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Policy Recommendations

In addition to the physical mitigation and preparedness strategies described in the previous two chapters, the study identified several regulatory strategies and policy recommendations to better promote industrial resiliency.

- 1 Modifications to the City’s zoning and building code regulations**
- 2 Technical and financial assistance to support mitigation and preparedness within the private sector**
- 3 Changes to the National Flood Insurance Program that would broaden flood insurance coverage and create more effective incentives to reduce risk**

The following policies and regulatory changes are recommended for consideration in order to remove existing barriers to flood resiliency and encourage private business to take steps to further reduce flood risk.



Floor area limitations and parking requirements make it difficult for some businesses to add a second floor or mezzanine to existing structures.

Vertical enlargement of industrial buildings in the floodplain

Second story additions can provide protected space for offices and storage of valuable equipment and materials in the event of a flood. In addition, the NFIP typically offers lower rates for content insurance for nonresidential space with a second floor located above the DFE.

In some manufacturing zoning districts, floor area limitations or parking requirements make it difficult or impossible for some businesses to add a second floor or mezzanine to existing structures. In the city's lowest density manufacturing zones (M1-1 districts), where the permitted floor area ratio (FAR) is limited to the lot area (1.0), there are approximately 140 buildings in the floodplain that have a built FAR between 0.7 and 1.0. Many of these buildings are unlikely to have sufficient remaining development rights to expand vertically to create storage or office space above the DFE.

Exemptions to the existing floor area limits that are offered through the 2013 flood resilience zoning text amendment (Article VI, Chapter 4) may only be applied if the building comes into full compliance with flood-resistant construction standards in Appendix G of the NYC Building Code. Because full compliance through dry floodproofing or elevation is cost-prohibitive for many industrial businesses, amendments to the flood resilience zoning text should be considered to create more flexibility for modest FAR exemptions for industrial buildings in the floodplain to create protected second floor or mezzanine space to allow for storage, relocation of equipment, or protected office space. This flexibility should be considered even if the building is not coming into full compliance with Appendix G. Such amendments to the Zoning Resolution would be subject to a complete public land use and environmental review process. Appendix G of the NYC Building Code would continue to require that an addition resulting in a substantial improvement to a building would need to comply with floodproofing requirement.

Standards for unenclosed uses on industrial facilities within Appendix G of the Building Code

A range of unenclosed industrial uses are permitted and exist within manufacturing districts, including auto dismantling, recycling, processing of construction and demolition debris, asphalt and cement manufacturing, scrap metal processing, and general storage of equipment and aggregate. Approximately 30 percent of the city's estimated 630 unenclosed industrial uses are located within the 1 percent annual chance floodplain.

Appendix G of the NYC Building Code applies to site improvements, which includes temporary or permanent storage of materials, mining, dredging, filling, grading, paving, excavations, and other land disturbing activities. However, the standards for flood resilient design and construction that are referenced in Appendix G (ASCE 24) apply only to buildings, structures, and tanks. These standards are largely inapplicable to unenclosed uses, which are a key component of many industrial sites in the city's floodplain.

During the Building Code revision process, standards for the appropriate storage of materials and equipment on unenclosed industrial sites in the floodplain should be considered for inclusion within Appendix G. These standards could draw on analyses conducted by the Department of City Planning and other agencies, and should comply with NFIP requirements and be designed to help reduce risk and prevent pollution from unenclosed facilities in the floodplain. To supplement standards for unenclosed industrial sites within Appendix G, resources can be sought to support outreach and technical assistance to businesses with unenclosed facilities seeking to comply with Appendix G and other relevant resiliency, stormwater management, and pollution prevention regulations and guidelines.

Consideration of flood risk due to climate change in siting and design of critical infrastructure

Facilities considered to be critical infrastructure by the U.S. Department of Homeland Security include the energy sector, transportation systems, water and wastewater systems, and the communications sector, and others. All exist in locations along the city's waterfront. Due to the need to maintain or quickly restore operations of city facilities and critical infrastructure following a flood event, these activities should be protected from flooding by ensuring that the siting and design takes into account the potential for wave action and future climate change impacts.

