

ANNEX B

MITIGATION OPTIONS AND CONSIDERATIONS

CHATHAM COUNTY MULTI-JURISDICTION PRE-DISASTER HAZARD MITIGATION PLAN

DECEMBER 2015



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This annex to the plan is provided to describe the range of mitigation options that were identified and considered during development of the Chatham Pre-Disaster Hazard Mitigation Plan Update.

I. Coastal Storms

A. Identification and Analysis of Mitigation Options

1. Structural and non-structural mitigation

Chatham County maintains an aggressive public education and public information program using a variety of media, a system of outdoor warning sirens, and the electronic CEMA Alert to inform the public about potential, occurring and/or imminent hazards. See section E. below.

2. Existing policies, regulations, ordinances and land use

Based on the 2009 International Building Code, construction in most of the eastern portion of Chatham County should be built to withstand 120 mile-per-hour winds. For the western portion of the county, the wind load requirement is 110 miles per hour; for construction on the coast, the wind load requirement is 130 miles per hour. These practices benefit resilience in coastal storm events as well as in high wind events associated with severe thunderstorms.

Municipal construction and zoning ordinances are applicable within their respective jurisdictions. Existing policies addressing storm surge are discussed in Section IV.

3. Community values, historic and special considerations

As previously noted, Chatham County contains many historical and cultural facilities. These facilities are included within the broader critical facility list and can often be mitigated in many of the same ways as other existing buildings. However, there are certain special considerations regarding these facilities. Mitigation measures undertaken must not interfere with the historical designation of the structure. There are several federal regulations and publications that provide guidance regarding the types of alterations that can be made to these structures.

Another special consideration in Chatham County is that of transient populations such as students who may only reside in the County for portions of the year and tourists. Mitigation actions identified by this plan include efforts to provide education and outreach to all persons within the County, including students and tourists, as well as

mitigate damage to historic structures. There are several outreach efforts particular to the tourist population.

4. New buildings and infrastructure

Mitigation opportunities for hurricane winds are similar to mitigation measures for other wind hazards. Attention to the type of structure used in hurricane-prone areas may yield benefits, particularly by avoiding highly susceptible manufactured or mobile homes.

The greatest protection is afforded by quality construction and reinforcement of walls, floors, and ceilings. Proper anchoring of walls to foundations and roofs to walls is essential for a building to withstand certain wind speeds. Code adoption by local jurisdictions, compliance by builders, and local government inspection of new homes could reduce the risk of destruction in hurricane-prone areas.

5. Existing buildings and infrastructure

Structures can be retrofitted to withstand high winds by installing hurricane shutters, roof tie-downs and other storm protection features. Exterior integrity can be maintained by protecting the interior of the structure and providing stability against wind hazards associated with coastal storms. These measures can be relatively inexpensive and simple to put in place.

Storm/Hurricane Shutters: Evidence from previous hurricanes has shown that plywood boards used for last minute protection can become flying missiles as they are torn off, creating an added hazard. Broken windows can expose buildings to internal pressurization from hurricane force winds, causing roofs to explode and walls to collapse. Properly installed storm panels remain strongly secure and cannot be pulled away from window frames and doors during powerful storms. Accordions shutters, have a unique, interlocking folding blade system, designed to cover large spans and fold away for a unobstructed view. The accordion shutter provides maximum storm protection. These shutters may have a key-lock feature for security needs.

The Rolling Shutter, based on European design, was re-engineered for U.S. consumers to concentrate on the need for storm protection and security. Many vendors meet the Southeast U.S. building codes regarding storm shutters. Made of impact resistant PVC or aluminum, shutters provide a dependable and effective line of defense against flying debris during storms as well as a reliable deterrent for burglars and vandals. It is also effective for agencies with no manpower to install shutters, especially for a multi-story building.

Corrugated metal panel shutters provide a rigid deterrent blocking driving winds, rain and flying debris. This design requires minimal storage space.

- Made from durable aluminum-formed materials.
- Must be properly anchored, as per manufacturer installation procedure. Use of simple dry wall screws and other weak fasteners will lead to failure.

Most building codes do not address the issue of a wind-resistant soffit. Failed soffits, along with collapsed non-wind resistant garage doors, are a major source of failed building envelopes, particularly roof sheathing. Horizontal rain also causes interior flooding, with no other failure of building envelope. Standard soffit is a panel of aluminum or vinyl slipped into a track lightly fastened to roof overhang frame.

- High-tech solution is not required to solve this problem.
- Using conventional construction technique, installation of either a strong metal or strong wood framing behind the soffit is sufficient. Wood framing should be at least the standard 2" x 4" dimensioned lumber, properly fastened, using hurricane type straps and tees properly nailed. This should be more than adequate. Soffit should be nailed with rim shank nail with full heads, or screwed with full-head stainless deck screws (#8) with sufficient penetration of frame, least one inch or more.
- Alternatively, heavy plywood could be use, using a traditional opening for soffit vents. Vents should be nailed or screwed as above.

Retrofitting Garage Doors: Failure of garage doors is a major cause of failure of the building envelope. Garage door failure usually results in a blow out of the roof sheath or complete failure of the building. A 1 percent opening is needed to cause building failure. New hurricane-rated garage doors come with vertical bracing. Bracing must be manually installed prior to a wind event. Existing garage doors can be retrofitted with bracing. Large garage doors may require 3 or more braces.

For large rollup doors, hurricane-rated doors are available.

Roofing – high performance metal: offers higher performance than standard metal roofing, up to 200 mph, stamped and certified; 2.5" standing seam metal roof using concealed floating clips that can be attached to any surface, even without removal of buildup.

Roofing – HVHZ rated Modified Bitumen System: So-called Hurricane Roof can be engineered for 300 mph rated, stamped and documented. This is especially important in High Velocity Hurricane Zone (HVHZ). Should be used with hurricane-rated flashing, coping, gutters, downspouts, hurricane-rated HVAC stands, etc. Uses 5-ply

modified bitumen built up roofing using polymer enhanced high performance plies and polyer and rubber enhanced asphalt (500-1000% elasticity). This is applied over insulated concrete (using special fasteners) and polystyrene insulation, which is placed over 3-ply modified bitumen built up roof, over densdeck (gymsum), properly fastened to roof decking with special fasteners.

