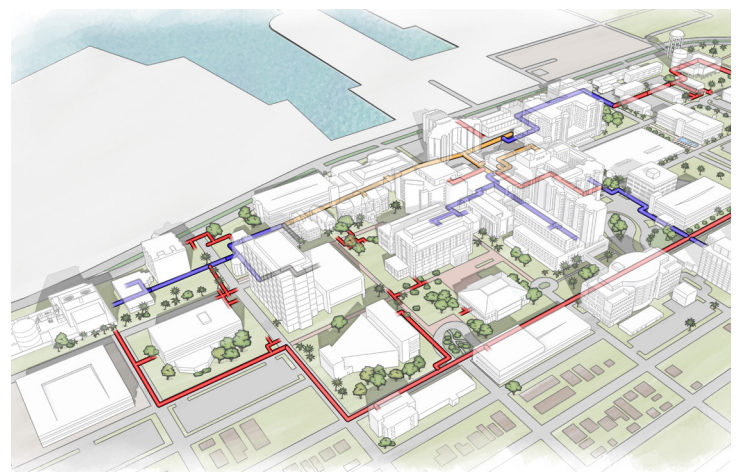


Designing Resilience

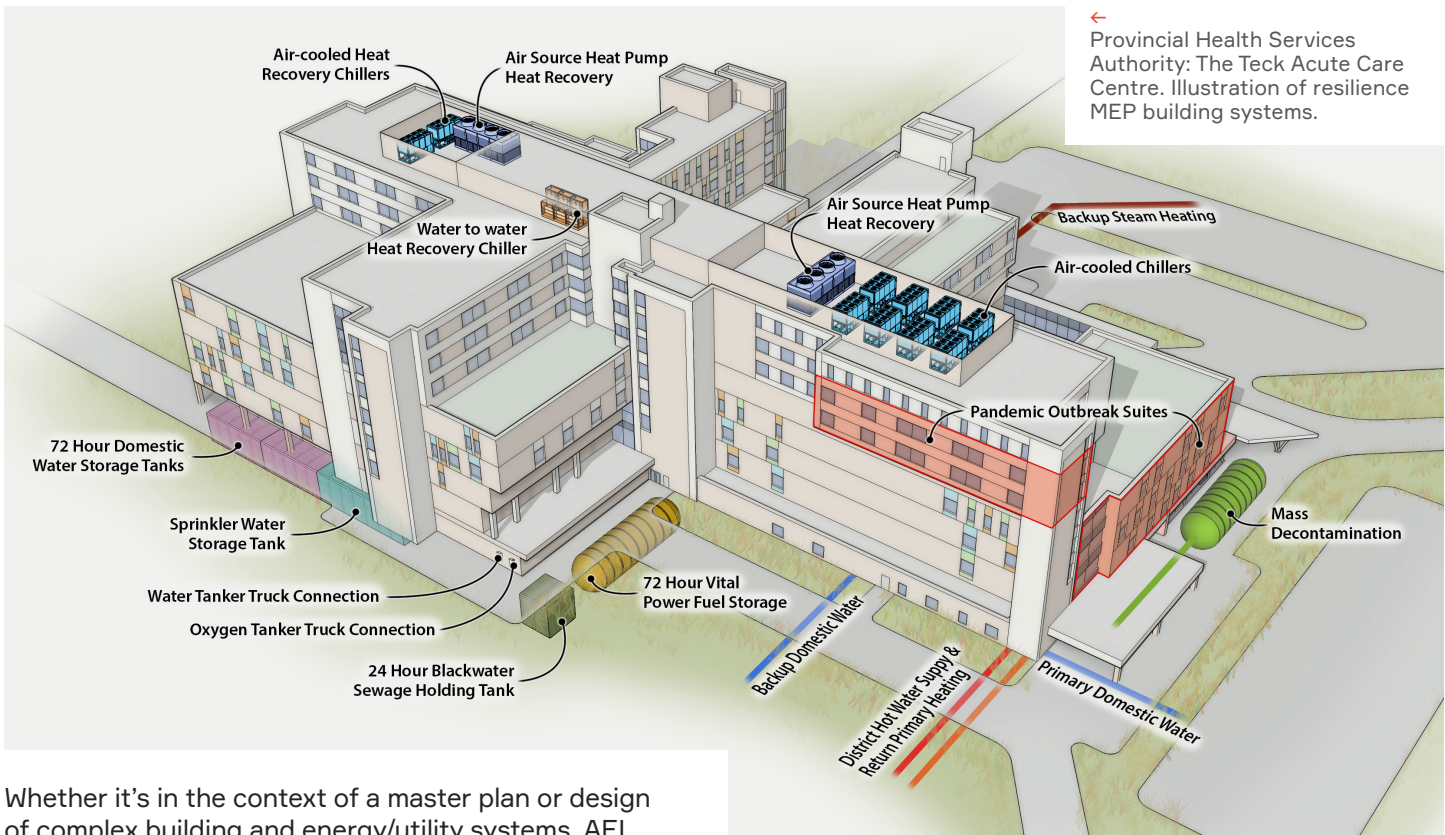
Resilience design anticipates disaster-scale natural and human-caused events to ensure that facilities maintain operation through the event and/or promptly recover to full operation after. Resilience is implicit in regulations and standards based on past events, but the increase in scale and occurrence of disasters combined with deteriorating infrastructure have created a gap between design standards and resilience needs.