At the federal level, Executive Order 13690: "Establishing a Federal Flood Risk Management Standard and a Process for Further Solicitation and Considering Stakeholder Input" required critical facilities that receive federal funding to be designed based on a climate-informed science approach or to include additional freeboard to mitigate risk. However, the repeal of this executive order in 2017 has removed these additional flood mitigation requirements for critical facilities.

In the absence of federal standards for siting critical facilities in the floodplain, the Waterfront Revitalization Program can be used in New York City to ensure that critical facility siting and design is sufficiently protective with regard to flood risk. Specifically, the Climate Change Guidance (Policy 6.2) within the Waterfront Revitalization Program establishes a critical facility site selection and planning framework, which can be used to continue to apply protective design standards like those described in Executive Order 13690, consistent with the Climate Resiliency Design Guidelines currently being developed by the NYC Mayor's Office of Recovery and Resiliency.



The City can identify opportunities to promote inter-business agreements to support resiliency.

Commercial vehicle relocation in advance of flooding

Truck-dependent industries are a core component of New York City’s industrial sector. In addition to the transportation and warehousing industry, sectors such as concrete and asphalt manufacturing, fuel distribution, construction, and film and television production rely on commercial vehicles. Since many of these industries tend to be located in the floodplain, large fleets of commercial trucks and vehicles are regularly parked near the waterfront or in areas subject to flooding.

To avoid flood damage to commercial vehicles and the lost revenue caused by this disruption, businesses with parking areas located in the floodplain can create preparedness plans and agreements to use available parking outside of the floodplain. Because space within New York City is limited and emergency response vehicles and equipment have staging needs, this

may involve creating connections with businesses in the broader region with available parking outside of the floodplain.

Opportunities may exist for the City to support these inter-business agreements to support resiliency. For example, the NYC Department of Small Business Services or a partner organization could make available to businesses a model contract for emergency use of space for truck parking. Similarly, trainings to Industrial Business Service Providers and other industrial trade groups regarding emergency truck relocation planning and other preparedness strategies would support the City’s broader resiliency goals. Beyond truck relocation, trainings should encourage businesses to consider other mechanisms to share resources or coordinate during interruptions, such as contingency plans to temporarily rent unused electrical generators or a portion of another company’s warehouse space.

On-street parking regulations and policies to allow emergency parking for businesses whose vehicles are a critical part of the supply chain and emergency response

Many businesses operating in the city's industrial floodplain rely on fleets of commercial vehicles. During Hurricane Sandy, a number of businesses suffered major losses from flood damage to trucks and other vehicles that are regularly parked in the floodplain. Replacing vehicles and securing temporary alternatives in the immediate aftermath of a storm can have significant costs and challenges and can result in operational delays. In addition, vehicle flooding can also cause fuel and other hazardous materials to leak, potentially exposing employees, neighbors, and the surrounding environment to greater concentrations of harmful chemicals. Relocation of commercial vehicles to safe areas in advance of flooding can be challenging for industrial businesses. Section 4-08k of New York City Traffic Rules sets restrictions for short-term and overnight parking, and on-street storage. With a few exceptions, commercial parking is generally not allowed on

residential streets and prohibited in residential districts at night (between 9PM and 5AM). When parking rules are not otherwise specified, commercial vehicles are limited to three hours of parking in any area of the city and at any given time, effectively prohibiting street storage of such vehicles. However, during inclement weather events, the Department of Transportation does have authority to suspend certain parking regulations.

To help minimize potential damage and loss of commercial vehicle fleets, emergency preparedness strategies can be explored to relax regulations related to on-street parking changes. Any such changes should ensure that commercial vehicles are not being parked in residential areas, and designate specific on-street locations that are best suited for emergency vehicle storage during floods. Priority may be considered for businesses whose vehicles are a critical part of the supply chain and emergency response, such as fuel and food distribution, and waste management.

Beverage distribution company parking vehicles in the 1 percent annual chance floodplain.

