tripled, there was no mass trauma.

## **THE EMERGENCY RESPONSE TASK FORCE**

The Monday following the blackout, Mayor Michael R. Bloomberg directed Andrew Alper, President of the New York City Economic Development Corporation, and Susan Kupferman, Director of the Mayor’s Office of Operations, to co-chair the Emergency Response Task Force to assess the City’s emergency response and preparedness and to make specific recommendations that might improve the City’s response to future emergencies.

In order to ensure an independent review, the Task Force members were drawn largely from outside of the Administration, and, in addition to City officials, included representatives from both the private and not-for-profit sectors with broad experiences and responsibilities:

Andrew Alper President NYC Economic Development Corporation	Susan Kupferman Director Mayor's Office of Operations
Lilliam Barrios-Paoli Senior Vice President United Way of New York City	Stanley Brezenoff President and COO Continuum Health Partners, Inc.
John Gilbert Executive Vice President and COO Rudin Management, Inc.	Charles Maikish Executive Vice President JP Morgan Chase
Gino Menchini Commissioner New York City Department of Information Technology and Telecommunications	Virginia Mewborn Senior Director, Emergency Services American Red Cross in Greater New York
Sam Schwartz President The Sam Schwartz Company	Ben Tucker Chief Executive, School Safety and Planning New York City Department of Education

As a first step, the Task Force contacted every City agency in order to begin cataloguing the scope of the City’s response—which ranged from providing meals to the elderly, to enforcing health-code violations, to managing traffic, to freeing people from elevators—and to solicit agencies’ feedback on what went right and wrong in terms of their own response and their observations about the City’s overall response. All City agencies provided valuable feedback in a compressed time frame, providing a solid foundation of knowledge for further outreach. It was clear that most agencies had already begun their own internal reviews, and that many had already begun to modify their emergency plans and procedures.

To the extent allowable by the timeline, the Task Force conducted extensive outreach to the private and non-profit sectors, as well as to other governmental entities. The entities contacted included other states and municipalities, educational institutions, private industry groups, relief organizations, regional transportation providers, transportation organizations representing users, advocacy groups and academia. Where possible, the Task Force relied on industry groups and not-for-profit associations that could

aggregate feedback related to different aspects of the response to the blackout. A complete list of the entities contacted is included in Appendix A to this report.

The Task Force also conducted a public outreach survey that appeared on the City's website in English and Spanish, and, for those without computer access, was available through the 311 Citizen Service Center. The survey was posted from September 12<sup>th</sup> through September 18<sup>th</sup>. Over 3,700 survey responses were received. The survey results provided an overview of the impact of the outage on City residents and are set forth in Appendix B to the report.<sup>1</sup>

The Task Force convened five times during September. In the intervening periods, the Task Force and its staff conducted interviews, synthesized comments and drafted recommendations.

The Task Force is grateful to everyone who provided the feedback upon which this report is based.

## **CONSIDERATIONS AND APPROACH**

Despite the City's successes on August 14<sup>th</sup> and 15<sup>th</sup>, it is important to learn from our experiences and find ways to improve current practices. Although there are common themes to many emergencies, every event is unique, and the next one could be significantly more challenging. It is impossible to prepare contingency plans for every eventuality, to model every permutation of disruptions or to stockpile the resources required to respond to an infinite number of worst-case scenarios.

Accordingly, appropriate preparedness requires development of protocols that are flexible, foster coordination among agencies, and leverage the vast wealth of resources that are available within the City and accessible from the private sector. Among the greatest challenges is the collection and management of information. Many of the recommendations within this report focus on establishing and strengthening the mechanisms and structures that will facilitate both access to and the dissemination of information for the public, City employees and the business community, as well as among City agencies.

Although the tight timeframe was useful in that it required work to be completed while memories of the blackout were still fresh, it put limitations on the ability to develop the recommendations fully. Many are therefore recommendations for further study within specific areas.

The Task Force has not undertaken cost analyses of the recommendations contained in this report either to determine priorities among them or to assess their budgetary impact. Further study of specific recommendations may include such cost/benefit analyses.

Finally, many City agencies have already begun to study the issues raised in the report and to develop and implement a number of the Task Force recommendations.

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<sup>1</sup> As set forth in Appendix B to the report, most of those who responded to the Task Force survey cited lack of communication as their biggest problem. Transportation was reported to be nearly as big a problem. The majority of those responding walked to a safe destination; automobiles were the next most highly used mode of transportation. Overwhelmingly, people did not require emergency assistance. Almost half did not have access to an emergency preparedness kit. A good number had kits at home, and only a few workplaces had kits available to those who responded to the survey.



## ORGANIZATION

To provide structure to its outreach efforts and this report, the Task Force focused on six areas of the City's response:

- ***Emergency Response:*** Mobilization and coordination of agency resources.
- ***Business Continuity:*** Maintenance of critical functions within the public and private sectors, including backup power, telecommunications, and essential workforce.
- ***The City as Employer:*** Ability of agencies to evacuate and communicate with their employees, especially employees required to ensure essential City services.
- ***Communications:*** Efficacy of communications within agencies, between agencies, to the City's businesses and to and from the public, including the infrastructure that supported these communications and the availability of information to key decision-makers.
- ***Transportation:*** Ability of people to move within, out of and into the City when various forms of transportation are impaired.
- ***Public Health, Safety and Preparedness:*** Availability of safe food, water, shelter and other services required to ensure public safety.

The final report is divided into two sections. The first section discusses impacts from the blackout and resulting issues in each of these six areas of inquiry. Inevitably, there is substantial overlap among the six areas. For ease of reading, where there is such overlap, the substance of an issue is discussed in detail in only one area. The second section of the report enumerates the recommendations proposed by the Task Force in response to these issues.

# IMPACTS AND ISSUES

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Within each of the six broad areas that the Task Force evaluated --- Emergency Response; Business Continuity; the City as Employer; Communications; Transportation; and Public Health, Safety and Preparedness, the following issues and impacts were identified.

