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PURPOSE

This executive deck summarizes key findings from a climate impact study conducted across 16 NYC Health + Hospitals facilities, identifies priority climate resilience projects, and outlines recommended next steps for NYC Health + Hospitals to become more climate resilient.

NYC Health + Hospitals is committed to providing safe environments and quality care to our communities. As we serve some of NYC’s most climate-vulnerable populations, H+H has demonstrated our support by signing the Health and Human Services (HHS) Health Sector Climate Pledge in May of 2022.

This Plan is the first step in H+H’s commitment to the Pledge, which is to “develop and release a climate resilience plan for continuous operations, anticipating the needs of groups in their community that experience disproportionate risk of climate-related harm.”

NYC Health + Hospitals studied the climate impacts and vulnerabilities of 16 facilities – 11 Acute Care Hospitals and 5 Post Acute/Long-Term Care Centers. This report assesses these facilities’ existing conditions, climate hazard exposure, and vulnerabilities, as well as informs projects to strengthen our infrastructure and enhance our system’s resilience.
Over 65 NYC Health + Hospitals staff contributed to the plan, including team members from the Office of Facilities Development, Sustainability and Energy Management, Emergency Management, Engineering, and Facility Leads. The consultant team consisted of Gensler, Arup, GC Eng & Associates, Insight Civil Engineering and Hatfield Group to produce the Resilience plan from a resilience, architecture, MEP engineering, civil engineering and structural engineering standpoint.
PROJECT APPROACH + KEY TAKEAWAYS

- Project Scope
- Research Approach
- Process
- Key Takeaways
NYC Health + Hospitals | Climate Resilience Plan

**PROJECT SCOPE**

This assessment evaluates four climate hazards over three time horizons, considering two representative concentration pathways.

**FACILITIES**

11 Acute Care Hospitals and 5 Post-Acute/Long-Term Care Facilities were studied.

**CLIMATE HAZARDS**

The following climate hazards were studied:

- Stormwater Flooding
- Coastal Flooding
- Extreme Heat
- Wind

**SCENARIOS**

Impact of climate hazards were studied through the following scenarios: current, 2050, 2080, RCP4.5 and RCP8.5.

**INFRASTRUCTURE**

Systems studied at each facility included electrical power, natural gas, steam, telecommunication, potable water, wastewater, transportation, and logistics.
RESEARCH APPROACH

NYC Health + Hospitals’ Climate Resilience study evaluated 16 facility’s level of exposure to climate hazards and facility vulnerability to determine their total “impact.”

- **Climate Hazard**: The intensity and likelihood of a particular climate event
- **Vulnerability**: The susceptibility to damage given a certain climate hazard
- **Impact**: The integration of climate hazard exposure and vulnerability
The key findings from the facility impact assessment and workshop discussions were synthesized into NYC Health + Hospitals’ Climate Resilience Plan. The following research engagements and activities were included in this study:

**Impact Assessment**
- Assessed Facility’s Climate Hazard Exposure
- Reviewed Existing Documents

**Facility Vulnerability**
- Assessed Facility Vulnerability
- Assessed Utility Vulnerability
- Assessed Transportation & Logistics Facility Vulnerability
- Facility Vulnerability Survey
- Conducted Facility Interviews

**Facilitated Workshop with NYC Health + Hospitals: Prioritization of Investments & Brainstorm of Possible Projects**

**Resilience Plan**
- Priority Projects & Facilities
- Policy + Community Engagement
- Further Research + Assessments
- Climate Resilience
- How to prioritize future investments for climate projects
Patient and staff safety is the #1 priority.

Climate hazards disproportionally impact different variables of healthcare operations; however, patient & staff safety was voted the highest priority.

Take a holistic, strategic planning approach.

NYC Health + Hospitals will prioritize projects that ensure patient & staff safety and can address multiple climate hazards. Resources will be allocated towards long-term, sustainable solutions.

Continue ongoing climate resilience projects.