HVAC – Hurricane-rated stands: Hurricane rated and certified, as per ASCE 7 - 98 Exposure C (150 mph) includes cable to strap HVAC unit system includes joist/truss stiffener requirement.

Hurricane/Tornado rated exit doors: Multi-point locking door and frame meeting high wind standards and meeting legal requirements for exit doors.

Pre-engineered metal buildings can be strengthened using the following techniques:

- Increase the number of purlins and grits, by doubling. Spacing should be at least to 3 feet apart. Purlins and grits should increase for gabled/building ends.
- Specify 80,000 psi tensile strength paneling, instead of industry-common 30,000 or 50,000 psi panels.
- Use cable cross bracing at every opportunity (ceiling, walls, etc.)
- Require garage doors to be at least Florida “B” standards (door should be dogged at perimeter location or reinforced with vertical bracing)
- Paint zee’s and cee’s, to prevent rust induced failure in future.
- Use #14, instead of industry standard #12 fasteners.
- Wind bents – rigid metal frame support, in lieu of wind column, where “X” bracing cannot be used.
- Wind Column – fixed base columns used to transfer the end-wall forces to the concrete slab in buildings that cannot be "X" braced by cables or lack enough sheeting to provide diaphragm strength. Requires special concrete design in order to function properly.

Another cost effective retrofitting technique is installation of generators. By providing power with generators during and after severe storms many critical facilities may continue to provide necessary services to the community. The installation of generators serves to assist the communities with problems experienced from floods, hurricanes and tornadoes.

Electrical Distribution: Another retrofitting technique is to bury electric power lines to avoid tree limbs falling on them or from wind damage resulting in a break in service to the consumer. However, burying is not always feasible. To provide wind protection for a power line, one option is to have two conductor lines twisted together instead of one high-voltage transmission line conductor. Sizing is based on

impedance and load capacity of wire. Two conductors are stronger than single conductors, so lines resist high-wind loads, resisting galloping/oscillation (two lines dampen each other out) and handles increase ice load. Additional projects include:

- Replace old style copper conductor with aluminum conductor for short span, or aluminum conductor steel reinforced (ACSR) for long span. ACSR is very strong and seldom breaks, even under high wind load
- Replace standard southern yellow pine poles with spun concrete. Almost no spun concrete pole failed during Hurricanes Charley, Frances, Ivan and Jeanne.
- Replace wooden cross arms with line post polymeric insulator, which seldom break and do not have high-wind profile of cross arm
- Add more guide wire support for poles
- Add Aeolian Dampeners, commonly called dog bones, to high voltage line in order to stop oscillation (galloping) which can tear lines and poles.
- Have replacement poles installed in random spacing. Random span spacing would stop standing harmonic wave that may destroy line (e.g. first span maybe 300 feet apart, next maybe 294 feet, next maybe 310 feet apart.) Random span spacing would stop standing harmonic wave that may destroy line from galloping
- Make sure electrical coop is rebuilt with top static line, plus adequate grounding. This line is used to intercept lightning strikes. Some small coops may omit this important item.

B. Special Multi-Jurisdictional Strategy and Considerations

The components of this plan, including many of the mitigation actions identified in the previous section, are designed to create a multi-jurisdictional strategy for mitigating effects of coastal storms. The vulnerabilities discussed in Chapter 2 illustrate the comprehensive nature of impacts from coastal storms. Any one event is capable of effects throughout Chatham County and its seven municipalities. Reviewing the Pre-Disaster Mitigation Critical Facility and Critical Infrastructure Assets Inventory, the 501 structures or buildings identified are controlled by utilities, local government agencies, school districts, health care organizations, independent and municipal fire departments, Federal government agencies including military installations, private educational organizations, state agencies including universities, cultural, historical and religious institutions.

Additional considerations include multiple highway and other transportation links that connect with adjacent counties to the south and west and to South Carolina to the north. Local, state and federal governments have jurisdiction regarding portions of the highway system, with the State of Georgia Department of Transportation responsible for many bridges. The Intracoastal Waterway connects north and south and, like U.S. highways, involves federal jurisdiction. CSX

Transportation System, Inc., Norfolk Southern Railroad and Amtrak, Inc., also operate within Chatham County and are governed by federal rules and regulations.

C. Local Public Information and Awareness Strategy

Insurance industry and emergency management research has demonstrated that awareness of hazards is not enough. People must know how to prepare for, respond to, and take preventive measures against threats from natural hazards. This research has also shown that a properly run local information program is more effective than national advertising or public campaigns.

Although concerted local, county and statewide efforts to inform the public exist, lives and property continue to be threatened when segments of the population remain uninformed or chose to ignore the information available. Public education serves to assist the communities with problems experienced from floods, hurricanes, and tornadoes as well as other lower priority hazards. Educating the public of these life and property saving techniques must remain a high priority item at the local, state, and federal level.

Chatham County continues to use a multi-faceted approach to informing its diverse public about coastal storms and their potential impacts. Public education efforts include an up-to-date CEMA web site; local access cable television; brochures and planning tools regarding family, business, and hospitality industry preparedness; evacuation, including transportation options and re-entry; and preparedness for the elderly, for special needs residents, and for residents with pets. CEMA offers an automatic e-mail/text alert system, "CEMA Alert," free to residents. CEMA representatives speak to community organizations and at community events. CEMA also partners with organizations to gauge residents' understanding of coastal storms and evacuation procedures. CEMA has held two Citizens' Hurricane Academy events to educate residents about coastal storms and local evacuation plans and procedures and will continue similar outreach activities in the future.

In summary, most mitigation actions will necessarily involve multi-jurisdictional considerations. Additionally, several municipality specific actions are identified above and summarized in the table below.