## EMERGENCY RESPONSE

- **Command Center issues:** The City has three different types of command centers. City agencies activate tactical command centers to oversee the vital services that they provide. Examples of agencies that set up command centers during the blackout and that would need to establish command centers during another major emergency include the Police and Fire Departments, the Departments of Transportation, Sanitation and Health and Mental Hygiene, and the Health and Hospitals Corporation. The Office of Emergency Management's Emergency Operations Center serves as a second type of command center, established to provide emergency coordination, including the gathering and distribution of information and situation reports, and providing an environment in which operational problems can be solved in real time. Finally, the Mayor and key senior decision-makers form a command center where policy and leadership decisions are made. The following issues related to these command centers were identified:

*Some agencies were not able to run effective tactical command centers:* A tactical command center can be as simple as a commissioner's office equipped with power, lights and communications. For some agencies this is sufficient, but during the blackout not all key agencies had these basics. Some agencies require more robust infrastructures to perform effectively.

*Agency staffing at the Office of Emergency Management's Command Center was inconsistent:* The efficacy of the Emergency Operations Center relies in large part on the presence of multiple agencies. To solve problems and match resources to needs quickly, agency representatives must have deep knowledge of their agencies and be capable of quick decision-making.

*Inconsistent command and coordination between command centers:* During the blackout, information was not always disseminated and shared between command centers in a timely manner. As a result, efforts were sometimes duplicated and decisions were sometimes made without the most up-to-date, available information.

*City Hall is not optimally configured to function as a command center in an emergency:* For the Mayor and key Commissioners to function effectively in an emergency, City Hall must have adequately configured physical space, as well as robust telecommunications capabilities. These requirements are different in emergency situations than they are in non-emergency situations.

- **Lack of consistent and coordinated agency response plans:** Though largely not the case for emergency response agencies, the response capabilities of other City agencies suffered in cases where they were not thoroughly modeled and drilled in advance. In many cases, the workforce that would be essential during an emergency—including the role that they would play and the location to which they should report—was not predefined and, as discussed below, essential employees lack credentials that would enable them to travel quickly to their required posts.

- **Lack of emergency dispatch efficiency:** The City's emergency agencies (Police and Fire Departments and Emergency Medical Service) rely upon seven different dispatch centers and three dispatch systems. This distributed model extends call duration for public reporting of incidents through 911, and increases the potential for failures as a result of the need for call transfers between dispatch facilities. During the outage a lack of dispatch system integration along with varying operational practices resulted in decreased dispatching efficiency. For instance, the Police and Fire Departments and Emergency Medical Service dispatch calls are based on strict protocols rather than a coordinated effort to determine which agency has the closest, most appropriate unit for a specific 911 call. This issue is present in day-to-day operations, but is heightened during an incident such as the power outage when call volume is increased dramatically. The current dispatch structure leads to an inefficient on-scene incident command structure where the Police and Fire Departments and Emergency Medical Service units operate in a silo-based manner that lacks overall coordination and communication. As incidents grow in scale and complexity, integration with other Local, State, and Federal agencies will further complicate the current dispatch-operating model.
- **Employee movement and physical resource deployment was hampered:** The City has not provided credentials to essential public or private employees which slowed the movement of key personnel and resources, including fuel, generators, other equipment, and emergency services. This problem would be more pronounced during an event that requires secure perimeters.
- **Mobilization of City employees was impeded by communication problems:** Availability of public sector employees during a crisis is paramount to ensure the continuity of critical services to the public. Due to the widespread communications outage, agency managers had difficulty contacting their employees on August 14<sup>th</sup> and 15<sup>th</sup>. Agencies, such as the Department of Housing Preservation and Development, the Economic Development Corporation, the Human Resources Administration and the Community Assistance Unit, with established employee telephone contact protocols for emergencies experienced some outages. Following the September 11<sup>th</sup> attacks on the World Trade Center, agencies invested heavily in cellular technology to communicate with their employees, which did not perform optimally during this emergency. This lack of communications led employees to be uncertain whether they should report back to work the day of the outage or at any point during the following day. In other cases, employees were not informed that they were non-essential and made their way to work the next day despite the difficulty in commuting without subway service.
- **Defining activities for non-emergency staff:** Public employees represent the front line response to most emergencies. However, because of the magnitude of the City's workforce, tens of thousands of City employees work in non-essential functions and, therefore, do not play a direct role in the City's emergency response or recovery. Some workers perform emergency response-like tasks (for example, electricians or plumbers), but, because they do not work in emergency response agencies, have been overlooked. Depending on the circumstance, these employees are an untapped resource that could make a significant contribution to City's efforts.

## **BUSINESS CONTINUITY**

- **Uncoordinated backup power and fuel supply:** Many City offices and private sector functions did not have sufficient backup power in place, including key agencies such as the Departments of Health and Mental Hygiene, Sanitation and Transportation, neighborhood firehouses, the Hunt's Point food distribution center, and certain functional areas of hospitals. A small percentage of emergency generators failed to operate, either failing to initiate power generation, or ceasing to operate during the blackout due to mechanical failure or exhaustion of fuel supply. While in hindsight there was an

adequate fuel supply for generator operations, much effort was spent during the early hours of the blackout, often at cross purposes, reacting to fuel requests, and securing and delivering fuel supplies. Potential fuel delivery delays due to congestion in the streets were avoided due to the use of police escort services, but a “lockdown” situation may have caused additional delivery problems.

- **Slow recovery of steam pressure delayed business recovery:** Over 1,800 customers are served by Consolidated Edison steam generation for space heating, air conditioning, equipment sterilization, and other purposes. Some businesses remained closed after power was restored due to lack of steam pressure, which took several days longer to become operational.
- **Inadequate emergency supplies on hand:** Some agencies and businesses did not have stores of critical supplies, such as food, water, batteries, or flashlights. While this shortage did not cause any severe problems during the blackout, it is possible that limited availability of these resources could cause larger problems in other types of events. In addition, some City agencies did not have cash on hand to purchase additional emergency supplies as needed, and procurement of needed goods may have been slowed in some places due to procurement requirements.
- **Communication with businesses:** Businesses need as much information as possible in order to make operational decisions and to disseminate appropriate instructions to employees. Companies made decisions during the outage based on information from broadcast news, which was often delayed and lacking in important detail. Communications is especially challenging with the estimated 200,000 small businesses that employ almost half of the City’s private sector workforce.