There are emergency plans in place and ongoing climate resilience projects, such as flood mitigation efforts at Bellevue, Harlem, Metropolitan, South Brooklyn Health and Coler.

Stormwater flooding + extreme heat have the greatest impact.

44% of facilities were scored as High impact for stormwater flooding and 38% of facilities scored High impact for extreme heat.

Power is the most vulnerable utility.

Of the total 16 facilities assessed, 9 scored High vulnerability and 7 scored Medium-High vulnerability for power.
RESILIENCE PLAN

- Potential Projects & Facilities
- Recommended Next Steps
- Additional Research & Policy Projects
Potential projects at 5 facilities were identified due to their vulnerability scores and having at least one priority consequence: maintains patient and staff safety, sustains community access to care, and building damage mitigation.

Climate hazards that scored High impact is noted under each facility to the right.

For full list of identified projects, please refer to the Impact Assessment Report.

<table>
<thead>
<tr>
<th>POTENTIAL CAPITAL PROJECTS + FACILITIES</th>
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<tbody>
<tr>
<td>** QUEENS **</td>
</tr>
<tr>
<td>• Elevate or floodproof critical equipment located below ground.</td>
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<tr>
<td>• Replace roof membranes and remove all ballast roof covering.</td>
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<tr>
<td>• Add both chillers to the emergency power circuit.</td>
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<tr>
<td>** BELLEVUE **</td>
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<tr>
<td>• Structurally reinforce and seal the penetration where steam enters the facility.</td>
</tr>
<tr>
<td>• Install backflow prevention devices.</td>
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<tr>
<td>• Seal windows, louvers, and envelope to protect against wind-driven rain.</td>
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<tr>
<td>** SOUTH BROOKLYN HEALTH **</td>
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<tr>
<td>• Improve envelope drainage capacity.</td>
</tr>
<tr>
<td>• Install impact protection shutters or glazing throughout the campus.</td>
</tr>
<tr>
<td>** METROPOLITAN **</td>
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<tr>
<td>• Elevate and/or floodproof critical utility equipment located below ground.</td>
</tr>
<tr>
<td>• Add chillers, cooling towers, and chilled water distribution system to the emergency power supply.</td>
</tr>
<tr>
<td>** GOUVERNEUR **</td>
</tr>
<tr>
<td>• Elevate the switchgear distribution rooms that are located below ground.</td>
</tr>
<tr>
<td>• Add an emergency generator quick connection at the street level.</td>
</tr>
<tr>
<td>• Repair roofs.</td>
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</tbody>
</table>
As a result of this study, key projects have been identified at facilities with the most High and Medium-High impact scores. These projects can be used to guide next steps to directly improve the long-term sustainability of NYC Health + Hospitals’ portfolio.

This study has also identified gaps in data and information where further research and assessments are needed in order to develop comprehensive resilient design guidelines to be integrated into master planning efforts.

For full list of identified and recommended projects, please refer to the Impact Assessment Report.

**Priorities**

For future climate resilience projects, ensure the following qualifications and considerations are met:

- **Maintains Patient & Staff Safety**
  Climate resilience projects that directly maintain, project, and improve patient & staff safety should be prioritized.

- **Sustains Community Access to Care**
  Climate resilience projects should ensure access to care by considering transportation options, system access, and site exits/entrances.

- **Mitigates Damage**
  Climate resilience projects that address climate hazards and building system improvements that add redundancy to better maintain building operations should be prioritized.
RESILIENT DESIGN INTEGRATION INTO MASTERPLAN

To integrate resilience into master planning efforts, the following steps are recommended:

