GHP

ARCHITECTURE
ENVIRONMENTAL
CONSTRUCTION SERVICES

DESIGN AND CONSTRUCTION ISSUES AFTER HURRICANE IMPACT

A Case Study

FHEA 2023

PRESENTATION OUTLINE

Case Study - Facility Restored as a result of Hurricane teaches valuable planning lessons

1. Analyze Risks
2. Improve Build-Back
3. Infection Control Risks during Restoration
4. MEPFP is a Critical Part of Restoration
5. Build back Pricing and Construction Management

OUR SPEAKER

Rich Crim PE, LEED AP BD+C
Vice President, Project Operations

Education

- Bachelor of Science - Mechanical Engineering –2003, University of Mississippi, Oxford, MS
- Master of Science - Mechanical Engineering –2005, Vanderbilt University, Nashville, TN

Biography

- Joined GHP 2014
- Based out of Nashville, TN
- 17+ years of mechanical engineering experience

OUR AUTHORS

Paul Haas, CSP, CIH
Environmental Project Manager
- Joined GHP 2021
- Based out of Jupiter, FL

Mark L. Smith, AIA, LEED AP
VP, Florida Operations
- Joined GHP 1997
- Based out of Jupiter, FL

LET'S HEAR FROM YOU.

How many damaged facilities have you restored as a result of hurricanes?

A. 1-3

B. 3 or more

C. NONE

BACKGROUND

HURRICANE DAMAGES

- Facilities Exposed to Hurricane Winds— potentially leading to structure damages, roof loss, infrastructure and civil losses
- Extensive Power Outages create loss of finishes and interiors. Architecture is impacted, Infrastructure Connections and widespread Environmental damages.
- HVAC Systems, Potable Water, Electrical/ Data Systems— Part of the MEPFP will need to be assessed

BUILDING MANAGEMENT
Hurricane Response & Pre-planning

LET'S HEAR FROM YOU.

Does your enterprise have specific pre or post hurricane response policies & procedures dictated by your administration?

A. Yes

B. No

C. Not Applicable

MODEL HURRICANE MANAGEMENT PLAN

Consider available checklists for hurricane preparedness as templates for a Response Plan to address main points below:

- Damage Assessment
- Water Extraction and Debris Removal
- Measures to prevent the spread of water and wind damage within the facility
- Prompt identification and isolation of safety risks to patients, staff/public health
- Public and staff communication and plan for appropriate external communication related to building operations
- Restoration of routine operations*
- Remediation Monitoring
- Architectural Design and Construction Administration
- Base Building Common Area MEPFP
- Construction Management

*These plans can speak to stock storage of supplies for hospital use.

- Availability and storage of supplies used to quarter off facility sections to accommodate a damages (e.g., PVC, rolled plastic, PPE, HEPA-filtered negative air machines, HEPA filters, sticky pads, etc.). (GHP)