Commercial trucks parked in the floodplain in Maspeth, Queens.



Expansion of the Business PREP program to serve more businesses

The New York City Department of Small Business Services administers the Business Preparedness and Resiliency Program (Business PREP), designed to help small businesses prepare for emergencies and enhance resiliency of operations, assets, and physical space. The program offers on-site, one-on-one resiliency assessments for businesses operating in New York City. These resiliency assessments are designed to:

- 1. Help business owners, operators, and staff identify and understand physical, operational, and financial risks faced by the business**
- 2. Provide personalized recommendations to improve business preparedness and resiliency**
- 3. Make businesses eligible for a grant of up to \$3,000 toward recommended items or equipment to prepare for interruptions and reduce risk.**

Eligibility to participate in the Business PREP program is limited to businesses that experienced flooding or power outage during Hurricane Sandy. The requirement related to Hurricane Sandy impact is a constraint related to the program's federal funding source. If FEMA mitigation funding or an alternative funding source can be identified, the program could be expanded to provide site-specific resiliency assessments to other businesses in the city interested in preparing for and mitigating against a variety of hazards and business interruptions.

In addition to resiliency assessments being offered through the Business PREP program, the Department of Small Business Services is providing disaster preparedness workshops and developing a website with materials to help guide businesses through continuity and preparedness planning. City agencies providing disaster resiliency resources and guidance to businesses can use this website as a platform to disseminate this information to businesses. In addition to materials developed through the Business PREP program, this website can include

links to flood maps and forecast systems, guidance provided by NYC Emergency Management, a link to participate in the Partners in Preparedness program, and resources from the Resilient Retail and Resilient Industry studies produced by the Department of City Planning.

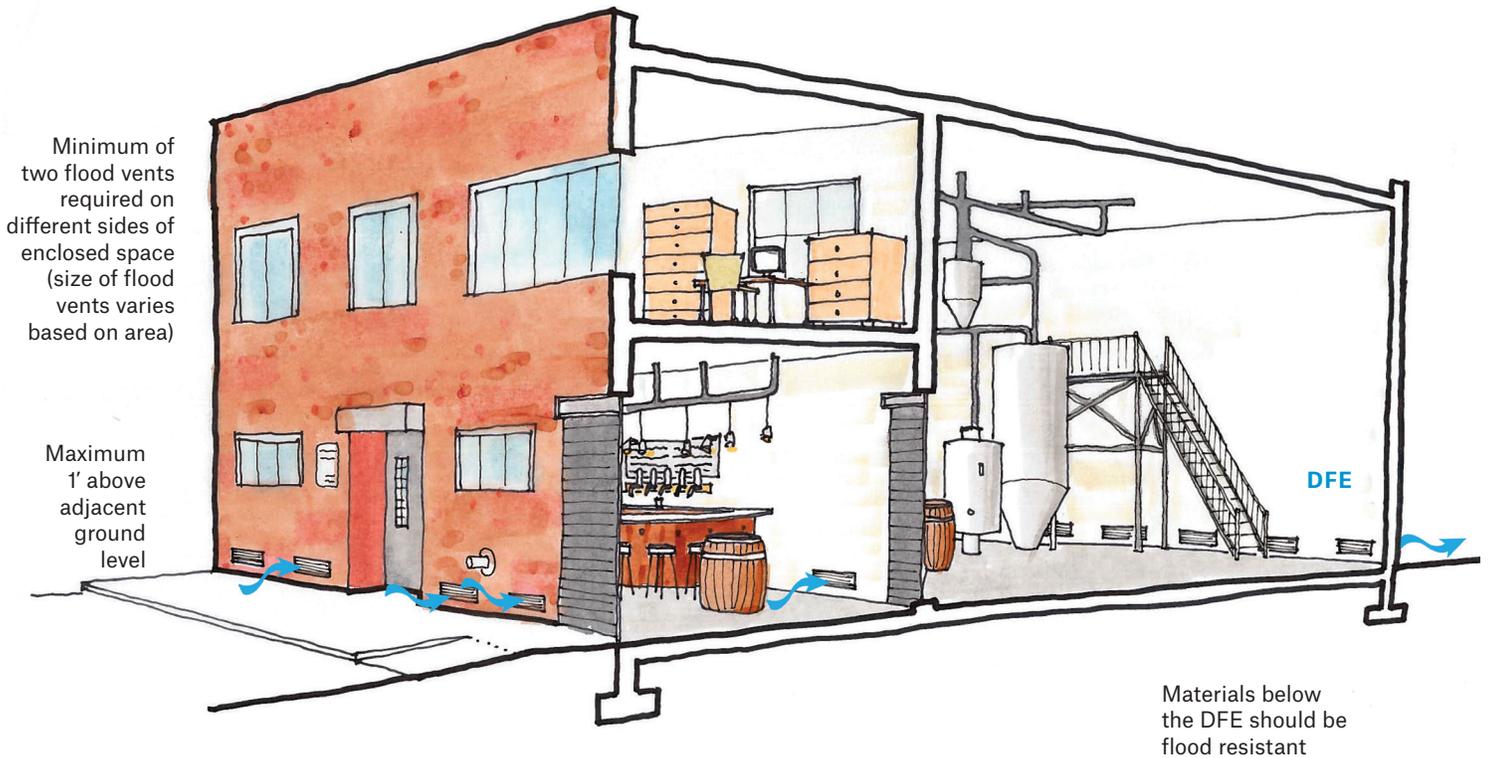
Broader participation in emergency alert systems and guidance materials about flood forecast resources