AEI's approach to resilience is strategic, designing to the owner's articulation of critical functions of the facility. A facility's resilience design is customized. It responds to a dynamic collaboration with the client and is integrated into the larger design process, avoiding excess cost. Designed efficiencies for energy demand and water use in normal operation, as well as effective passive design, establish a foundation for resilience design.

Illustration of AEI's *Resilience+ Planning and Design Tool* assessment of facility vulnerabilities and example of design approach to achieve resilience.



University of Texas Medical Branch at Galveston. Illustration of AEI design for resilience in campus infrastructure. After the devastation of Hurricane Ike (2008), the campus invested in combined heat and power plants, hot water distribution with building conversion and new energy and utility distribution/collection networks.



Whether it's in the context of a master plan or design of complex building and energy/utility systems, AEI advises clients of their climate/weather vulnerabilities and mitigation opportunities. Our master plans offer these considerations as integral to long-term planning of facility renewal and growth. Designs include rigorous exploration of mitigation and adaptation opportunities, conveying costs, relative benefits, and residual risks, to indicate optimal interventions for reducing risk of MEP system failure in the event of a disaster scale event.

AEI resilience planning and/or design clients include:

- Canada Center for Addiction and Mental Health (Toronto, Ontario)
- Cedars Sinai Medical Center (Los Angeles, California)
- Children's Hospital of Philadelphia (Philadelphia, Pennsylvania)
- Confidential corporate clients (Michigan, New York)
- Indiana University Health (Indianapolis, Indiana)
- Northwestern University (Evanston, Illinois)
- Pratt Institute (Brooklyn, New York)
- Princeton University (Princeton, New Jersey)
- Sarasota Memorial Health Care System (Venice, Florida)
- Provincial Health Services Authority (Vancouver, British Columbia)
- Secura Insurance (Appleton, Wisconsin)
- The Ohio State University (Columbus, Ohio)
- University of North Carolina (Chapel Hill, North Carolina)
- University of North Texas (Denton, Texas)
- University of Texas Medical Branch (Galveston, Texas)
- University of Wisconsin Platteville (Platteville, Wisconsin)
- U.S. Department of Veteran's Affairs: Portland Health Care System (Portland, Oregon)
- Valleywise Health (Phoenix, Arizona)

AEI's resilience planning and design tool. Sankey diagram tracing utility connections to building systems, used to test and illustrate vulnerabilities to hazard scale events.