II. Tornado

A. Identification and Analysis of Mitigation Options

1. Structural and non-structural mitigation

Please definitions of Structural and Non-Structural mitigations in the Glossary, Annex F. Relevant examples can be found in the subsections that follow and in section E. below.

Chatham County maintains an aggressive public education and public information program using a variety of media, a system of outdoor warning sirens, and the electronic CEMA Alert to inform the public about potential, occurring and/or imminent hazards. See also section E. below.

2. Existing policies, regulations, ordinances and land use

Based on the 2009 International Building Code, construction in most of the eastern portion of Chatham County should be built to withstand 120 mile-per-hour winds. For the western portion of the county, the wind load requirement is 110 miles per hour; for construction on the coast, the wind load requirement is 130 miles per hour.

The Chatham County Code, Chapter 9, addresses manufactured mobile home parks and units. Section 9-105, Design Standards for New Manufactured Home Parks, requires that the area of a manufactured home stand be improved to provide adequate support for the placement and tie-down of the manufactured home, to secure it against uplift, sliding, rotation, and overturning. It further states that each manufactured home stand shall have tie-downs or other devices securing the stability of the manufactured home base on the requirements of the Standard Building Code. Municipal construction and zoning ordinances are applicable within their respective jurisdictions.

3. Community values, historic and special considerations

As previously noted, Chatham County contains a great many historical and cultural facilities. These facilities are included within the broader critical facility list and can often be mitigated in many of the same ways as other existing buildings. However, there are certain special considerations regarding these facilities. Mitigation measures must not interfere with the historical designation of the structure. There are several federal regulations and publications that provide guidance regarding the types of alterations that can be made to historic structures.

Another special consideration in Chatham County is that of transient populations such as students who may only reside in the County for portions of the year and tourists. The mitigation actions identified by this Plan include several efforts to provide education and outreach to all persons within the County, including students and tourists. In fact, there are several outreach efforts particular to the tourist population.

4. New buildings and infrastructure

Mitigation opportunities for tornado winds are similar to mitigation measures for other wind hazards. Attention to the type of structure used in tornado-prone areas may yield benefits, particularly by avoiding highly susceptible manufactured or mobile homes.

The greatest protection is afforded by quality construction and reinforcement of walls, floors, and ceilings. Proper anchoring of walls to foundations and roofs to walls is essential for a building to withstand certain wind speeds. Code adoption by local jurisdictions, compliance by builders, and local government inspection of new homes could reduce the risk of destruction in tornado-prone areas.

Construction of safe rooms has also shown great success in protecting life and reducing injuries during tornado events. These are typically areas within an existing structure that are reinforced to serve as temporary shelters during the duration of an event. Walls and other structural components are heavily reinforced with concrete and rebar to provide an area designed to withstand high wind speeds and protect occupants from windborne debris. Safe rooms can be constructed not only in critical facilities such as police stations and hospitals but also in residential and commercial buildings. They can be built into any new structure during the construction phase which often proves to be the most cost beneficial time to do such an activity. As such the Parish will consider incorporating safe room areas into all new construction projects as well as retrofitting existing facilities to include safe room areas. All projects will be designed to meet FEMA 320 standards.

5. Existing Buildings and Infrastructure

Existing structures can be retrofitted to withstand higher winds, as described in previously. Additionally, safe rooms may be constructed in existing buildings. Safe room construction includes very specific design and engineering standards set forth by FEMA for structures to withstand tornado force winds. Retrofitting existing structures to meet safe room criteria involves making improvements to walls, roofs, window, doors, among other structural elements of the building.

Structures can be retrofitted to withstand high winds by installing roof tie-downs and other storm protection features.

Roofing – high performance metal: Much higher performance than standard metal roofing, up to 200 mph, stamped and certified. 2.5” standing seam metal roof using concealed floating clips that can be attached to any surface, even without removal of buildup.

Roofing – HVHZ rated Modified Bitumen System: So called Hurricane Roof can be engineered for 300 mph rated, stamped and documented. This is especially important in High Velocity Hurricane Zone (HVHZ). Should be used with hurricane rated flashing, coping, gutters, downspouts, hurricane rated HVAC stands, etc. Uses 5-ply modified bitumen built up roofing using polymer enhanced high performance plies and polyer and rubber enhanced asphalt (500-1000% elasticity). This is applied over insulated concrete (using special fasteners) and polystrene insulation, which is placed over 3-ply modified bitumen built up roof, over densdeck (gymsum), properly fastened to roof decking with special fasteners.

HVAC – Hurricane rated Stands:

Hurricane rated and certified, as per ASCE 7 - 98 Exposure C (150 mph) includes cable to strap HVAC unit system includes joist/truss stiffener requirement.

Hurricane/Tornado-rated external doors: Multipoint locking door and frame meeting both hurricane wind standards and also meeting legal requirements for exit doors.

Pre-engineered metal buildings can be strengthened using the following techniques:

- Increase the number of purlins and grits, by doubling. Spacing should be at least 2 – 3 feet apart. Purlins and grits should increase even more for gabled/building ends
- Specify 80,000 psi tensile strength paneling, instead of now industry common 30,000 or 50,000 psi panels.
- Use cable cross bracing at every opportunity (ceiling, walls, etc.)
- Require garage doors to be at least Florida “B” standards. (door should also be dogged at perimeter location or reinforced with vertical bracing.)
- Require building to be at least build to Miami Dade standards.
- painted zee’s and cee’s, to prevent rust induced failure in future.
- Use #14, instead of industry standard #12 fasteners.
- Wind bents – rigid metal frame support, in lieu of wind column, where “X” bracing cannot be used.
- Wind Column – fixed base columns used to transfer the end-wall forces to the concrete slab in buildings that cannot be "X" braced by cables or lack enough

sheeting to provide diaphragm strength. Requires special concrete design in order to function properly.

Another cost effective retrofitting technique is installation of generators. By providing power with generators during and after severe storms many critical facilities may continue to provide necessary services to the community. The installation of generators serves to assist the communities with problems experienced from floods, hurricanes and tornadoes.

