Table 7.1 Summary Ratings of Surveyed Infrastructure
- East Carolina University -

Facility	Rating - Current	Rating - After Mitigation Project	Difference
Blount House	2.20	1.73	0.47
Brody Medical Sciences	1.42	1.02	0.40
Cotanche Building	1.00	1.00	0.00
Edward Nelson Warren Life Science Building	1.13	1.00	0.13
Eppes Complex	1.53	1.27	0.26
Jones Hall	1.20	1.11	0.09
Joyner East	1.02	1.00	0.02
Leo W. Jenkins Cancer Center	1.13	1.00	0.13
Medical Central Utility Plant	1.02	1.00	0.02
Steam Plant	1.58	1.13	0.45
Todd Dining Hall	1.02	1.00	0.02

Location of Individual Infrastructure Reports:

This table above summarizes the OVERALL Risk Rating for 10 campus facilities on the date in 2010 that it was inspected, and at some future, unspecified time by which all recommended Mitigation Actions have been completed. Each facility report section provides the data resulting from the on-site engineering inspection, plus the risk calculations that resulted from applying the UFRAS software. Data from all 10 facility inspections and UFRAS calculations will be contained in an accompanying CD.

For all mitigation measures related to East Carolina University, the following is true:

Responsible Party: East Carolina University Administration
Implementation period: 2012-2017
Potential Funding: State/Federal Grants
All measures are new

An addition to the guidelines will be implemented to ensure that future architects, planners, developers, builders, and others involved in the design and construction of new structures and retrofit of existing buildings on campus will be made aware of the University's policy on mitigation. (All hazards addressed).

The planning committee developed the mitigation measures described in Section 7. Many proposed actions will have a positive effect on mitigating potential damages from most if not all natural hazards. The listed actions do, however, primarily focus on ways the campuses can act to lessen and, ideally, eventually prevent future flood losses from inappropriate new development. Mitigation actions include a number of new programs and descriptions other expanded programs that the jurisdictions will undertake to ensure further reductions in community vulnerability during the 5-year implementation period (2012-2017).

Mitigation actions were developed and prioritized by the departmental staff responsible for implementation of the specific action. Each department categorized actions as A, B, C, or D based on assessment of the need for the specific action, the projected cost of implementation, the potential beneficial effects from implementation of the action, and available funding sources. The implementation costs are distributed as follows: A: $5,000 or less; B: between $5,000 and $25,000; C: between $25,000 and $100,000; and, D: more than $100,000. The implementation years were also determined by the responsible departments using projected resources (personnel, vehicles, etc.) and operating funds. The planning team determined that all potential actions were more appropriately addressed at the campus level due to long established priorities and responsibilities assumed.

The primary factor considered by the planning committee for action prioritization was the cost-effectiveness of each action in the plan. To determine cost-effectiveness for each action, a cost-benefit review process was implemented by the planning committee using local knowledge of the probable cost of each action. Actions were given a priority of A, B, C, or D based on this assessment. Actions considered a "D" priority are those that should be addressed first and which will receive a majority of the funding and effort from the campus. Conversely, "A" priority actions are those that will receive the least amount of time and effort from the campus. "B" and "C" priority actions fall in between high and low priority in terms of resources and effort.

The mitigation actions were prioritized using the information provided by each individual staff for each of the following criteria:

1. Cost effectiveness, i.e., do returns or savings produced by implementation of the action outweigh the cost of implementation?
2. Environmental impact, i.e., are actions designed to protect environmentally fragile areas as natural stormwater storage areas? and,
3. Technically feasibility, i.e., can the action be undertaken by the Town using current staff and local funds, State, or Federal funds, or do other funding sources need to be identified?

Also, in developing actions, the committee relied on the following six mitigation policy categories provided by FEMA:

1. Prevention
   Preventative activities are intended to keep hazard problems from getting worse. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. Examples of preventative activities include:
   - Planning
   - Hazard mapping
   - Open space preservation
   - Floodplain regulations
   - Stormwater management
   - Drainage system maintenance
   - Capital improvements programming
   - Riverine / fault zone setbacks

2. Property Protection
   Property protection measures enable structures to better withstand hazard events, remove structures from hazardous locations, or provide insurance to cover potential losses. Examples include:
   - Acquisition
   - Relocation
   - Building elevation
   - Critical facilities protection
   - Retrofitting (i.e., wind proofing, flood proofing, seismic design standards, etc.)
   - Insurance
   - Safe room construction

3. Natural Resource Protection
   Natural resource protection activities reduce the impact of hazards by preserving or restoring the function of natural systems. Examples of natural systems that can be classified as high hazard areas include floodplains, wetlands and barrier islands. Thus, natural resource protection can serve the dual purpose of protecting lives and property while enhancing environmental goals such as improved water quality or recreational opportunities. Parks, recreation or conservation agencies and organizations often implement these measures. Examples include:
   - Floodplain protection
   - Riparian buffers
   - Fire resistant landscaping
   - Erosion and sediment control
   - Wetland restoration
   - Habitat preservation
   - Slope stabilization

4. Structural Projects
   Structural mitigation projects are intended to lessen the impact of hazards by modifying the environment or hardening structures. Structural projects are usually designed by engineers and managed or maintained by public works staff. Examples include:
   - Reservoirs
   - Levees, dikes, floodwalls, or seawalls
   - Detention and retention basins
   - Channel modification
   - Storm sewer construction

5. Emergency Services
   Although not typically considered a mitigation technique, emergency services minimize the impact of a hazard on people and property. Actions taken immediately prior to, during, or in response to a hazard event include:
   - Warning systems
   - Search and rescue
   - Evacuation planning and management
   - Flood fighting techniques

6. Public Information and Awareness
   Public Information and awareness activities are used to advise residents, business owners, potential property buyers, and visitors about hazards and mitigation techniques they can use to protect themselves and their property. Examples of measures used to educate and inform the public include:
   - Outreach and education
   - Training
   - Speaker series, demonstration events
   - Real estate disclosure
   - Hazard expositions

