

Fact Sheet 4.0: Public Utilities

The Fact Sheets in this section present mitigation approaches used to maintain or quickly recover from the disruption of drinking water, wastewater, electric power and communications services during and immediately after hurricanes or floods.

Hurricane and Flood Impacts

Public utilities provide essential services such as drinking water, stormwater and wastewater collection and treatment, electric power, and communications. These services contribute to the economic well-being and public health and safety of the communities they serve. Under Presidential Policy Directive 21 (PPD 21), the National Infrastructure Protection Plan (NIPP), they comprise three of sixteen critical infrastructure sectors. Safe drinking water is crucial for public welfare. Nearly every sector requires electric power, so it is a cornerstone upon which all other sectors are built, making it critical to the economy. Effective wastewater collection and treatment help avoid the spread of disease and protect the environment by preventing people and property from being exposed to untreated wastewater. Communication is necessary for emergency responders, governments, other public safety organizations, and businesses to function.

Hurricanes and floods can damage utilities and interrupt critical services. Flooding of system components and facilities can damage them and cause them to stop working. Quickly flowing water can erode soil, putting structures at risk. Floodwaters carrying sediment and debris can clog screens and pumps. Hurricane winds can bring down power lines and cause other structures to collapse. Any of these impacts from hurricanes and floods can disrupt service, negatively impacting emergency management procedures and slowing the recovery process for communities.

Mitigation Fact Sheets

Public utilities are grouped into four Fact Sheets in this Handbook. Some mitigation measures presented, such as building improvements, are relevant to other public facilities and may be referenced in other Fact Sheets in the Handbook. The four Public Utilities Fact Sheets are:

- **Drinking Water Systems**—These systems provide drinking water to users. They also can be called potable water systems.
- **Wastewater Treatment Systems**—These systems collect, carry and treat wastewater to prevent the spread of disease and contamination that results from sewage overflow into the environment.



- **Electric Power Generation, Transmission and Distribution**—These systems provide electricity to public, commercial and residential buildings and support structures.
- **Communication Towers, Masts and Antennas**—These systems provide communications capabilities to essential support functions and critical facilities as well as other public, commercial and residential facilities.

Mitigation Solutions

Public utilities are critical to community resilience. It is vital for the services they provide to remain as stable as possible during hurricanes and floods and to be restored quickly if service is disrupted. These systems' resilience can be improved by protecting them against flooding, providing backup power sources, strengthening structural connections, and retrofitting some system components. The choice of mitigation measures may depend on project restrictions, such as the availability of land and materials and environmental requirements, and on consideration of other hazards so that the selected measure addresses multiple hazards. Many potential mitigation solutions can be used, including:

- Elevate critical equipment and components to a height above the flood protection level.
- Strengthen structures to resist wind and flood forces.
- Create redundancy in electrical distribution systems.
- Install distributed power generation systems, such as solar and wind power, which generate electricity near the location where it will be used.
- Provide on-site standby power supplies for when power is lost.
- Install quick-connects for portable temporary backup power supplies for when power is lost.
- Construct floodwalls, levees or berms around large areas containing critical facilities or critical components that are at risk for flooding but cannot be relocated or elevated.







In addition to structural mitigation measures, non-structural measures also can be implemented and often are essential to the safe and efficient operation of public utilities. Non-structural measures generally are cost-effective compared with structural measures, which may be more expensive to build. Non-structural measures generally are included in a safety program for the facilities and may include:

- Implementing a surveillance and monitoring program
- Preparing and regularly updating an emergency action plan
- Monitoring system status to protect from failure

Icons

The Fact Sheets include points to consider about developing and implementing each mitigation option. Icons represent these common considerations which are summarized in Table 4.0.1 below.

Table 4.0.1. Icons Used to Represent Considerations about Hazard Mitigation Strategies

Icon	Considerations about Hazard Mitigation Strategies
	Cost – The cost to carry out the mitigation option may be high, which could make using the option cost prohibitive.
	Engineering – A qualified engineer would likely need to design the mitigation option.
	Environmental and Historic Preservation – The mitigation option likely will need to comply with local, state and/or federal environmental and historic preservation requirements.
	Floodplain Management – Carrying out the mitigation option might impact the floodplain, triggering compliance with floodplain management requirements.
	Operations and Maintenance – The mitigation option might require additional operations and maintenance activities beyond those currently being performed.
	Permitting – Evaluate the local, state or federal permits required to carry out the mitigation option.

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