Electrical Distribution: Another retrofitting technique is to bury electric power lines to avoid tree limbs falling on them or from wind damage resulting in a break in service to the consumer. However, burying is not always feasible. To provide wind protection for a power line, one option is to have two conductor lines twisted together instead of one high-voltage transmission line conductor. Sizing is based on impedance and load capacity of wire. Two conductors are stronger than single conductors, so lines resist high-wind loads, resisting galloping/oscillation (two lines dampen each other out) and handles increase ice load.

B. Special Multi-Jurisdictional Strategy and Considerations

The components of this plan, including many of the mitigation actions identified in the previous section, are designed to create a multi-jurisdictional strategy for mitigating effects of tornadoes. The vulnerabilities discussed in Chapter 2 illustrate the comprehensive nature of impacts from a tornado. An event is capable of affecting multiple jurisdictions in Chatham County. Reviewing the Pre-Disaster Mitigation Critical Facility and Critical Infrastructure Assets Inventory, the 501 structures or buildings identified are controlled by utilities, local government agencies, school districts, health care organizations, independent and municipal fire departments, Federal government agencies including military installations, private educational organizations, state agencies including universities, cultural, historical and religious institutions.

Additional considerations include multiple highway and other transportation links that connect with adjacent counties to the south and west and to South Carolina to the north. Local, state and federal governments have jurisdiction regarding portions of the highway system, with the State of Georgia Department of Transportation responsible for many bridges. The Intracoastal Waterway connects north and south and, like U.S. highways, involves federal jurisdiction. CSX Transportation System, Inc., Norfolk Southern Railroad and Amtrak, Inc., also operate within Chatham County and are governed by federal rules and regulations.

In summary, most mitigation actions will necessarily involve multi-jurisdictional considerations. Additionally, several municipality specific actions are identified above and summarized in the table below.



C. Local Public Information and Awareness Strategy

Chatham County continues to use a multi-faceted approach to informing its diverse public about tornadoes and their potential impacts. Public education efforts include an up-to-date CEMA web site; brochures regarding family, business, and hospitality industry preparedness; information about and monthly tests of emergency warning sirens; and preparedness for the elderly, for special needs residents, and for residents with pets. CEMA offers an automatic e-mail/text alert system, “CEMA Alert,” free to residents. CEMA representatives speak to community organizations and at community events. CEMA also partners with local organizations to gauge residents’ understanding of local hazards and preparedness measures and participates in regional and state hazard awareness campaigns.

III. Rainwater Flooding

A. Identification and Analysis of Mitigation Options

1. Structural and non-structural mitigation

See definitions of Structural and Non-Structural mitigations in the Glossary, Annex F. See subsection 2. below for policy-related mitigation approaches and section E. below for public awareness approaches.

With sufficient warning of a flood, a community and its residents can take protective measures such as moving personal property, cars, and people out of harm's way. When a flood threat recognition system is combined with an emergency response plan that addresses the community's flood problems, considerable flood damage can be prevented. This system must be coupled to warning the general public, carrying out appropriate tasks, and coordinating the flood response plan with operators of critical facilities. A comprehensive education and outreach program is critical to the success of early warning systems so that the general public, operators of critical facilities, and emergency response personnel will know what actions to take when warning is disseminated.

Chatham County maintains an aggressive public education and public information program using a variety of media, a system of outdoor warning sirens, and the electronic CEMA Alert to inform the public about potential, occurring and/or imminent hazards. See also section E. below.

2. Existing policies, regulations, ordinances and land use

Improved floodplain management, including land use planning, zoning, and enforcement at the local level can reduce flood related damages for both existing buildings and new development. The use of the National Flood Insurance Program (NFIP) is critical to the reduction of future flood damage costs to the taxpayer.

About 21 percent of Chatham County is located in the 100-year floodplain. Developments require a permit to include buildings, fill, and any other type development. Municipal construction and zoning ordinances are applicable within their respective jurisdictions.

The NFIP requires that when the cost of reconstruction, rehabilitation, addition, or other improvements to a building equals or exceeds fifty percent of the fair market value, then the building must meet the same construction requirements as a new building. Substantially damaged buildings must be brought up to new construction

standards. A residence or building damaged so that the cost of repairs equals or exceeds fifty percent of the structure's fair market value must also be elevated above the Base Flood Elevation (BFE) in flood zones where BFE's are available.

Chatham County joined the NFIP in 1976. According to the National Flood Insurance Community Status Book, all of the municipalities within Chatham County participate in the NFIP. Floodplain managers in four municipalities enforce municipal floodplain ordinances. As listed in the Georgia Association of Floodplain Managers' 2009 Directory of Flood Officials, officials are employed by the cities of Savannah, Port Wentworth, Pooler, and Tybee Island. Floodplain management ordinances are intended to address methods and practices to minimize flood damage to new and substantial home improvement projects as well as address zoning and subdivision ordinances and state regulations.

Within floodplain management as a whole, the education process must play an important role. As noted above, an effective education program can show citizens the importance of building codes and ordinances and how cost effective they could be in reducing future damages.

Established through the NFIP, the Community Rating System (CRS) is a program that counties and municipalities can elect to join. Once a county has joined, participants receive a discount on their flood insurance premiums. As a result of being part of the CRS, the County actively pursues public outreach programs. One of the requirements of CRS is an annual outreach project, such as a Repetitive Loss Outreach Program. This program focuses on repetitive loss areas within the County and consists of three main components: The first is to advise the homeowners that they live in a repetitive loss area and could be subject to flooding. The second is to give the homeowner appropriate property protection measure guidelines. The third is to make the homeowner aware of the basic facts about flood insurance.

The County and the City of Savannah's Flood Damage Prevention ordinances require that all construction, additions, conversions and/or development located in areas of special flood hazard comply with certain minimum standards to minimize damage from floods. Houses and certain other structures are required to be built at or above the 100-year base flood elevation. The County Zoning Ordinance requires that building permits be obtained from the County Department of Building Safety and Regulatory Services. The County Storm Water Management Ordinance and City of Savannah restrict placement of fill in special flood hazard areas. The County Land Disturbing Activities (LDA) provision requires permits for certain land disturbing activities and requires soil erosion control for construction even if an LDA permit is not required.