## THE CITY AS EMPLOYER

- **Safe evacuation of employees:** The City has an evacuation plan for each of the buildings under its management, and is in the process of updating these procedures. Agencies that are tenants in privately leased office space are responsible for developing their own plans in concert with their landlords. Where they do exist both in public and private buildings, such plans are infrequently drilled, and employees are not necessarily aware of them. Further, not all City agencies have evacuation plans in place.

The evacuation of certain City buildings was also hindered by the lack of an operable public address system due to the absence of backup batteries or a generator. Most notably, this affected the City’s largest facility, the Municipal Building, which houses 16 agencies with approximately 2,250 employees. It prevented communication regarding the extent of the power outage and any directions about evacuation. However, in lieu of an announcement, the Department of Citywide Administrative Services, which manages all City facilities, conducted floor-by-floor searches to ensure buildings were cleared before sunset. In some buildings, battery-powered emergency stairwell lighting also failed after a relatively short period of continuous use.

- **Availability of emergency kits and essential emergency supplies:** While some agencies assembled “go bags” for their employees in anticipation of Y2K and in the aftermath of September 11<sup>th</sup>, many others identified the need for emergency kits and additional employee preparedness. For those that have already assembled kits there is significant variation in their content, and for agencies that are planning to do so there is a lack of uniformity in the inventory of items that are being considered for inclusion, and the quantity of items considered to be necessary.

## COMMUNICATIONS

- **Loss of service at Verizon central offices:** Although equipped with backup power generating equipment, which operated appropriately in most Verizon central offices (CO), three Verizon central offices experienced outages of various durations due to failures of generating equipment. These failures resulted in the loss of Verizon CO's that service Manhattan's midtown area and the downtown Brooklyn area. The result of these failures included the loss of Emergency Medical Service and Fire Department (Brooklyn only) dispatch capabilities, and intermittent radio communications disruptions to Police and Fire Departments and Emergency Medical Service dispatch (due to failed T-1 circuits). Additionally, a Verizon facility has been identified as a critical single point of failure for the City's 911 system. In the areas serviced by the central offices that experienced outages there was a reduction in cellular capacity, as well as an inability of the public to have inbound and outbound telephone service, which included the ability to dial 911. These CO outages also caused a loss of telephone service at the Office of Emergency Management's Emergency Operations Center, as well as at police precincts, firehouses and hospitals in the areas served by the CO's.
- **Overload of cellular network following the emergency:** As experienced in previous emergencies, there is a tendency for cellular networks to be overloaded immediately following an emergency situation. The power outage of August 14<sup>th</sup> was no exception. Throughout the City cellular service was unavailable immediately following the outage. This unavailability caused significant problems for residents, visitors and businesses that were attempting to obtain information about the outage, to reach a safe destination, or in the worst cases to reach emergency services. The outages also caused problems for the City while it tried to coordinate resources for response to the emergency.
- **911 call volume overloaded Verizon queuing capacity:** Over 132,000 calls were logged into 911 during the outage, a 187 percent increase over an analogous period last year. Queuing slots that control the number of calls that can be placed into 911 at any given time were overloaded. The overload of this system created an inability for callers to reach 911 operators. In order to alleviate this problem Verizon increased the number of slots available to 911; however, this increase did not create sufficient resources, and 911 continued to experience an overload of the system.
- **Emergency dispatch systems lack interoperability, scalability, and resiliency:** Components of the City's emergency dispatch operations rely on outdated technologies that are neither interoperable nor capable of expanding to meet the increased volume and demand for services during a major incident such as the power outage. Disruptions to power and communications affected the City's ability to effectively manage and dispatch emergency services in a coordinated manner. This problem was further compounded by segregation of the operational, technical, and geographical nature of the City's current emergency dispatch and communications organizations. Additionally, disparities ranging from infrastructure reliability to physical security exist in the manner in which the Police and Fire Departments' communications facilities are maintained and protected.
- **Emergency dispatch infrastructure experienced disruptions due to multiple single points of failure:** The City's current emergency dispatch and communications facilities rely heavily upon public switched networks, outdated and end-of-life technologies, as well as key infrastructure components that are not interoperable or contain single points of failure. The City's call box system relies upon antiquated premise based equipment that is costly to maintain and does not take advantage of modern technologies. While not a problem during this power outage, this system adds significant risk to both the Police and Fire Departments dispatch.

- **Inability to efficiently locate and route emergency and essential vehicles:** Disruptions to communications systems affected the City's ability to efficiently mobilize City staff and resources. The inability to quickly locate the closest appropriate unit to an emergency could jeopardize the City's ability to provide an efficient response to incidents. Additionally, lack of coordination between emergency agencies results in duplicative dispatch to emergency incidents.
- **Radio repeaters and agency radio systems failed after time:** The duration of the power outage exceeded the battery life/duration at City owned/managed radio repeater sites. Since most of these sites are not under generator power, the facilities failed as soon as battery supplies were exhausted. The failure of these sites caused diminished radio capacities for agencies such as the Police and Fire Departments, Emergency Medical Service and Departments of Sanitation and Transportation. Many agencies attempted to alleviate the problem by transporting temporary power supplies to the facilities; however, the sheer number of repeater sites made this task challenging.
- **Emergency Communications Systems Failed:** Access to the Government Emergency Telecommunications Service (GETS) network and the priority cellular network did not work as expected following the outage. These networks are used by essential government personnel to conduct business related to the emergency at hand and are the primary method of communications at times when traditional public networks are overburdened during an emergency. Diminished access to the priority cellular network appears to have been the result of cellular repeater sites failing following the loss of power. The inability to reach the GETS network appears to have been the result of callers' inability to reach long distance access numbers.
- **City Hall's ability to communicate with the broadcast media was impaired:** The City Hall press office has established the ability to communicate immediately to television and radio stations in the City by means of a fiber line from City Hall to the switch. The fiber line passes through a Time Warner hub that did not have enough backup power. At about 9 pm on August 14<sup>th</sup>, all the fiber in and out of that hub went dark, cutting the press office's link to the switch and television stations in the City. In addition, television stations, expecting the fiber line to work, assigned crews to other locations around the City. In the event of another emergency, television stations will expect the fiber line to function and again may not send crews to City Hall. Further, depending on traffic and security around City Hall, there may be significant delays in assembling television crews to broadcast from City Hall. It is invaluable to have the ability to send live video to all television stations in the City at the push of a button. However, the City's capabilities must be improved.
- **Coordination of public information through the 311 Citizen Service Center, nyc.gov and NYC TV:** The 311 Citizen Service Center received over 150,000 calls from 4 pm on Thursday, August 14<sup>th</sup> when the power failed through the end of the day on Friday, August 15<sup>th</sup>. While the Center played an important role in providing information to the public, agency coordination of information with 311 lacked timeliness and accuracy during the early stages of the outage. Additionally, due to the loss of Time Warner's head end facilities at East 23<sup>rd</sup> Street, NYC TV was not available to provide more detailed information for the public or City employees.
- **Remote telecommunications equipment failed after time:** The duration of the power outage exceeded the battery life/duration of remote telecommunications electronics. These electronics include premise based fiber access nodes primarily used in corporate environments, as well as onsite telecommunications equipment such as PBX's and IVR's. These failures resulted in isolated voice and data communication outages throughout the five boroughs, including an inability to dial 911 from these locations. At the homeowner level, a reliance on cordless telephones also resulted in many