East Carolina University	Blount House
	**NCCHEF #:** *067* **Year Built***: 1945* **Intended Use:** *Private residence* **Actual Use:** *Police station, 911 call center, EOC* **Construction Cost:** *$6,018* **Present Value of Structure:** *$ 782,636* **Present Value of Contents:** *$ 1,500,000* **Number of Stories:** *2* **Square Footage (Conditioned):** *2,298* **Façade Constr. :** *Timber siding* **Roof Constr. :** *Shingle* **Structural System:** *Timber* **Special Contents:** *911 call center, EOC* **Last Renovation:** *1999, $ 343,414* **Date Inspected:** *30 June 2010*

Facility Description

The Blount House is a former residence donated to the University and recently remodeled to house the police department, the 911 call center, and a location for the emergency operations center (EOC). The building also houses central servers for monitoring fire alarms and the campus video monitoring and recording system. The structure is a timber framed shear wall building. Exterior walls are timber siding with a shingled roof on timber decking. The building has a basement that is below grade but no critical infrastructure is below the flood level from Hurricane Floyd, according to facility personnel. There is an emergency generator for life safety and critical systems and plans for a larger generator are currently underway. The building is sprinklered and has a fire alarm system.

Vulnerabilities/Risk

- Some of the heat pumps are not anchored to their foundation and the minisplit heat pumps have only partial anchorage. The emergency generator is not anchored to its foundation. (Photos 1 and 2)
- The windows in the dispatch area are unreinforced against wind-borne debris impact. (Photo 3)
- The basement sump pump is undersized relative to the rate of water infiltration during intense storms.
- There is only one direct fiber optic link with Joyner East. If this line were severed, there would be a significant disruption to VOIP and data services.
- The room designated as the EOC is too small to house even a partially staffed EOC. The room also has several unreinforced windows. (Photo 4)
- The dispatch area is too small to allow consolidation of the primary and Brody Hall 911 call centers.
- The dispatch area is not protected against accidental vehicle strikes on its eastern facade.

Mitigation Measures – A: <$5,000 B: $5,000-$25,000 C: $25,000-$100,000 D: >$100,000

- All HVAC equipment should be properly anchored to its foundation. **A** (Wind/Hurricane, Tornado)
- The generator should be properly anchored to its foundation. **A** (Wind/Hurricane, Tornado)
- The windows in the dispatch area should be reinforced to prevent shattering as a result of wind-borne debris impact. **A** (Flood)
- A secondary or single large sump pump should be installed in the basement to prevent flooding. **A** (Flood)
- A redundant fiber path should be on standby to maintain normal operations in the event the existing Blount-Joyner fiber path is damaged. **B** (All hazards)
- The EOC should be relocated to another facility to allow a fully staffed EOC to meet in a single location. The 911 call/dispatch centers from Blount and Brody should be consolidated into this new facility. **D** (All hazards)
- Vehicle barriers should be installed to prevent accidental damage to the dispatch center. **A** (Tornado)

Blount House										
RISK INDEX AS OF INSPECTION DATE **2.20**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	5	3	1	1	1	1	1	1	1	1.7
ENVELOPE	7	4	1	1	1	1	1	1	1	2.0
STRUCTURE	7	4	1	1	1	3	1	3	1	2.4
CONTENTS	10	6	1	1	1	1	1	1	1	2.6
UTILITIES	8	5	1	1	1	2	1	1	1	2.3
AVERAGE	7.4	4.4	1.0	1.0	1.0	1.6	1.0	1.4	1.0	**2.20**

Blount House										
RISK INDEX AFTER ALL MITIGATION MEASURES ARE IMPLEMENTED **1.73**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	3	2	1	1	1	1	1	1	1	1.3
ENVELOPE	6	4	1	1	1	1	1	1	1	1.9
STRUCTURE	6	3	1	1	1	1	1	2	1	1.9
CONTENTS	5	3	1	1	1	1	1	1	1	1.7
UTILITIES	6	4	1	1	1	1	1	1	1	1.9
AVERAGE	5.2	3.2	1.0	1.0	1.0	1.0	1.0	1.2	1.0	**1.73**

Photo 1. View of heat pumps not anchored to their foundation. Heat pumps and minisplits should be properly anchored to their foundations.

Photo 2. View of emergency generator. The generator (and the new unit in planning) should be properly anchored to its foundation.

Photo 3. View of unreinforced window in dispatch area. Dispatch area is too small to accommodate consolidation of Brody 911 call center which would be beneficial to disaster response due to technological/logistical considerations.

Photo 4. View of the EOC at the Blount House. The room is too small to house a fully staffed EOC and has several unreinforced windows.

East Carolina University	Brody Medical Sciences
	**NCCHEF #***: 015* **Year Built***: 1982* **Intended Use:** *Classrooms and laboratories* **Actual Use:** *Classrooms and laboratories* **Construction Cost:** *$ 29,151,000* **Present Value of Structure:** *$ 91,596,464* **Present Value of Contents:** *$ 65,500,000* **Number of Stories:** *9* **Square Footage (Conditioned):** *279,394* **Façade Constr. :** *Brick masonry* **Roof Constr. :** *Built-up bitumen* **Structural System:** *Steel moment frame* **Special Contents:** *Vivarium, BSL 2 Lab, Hot Site Data Center* **Last Renovation:** *1999, $ 1,200,000* **Date Inspected:** *1 July 2010*

Facility Description

Brody is composed of two separate, but connected steel moment frame structures. The first, a high rise, is nine stories while the second, a low rise, is three stories. The exterior is brick masonry infill and metal cladding for the rooftop mechanical penthouse. Inhabited spaces are above grade. The building is home to the Brody School of Medicine with classrooms, offices, laboratories, vivariums, and the campus' backup hot site data center. The 911 call center for the Medical Campus is located in the basement of the building. The facility is sprinklered and has a fire alarm system. There is an emergency generator for life safety functions and limited standby power. The Brody emergency generator facility contains three interconnected diesel fueled generators which supply Brody, Leo Jenkins, and the MRI facility with life safety and critical standby power. The building receives chilled water and steam from the adjacent Central Utility Plant.