Additional relevant County regulations (not mentioned above) include Subdivision Regulations, Right-of-Way Encroachment Ordinance, Mapped Streets Ordinance, Well Ordinance, Wetlands Protection Ordinance, and Groundwater Recharge Protection Ordinance, as well as County Department of Engineering Policies.

The City of Savannah Real Property Services Department (RPS) maintains an ongoing property buyout program designed to remove damaged structures and return property to green space to reduce or eliminate flood problems in impacted neighborhoods. RPS administers FEMA grants for acquisition and demolition of flood-damaged properties through the Severe Repetitive Flood program (75 percent federal funding; 25 percent local funding). RPS also assists the Stormwater Management Department in the acquisition of property for drainage improvements.

3. Community values, historic and special considerations

As previously noted, Chatham County contains a great many historical and cultural facilities. These facilities are included within the broader critical facility list and can often be mitigated in many of the same ways as other existing buildings. There are certain special considerations regarding these facilities. Local historic ordinances include the Mid-City (Thomas Square) District Zoning Ordinance, City of Savannah Historic Preservation Ordinance, Victorian District Design Manual, and Pin Point Historic District Ordinance. A list of local zoning codes and ordinances is available from the MPC. Mitigation measures undertaken must not interfere with the historical designation of the structure. There are several federal regulations and publications that provide guidance regarding the types of alterations that can be made to these structures.

Additionally, the City of Savannah Flood Mitigation Plan includes a detailed analysis of the vulnerability of historic structures to flooding by National Register Historic District. As in many communities with flood-prone areas, education, resources and activities focus on both flood mitigation in historically low property value areas, where residents have few resources to initiate mitigation, as well as previously undeveloped areas newly attractive to residential construction because of population growth. Another special consideration in Chatham County is that of transient populations such as students who may only reside in the County for portions of the year and tourists. Mitigation actions identified by this plan include several efforts to provide education and outreach to all persons within the County, including students and tourists. In fact, there are several outreach efforts particular to the tourist population.

4. New Buildings and Infrastructure

The greatest protection is afforded by quality construction and compliance with NFIP requirements or beyond. Code adoption by local jurisdictions, compliance by builders, and local government inspection of new homes could reduce the risk of flooding.

5. Existing Buildings and Infrastructure

Retrofitting structures prone to periodic flooding is an effective mitigation technique to reduce damage to property. Techniques include the elevation of structures, acquisition, mitigation reconstruction, dry flood proofing, wet flood proofing, and drainage improvements.

Elevation involves raising a structure on a new foundation so that the lowest floor is above the Base Flood Elevation (BFE). Almost any type and size of structure can be elevated.

Acquisition of structures or "buyout" option is the most effective mitigation technique to reduce the loss of property due to flooding. The owners of repetitive flood loss structures sell their structure to the community on a cost share basis for the fair market value of the structure prior to the last flood event. The structure is removed/demolished and a deed restriction is placed on the property for perpetuity, thus eliminating the structure from future flood damage. This approach is most effective when flood prone structures located within the same vicinity are grouped together and acquired. The remaining property can be converted into usable recreational space with minor structure restrictions.

Mitigation Reconstruction is a component of the Severe Repetitive Loss (SRL) grant program that allows demolition and reconstruction of structures when traditional elevation cannot be implemented. This activity can be used for structures that were substantially damaged or destroyed. This is a pilot program utilized mainly on the Gulf Coast but can be considered a potential approach to mitigation activities.

Dry flood proofing techniques include the building of floodwalls adjacent to existing walls, the installation of special doors to seal out floodwaters, and special backflow valves for water and sewer lines. Wet flood proofing includes low cost mitigation measures such as raising air conditioners, heat pumps, and hot water heaters on platforms above the BFE.

Wet flood proofing includes measures applied to a structure that prevent or provide resistance to damage from flooding while allowing floodwaters to enter the structure

or area. Generally, this includes properly anchoring the structure, using flood resistant materials below the BFE, protection of mechanical and utility equipment, and use of openings or breakaway walls. Application of wet flood proofing as a flood protection technique under the NFIP is limited to enclosures below elevated residential and non-residential structures and to accessory and agricultural structures that have been issued variances by the community.

Improving drainage capacity around roads and low-lying areas is a time-tested technique to mitigate flood damage. Maintenance of drainage canals and laterals is essential to maximize their efficiency and continued long term effectiveness. Actions in general to reduce the effects of flooding are widening and deepening the earthen canals, cleaning of existing ditches, and replacing existing culverts, upgrading pumps, and installing check valves and inverts in certain culverts. Maintaining and improving drainage serves to assist the communities with problems experienced from floods, high winds, and severe storms.

B. Special Multi-Jurisdictional Strategy and Considerations

The components of this plan, including many of the mitigation actions identified in the previous section, are designed to create a multi-jurisdictional strategy for mitigating effects of flooding. The vulnerabilities discussed in Chapter 2 illustrate the comprehensive nature of impacts from flood events. Any one event is capable of effects throughout Chatham County and its seven municipalities. Reviewing the Pre-Disaster Mitigation Critical Facility and Critical Infrastructure Assets Inventory, the 501 structures or buildings identified are controlled by utilities, local government agencies, school districts, health care organizations, independent and municipal fire departments, Federal government agencies including military installations, private educational organizations, state agencies including universities, cultural, historical and religious institutions.

Additional considerations include the multiple highway and other transportation links connect with adjacent counties to the south and west, and to South Carolina to the north. The State of Georgia Department of Transportation has jurisdiction on many of the highways. The Intracoastal Waterway connects north and south and, like U.S. highways, involves federal jurisdiction. CSX Transportation System, Inc., Norfolk Southern Railroad and Amtrak, Inc., also operate within Chatham County and are governed by federal rules and regulations.