homeowners being unable to access any telephone services (including 911) due to power requirements of cordless phones.

- **Cellular telecommunications towers failed after time:** The duration of the power outage exceeded the battery life/duration at cellular telecommunications towers. Since most of these sites do not maintain generator backup, the sites failed as soon as onsite battery supplies were exhausted. The failure of multiple cellular sites resulted in widespread cellular outages.
- **Inability to determine scope of outage:** City decision-makers experienced difficulty determining the extent, duration, and scope of telecommunication outages. Although the Mutual Aid Restoration Consortium was activated, there was some reluctance on the part of carriers to include the City in individual restoration efforts. This made it difficult to plan for restoration of City services and to provide the public with updates for telecommunications services.

## TRANSPORTATION

- **Widespread transportation outages resulted in gridlock:** Nearly two million people are located each weekday afternoon below 60<sup>th</sup> Street, from river to river, in Manhattan – the largest concentration citywide. It is not surprising that this is the area where the greatest congestion occurs during a major event. The complete loss of subway and commuter rail service resulted in the overtaxing of the remaining operational transportation system. When the power failed, surface traffic demand soared and the capacity to move vehicles was eroded by blocked intersections and pedestrian clogged bridges. Traffic congestion was a major issue for a relatively short period time -- three to four hours, as people made their way to a safe destination.
- **Inability to meet ferry demand:** Ferries have become an increasingly important component of responding to a travel emergency. Commuters flocked to ferries in overwhelming numbers. New York Waterway, which operates the majority of the private ferry service, carried 170,000 people compared with typical volumes for an evening rush period of 30,000. Demand far outstripped the availability of ferryboats, there were long wait times at the landings, and the number of personnel available to assist passengers and provide for crowd control was less than desirable. Despite these conditions, some of the private ferry operators continued to charge passenger fares.
- **Intersections lacked traffic signals or traffic control:** The loss of power to the City's 11,000 signalized intersections created a severe congestion problem in business districts during the first few hours of the blackout, and created a safety issue throughout the event, especially at night. While the City deployed hundreds of personnel to direct traffic in the most critical locations, much of the traffic control was taken over by civilian volunteers who, while inexperienced, helped to alleviate some of the congestion.
- **Difficulty in getting essential employees to work:** While the exodus of commuters leaving the City was a problem of a relatively short duration, business continuity depends on the ability to mobilize an essential workforce for the duration of any transportation outage. There is a need to assist both the public and private sectors in getting their key personnel to work.
- **No single repository for traffic information:** There are two major public traffic monitoring centers that focus on New York City --- the Joint Traffic Operations Center, which includes the City and State Departments of Transportation and the New York City Police Department; and TRANSCOM, which is comprised of multiple transportation providers in the New York/New Jersey region. In addition, private media broadcasting services provide extensive traffic reporting to radio and

television stations. Each of these traffic monitors act independently, and there is no one central repository for recording and disseminating all transportation information during a large-scale event.

## **PUBLIC HEALTH, SAFETY AND PREPAREDNESS**

- **Operability of backup generators at hospitals and other health care facilities:** There are 76 public and private hospitals and 184 proprietary, voluntary and public nursing homes in the City. Routinely, over 23,000 hospital and 45,000 nursing home beds are in service daily.

During the power outage, hospitals and nursing homes relied on emergency generators to maintain essential health care. However, a prominent trade association, which represents both public and private hospitals and continuing care facilities within the City and surrounding areas, reported that in some instances, despite prior testing according to applicable State and accreditation standards, generators malfunctioned, experiencing, for example, problems with switches and overheating. Further, only certain functional areas of hospitals are equipped with backup power. Hospitals that depend on steam were unable to sterilize equipment, and were forced to rely on other hospitals for assistance. In a few cases hospitals reported that fuel supplies for generators fell to dangerously low levels, in part because of transportation difficulties encountered by fuel delivery trucks. Notably, hospital and nursing home professionals have praised the Office of Emergency Management's assistance in securing replacement generators and obtaining fuel deliveries and repairs for public and private hospitals during the outage.

According to the same trade association, hospitals also reported increased patient care demands during the outage, including by dialysis patients who could not receive treatment at their usual free-standing centers, by individuals seeking to fill prescriptions or non-emergency care because pharmacies or physicians' offices were closed, and by seniors seeking shelter or whose apartments had no water. The City's Emergency Medical Service transported 133 percent as many patients during the outage than in a typical 24-hour period. In a prolonged outage or an event involving injuries, hospital services would be taxed even further by increased emergency and critical care admissions, individuals unable to obtain required services from their regular providers, and others seeking non-emergency services or a safe haven.