MODEL HURRICANE MANAGEMENT PLAN

Envelope and Interior Damage Assessment

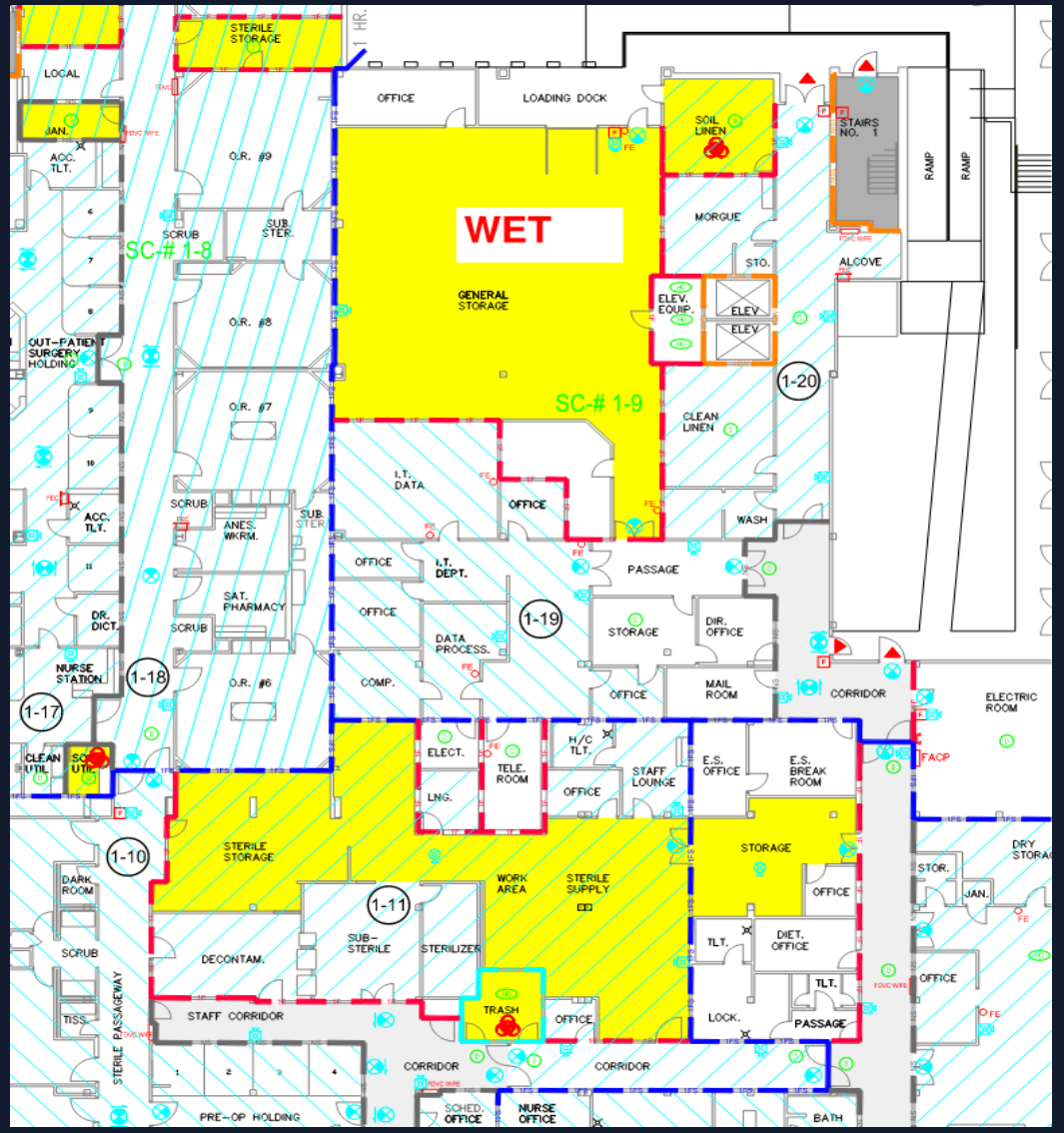
- Interior Water Damage
  - Water extraction, dehumidification, drying
- Envelope Damage Assessment
  - Repair roof, skin, and window damages
- MEPFP Systems Assessment
  - Determine operable and inoperable systems

How do the above impact hospital operations?

MODEL HURRICANE MANAGEMENT PLAN

Hospital Operations

- Per Department, Confirm Systems Operations
  - Interiors / Envelope – Are rooms dry and will they remain dry?
  - Mechanical – Are HVAC systems operational?
  - Electrical – Are electrical systems operational – high voltage and communications?
  - Plumbing – Are domestic and sanitary systems operational?
  - Fire Protection – Are sprinkler systems operational?
  - Sterile Processing – Are all systems operational?
  - Supplies and Storage – Are supplies salvageable, can new supplies be acquired?
  - Other – Department Specific



LET'S HEAR FROM YOU.

Have you implemented temporary engineering controls to create negative isolation treatment spaces after hurricane damages?

A. Yes

B. No

C. Not Applicable

TEMPORARY ANTE ROOM TO PATIENT ROOM/SPACE RECOMMENDATIONS

- Constant manometer reading to show continuous negative pressure flow
- Zipper flaps on each end of Ante Room
- Storage space for PPE (single use, reuse)
- Space for donning and doffing PPE
- Waste receptacles for used PPE
- Sticky matts on in/out sides of access point (if applicable)
- Consider one-way in/out, if space(s) allows
- Entry side signage designating limited access stipulations
- Consider EVS designated supplies storage area/waste load out times
- Consider Dietary waste load out times
- Consider access to limited employees; access for (e.g., cart) EMT and their protocols

Photo from STARC Systems

HEPA FILTERED NEGATIVE AIR UNIT USE CONSIDERATIONS

- Consider room size or affected space size and air change goals for determining airflow sizing
- Consider noise generation by machines
- Consider electrical loading, GFI electrical outlets recommended
- Balance airflow with make-up air relative to negative airflow
- In large affected space, consider negative air exhaust points in unused or under-used spaces or at multiple locations

Photo from Oaklawn Hospital

OTHER CONSIDERATIONS

- Cleaning and restoration of electronics (ASHE) (IICRC)
- Safety guidelines related to maintenance and engineering staff working within a damaged structure (AIHA)
- Reopening of previously closed-off or little used areas of a hospital (AIA, ASHRAE, ASHE)

GHP

Questions

RICH CRIM PE, LEED AP BD+ C
rcrim@ghp1.com / (615) 254-8500

MARK L. SMITH, AIA, LEED AP
msmith@ghp1.com / (615) 496-9819

GHP1.com