In summary, most mitigation actions will necessarily involve multi-jurisdictional considerations. Additionally, several municipality specific actions are identified above and summarized in the table below.

C. Local Public Information and Awareness Strategy

CEMA and multiple other local agencies provide information to residents, including homeowners, and businesses regarding flooding issues, mitigation, and flood safety on an ongoing basis and using a variety of means, including brochures, web pages, and public access cable television. Both CEMA and the Chatham County Engineer's office, for example, provides Chatham County flood facts on their web sites (see http://www.chathamcounty.org/ten_flood_facts.html) addressing issues including flood risk, flood insurance, permitting, and stormwater drainage.

IV. Storm Surge

A. Identification and Analysis of Mitigation Options

1. Structural and non-structural mitigation

See definitions of Structural and Non-Structural mitigations in the Glossary, Annex F. Relevant examples can be found in the subsections that follow and in section E. below.

Chatham County maintains an aggressive public education and public information program using a variety of media, a system of outdoor warning sirens, and the electronic CEMA Alert to inform the public about potential, occurring and/or imminent hazards. See section E. below.

2. Existing policies, regulations, ordinances and land use

The Chatham County Flood Damage Prevention Ordinance, Section E, addresses issues related to Coastal High Hazard Areas (V-Zones). The ordinance states that all new construction and substantial improvements of existing structures in a V Zone shall be:

- located a minimum of 25 feet landward of the reach of mean high tide
- elevated on piles, columns, or shear walls parallel to the flow of water to that the bottom of the lowest supporting horizontal structural member is located no lower than one foot above the base flood elevation.
- Anchored to resist flotation, collapse, and lateral movement from the combined effects of wind and water loads acting simultaneously on all building components.

Municipal construction and zoning ordinances are applicable within their respective jurisdictions.

3. Community values, historic and special considerations

Chatham County values its coastal location and its historic structures. Because the area has not seen a direct hit from a major hurricane in recent memory, there may be a tendency among residents to minimize the potential threat from storm surge. As previously noted, Chatham County contains multiple historical and cultural facilities. These facilities are included within the broader critical facility list and can often be mitigated in many of the same ways as other existing buildings. However, there are certain special considerations regarding these facilities. Mitigation measures undertaken must not interfere with the historical designation of the structure. Local historic ordinances include the Mid-City (Thomas Square) District Zoning Ordinance, City of Savannah Historic Preservation Ordinance, Victorian District Design Manual, and Pin Point Historic District Ordinance. A list of local zoning codes and ordinances is available from the MPC. There are several federal regulations and publications that provide guidance regarding the types of alterations that can be made to historic structures.

Another special consideration in Chatham County is that of transient populations such as students who may only reside in the County for portions of the year and tourists. Mitigation actions identified by this plan include several efforts to provide education and outreach to all persons within the County, including students and tourists. There are several outreach efforts targeting the tourist population.

4. New Buildings and Infrastructure

With a clear understanding of the storm surge hazard, Chatham County works toward preventing or reducing future damages. Mitigation measures to address new construction include:

Educational Outreach: develop and conduct educational outreach programs to educate residents in the potential storm surge zone.

SLOSH modeling: conduct detailed modeling to identify potential storm surge heights and provide direction for future coastal development.

Building Codes: adopt building codes using a flood protection elevation which is based on maximum surge levels and incorporating appropriate building materials such as breakaway walls on the lower level of elevated homes.

5. Existing Buildings and Infrastructure

Depending upon the expected depth of the storm surge, retrofitting structures can be an effective mitigation technique to reduce damage to property. Techniques include the elevation of structures, acquisition, and mitigation reconstruction.

Elevation involves raising a structure on a new foundation so that the lowest floor is above the Base Flood Elevation (BFE). Almost any type and size of structure can be elevated.

Acquisition of structures: Also called a buyout option is the most effective mitigation technique to reduce the loss of property due to flooding. The owners of repetitive flood loss structures sell their structure to the community on a cost share basis for the fair market value of the structure prior to the last flood event. The structure is removed/demolished and a deed restriction is placed on the property for perpetuity, thus eliminating the structure from future flood damage. This approach is most effective when flood prone structures located within the same vicinity are grouped together and acquired. The remaining property can be converted into usable recreational space with minor structure restrictions.

Mitigation Reconstruction is a component of the Severe Repetitive Loss (SRL) grant program that allows demolition and reconstruction of structures when traditional elevation cannot be implemented. This activity can be used for structures that were substantially damaged or destroyed. Currently this is a pilot program utilized mainly on the gulf coast but can be considered a potential approach to mitigation activities.

B. Special Multi-Jurisdictional Strategy and Considerations

The components of this plan, including many of the mitigation actions identified in the previous section, are designed to create a multi-jurisdictional strategy for mitigating effects of storm surge. The vulnerabilities discussed in Chapter 2 illustrate the comprehensive nature of impacts from storm surge and coastal storms. Any one event is capable of effects throughout Chatham County and its seven municipalities. Reviewing the Pre-Disaster Mitigation Critical Facility and Critical Infrastructure Assets Inventory, the 501 structures or buildings identified are controlled by utilities, local government agencies, school districts, health care organizations, independent and municipal fire departments, Federal government agencies including military installations, private educational organizations, state agencies including universities, cultural, historical and religious institutions.

Additional considerations include multiple highway and other transportation links that connect with adjacent counties to the south and west and to South Carolina to the north. Local, state and federal governments have jurisdiction regarding portions of the highway system, with the State

of Georgia Department of Transportation responsible for many bridges. The Intracoastal Waterway connects north and south and, like U.S. highways, involves federal jurisdiction. CSX Transportation System, Inc., Norfolk Southern Railroad and Amtrak, Inc., also operate within Chatham County and are governed by federal rules and regulations.

In summary, most mitigation actions will necessarily involve multi-jurisdictional considerations. Additionally, several municipality specific actions are identified above and summarized in the table below.