- **Absence of emergency preparedness plans for human services vendors:** The City has thousands of contracts with human service providers, many of which offer programs for senior citizens and children. Where outside vendors deliver required services, the relevant City agencies undertook to contact the vendors to ensure client safety. Where facilities are directly managed by vendors, such as daycare and after school programs, the administering City agencies had to depend on the vendors' emergency preparedness and response. While many human service providers have such plans for their organizations and services, they are not routinely submitted to or reviewed by funding agencies.
- **Identifying homebound persons requiring assistance:** Identifying homebound persons or others who required assistance was a pervasive concern during this outage. The City's disabled population is estimated at 1 million, of which 60,000 utilize wheelchairs or other mobility devices. Approximately 15,000 seniors are homebound, and an estimated 68,000 individuals receive City-administered homecare services.
- **Availability of potable drinking water in high-rise buildings:** Potable water was unavailable to high floors in high-rise buildings during the outage as a result of the loss of power to water pumps. This was a particularly critical issue in the case of homebound seniors and medically frail individuals living on those floors. While the Department of Environmental Protection opened fire hydrants on a



controlled basis in order to assist residents of high-rise buildings obtain water, these groups could not readily access the available water. New York City Housing Authority staff assisted residents on higher floors of high-rise public apartment buildings with obtaining drinking water. In a prolonged emergency, the continued unavailability of water would pose an even more serious health and safety risk for this population.

- **Availability and accessibility of comfort stations:** The City opened one comfort station in each of the five boroughs during the power outage. However, these sites did not have sufficient emergency power to support cooling needs, were inaccessible to individuals in other areas, and were not extensively utilized. The New York City Housing Authority also opened 70 community centers for concerned or frightened residents to congregate. These facilities on the whole were similarly without emergency power. The Office of Emergency Management has pre-identified an inventory of facilities, largely City-owned, which are tailored for specific crises, including cooling centers for heat emergencies, hurricane shelters and shelters for individuals displaced because of fire. However, most of these locations are public schools, which generally do not have backup power.
- **Student safety and schools' emergency preparedness:** Had the power outage occurred during the school year, the City's emergency response would have included ensuring the safety of the 1.1 million students in the City's approximately 1,200 public schools. Communication and reunification with families and legal guardians would have been a paramount issue. Each public school currently has a school specific safety plan and school safety committee. The safety plans include provisions for evacuation, sheltering-in, fire drills and meals. Activation and implementation of the plans are dependent on the type and duration of any particular emergency. In an emergency of longer duration, sheltering and feeding students and staff could be an issue. On a routine day, City schools serve 145,000 breakfasts and 640,000 lunches, and typically have a two-day supply of food. However, they do not store potable water, medication or blankets, and most do not have generators. Where there are generators, they are limited to critical building systems. Certain emergencies might conversely necessitate evacuation of a specific or numerous sites.

Independent, parochial and charter schools would face the same safety and security issues during an outage or other citywide emergency. Prior to the blackout, the Office of Emergency Management and the Department of Education briefed representatives from independent schools about emergency plans, and the Department of Education agreed to be a continuing resource in that effort.

- **Emergency preparedness of vulnerable populations:** The Office of Emergency Management's Ready New York guide is available in hard copy and in eight languages on the Internet. The Mayor's Office for People with Disabilities, the Office of Emergency Management and the Department for the Aging have also distributed a guide to emergency preparedness for seniors and persons with disabilities. Despite such outreach, the risks to the elderly, mentally and physically disabled, and homebound and other vulnerable populations were increased by individuals' having failed to make their own preparations for emergency situations, such as arranging for buddies, emergency contacts and back-up food, water and medical supplies, or lacking knowledge about how to be better prepared. These difficulties would be compounded in an outage or other emergency of greater duration.

# RECOMMENDATIONS

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To address the issues identified in the previous section of this report, the Task Force recommends that the following actions be taken.

## **Recommendation 1: Strengthen the City’s command center structure.**

In order to assure effective disaster response, agency personnel required at City Hall, agency command centers and the Office of Emergency Management should be pre-designated. Each command center should be staffed with the appropriate level of resources to handle the types of decisions delegated to it, and should be equipped with the necessary equipment and supplies for fulfillment of its emergency role. A protocol similar to a “White House style” switchboard should be designated that serves to locate Commissioners and other key personnel during an emergency. Procedures should be put in place that require all Commissioners to notify an appropriate contact of their whereabouts and status immediately upon awareness of a City emergency.

## **Recommendation 2: Centralize public communication.**

Unless the event prevents it, the City Hall press office should centralize the dissemination of information to the public. The Office of Emergency Management should be used to funnel information to the City Hall press office. The most current emergency information should be disseminated as frequently as possible to every outlet available to the City, including the news media, the 311 Citizen Service Center, NYC.gov (the City’s official website), NYC TV (the City’s television station), and the Office of Emergency Management’s command center.

## **Recommendation 3: Strengthen self-activating emergency plans for essential staff.**

City agencies should identify critical functions that must be sustained during an emergency and the necessary personnel to provide continuity of these services. Tiers of employees should be designated as appropriate for varying types of emergencies, and might include, among others, employees in key operational areas, information technology, and telecommunications and facilities management. These essential employees should know in advance of any emergency about their classification, their assigned tasks during an emergency, the location where they are to report to work and expectations to foster self-activation in the event of an emergency where communication may otherwise be severed. The Office of Emergency Management should play a strengthened role in ensuring that agencies have prepared and drilled on emergency plans and that plans are consistent and coordinated across agencies. The City should explore expanding emergency drills currently undertaken to include rehearsals of citywide “Emergency Dry Runs” to ensure clarity of decision-making, communication protocols and staff deployment.

## **Recommendation 4: Develop a hardened citywide communications infrastructure that has the capacity to survive public infrastructure failures.**

The City should develop and implement a private wired and wireless communications infrastructure to secure essential and emergency communications during a sustained public infrastructure disruption. This infrastructure would allow the City to effectively communicate and manage essential and emergency services irrespective of the condition of public sector power and communications infrastructures.