Vulnerabilities/Risk

- The building has no source of chilled water during power outages even though secondary pumps and air handlers are on standby power. Both vivariums and the hot site data center would be affected.
- The hot site data center uses potable water for heat rejection from a Leibert unit during power outages. The water is dumped into undersized floor drains and can flood the room. This method of heat rejection is incapable of carrying the full heat load of the room. (Photo 1)
- The radio and paging system closets in the mechanical penthouse do not have smokeheads or temperature sensors. (Photo 2)
- The exterior façade of the building suffers extensive water infiltration during intense storms. (Photo 3)
- There are a number of antennae cables loosely attached to the exterior façade of the mechanical penthouse. (Photo 4)
- The data center is in a room with wet sprinklers.

Mitigation Measures – A: <$5,000 B: $5,000-$25,000 C: $25,000-$100,000 D: >$100,000

- Install a chiller on standby power at the adjacent Central Utility Plant to provide adequate emergency cooling for vivariums and the hot site data center. **D** (All hazards)
- Install an appropriately sized drain line to accommodate the maximum water flow. **B** (Flood)
- Install smokeheads and temperature sensors to monitor vital radio and paging systems. **B** (Wildfire)
- Seal the exterior façade of the building to prevent water infiltration and prevent further damage and/or mold growth. **D** (Flood)
- Attach all antennae cables to the exterior façade of the structure to prevent them from becoming windborne. **A** (Wind/Hurricane)
- Replace the wet sprinklers in the data center with a gas-based fire suppression system. **C** (Wildfire)

Brody										
RISK INDEX AS OF INSPECTION DATE **1.42**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	1	1	1	1	1.0
ENVELOPE	1	1	1	1	1	4	1	1	1	1.3
STRUCTURE	2	1	1	1	1	1	1	1	1	1.1
CONTENTS	3	2	1	1	1	7	1	1	1	2.0
UTILITIES	2	1	1	1	1	6	1	1	1	1.7
AVERAGE	1.8	1.2	1.0	1.0	1.0	3.8	1.0	1.0	1.0	**1.42**

Brody										
RISK INDEX AFTER ALL MITIGATION MEASURES ARE IMPLEMENTED **1.02**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	1	1	1	1	1.0
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	2	1	1	1	1	1	1	1	1	1.1
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.02**

Photo 1. View of water lines in hot-site data center. Leibert unit at right uses potable water for heat rejection during power outages. Drain lines for this water are undersized and could flood the room.

Photo 2. View of critical radio equipment in penthouse closet. The two radio rooms need smokeheads and temperature sensors.

Photo 3. View of façade of interior courtyard. Several areas of the façade are reported to leak water in driving rain as a result of both improper construction and a failed remediation attempt.

Photo 4. There are loose antennae cables attached to the outside of the mechanical penthouse. The cables should be better anchored to prevent damage in high winds.

East Carolina University	Cotanche Building
	**NCCHEF #:** *164* **Year Built***: 1955* **Intended Use:** *N/A* **Actual Use:** *Data center, EOC, NOC, and offices* **Construction Cost:** *$ 1,438,000* **Present Value of Structure:** *$ 6,748,455* **Present Value of Contents:** *$12,000,000* **Number of Stories:** *2* **Square Footage (Conditioned):** *20,809* **Façade Constr. :** *Brick masonry* **Roof Constr. :** *Standing seam metal, built up bitumen* **Structural System:** *Steel frame / masonry bearing wall* **Special Contents:** *Data center, EOC, NOC* **Last Renovation:** *2002, $ 2,898,471* **Date Inspected:** *29 June 2010*

Facility Description

The Cotanche Building, located away from the main campus in downtown Greenville, is home to the University's primary data center, the network operations center (NOC), and the offices of the Information Technology and Computing Services (ITCS) group. The building is also used as the EOC during disaster responses and drills. The building is one of the primary nodes for voice and data communication on campus. The structure is steel framed in the interior with masonry bearing/shear walls around the perimeter. Exterior walls are brick masonry with few windows except in the entrance atrium which has large glass curtain walls. The roof is built up bitumen. The building is entirely above grade. The building has two emergency generators capable of fully powering all critical systems and environmental controls. The data center area has FM-200 fire suppression. The building has a fire alarm system.

Vulnerabilities/Risk

- The chillers at the northeastern edge of the facility are not anchored to their foundations (Photo 1).
- The University performs periodic tape backups; however the tapes are stored in the Cotanche Building. (Photo 2)
- There are gas cylinders which are not properly anchored in the mechanical area at the southeastern corner of the facility (Photo 3)
- The EOC telecommunication equipment relies on the (non-redundant) fiber connection to Joyner East.

Mitigation Measures – A: <$5,000 B: $5,000-$25,000 C: $25,000-$100,000 D: >$100,000

- The chillers should be properly anchored to their foundations. **A** (Wind/Hurricane)
- The University should relocate the tape backup archive to, at minimum, a different building. Co-locating the primary copy of data and its backup is inadvisable, even considering the hot-site in Brody. **B** (All hazards)
- Gas cylinders should be anchored to the wall to prevent toppling, regardless of contents. **A** (Wind/Hurricane)
- An alternate fiber path to Joyner East should be on standby, or some other redundant communication system in place, allowing the EOC to communicate in the event that the Joyner East fiber hub is offline. **C** (All hazards)

Cotanche Building										
RISK INDEX AS OF INSPECTION DATE **1.00**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	1	1	1	1	1.0
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.00**

Cotanche Building										
RISK INDEX AFTER ALL MITIGATION MEASURES ARE IMPLEMENTED **1.00**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	1	1	1	1	1.0
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.00**

Photo 1. View of chillers at northeast corner of facility. Mechanical equipment should be properly anchored to their foundations.

Photo 2. View of tape storage racks located in the same building as the primary data center. It is inadvisable to maintain the primary copy and the backup copy in the same location, even considering the hot-site data center in Brody.