C. Local Public Information and Awareness Strategy

Chatham County continues to use a multi-faceted approach to informing its diverse public about storm surge and related impacts. Public education efforts include an up-to-date CEMA web site; brochures regarding family, business, and hospitality industry mitigation and preparedness; information about evacuation procedures, including transportation options and reentry; and preparedness for the elderly, for special needs residents, and for residents with pets. CEMA offers an automatic e-mail/text alert system, “CEMA Alert,” free to residents. CEMA representatives speak to community organizations and at community events and supports efforts to preserve natural protective barriers. CEMA also partners with local organizations to gauge residents’ understanding of local hazards and mitigation measures and participates in regional and state hazard awareness campaigns.

V. Fire

A. Identification and Analysis of Mitigation Options

1. Structural and non-structural mitigation

See definitions of Structural and Non-Structural mitigations in the Glossary, Annex F. Relevant examples can be found in the subsections that follow and in section E. below.

Chatham County maintains an aggressive public education and public information program using a variety of media, a system of outdoor warning sirens, and the electronic CEMA Alert to inform the public about potential, occurring and/or imminent hazards. See section E. below.

2. Existing policies, regulations, ordinances and land use

Georgia and Chatham County have adopted the International Building Code with Georgia amendments. The Building Code Ordinance for Chatham County is found in Section 20 of the Chatham County Code and includes county building-related fire ordinances. The county has adopted the Technical Standards and Provisions of the National Electric Code promulgated by the National Fire Protection Association, 1990 Edition and future state-adopted editions, regarding electrical equipment and installation. Additional municipal construction and zoning ordinances may be applicable within their respective jurisdictions.

Section 102.5 of the International Building Code states that provisions of the code are “not mandatory for buildings or structures classified by the state, or as appropriate, by the local jurisdiction, as historic buildings when such buildings are judged by the fire code official to be safe and in the public interest of health, safety and welfare.”

Additional local historic ordinances may also be applicable and include the Mid-City (Thomas Square) District Zoning Ordinance, City of Savannah Historic Preservation Ordinance, Victorian District Design Manual, and Pin Point Historic District Ordinance. A list of local zoning codes and ordinances is available from the MPC.

3. Community values, historic and special considerations

As previously noted, Chatham County contains many historical and cultural facilities. These facilities are included within the broader critical facility list and can often be mitigated in many of the same ways as other existing buildings. However, there are certain special considerations regarding these facilities. Mitigation measures

undertaken must not interfere with the historical designation of the structure. There are several federal regulations and publications that provide guidance regarding the types of alterations that can be made to these structures.

Another special consideration in Chatham County is that of transient populations such as students who may only reside in the County for portions of the year and tourists. The mitigation actions identified by this Plan include several efforts to provide education and outreach to all persons within the County, including students and tourists. In fact, there are several outreach efforts particular to the tourist population.

4. New and existing buildings and infrastructure

Fireproofing is a passive fire protection measure. Typically, this could include making materials or structures more fire resistant, materials themselves fire resistant, or the process of coating such materials. Applying a certification listed fireproofing system to certain structures allows these to have a fire-resistance rating.

The term fireproof does not necessarily mean that an item cannot ever burn: It relates to measured performance under specific conditions of testing and evaluation. Fireproofing does not allow treated items to be entirely unaffected by any fire, as conventional materials are not immune to the effects of fire at a sufficient intensity and/or duration.

A cost effective method is use of water-based, intumescent fire retardant and fire resistant coating (i.e. paint). Intumescent paint is available to withstand extreme temperatures (up to 2000 degrees Fahrenheit) for two hours. It can be applied as a fire barrier to typical building materials such as sheetrock, wood, lath and plaster, concrete, sheet metal, tin, foam, foam composite panels, plus fiberglass and carbon fiber. These coatings are available as a ready to apply paint (apply at level of 100-200 square feet per gallon) or as an additive that can be added to any standard latex paint. They should be applied the exterior and interior of the building. Especially for historic buildings, they can be used in lieu of fire sprinklers. Often fire insurance rates can be substantially lowered. If used in building, once the fuel that is burning is consumed, the structure is left standing, ready to be cleaned up and re-occupied.

Safety zones can be created around structures by reducing or eliminating brush, trees, and vegetations around a home or facility. FEMA recommends using a 30-foot safety zone, including keeping grass below 2 feet tall and clearing all fallen leaves and branches promptly.

Fire Breaks: roads and trails can be planned so as to serve a dual function as firebreaks. Firebreaks are areas of inflammable materials that create a fuel break and reduce the ability for fires to spread.

B. Special Multi-Jurisdictional Strategy and Considerations

The components of this plan, including many of the mitigation actions identified in the previous section, are designed to create a multi-jurisdictional strategy for mitigation. The vulnerabilities discussed in Chapter 2 illustrate the comprehensive nature of impacts from fire. An event is capable of affecting multiple jurisdictions. Reviewing the Pre-Disaster Mitigation Critical Facility and Critical Infrastructure Assets Inventory, the 501 structures or buildings identified are controlled by utilities, local government agencies, school districts, health care organizations, independent and municipal fire departments, Federal government agencies including military installations, private educational organizations, state agencies including universities, cultural, historical and religious institutions.

Additional considerations include multiple highway and other transportation links that connect with adjacent counties to the south and west and to South Carolina to the north. Local, state and federal governments have jurisdiction regarding portions of the highway system. The Intracoastal Waterway connects north and south and, like U.S. highways, involves federal jurisdiction. CSX Transportation System, Inc., Norfolk Southern Railroad and Amtrak, Inc., also operate within Chatham County and are governed by federal rules and regulations.

In summary, most mitigation actions will necessarily involve multi-jurisdictional considerations. Additionally, several municipality specific actions are identified above and summarized in the table below.