**Recommendation 5: Strengthen the City’s communication with employees.**

Agency communication options should offer multiple means to get information to employees, particularly in the event of a widespread power or telecommunications outage. The City should enhance its use of the 311 Citizen Service Center, NYC.gov, NYC TV, and other media outlets owned and/or operated by City agencies, and the private broadcast media. In addition, the City and the business community should investigate 1-800 dial up numbers to provide information to employees, using dial-out technologies to reach critical employees following a disaster, and other multiple communication devices (such as point to point radios, email, radio, satellite phones) to disseminate critical information.

**Recommendation 6: Develop a system to credential essential staff.**

The City should develop a secure emergency workforce identification system for use by the public and private sectors to facilitate essential employee access to work assignments. The system should be responsive to the complexities of emergency response that may necessitate activation of different categories of employees for various types of incidents. The Commonwealth of Pennsylvania has this type of policy for its public employees and key contracted vendors. Similar systems have been developed outside of government.

**Recommendation 7: Develop an essential skills database.**

The City and the private sector should compile an “essential skills” database that identifies employees capable of performing critical tasks that are frequently needed during a crisis. In addition, the feasibility of utilizing non-essential municipal personnel to support emergency response and recovery efforts should be assessed. While recognizing that the City has a unionized workforce, this approach could supplement personnel in key areas, such as traffic control, enhanced staffing to assist at ferry landings, or responding to non-crisis needs of vulnerable individuals. Similar personnel policies exist in San Francisco, where all public employees are designated as “disaster service workers.” In the event of an emergency, staff can be assigned to any disaster service activity that promotes the protection of public health and safety.

**Recommendation 8: Develop an emergency resources database.**

The City should create and maintain a robust, accessible inventory of available public and private emergency resources, including location and type of backup generators, light towers, fuel, and other emergency supplies. Using federal funding, the Office of Emergency Management has initiated data collection to support the development of such a citywide logistics plan. This multi-agency effort includes inventorying emergency resources and developing plans to support the distribution of assets throughout the City in the event of an emergency. This effort should be expanded to include key private sector resources.

**Recommendation 9: Conduct a backup power survey and develop a backup power installation plan.**

The City should conduct an agency-wide evaluation and survey of backup power capacity and needs. The focus of this effort should be on identifying gaps in emergency power generation for critical governmental functions that must continue to be performed during an emergency. In addition, as reliance on technology grows, capacity must be adjusted accordingly. Any future generator installations should be based on uniform standards, and tanks should be large enough to optimize the duration of operation between fuel deliveries. Agencies should keep their generator fuel tanks topped off.

**Recommendation 10: Enhance the City’s emergency fuel management plan.**

The City should review its current emergency fuel management plan, including identifying and prioritizing the most critical users and ensuring the ability to quickly expand available supply in the event of an emergency, as well as inter-agency delivery capacity. Fuel issues are currently addressed in overall disaster contingency efforts executed by the Office of Emergency Management. The Department of Citywide Administrative Services also has extensive experience in procuring fuel for the City. The expertise of these agencies, as well as the impact of an emergency of a longer duration or in multiple locations throughout the City, should be factored into a dedicated fuel plan. The City should also develop stronger relationships with private suppliers to ensure a cohesive supply network during an emergency.

**Recommendation 11: Strengthen communications with businesses.**

To meet businesses’ needs and to better communicate with core business constituencies in a timely and accurate manner, the City should provide more detailed updates directly to critical business sectors. Emergency Operations Center staffing at the Office of Emergency Management should be expanded to include private sector personnel (such as the Real Estate Board of New York, the Partnership for New York City, NYC & Company, and the Association for a Better New York). Other options include use of a limited access central telephone number or direct outreach from the Office of Emergency Management. The City should create a small business outreach tree using the Business Improvement Districts to facilitate communications with small businesses during a crisis.

**Recommendation 12: Ensure City agencies have evacuation plans and drill regularly on plans.**

Each agency should be directed to formulate and regularly drill an emergency plan. Plans should be developed around a uniform template of elements that can be tailored to meet individual agency needs, including evacuation and sheltering in place and arrangements for the physically disabled and other employees with special needs. The plan, to the maximum extent possible, should include a transportation component to get employees safely home, similar to the contingency plans developed for the transit strike last December. In addition, the role of the floor Fire Marshall should be expanded to an Emergency Preparedness Marshall to help facilitate communication and direct employees in the event of future, non-fire related emergencies.

**Recommendation 13: Develop guidance on emergency kits for the workplace.**

Building on the Office of Emergency Management’s Ready New York campaign, the City should provide employees guidance on preparedness at work and individuals’ need to have a “go bag” in multiple locations. Such guidance should include an inventory of items that should be included in an emergency kit, the quantity of items considered necessary and recommended workplace emergency supplies.

**Recommendation 14: Explore revisions to the building code to ensure evacuation safety and mitigation of emergency-related hazards.**

The City’s residential and commercial building code should be reviewed and updated where necessary to ensure safe evacuation. Areas of focus should include code provisions governing the installation of backup generators in residential buildings, changes to support the return of elevators to the ground floor of buildings in the event of a power disruption, regulations related to emergency stairwell lighting, photoluminescent paint or glow strips and/or battery powered emergency lights, and solutions to tackle an outage of buildings’ public address systems. Many of the recommendations published in February 2003 by the World Trade Center Building Code Task Force are applicable.

**Recommendation 15: Backup power systems at telecommunications facilities should be reviewed.**

Verizon should review central office locations to ensure that backup systems are in proper working order and that adequate generation capabilities are in place. Special emphasis should be placed on facilities that serve as central hubs for emergency communications. Cellular carriers should provide emergency generator and Uninterrupted Power Supply, and additional battery capacity for critical cellular sites and provide alternative power solutions for other “non-critical” cellular sites. Land based and cellular carriers should be required to present the City with plans to address these issues.