Photo 3. View of gas cylinders leaning against the southeastern exterior wall of the facility. Gas cylinders should be anchored to the wall, regardless of contents.

East Carolina University	Edward Nelson Warren Life Science Building
	**NCCHEF #:** *088B* **Year Built***: 1999* **Intended Use:** *Offices and laboratories* **Actual Use:** *Offices, laboratories, outpatient surgery* **Construction Cost:** *$ 14,218,700* **Present Value of Structure:** *$ 24,835,600* **Present Value of Contents:** *$ 9,500,000* **Number of Stories:** *3* **Square Footage (Conditioned):** *49,370* **Façade Constr. :** *Brick masonry* **Roof Constr. :** *Built up EPDM* **Structural System:** *Steel moment frame* **Special Contents:** *Robotic surgery suite, vivarium* **Last Renovation:** *1992, $ 2,000,000* **Date Inspected:** *30 June 2010*

Facility Description

The Edward Nelson Warren Life Science Building houses offices, laboratories, a BSL level 3 lab, and vivariums for the Brody School of Medicine. The building is also a temporary home for specialized robotic outpatient surgeries. The facility has a potable water storage cistern that is filled prior to storms to provide water for vivariums in the event of a city water outage. The structure is a steel moment frame with joists and metal decking. Exterior walls are brick masonry. The roof is a built up EPDM. The facility is mostly above grade and below grade areas have adequate drainage. There is an emergency generator for life safety systems and critical refrigeration/cooling equipment. The building is sprinklered and has a fire alarm system.

Vulnerabilities/Risk

- Although the air handlers for the vivariums are on emergency power, there is no means of providing chilled water for cooling. Spot coolers have limited capacity to maintain environmental conditions.
- The guy wires on exhaust stacks for the BSL level 3 lab are slack. (Photo 1)
- The generator is not anchored to its foundation. (Photo 2)
- The pumps for the chilled water loop are not anchored to their foundations. (Photo 3)
- There is a large tree overhanging the roof near the northeast corner of the facility. (Photo 4)

Mitigation Measures – A: <$5,000 B: $5,000-$25,000 C: $25,000-$100,000 D: >$100,000

- Install a chiller on standby power at the adjacent Central Utility Plant to provide adequate emergency cooling for patient treatment areas. **D** (All hazards)
- Guy wires supporting exhaust stacks should be tensioned to reduce wind induced movement. **A** (Wind/Hurricane)
- The generator and all critical mechanical systems should be attached to their foundations. **A** (Wind/Hurricane)
- Trees adjacent to the facility should be pruned to prevent limbs from overhanging the roof which could shed debris and clog roof drains. **A** (Wind/Hurricane, Ice/Snow)

Edward Nelson Warren Life Science Building										
RISK INDEX AS OF INSPECTION DATE **1.13**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	1	1	1	1	1.0
ENVELOPE	2	1	1	1	1	1	1	1	1	1.1
STRUCTURE	2	1	1	1	1	1	1	1	1	1.1
CONTENTS	2	1	1	1	1	1	1	1	1	1.1
UTILITIES	3	2	1	1	1	1	1	1	1	1.3
AVERAGE	2.0	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.13**

Edward Nelson Warren Life Science Building										
RISK INDEX AFTER ALL MITIGATION MEASURES ARE IMPLEMENTED **1.00**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	1	1	1	1	1.0
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.00**

Photo 1. View of exhaust vents for BSL level 3 lab. Guide wires should be tensioned to prevent wind damage to exhaust stacks.

Photo 2. View of emergency generator. Mechanical equipment serving critical facilities should be anchored to its foundation.

Photo 3. View of coolant/condensate pump skid not anchored to foundation. Mechanical equipment serving critical facilities should be anchored to its foundation.

Photo 4. View of tree overhanging roof at northeast corner of facility. Trees should be pruned to reduce the likelihood of clogging roof drains.

East Carolina University	Eppes Complex
	**NCCHEF #:** *126D, 126E* **Year Built***: 1970* **Intended Use:** *N/A* **Actual Use:** *Offices, maintenance shops, storage* **Construction Cost:** *$* **Present Value of Structure:** *$ 215,689, $ 711,547* **Present Value of Contents:** *$ 500,000* **Number of Stories:** *1* **Square Footage (Conditioned):** *830, 2,625* **Façade Constr. :** *Brick masonry* **Roof Constr. :** *Built up bitumen, standing seam metal* **Structural System:** *Masonry shear/bearing wall* **Special Contents:** *None* **Last Renovation:** **Date Inspected:** *29 June 2010*

Facility Description

The Eppes Complex of buildings consists of four main structures that house the facilities maintenance offices and shops for ECU's main campus. Some of the buildings are leased from the adjacent C.M. Eppes Elementary School. The buildings house offices, the carpentry shop, the paint shop, and the vehicle maintenance shop. Three of the structures are brick masonry bearing wall and one of the structures is a pre-engineered metal building. The roofs are built up bitumen except for the pre-engineered building which is standing seam metal. The buildings are entirely above grade. There is an emergency generator for life safety and critical standby systems. The buildings are not sprinklered but do have fire alarms.

Vulnerabilities/Risk

- The buildings are not sprinklered and many areas have only a pull station with no fire detection equipment. This includes areas such as the paint shop and carpentry shop that contain flammable materials (Photo 1).
- The HVAC units at the rear of Eppes #3 are not anchored to their foundations. (Photo 2)
- There are several minisplit heat pumps on the roofs not anchored to the structures. Additionally, some of the timbers to which they are attached are not oriented to provide maximum tipping resistance. (Photo 3)
- There is an unreinforced window above the server area that, if broken, could permit water damage to equipment. (Photo 4)

Mitigation Measures – A: <$5,000 B: $5,000-$25,000 C: $25,000-$100,000 D: >$100,000

- Areas that store flammable materials should have adequate fire suppression and/or detection equipment installed. **B** (Wildfire)
- All mechanical equipment should be properly anchored to its foundation. **A** (Wind/Hurricane, Tornado)
- The minisplit heat pumps should be properly anchored to the structure. **B** (Wind/Hurricane, Tornado)
- Windows in areas containing sensitive electronics should have a film coating and water catchment system to minimize the likelihood of damage resulting from wind borne debris and rain. **A** (Wind/Hurricane)