A number of resources and alert systems currently exist that provide flood forecasts and warnings in advance of coastal storms and potential flooding events. These include:

- 1. Forecasts from the National Weather Service and National Hurricane Center**
- 2. Notify NYC, Partners in Preparedness, and CorpNet, operated by NYC Emergency Management**
- 3. Stevens Flood Advisory System, maintained by the Urban Ocean Observatory at Davidson Laboratory at the Stevens Institute of Technology**

Despite these and other resources being available to businesses, many of them are unaware of the best sources of flood forecasts and alerts. Since industrial businesses often require multiple days to fully prepare their facilities for a storm, it is even more important that businesses are aware of, and have access to, the most accurate and locally-specific forecast information available.

The Mayor's Office of Recovery and Resiliency, NYC Emergency Management, and the Department of Small Business Services should collaboratively identify opportunities to increase business participation in existing emergency alert systems, and develop and disseminate guidance materials about where businesses should turn for forecasts, including locally specific coastal inundation.



Wet floodproofing and other partial floodproofing measures can be a cost-effective strategy to reduce risk.

Great flexibility within the NFIP to encourage partial floodproofing for nonresidential structures

The Flood Insurance Manual produced by the NFIP does not recognize wet floodproofing or partial mitigation as an acceptable method of flood mitigation for enclosed areas of nonresidential structures below the DFE. Exemptions, which result in lower insurance premiums, can be achieved only through elevation or dry floodproofing.

For many existing industrial businesses, dry floodproofing or elevation to comply with the NFIP are cost-prohibitive. Wet floodproofing of parking, building access, and limited storage spaces in nonresidential structures is currently permitted. Investments in partial floodproofing or wet floodproofing to occupied spaces or other spaces enclosing substantial storage or equipment in existing industrial buildings could result

in more flood resilient buildings and reduce the amount of time for businesses to resume operations. However, because these improvements are not currently recognized by FEMA, businesses are less likely to invest in these retrofits that would enhance flood resiliency. For example, industrial businesses that choose to elevate electrical or mechanical equipment may substantially reduce their losses in the event of a flood, but these investments would have no effect on insurance rates through the NFIP.

By providing more flexibility within the NFIP and incentivizing a wider range of resiliency measures, FEMA could more effectively encourage mitigation and expand insurance take-up by making rate reductions possible. FEMA should conduct a study of nonresidential flood retrofits to identify partial mitigation strategies that satisfy benefit-cost ratio eligibility requirements.