**Recommendation 16: The overall 911 system should be reviewed to eliminate single points of failure.**

The City should conduct an in-depth assessment to identify critical single points of failure within the 911 communications infrastructure. This work should include internal network reliance, as well as reliance on public infrastructure supplied by Verizon and other carriers. Known single points of failure and 911 system limitations should be addressed immediately. This includes building redundancy into critical central office facilities and addressing Verizon’s queuing capacity for 911 calls. The City should also consider implementing an interoperable, robust, and redundant citywide emergency dispatch and communications infrastructure that is closely integrated into a private citywide communications infrastructure, and clearly capable of meeting the extended communications and dispatch challenges that face the City during extended outages. Specific attention should be paid to interfaces with public infrastructure, as well as components where multiple City dispatch centers are involved in the dispatch of a single 911 call.

**Recommendation 17: Review emergency dispatch and communications operations to improve the capacity for coordinated dispatch, and incident command and management.**

The City should design and implement an integrated emergency dispatch and communications model that would provide for a more effective, efficient, and centralized incident dispatch as well as command and management capability by more closely integrating dispatch capabilities of the City’s emergency services. This type of model would provide the City with a robust integrated dispatch model that:

- Decreases the time required to enter calls into the 911 system
- Allows callers to provide 911 with emergency information once, and only once
- Provides a seamless method of reporting on 911 incidents across the Police Department, Fire Department, and Emergency Medical Service
- Lends itself towards integrated on scene incident command and management of large scale emergencies
- Eliminates single points of failure throughout the system
- Provides for coordinated response of units between the Police Department, Fire Department, and Emergency Medical Service
- Relies upon modern technology and infrastructure

**Recommendation 18: Integrate vehicle location and routing capability into emergency dispatch operations.**

The City should invest in an automated vehicle location system (AVL), and corresponding communications capability for emergency and essential City vehicles. Implementation of such a system would improve the City's ability to identify and locate emergency resources, and dynamically dispatch and route them as required to meet the current needs in light of traffic and other mobilization challenges.

**Recommendation 19: Agency radio communications efforts should leverage citywide efforts.**

Agency radio capabilities should be reviewed to determine if upgrades to existing systems or participation in the City's channel 16 and 800 MHz radio projects should be expedited. Consolidated solutions should be encouraged, rather than individual agency efforts. In order to support this citywide approach, redundancy and resiliency should be incorporated into existing 800 MHz and channel 16 systems. Single points of failure in the 800 MHz system should be addressed immediately, including the implementation of permanently mounted antenna sites to backup the current standalone permanently mounted antenna. Repeater sites should be assessed for backup power requirements and increased battery life issues need to be researched. Radio spectrum allocation should be reviewed to identify available spectrum that can be used for private network capabilities such as an automated vehicle location system. Finally, coordination should occur between emergency agencies so that key repeater sites can be more adequately backed up with emergency power.

**Recommendation 20: Consider public-private initiatives to create redundant wireless telecommunications systems to ensure communication in an emergency.**

New technologies offering greater redundancy and diversity currently exist allowing uninterrupted connectivity regardless of disruptions to conventional telecommunications infrastructure. Used by many large financial, legal and government institutions, they allow wireless connectivity to take place by beaming light (free space optics) and radio waves (microwave) from a single point to multiple points throughout the City. While large companies can afford to create these links themselves, small and medium companies generally cannot. The City should work with the private sector to identify the barriers to entry for small and medium sized companies and to assess the infrastructure requirements for these companies to access wireless broadband networks.

**Recommendation 21: Communications and response protocols need to be formalized between the City and telecommunications carriers.**

A procedure for communicating and responding to telecommunications issues needs to be established. This protocol should include land and cellular based carriers and be in addition to the current Mutual Aid Restoration Consortium agreement. It should also address notification requirements (when telecommunications facilities are disrupted), as well as scheduled ongoing communications. Carriers should be required to report telecommunications failures to the City and maintain an open line of communications to support recovery.

**Recommendation 22: Emergency communications systems should be reviewed.**

The City should work with the Federal government to review the Government Emergency Telecommunications Service system and priority cellular access lines. Fixes for problems encountered during the outage should be immediately resolved or the City should investigate other methods for emergency communications.

**Recommendation 23: Ensure multiple means of transmitting emergency broadcasts from City Hall.**

The City should consolidate all television operations in one group responsible for both broadcast and cable television operations. A microwave or satellite link should be established from City Hall to the City's television broadcast tower (WNYE--Channel 25) to ensure that during emergency events City officials are able to broadcast immediately without depending upon fiber lines and backup power at various points of failure. Broadcast television utilizes radio frequencies, ensuring the ability to broadcast even if fiber lines are rendered inoperable near City Hall. Further, in the event of a sale of WNYE, the City should explore preserving the ability to use the station in the event of an emergency.

**Recommendation 24: Develop a transportation plan that steers pedestrians and vehicles to pre-determined thoroughfares.**

The City could benefit from a pre-determined emergency transportation plan that is publicized in advance and optimizes the use of whatever facilities are available to hasten a mass departure. The plan should be flexible, recognizing that emergency events in many respects require managing the moment. Elements of such a plan might include roadway restrictions that facilitate emergency vehicle access inbound to Manhattan, lane reversals where appropriate to facilitate an orderly evacuation, and dedication of certain facilities to pedestrians, mass transit vehicles, essential personnel and critical deliveries. In addition, the plan should recommend a uniform fare and toll policy for all publicly operated regional transportation facilities during times of crisis and should encourage the adoption of this policy by non-City agencies and private operators.

**Recommendation 25: Ease overcrowding at the Manhattan ferry piers.**

The City should explore all avenues to supplement ferry service during emergency situations. Questions regarding the depth of the Hudson River and whether adequate docking facilities were available precluded the Staten Island ferry from providing service to New Jersey. These questions should be resolved expeditiously to determine feasibility. An inventory and assessment of all available waterborne resources, both public and private, should be undertaken to determine the feasibility of enhancing service. In addition, the City should assess the resources dedicated to assisting passengers and monitoring overcrowding to ensure the public safety at ferry landings.