Eppes Complex										
RISK INDEX AS OF INSPECTION DATE **1.53**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	5	3	1	1	1	1	1	1	1	1.7
ENVELOPE	3	2	1	1	1	1	1	1	1	1.3
STRUCTURE	2	1	1	1	1	1	1	1	1	1.1
CONTENTS	5	3	1	1	1	2	1	1	1	1.8
UTILITIES	5	3	1	1	1	2	1	1	1	1.8
AVERAGE	4.0	2.4	1.0	1.0	1.0	1.4	1.0	1.0	1.0	**1.53**

Eppes Complex										
RISK INDEX AFTER ALL MITIGATION MEASURES ARE IMPLEMENTED **1.27**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	2	2	1	1	1	1	1	1	1	1.2
ENVELOPE	3	2	1	1	1	1	1	1	1	1.3
STRUCTURE	2	1	1	1	1	1	1	1	1	1.1
CONTENTS	3	2	1	1	1	1	1	1	1	1.3
UTILITIES	3	2	1	1	1	1	1	1	1	1.3
AVERAGE	2.6	1.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.27**

Photo 1. View of flammable storage lockers in paint shop. This area of the facility has neither fire detection or suppression systems.

Photo 2. View of pad mounted HVAC equipment at the rear of Eppes #3. All mechanical equipment should be properly anchored to its foundation.

Photo 3. View of roof mounted minisplit heat pump showing supporting timbers oriented in least stable configuration. Minisplit units should be anchored to the structure.

Photo 4. View of facilities management servers located in Eppes #3. If the window above the equipment were to break during a severe storm, driving rain could damage or destroy the servers.

East Carolina University	Jones Hall
	**NCCHEF #:** *070* **Year Built***: 1958* **Intended Use:** *Dormitory and offices* **Actual Use:** *Dormitory and offices* **Construction Cost:** *$ 1,404,000* **Present Value of Structure:** *$ 25,576,135* **Present Value of Contents:** *$ 4,000,000* **Number of Stories:** *5* **Square Footage (Conditioned):** *81,807* **Façade Constr. :** *Brick masonry* **Roof Constr. :** *Built up bitumen* **Structural System:** *Reinforced concrete* **Special Contents:** *Students, Campus Living Office* **Last Renovation:** *2002, $ 1,111,783* **Date Inspected:** *29 June 2010*

Facility Description

Jones Hall is a student dormitory, a small dining hall, and home to the Campus Living Office. The Campus Living Office is responsible for caring for the on-campus student population in the event of an emergency. The structure is a reinforced concrete moment frame. Exterior walls are brick masonry infill. The roof is built up bitumen. Occupied spaces are above grade. There is an emergency generator and a fire pump system serving Jones Hall that is shared with two other buildings. The emergency generator is capable of powering critical systems and some HVAC equipment for the Campus Living Office to permit operations during power outages. The building is sprinklered and has a fire alarm system.

Vulnerabilities/Risk

- The fire pump building, emergency generator, and chiller have large trees adjacent to them. (Photo 1)
- The chiller and emergency generator are not anchored to their foundations. (Photos 2 and 3)

Mitigation Measures – A: <$5,000 B: $5,000-$25,000 C: $25,000-$100,000 D: >$100,000

- The trees adjacent to the generator, chiller, and fire pump building should be routinely inspected and pruned by an arborist to mitigate the potential for wind related damage. **A** (Wind/Hurricane, Ice/Snow)
- The chiller and emergency generator should be anchored to their foundations. **A** (Wind/Hurricane, Tornado)

Jones Hall										
RISK INDEX AS OF INSPECTION DATE **1.20**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	4	2	1	1	1	1	1	1	1	1.4
ENVELOPE	3	2	1	1	1	1	1	1	1	1.3
STRUCTURE	2	1	1	1	1	1	1	1	1	1.1
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	2	1	1	1	1	1	1	1	1	1.1
AVERAGE	2.4	1.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.20**

Jones Hall										
RISK INDEX AFTER ALL MITIGATION MEASURES ARE IMPLEMENTED **1.11**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	2	1	1	1	1	1	1	1	1	1.1
ENVELOPE	3	2	1	1	1	1	1	1	1	1.3
STRUCTURE	2	1	1	1	1	1	1	1	1	1.1
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.8	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.11**

Photo 1. View of large trees overhanging emergency generator and chiller. Trees should be routinely inspected and pruned by an arborist to mitigate the potential for wind related damage.

Photo 2. View of the emergency generator. The generator should be properly anchored to its foundation.

Photo 3. View of the chiller on its skid. The chiller should be properly anchored to its foundation.

East Carolina University	Joyner East
	**NCCHEF #:** *001A* **Year Built***: 1975* **Intended Use:** *Bomb shelter* **Actual Use:** *Data network hub and telecom hub* **Construction Cost:** *$ 2,116,000* **Present Value of Structure:** *$ 11,310,305* **Present Value of Contents:** *$ 5,000,000* **Number of Stories:** *1* **Square Footage (Conditioned):** *17,930* **Façade Constr. :** *No exterior facade* **Roof Constr. :** *Built up bitumen* **Structural System:** *Reinforced concrete moment frame* **Special Contents:** *PBX and VOIP hubs, data fiber hub, and cellular provider base stations* **Last Renovation:** *1997, $ 1,214,000* **Date Inspected:** *1 July 2010*

Facility Description

The facility referred to as Joyner East is actually a small one story structure surrounded by a taller structure on all sides. The structure houses the campus' remaining PBX circuits. It will soon host a major VOIP node, the primary campus data fiber node, and will soon host cellular sites for four service providers. The networking center is located below grade, however is above the level of adjacent mechanical rooms. The cellular phone systems play a vital role in mass communication as the campus PIER network's primary notification is by SMS. The structure is concrete moment frame with masonry infill walls separating the network area from adjacent spaces. The roof is built up bitumen. There is an emergency generator capable of powering all network systems and supporting environmental controls. The building is not sprinklered but has a fire alarm system.

