Pumping Station Safe Rooms

Jefferson Parish, LA – Protection from high winds and floodwaters is an ongoing challenge for people who live and work in Southeast Louisiana. Shielding operators of the area's crucial pumping stations is critical, especially during major storm events. Following Hurricane Katrina in 2005, leaders in Jefferson Parish found a solid solution to this challenge at 13 major pumping stations — they built high-rise safe rooms designed to withstand the strongest of winds.

The safe rooms are 400-square-foot prefabrications with a bottom slab, walls, and roof of reinforced concrete. They are designed to hold up against 250 mph winds, well over the minimum strength of a Category 5 hurricane, and the spin-off tornadoes sometimes produced during hurricanes. All the safe rooms are anchored to 12 large concrete pilings rising 25 feet above the ground.

Each safe room has a pressure door, a reinforced roof hatch as an emergency exit, and 4-foot high galvanized steel guardrails around the platform and roof hatch. Access is by two staircases also made of galvanized steel. Floodwalls built about 17 feet high provide frontal protection to shield the pumping stations and safe rooms from storm surge, though the safe rooms are designed to withstand surge should the floodwalls and levees be overtopped.

The interior of each safe room has eight fold-up, attached bunk beds, as well as lockers, countertops, a refrigerator, microwave, and a bathroom. The appliances and the heating/cooling/ventilation system are backed up by a generator fueled for at least five days of operation. The remaining space is occupied by a computer that monitors the Supervisory Control and Data Acquisition system, which provides information on weather and water levels while allowing remote operation of the station's pumps and those of the smaller pumping stations associated with that main site. Operation is through fiber optic cables protected by high-density polyethylene conduit running as long as 350 feet from the pump station to the safe room. The cables connecting pump stations, some running as long as three miles, are buried along canal banks.

During storms, a safe room operator can keep the pumps going, while an additional operator monitors and cleans debris from collection grates using an automated cleaning system known as a "climber screen." During non-storm conditions, all of these operations take place at the pumping station itself.

Jefferson Parish had begun converting used shipping containers into temporary safe rooms before Hurricane Katrina swept into Louisiana in 2005, though the project had not been completed. As the hurricane bore down on the coast, operators were evacuated from pumping stations for safety purposes. To protect them in future storms — and as a mark of commitment to residents' safety — parish officials borrowed $40 million to build the new, permanent safe rooms at major pumping stations.

While safe rooms are the centerpiece of the pumping operations, the entire drainage system (started years ago when Jefferson Parish sent representatives to the Netherlands to study the ultimate in protective water management) is designed with safety as a priority. This is a necessity in low-lying Jefferson Parish, which drops to five feet below sea level and runs from Lake Pontchartrain to Grand Isle on the Gulf Coast.

The pumping stations serve a network comprised of 340 miles of drainage ditches and canals, 1,465 miles of drainage pipes, and 53 drainage pump stations with 148 pumps. Backflow prevention involves a compressed air system, butterfly valves, and large sluice gates that require continuous grass and trash removal. The huge responsibility for maintaining this flood abatement system belongs to the Jefferson Parish Department of Drainage and its director, Mitchell Theriot, who believes the system is unique, perhaps even on a global scale.

Such innovation shines a spotlight on Jefferson Parish and some of its visionary efforts to safeguard residents with the best that infrastructure mitigation has to offer.