**Recommendation 26: Implement alternatives to provide for traffic control at signalized intersections.**

There are a variety of different approaches that can be taken to backing-up the traffic signal system at priority locations. The alternatives vary widely in installation and ongoing maintenance costs, long-term operational viability, and approach. Technological solutions could include backup power sources --- generators, batteries, or solar units, or the deployment of portable signals. These technologies are being used and considered in other cities; however, they tend to have a relatively high cost per intersection. Toronto and Ohio have addressed this issue by promulgating traffic regulations. They both require motorists to stop at intersections when signals are not working. On the other end of the spectrum, the City could build upon the good will shown by New Yorkers in directing traffic. The Civil Defense Warden program of the 1950s enlisted thousands of trained and equipped volunteers for traffic control and other duties. Consideration should be given toward reviving elements of that program. Similarly, the feasibility of training municipal employees that are not engaged in emergency response in traffic control should be explored.

**Recommendation 27: Identify transportation hubs and maximize the use of available transportation to get essential employees to work.**

The mobility of essential employees, both public and private sector, should be addressed as part of the City's overall transportation plan. A network of rallying points should be designated throughout the boroughs, and a means for serving them should be identified that maximizes the use of all available transportation, including school buses, ferries, private buses, taxis, liveries, and commuter vans. Subsequent to an evacuation, the use of available mass transit should be limited to key personnel with appropriate credentials. In addition, the City should assist the private sector in their development of transportation contingency plans by providing a compendium of information on available public and private transportation resources.

**Recommendation 28: Pool traffic information and heighten communication.**

It is recommended that the Metropolitan Transportation Authority and the Port Authority of New York and New Jersey be linked to the City's Joint Traffic Operation Center. By taking this step, a record of all transportation information would be available in one central command site. Including other governmental agencies that operate outside of New York City would foster a more regional approach that would facilitate coordination during a large-scale event. Given that more than 20 agencies play a role in managing and planning transportation in the City, every effort should be made to share information and enhance communication. Consideration should be given to forging partnerships between public and private sector organizations to exchange traffic-related information.

**Recommendation 29: Upgrade generator testing standards and emergency preparedness for State Department of Health-regulated health care facilities.**

Hospitals and nursing homes, as well as adult homes and certain decentralized health services, such as dialysis and blood centers, are regulated by the State. The State and Joint Commission on Accreditation of Healthcare Organizations have promulgated requirements for testing hospital generators, including minimal load, duration and frequency standards. Testing protocols at both public and private hospitals tend to exceed these standards, in part because of hospitals' greater and continuing reliance on technology in administering routine and urgent patient care. The City should consider conferring with the State about upgrading hospital generator testing requirements, as well as about requiring backup plans for dialysis centers, including mandating alliances with hospitals and other medical facilities to provide required treatment during an emergency, and for blood banks, including the safe storage and transport of perishable blood products. In addition, consideration should be given to strengthening regulations in connection with emergency preparedness for adult homes and assisted living facilities.

**Recommendation 30: Require emergency preparedness plans for City human service vendors and programs.**

The City, as the primary funder of citywide human services, should routinely incorporate provisions in human services contracts (including, for example, day care, Head Start, after school and youth development programs, and senior centers) that require vendors to have approved emergency preparedness plans. Approved plans should ideally incorporate best practices for emergency response and preparedness. In addition, programs directly operated by the City, including recreation centers and Department of Education after school programs, should adhere to the same preparedness requirements. Community-based programs that do not receive City funding should also be encouraged to adopt such plans.



**Recommendation 31: Expand the use of the 311 Citizen Service Center or dedicate a phone line to respond to the needs of vulnerable populations during a crisis.**

During the outage, the City's 311 Citizen Service Center received numerous inquiries from individuals in need of assistance but not in life-threatening situations, as well as calls seeking medical and other advice. The 311 or another dedicated telephone line could be utilized as a regular component of the City's emergency response plan. Operators could be trained to respond to certain predicted inquiries. Expanding on the work the City is undertaking on building community emergency preparedness, community groups or other local organizations could be enlisted and trained to provide assistance and follow-up and check personally on callers. Building on the Mayor's request during the outage, the City should continue to encourage citizens to call 311.

**Recommendation 32: Develop cooperative arrangements with private sector entities to expand the inventory of comfort stations.**

For the most part, the inventory of public buildings that the City uses as shelters for various emergencies lack backup power. However, there is a vast array of privately held buildings and facilities with more extensive backup power or independent power generating capability that meet the requirements for a comfort site. The City should work with the private sector to create an inventory of privately held facilities that meet applicable standards and explore entering into cooperative arrangements with the owners of these properties to expand the available pool of comfort station sites during an emergency. Additional facilities could prevent health emergencies and would also relieve pressure on hospitals by decreasing such admissions and accommodating individuals who do not require immediate medical attention or who are merely seeking a safe haven.

**Recommendation 33: Enhance plan for the availability of potable water.**

The City should review its plans for the availability and distribution of potable water in the event of a long-term disruption of the water supply, particularly to provide options for the availability of water to residents of high-rise buildings. In addition, the plan should reflect the experience and role of major disaster relief organizations, which historically assist the City in obtaining water during emergencies.

**Recommendation 34: Encourage vulnerable populations, caregivers and community groups to develop individual preparedness plans for those with special needs and consider expanding the City's Ready New York campaign to address specifically the preparedness needs of these individuals.**

The City should continue to actively encourage vulnerable populations, their caregivers, and community members to develop individual preparedness plans for citizens with special needs and consider expanding its current outreach efforts to these individuals. These campaigns should promote the importance of emergency contacts within and outside the City, the availability of emergency preparedness kits, the use of buddy systems, and the maintenance of backup food, water, medication and supplies, as well as provide more specific and detailed information on where and how to obtain assistance if needed. In addition, able body citizens should be encouraged to check on neighbors.

**Recommendation 35: Assess the comprehensiveness of existing school safety plans and continue to provide a resource to independent and other non-public schools for emergency preparedness.**

The power outage would have been a greater challenge had school been in regular session. The Department of Education has an opportunity to review school safety plans to assess whether schools would have been sufficiently prepared in an outage. The Department of Education should continue to be an available resource for independent and other non-public schools developing or refining their own emergency preparedness plans.