Vulnerabilities/Risk

- This facility is the single point of failure for much of the campus telecom network including the mobile 'crash-cart' used to provide telephone service to the campus emergency operations center (EOC).
- There are pipes collecting water from roof drains suspended from the ceiling over sensitive electronic equipment. (Photo 1)
- The air handling unit and compressor for this area are not anchored to their foundations. (Photos 2 and 3)
- The emergency generator is not anchored to its foundation and could be accidently struck by vehicles backing into the courtyard.
- There are a number of pipes in a crawlspace adjacent to the network hub that could burst and cause water damage. (Photo 4)

Mitigation Measures – A: <$5,000 B: $5,000-$25,000 C: $25,000-$100,000 D: >$100,000

- An alternate means of providing telephone service to the emergency operations center should be identified in the event that the fiber node in Joyner East is unavailable. **B** (All hazards)
- Pipes above sensitive electronics should have a secondary catchment in the event of a leak. **A** (Flood)
- The air handler and compressor should be anchored to their foundations. **A** (Wind/Hurricane)
- The emergency generator should be anchored to its foundation and protected from potential vehicle impacts. **A** (Tornado)
- A water detection system should be installed to monitor for the presence of water in the crawlspace. **A** (Flood)

Joyner East										
RISK INDEX AS OF INSPECTION DATE **1.02**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	1	1	1	1	1.0
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	1	1	1	1	1	2	1	1	1	1.1
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.0	1.0	1.0	1.0	1.0	1.2	1.0	1.0	1.0	**1.02**

Joyner East										
RISK INDEX AFTER ALL MITIGATION MEASURES ARE IMPLEMENTED **1.00**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	1	1	1	1	1.0
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.00**

Photo 1. View of roof drain lines suspended over sensitive network equipment. Provide an alternate catchment system, such as a gutter, to prevent damage to electronic equipment.

Photo 2. View of anchorage point for air handling unit for network area. The air handling unit should be anchored to its foundation.

Photo 3. View of the compressor unit for the network area. The unit should be anchored to its foundation.

Photo 4. View of water pipes in crawlspace adjacent to network area. This area should have a water monitoring system to detect pipe leaks to prevent potential network gear damage.

East Carolina University	Leo W. Jenkins Cancer Center
	**NCCHEF #:** *090* **Year Built***: 1984* **Intended Use:** *N/A* **Actual Use:** *Outpatient treatment, offices* **Construction Cost:** *$ 7,225,692* **Present Value of Structure:** *$ 15,976,815* **Present Value of Contents:** *$ 8,500,000* **Number of Stories:** *2* **Square Footage (Conditioned):** *22,198* **Façade Constr. :** *Brick masonry* **Roof Constr. :** *Bonded membrane* **Structural System:** *Steel framed* **Special Contents:** *Outpatient treatment facilities* **Last Renovation:** *1992, $ 2,000,000* **Date Inspected:** *29 June 2010*

Facility Description

The Leo W. Jenkins Cancer Center houses physicians' offices, laboratories, and outpatient cancer treatment facilities. Specialized equipment and contents include linear accelerators, radioisotopes, and the Cyberknife system. The facility treats up to 100 patients per day and cannot be closed longer than three days at a time due to the time sensitive nature of radiation treatment plans. There is a call center in the building used for mass notification of students and parents in the event of an emergency. The structure is steel framed with joists and metal decking. Exterior walls are brick masonry infill. The roof is a bonded membrane. The facility receives emergency power from the Brody generator building for life safety systems. The building is partially sprinklered and has a fire alarm system.

Vulnerabilities/Risk

- The facility is unable to provide radiation therapy during power outages. During extended outages patients would need to be transported as far as Charlotte to continue treatment plans due to special equipment requirements. (Photo 1)
- The power line connecting the facility to the Brody generator building is undersized according to facility management personnel. There is unused excess emergency power generated in the Brody generator facility but it cannot be transported to Leo Jenkins. (Photo 2)
- There are materials improperly stored in the emergency generator building. (Photo 3)
- There is a skylight over the staging area for radiation treatment that is reported to leak during intense storms. (Photo 4)
- The facility is unable to provide climate control without chilled water supplied by the Central Utility Plant.

Mitigation Measures – A: <$5,000 B: $5,000-$25,000 C: $25,000-$100,000 D: >$100,000

- Provide standby power capable of powering vital radiation therapy equipment. **D** (All hazards)
- Upgrade the power lines between Brody and Leo Jenkins to utilize surplus generation capacity. **C** (All hazards)
- Proper clearances between stored materials and electrical switchgear should be maintained in accordance with code. If necessary, install additional storage adjacent to building. **(A or B)** (Wildfire)
- Replace the skylights with an impact resistant system that is appropriately sealed, or fill in the skylights. **C** (Wind/Hurricane)
- Install a chiller on standby power at the adjacent Central Utility Plant to provide adequate emergency cooling for patient treatment areas. **D** (All hazards)

Leo W. Jenkins Cancer Center										
RISK INDEX AS OF INSPECTION DATE **1.13**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	1	1	1	1	1.0
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	4	2	1	1	1	2	1	1	1	1.6
UTILITIES	1	1	1	1	1	2	1	1	1	1.1
AVERAGE	1.6	1.2	1.0	1.0	1.0	1.4	1.0	1.0	1.0	**1.13**

Leo W. Jenkins Cancer Center										
RISK INDEX AFTER ALL MITIGATION MEASURES ARE IMPLEMENTED **1.00**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	1	1	1	1	1.0
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.00**

Photo 1. View of radiation treatment area of the building. The equipment inside the building and the supplemental cooling (visible on roof) do not have emergency power.

Photo 2. View of Brody emergency generator facility. The lines connecting this building to Leo Jenkins are undersized relative to available emergency power.

Photo 3. View of combustible materials impeding on equipment clearances. Materials should be stored in an alternate location, in accordance with code requirements.