<table>
<thead>
<tr>
<th>SYSTEM-WIDE RESILIENCE MASTERPLAN</th>
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<tr>
<td><strong>POLICY + COMMUNITY ENGAGEMENT</strong></td>
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<tr>
<td>• Update Emergency Planning Policies &amp; documentation to account for Transportation &amp; Logistics Vulnerabilities.</td>
</tr>
<tr>
<td>• Create a Power Emergency Response Plan with Extreme Heat scenario.</td>
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<tr>
<td><strong>RESEARCH + ASSESSMENTS</strong></td>
</tr>
<tr>
<td>• Gather remaining Facility Record Documents, Emergency Power Data &amp; updated VFA Reports.</td>
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<tr>
<td>• Conduct an MEP Assessment with focus on Electrical Power Assessment.</td>
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<tr>
<td>• Study Microgrid Scoping Study, Drainage Capacity Study, Transportation and Logistics Study, Patient Influx Study during Extreme Heat events and Generator Quick Connects Study.</td>
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<tr>
<td><strong>PROJECT IDENTIFICATION + CAPITAL PLAN ALIGNMENT</strong></td>
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<tr>
<td>• Create programs for possible Climate Resilience Projects for further assessment, pricing, design and implementation.</td>
</tr>
<tr>
<td>• Confirm projects address and meet upcoming local law requirements (LL41).</td>
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<tr>
<td>• Explore federal funding and grant opportunities.</td>
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</tbody>
</table>
Impact: Measures the cumulative influence of exposure and vulnerability on facilities.

Exposure: The presence of people; livelihoods; environmental services and resources; infrastructure; or economic, social, or cultural assets in places that could be adversely affected.

Vulnerability: The propensity or predisposition to be adversely affected.

Climate Resilience: The ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions.

Climate Scenario: A plausible representation of the future climate, based on an internally consistent set of climatological relationships that has been constructed for explicit use in investigating the potential consequences of anthropogenic climate change, often serving as input to impact models.
Tailored Questionnaire

HHS Survey was tailored specifically to Health + Hospitals facilities to collect data on existing site conditions and policies. The distributed survey included 50 questions that gathered information regarding site historical events, transportation & site access, site & building construction, utility infrastructure, and essential clinical care service planning.

Survey Yielded 100% Response Rate

The survey was hosted and distributed through Qualtrics to the 11 participating facility managers. Within one month, there was a 100% response rate with total survey completion.

Data Given Weighted Impact Score

The survey results were then input into a model that translated responses into a weighted impact score.

Results Used to inform Total Impact

The weighted scores were then used to inform the total facility impact assessment.
The Hazard Exposure Report examined the exposure of 16 Health + Hospitals facilities to the following climate hazards:

- Coastal Flooding
- Stormwater Flooding
- Extreme Heat
- Wind

Hazard exposure was studied through 3 timeframes – current, 2050, and 2080 using publicly available sources.

Please note that ranking cannot be cross compared and hazard exposure does not equate the level of risk at the facilities.

*Chance of scenario occurrences:
- 500-yr Scenario: Event that has a 0.2% chance of occurrence each year.
- 10 yr Scenario: Event has a 10% chance of occurrence each year.
- 100-yr Scenario: Event that has a 1% chance of occurrence each year.
This report includes the following assessments:

**Utility Vulnerability Assessment**: Describes both systemwide and facility-specific, building-scale vulnerabilities of the primary utilities or “lifelines” critical to the operations of NYC H+H’s portfolio: electric power (referred to as “power” throughout), natural gas, district steam, telecommunications, potable water (referred to as “water” throughout), and wastewater.

**Transportation and Logistics Assessment**: Describes the vulnerability of transportation and logistics assets and operations for the 16 assessed facilities across four categories: transportation vulnerability, logistics vulnerability, exposure to coastal flooding, and exposure to stormwater flooding (coastal and stormwater flooding includes both transportation and logistics assets/infrastructure).

**Facility Impact Assessment**: Describes the projected impact to each of the 16 individual NYC H+H facilities, including exposure and vulnerabilities, from coastal flooding, stormwater flooding, heat, and wind.

**Facility Results**: These three assessments are summarized for each of the 16 facilities in the appendix. Each one page facility summary presents utility, transportation, and logistics vulnerability and facility impact results for each location.