

NEW YORK CITY DEPARTMENT OF
ENVIRONMENTAL PROTECTION

CLIMATE RESILIENCY STANDARD OPERATING PROCEDURE

New York City, New York

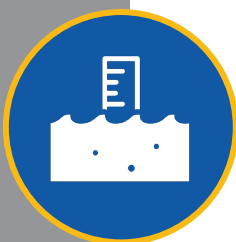
PREPARING FOR **RISING SEAS & EXTREME EVENTS**



The NYC Department of Environmental Protection (DEP) is the largest combined water and wastewater utility in the United States with a capital program budget greater than \$20 billion USD. DEP adopted the NYC Climate Resiliency Design Guidelines for use in wastewater and water supply design and construction projects. This case study highlights how DEP mainstreamed these guidelines and the use of climate change information in DEP's Bureau of Engineering, Design and Construction (BEDC) projects through a Standard Operating Procedure (SOP).

The New York City Panel on Climate Change (NPCC) provides regional climate change projections that inform City-wide resiliency policy and provide a scientific foundation for the NYC Climate Resiliency Design Guidelines, currently in their third version (2019). The NPCC climate change projections encompass a range of possible climate impacts including flooding, extreme precipitation, sea level rise, storm surge, and extreme heat. The NPCC projects mean annual precipitation will increase by 4 - 13% by the 2050s, while sea level is expected to rise by 11 - 21 inches by mid-century. The Design Flood Elevations (DFEs) outlined in the Climate Resiliency Design Guidelines are based on these projections.

CLIMATE CHANGE **CHALLENGES**



CLIMATE-READY **DESIGN**



The Climate Resiliency Design Guidelines were developed by the Mayor's Office of Resiliency (MOR) in direct collaboration with City agencies, including DEP. To mainstream these guidelines, BEDC integrated them into an existing SOP that was developed after Superstorm Sandy to support wastewater resiliency for all capital projects. This SOP requires that a) the criticality of assets and an asset's useful life be assessed, b) that designs include incremental DFE guidelines, and c) that critical and assets with longer life-spans be floodproofed or placed at higher elevations at the outset of project design. At DEP, all water and wastewater facilities are considered critical.



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USING A CLIMATE RESILIENCY STANDARD OPERATING PROCEDURE

BEDC has a Sustainability Section dedicated to incorporating sustainability into project designs. This Section facilitates incorporating the Climate Resiliency Design Guidelines into existing SOPs to support mainstreaming climate change information use in BEDC projects. Part of the SOPs now includes two workshops where climate change, energy use, sustainable sites, and environmental impacts are considered, first in a project planning workshop, and then in a project design workshop. In the first workshop, using an alternatives analysis, the useful life of asset is discussed and is used to determine which DFE will reduce risks from future floods, sea level rise and storm surge. In the second workshop, climate change data is designed into the DFE using site-specific information. This process occurs before construction and operation of infrastructure projects, making climate resiliency an inherent part of the design.

To obtain the DFE, sea level rise projections and freeboard information from the Climate Resiliency Design Guidelines are added to the baseline flood elevation (BFE) of the FEMA 100-year floodplain. BEDC applies the climate change projections following this general framework for critical assets:

- Use 2020 projections for temporary or rapidly replaced components and finishings (BFE + 24" freeboard + 6" of sea level rise (SLR))
- Use 2050 projections for facility improvements and components on a regular replacement cycle (BFE + 24" freeboard + 16" of SLR)
- Use 2080 projections for long-lived buildings and infrastructure (BFE + 24" freeboard + 28" of SLR)
- Use 2100 projections for assets that cannot be relocated (BFE + 24" freeboard + 36" of SLR)

MAINSTREAMING CLIMATE DESIGN

DEP engineers are a key stakeholder in the process for integrating the City's Climate Resiliency Design Guidelines into project design. BEDC has worked to make it easier to mainstream the Climate Resiliency Design guidelines into the project delivery process by standardizing SOP templates and reporting mechanisms, thereby enabling engineers and other project managers to apply the guidance to any project.



KEY TAKE-AWAYS

The step-by-step SOP aims to support an engineering-level process where climate change information is used to supplement historical data across a range of water and wastewater project planning, design and construction. Incorporating the Climate Resiliency Design guidelines early in the process helps to ensure climate change data informs design at the outset of projects. The SOP also provides a mechanism for mainstreaming climate adaptation. This approach has the potential to be used by other water utilities looking to integrate and institutionalize climate change information in planning and design.



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