Photo 4. View of skylights over radiation therapy treatment staging area. Skylights are reported to leak during intense storms.

East Carolina University	Medical Central Utility Plant
	**NCCHEF #***: 089* **Year Built***: 1980* **Intended Use:** *Offices and utility plant* **Actual Use:** *Offices and utility plant* **Construction Cost:** *$ 812,263* **Present Value of Structure:** *$ 2,930,930* **Present Value of Contents:** *$ 8,600,000* **Number of Stories:** *2* **Square Footage (Conditioned):** *5,723* **Façade Constr. :** *Brick masonry and metal* **Roof Constr. :** *Gravel ballasted bitumen and EPDM* **Structural System:** *Steel concentrically braced frame* **Special Contents:** *Central chiller plant, telecom fiber hub* **Last Renovation:** **Date Inspected:** *1 July 2010*

Facility Description

The Medical Central Utility Plant is home to the facilities management department that oversees medical campus buildings. The building houses the medical campus steam and chiller plants, building automation controls for adjacent structures, and is the central point of delivery for potable water, data fiber, and power. In the switchyard adjacent to the facility are Greenville Utility Company peaking generators capable of powering much of the medical campus during emergencies. The structure is a steel concentrically braced frame. Exterior walls are brick masonry and the roof is a combination of EPDM and gravel ballasted bitumen. The facility has three wells to supply makeup water during emergencies. There is a 75,000 gallon above ground storage tank for diesel fuel for the life safety generator and boiler. The building is sprinklered and has a fire alarm system.

Vulnerabilities/Risk

- Major mechanical systems (chillers, generators, fuel tanks, and boilers) are not anchored to their foundations (Photos 1 and 2).
- There is a potable water backflow preventer exposed to vehicle impacts on the western perimeter of the site. (Photo 3)
- The electrical switchgear at the southern end of the site between the cooling towers and the fuel tank is exposed to vehicle impacts. (Photo 4)
- There is no connection between the large diesel storage tank and the GUC peaking generator fuel tanks.
- The facility does not have adequate emergency power or compatible chillers to provide chilled water to critical facilities on the campus during major power outages.
- There is no source of emergency HVAC for the data fiber hub.
- There are several pine trees surrounding the well pumps (Photo 5)

Mitigation Measures – A: <$5,000 B: $5,000-$25,000 C: $25,000-$100,000 D: >$100,000

- All major mechanical systems should be anchored to their foundations in compliance with the building code. **B** (Wind/Hurricane)
- Install bollards to protect backflow preventer from potential vehicle impacts. **A** (Tornado)
- Install bollards to protect switchgear from potential vehicle impacts. **A** (Tornado)
- Install fixed or rapidly deployable piping to provide fuel to GUC peaking generators during extended outages. **B** (All hazards)
- Install compatible chiller, pumps, and adequate standby power to provide chilled water to critical facilities during power outages. **D** (All hazards)
- Install a minisplit system on standby power to provide HVAC to the fiber hub during power outages. **B** (All hazards)
- Have an arborist inspect and trim/remove the adjacent to the well pumps. **A** (Ice/Snow)

Medical Central Utility Plant										
RISK INDEX AS OF INSPECTION DATE **1.02**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	2	1	1	1	1	1	1	1	1	1.1
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.02**

Medical Central Utility Plant										
RISK INDEX AFTER ALL MITIGATION MEASURES ARE IMPLEMENTED **1.00**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	1	1	1	1	1.0
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.00**

Photo 1. View of the emergency generator. Mechanical equipment supporting critical facilities should be anchored to its foundation in compliance with the building code.

Photo 2. View of boiler. Mechanical equipment supporting critical facilities should be anchored to its foundation in compliance with the building code.

Photo 3. View of potable water backflow preventer on western perimeter subject to vehicle impact.

Photo 4. View of electrical switchgear susceptible to vehicle impact along the southern perimeter.

Photo 5. View of trees surrounding the well pumps.

East Carolina University	Steam Plant
	**NCCHEF #:** *060* **Year Built***: 1968* **Intended Use:** *Steam generation, power distribution* **Actual Use:** *Steam generation, power distribution* **Construction Cost:** *$ 1,110,000* **Present Value of Structure:** *$ 4,637,806* **Present Value of Contents:** *$ 7,500,000* **Number of Stories:** *4* **Square Footage (Conditioned):** *14,049* **Façade Constr. :** *Brick masonry* **Roof Constr. :** *Built up bitumen* **Structural System:** *Steel concentrically braced frame* **Special Contents:** *Steam boilers* **Last Renovation:** **Date Inspected:** *29 June 2010*

Facility Description

The Steam Plant is the main point of steam generation and power distribution for the University's main campus. The facility has three tanks containing a total of 350,000 gallons of diesel fuel for powering generators, vehicles, and the boilers. The structure is adjacent to a Greenville Utility Company peaking power plant and transformer yard. Steam, power, and fiber optic service are routed from the steam plant across Greenville Run to main campus by means of an elevated bridge. Flood maps indicate the transformer yard and the Greenville Run utility crossing are affected by the 100 year flood plain. The structure is a concentrically braced steel frame. Exterior walls are brick masonry or metal siding. The roof is built up bitumen. The lowest level of the building is below grade. There is an emergency generator capable of powering critical systems until the peaking generators can restore power. The building is not sprinklered but has a fire alarm system.

