

Advanced Mitigation Planning Allows Hospital to Stay Dry During Tropical Storm Lee

Broome County, New York - Lourdes Hospital, located in the picturesque city of Binghamton (pop. 47,376) and surrounded by rolling hills and rivers, averted major storm damage thanks to hazard mitigation and a new floodwall.

The floodwall with passive floodgates, built with hazard mitigation funds from the Federal Emergency Management Agency (FEMA) and New York State, protected this vital property from floodwaters that devastated other parts of the city during Tropical Storm Lee. City officials estimated that as many as 2,000 buildings suffered flood damage from the storm.

After being forced to evacuate patients and shut down operations in the Flood of 2006, Lourdes Hospital decided that it couldn't happen again. The 2006 flood, causing an estimated \$20M in damages due to up to 20 inches of contaminated floodwaters on its ground floor, had forced the hospital to close for two weeks, cutting off critical services to the community. The hospital power plant, particularly vulnerable to flooding, had integrated costly measures such as temporary earth berms and stormwater pumps to ensure continuation of hospital operations. However, these berms were breached during the flood causing severe damage to the pumps and emergency generators, as well as fuel and water supply infrastructure.

Lourdes Hospital, a major hospital in the Greater Binghamton NY area, is a critical fixture in the community with tens of thousands of surgeries, births, and patient visits per year and is recognized as an award-winning critical care center. Although situated in a 100-year floodplain on the banks of the Susquehanna River, the hospital could not be relocated. Lourdes had already embarked on a \$70 million, 3-year construction project to modernize the hospital and provide patients with a more streamlined system of obtaining outpatient services.

Two engineering firms teamed to develop a flood study and design a flood protection system for Lourdes Hospital. The project included hydrologic and hydraulic modeling of the Susquehanna River, assessment of floodplain impacts, investigation of flood prevention alternatives including earthen levee systems, portable panel and bollard walls, and design of interior flood removal systems. The project required extensive coordination with State and Federal resource agencies including FEMA, NYSOEM, NYSDEC and the USACE.

The final design phase included permanent concrete T-walls to the 500-year flood elevation. The project included closure structures, interior drainage, passive floodgates, pumping stations, utility relocations, letter of map revision, and the development of an operation and maintenance plan. The floodwall is 11 feet at its highest point and includes 11 passive floodgates at each entry point, which allow unimpeded access by vehicles and pedestrians during dry times, but automatically deploy without reliance on power or personnel when flooding occurs.

When the area was inundated by record-high floodwaters in September 2011 from the remnants of Tropical Storm Lee, it added misery to an area already soaked from Tropical Storm Irene 10 days earlier. The Susquehanna reached 25.71 feet before it began to recede, eclipsing the previous record of 25 feet – 11 feet above flood stage – in 2006. However, this time the hospital remained fully operational thanks to the floodwall completed in the summer of 2010 with funding from FEMA. With sufficient warning time, the floodgates were raised manually as part of their Flood Emergency Operation Plan.

"As we sat and watched the floodwaters rise and rise and rise, it was interesting. The floodwall itself worked magnificently, the gates operated as expected," said David Scribner, who is the facilities management director at the hospital. The floodwaters came within 30" but never breached.



As a result, said Wayne Mitteer, the Oncology and Clinical Services V.P. at Lourdes, “we could concentrate on helping the community this time. We didn't just have to remain within the walls of this hospital on Riverside Drive, we were able to reach out and help all those who were devastated by the flood.”