Vulnerabilities/Risk

- The facility does not have the ability to back-feed power to any existing EOC location during outages.
- The facility has a limited ability to dispense diesel to generators during extended outages.
- The boiler and several heat pump units along the front façade not anchored to their foundations.
- The emergency generator is not anchored to its foundation. (Photo 1)
- There are large trees overhanging the Greenville Run utility crossing, fuel tanks, fuel pumps, and primary switchgear for campus. (Photos 2 and 3)
- Beams supporting the main natural gas line have deteriorating concrete encasement that appears to be causing corrosion to the gas pipe in addition to posing a debris hazard to workers below. (Photo 4)
- While the facility is out of the 100-year floodplain, the transformer yard is in the 100-year flood plain.
- The fuel pumps on site may not be sufficiently protected from vehicle impacts. (Photo 5)

Mitigation Measures – A: <$5,000 B: $5,000-$25,000 C: $25,000-$100,000 D: >$100,000

- Relocate the EOC to a facility with redundant connections to campus voice/data networks and on a circuit which can be back-fed from either of campus's two points of back-up power delivery. **D** (All hazards)
- Obtain a large vehicle mounted tank or a small tanker to enable rapid fuel deliveries to emergency generators during extended outages. **(B or C)** (All hazards)
- Anchor the heat pumps and emergency generator to their foundations. All mechanical systems supporting critical facilities should be anchored to their foundations. **A** (Wind/Hurricane, Tornado)
- Large trees overhanging critical equipment and utilities should be regularly pruned and inspected by an arborist to minimize the likelihood of storm related damage. The largest trees near the steam crossing should be cut down. **B** (Wind/Hurricane, Ice/Snow)
- The deteriorating concrete should be removed from above the gas line and the corrosion repaired. **A** (Ice/Snow)
- Ensure all critical components in the transformer yard have sufficient freeboard above anticipated floodwater elevation. **(A for the study, C if action required)** (Flood)
- Install additional bollards to adequately protect fuel pumps from potential vehicle impacts. **A** (Tornado)

Steam Plant										
RISK INDEX AS OF INSPECTION DATE **1.58**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	3	2	1	2	1	10	10	1	1	3.4
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	1	1	2	1	1	1	1	1	1	1.1
UTILITIES	2	1	2	1	1	2	1	1	1	1.3
AVERAGE	1.6	1.2	1.4	1.2	1.0	3.0	2.8	1.0	1.0	**1.58**

Steam Plant										
RISK INDEX AFTER ALL MITIGATION MEASURES ARE IMPLEMENTED **1.13**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	4	4	1	1	1.7
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.0	1.0	1.0	1.0	1.0	1.6	1.6	1.0	1.0	**1.13**

Photo 1. View of the emergency generator at the rear of the facility. Mechanical equipment should be anchored to its foundation in accordance with the building code.

Photo 2. View of the Greenville Utility Company switchgear adjacent to peaking generators. Trees overhanging critical equipment should be routinely pruned and inspected by an arborist.

Photo 3. View of large trees overhanging the Greenville Run utility crossing. These trees should be removed as this utility corridor is essential in supplying the main campus with power and heat.

Photo 4. View of deteriorating concrete encasement in basement of steam plant. The concrete should be removed and the corrosion damage to the natural gas line repaired.

Photo 5. View of fuel pumps exposed to vehicle impacts.

East Carolina University	Todd Dining Hall
	**NCCHEF #:** *130* **Year Built***: 1994* **Intended Use:** *Dining hall* **Actual Use:** *Dining hall* **Construction Cost:** *$ 4,840,000* **Present Value of Structure:** *$ 9,271,613* **Present Value of Contents:** *$1,000,000* **Number of Stories:** *1* **Square Footage (Conditioned):** *23,686* **Façade Constr. :** *Brick masonry* **Roof Constr. :** *Bonded membrane* **Structural System:** *Steel frame* **Special Contents:** *Kitchens, food storage, fiber hub* **Last Renovation:** *2008* **Date Inspected:** *29 June 2010*

Facility Description

Todd Dining Hall is the primary campus dining hall and kitchen serving a majority of the 5,600 students who live on campus. There is also a fiber network hub in the building connecting several other facilities to the campus data/VOIP network. The structure is a steel framed building. The roof is a built up bonded membrane. The building is entirely above grade. There is an emergency generator for life safety systems only. The building has sprinklers and a fire alarm system. There is a plan in place to route power from the GUC peaking generators at the Steam Plant to this facility to provide dining services with power during extended outages. The facility uses a combination of steam and electric heat to cook food.

Vulnerabilities/Risk

- The chiller and emergency generator are not anchored to their foundations. (Photos 1 and 2)
- There is a large tree adjacent to the emergency generator which could fall and damage the generator and/or chiller. (Photo 3)
- There are trees adjacent to the facility which grow over the roof and deposit debris which could clog roof drains. (Photo 4)

Mitigation Measures – A: <$5,000 B: $5,000-$25,000 C: $25,000-$100,000 D: >$100,000

- The chiller and emergency generator should be anchored to their foundations. **A** (Wind/Hurricane)
- The large tree adjacent to the generator and chiller should be routinely pruned to reduce the possibility of wind related damage to the equipment. **A** (Wind/Hurricane)
- Trees should be pruned back from the facility to prevent trees from depositing debris on the roof and potentially clogging roof drains. **A** (Ice/Snow)

Todd Dining Hall										
RISK INDEX AS OF INSPECTION DATE **1.02**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	2	1	1	1	1	1	1	1	1	1.1
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.02**

Todd Dining Hall										
RISK INDEX AFTER ALL MITIGATION MEASURES ARE IMPLEMENTED **1.00**	WIND	TORNADO	SEISMIC	ICE	SNOW	DRIVING RAIN	FLOOD	WILDFIRE	LANDSLIDE	AVERAGE
SITE	1	1	1	1	1	1	1	1	1	1.0
ENVELOPE	1	1	1	1	1	1	1	1	1	1.0
STRUCTURE	1	1	1	1	1	1	1	1	1	1.0
CONTENTS	1	1	1	1	1	1	1	1	1	1.0
UTILITIES	1	1	1	1	1	1	1	1	1	1.0
AVERAGE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1.00**

Photo 1. View of the life safety generator. The generator should be properly anchored to its foundation.

Photo 2. View of chiller unit. The chiller should be properly anchored to its foundation.

Photo 3. View of large tree adjacent to emergency generator and chiller. The tree should be regularly pruned and inspected by an arborist to decrease the likelihood of wind related damage.

Photo 4. View of trees beginning to grow over roof. Trees should be pruned away from the facility to reduce the amount of drain clogging debris they deposit.