C. Local Public Information and Awareness Strategy

Chatham County continues to use a multi-faceted approach to informing its diverse public about fire hazards. Public education efforts include up-to-date CEMA and fire department web sites; local access cable television; brochures regarding family, business, and hospitality industry mitigation and preparedness; information about and monthly tests of emergency warning sirens; and an automatic e-mail/text alert system, “CEMA Alert,” which is free to residents. CEMA representatives speak to community organizations and at community events. CEMA also partners with local organizations to gauge residents’ understanding of local hazards and mitigation measures and participates in regional and state hazard awareness campaigns. Local fire departments offer educational outreach on structural and wildfire prevention, including information on fire-safe building practices.

VI. Hazardous Materials Incident

A. Identification and Analysis of Mitigation Options

1. Structural and non-structural mitigation

See definitions of Structural and Non-Structural mitigations in the Glossary, Annex F. Relevant examples can be found in the subsections that follow and in section E. below.

Chatham County maintains an aggressive public education and public information program using a variety of media, a system of outdoor warning sirens, and the electronic CEMA Alert to inform the public about potential, occurring and/or imminent hazards. See section E. below.

2. Existing policies, regulations, ordinances and land use

Existing regulations govern hazardous materials identification, storage, use, transport, and cleanup and include federal regulations promulgated by the U.S. Environmental Protection Agency (EPA), U.S. Department of Transportation (for hazmat transport) and the Occupational Safety and Health Administration (OSHA) as well as state Department of Natural Resources Environmental Protection Division (EPD) regulations and the Chatham County Code.

Chatham County is held accountable to the Georgia State Minimum Standard Fire Code (International Fire Code with Georgia State Amendments), which establishes regulations affecting or relating to structures, processes and premises and safeguards from the hazards of fire and explosion arising from the storage, handling or use of structures, materials or devices; from conditions hazardous to life, property or public welfare in the occupancy of structures or premises; and from fire hazards in the structure or on the premise from occupancy or operation. It also applies to the construction, extension, repair, alteration or removal of fire suppression and alarm systems. Additional municipal construction and zoning ordinances may be applicable within their respective jurisdictions.

3. Community values and historic and special considerations

As previously noted, Chatham County is home to many historical and cultural facilities, a number of which are in close proximity to hazardous materials sites or transportation routes. There are federal regulations and publications that provide guidance regarding the types of alterations that can be made to historical and cultural structures.

Another special consideration in Chatham County is that of transient populations such as students who may only reside in the County for portions of the year and tourists. The mitigation actions identified by this plan include several efforts to provide education and outreach to all persons within the County, including students and tourists.

4. New and existing buildings and infrastructure

Codes and Standards: Ensure that adequate training and enforcement of rules, regulations and standards are being carried out within the appropriate industries and facilities. This includes public outreach and education.

B. Special Multi-Jurisdictional Strategy and Considerations

The components of this plan, including many of the mitigation actions identified in the previous section, are designed to create a multi-jurisdictional strategy for mitigating effects of hazardous materials incidents. The vulnerabilities discussed in Chapter 2 illustrate the comprehensive nature of impacts from a hazardous material release. An event is capable of effects in multiple locations in Chatham County. Reviewing the Pre-Disaster Mitigation Critical Facility and Critical Infrastructure Assets Inventory, the 501 structures or buildings identified are controlled by utilities, local government agencies, school districts, health care organizations, independent and municipal fire departments, Federal government agencies including military installations, private educational organizations, state agencies including universities, cultural, historical and religious institutions.

Additional considerations include multiple highway and other transportation links that connect Chatham County and its multiple hazardous material sites with areas to the south and west and to South Carolina to the north. Local, state and federal governments have jurisdiction regarding portions of the highway system, with the State of Georgia Department of Transportation responsible for many bridges. The Intracoastal Waterway connects north and south and, like U.S. highways, involves federal jurisdiction. CSX Transportation System, Inc., Norfolk Southern Railroad and Amtrak, Inc., also operate within Chatham County and are governed by federal rules and regulations.

In summary, most mitigation actions will necessarily involve multi-jurisdictional considerations. Additionally, several municipality specific actions are identified above and summarized in the table below.



C. Local Public Information and Awareness Strategy

Insurance industry and emergency management research has demonstrated that awareness of hazards is not enough. Developing and conducting educational outreach programs on the associated risks that close proximity to these facilities presents. Chatham County continues to use a multi-faceted approach to informing its diverse public about hazardous materials and their potential impacts. Public education efforts include up-to-date CEMA and other web sites; local access cable television; brochures; information regarding evacuation and shelter-in-place; and information about and monthly tests of emergency warning sirens. CEMA offers an automatic e-mail/text alert system, “CEMA Alert,” free to residents. CEMA representatives speak to community organizations and at community events. CEMA also partners with local organizations to gauge residents’ understanding of local hazards and mitigation and preparedness measures and participates in regional and state hazard awareness campaigns. The County has an active Local Emergency Planning Committee (LEPC) that addresses issues related to hazardous materials.

VII. Terrorism

A. Identification and Analysis of Mitigation Options

1. Structural and non-structural mitigation

See definitions of Structural and Non-Structural mitigations in the Glossary, Annex F. Relevant examples can be found in the subsections that follow and in section E. below.

Chatham County maintains an aggressive public education and public information program using a variety of media, a system of outdoor warning sirens, and the electronic CEMA Alert to inform the public about potential, occurring and/or imminent hazards. See section E. below.

2. Existing policies, regulations, ordinances and land use

Acts of terrorism fall under federal, state and local criminal laws, and terrorism prevention on a day-to-day basis is in the hands of facility security personnel and local, state and federal law enforcement agencies. Multiple programs exist to prevent or mitigate damage from acts of terrorism, including efforts to improve security for 17 sectors of critical infrastructure under the National Infrastructure Protection Plan (NIPP) and sector-specific plans as part of that program. Energy, chemical, water resource, transportation and government facilities have sector-specific planning efforts and expectations under the NIPP.

Regarding military installations, U.S. Department of Defense Instruction, 2000.16, Antiterrorism Standards include:

- DoD Standard 10: Potential Threat of Terrorist Use of Weapons of Mass Destruction (WMD)
- DoD Standard 14: Commanders shall maintain a comprehensive AT program for those personnel and assets for which they have AT responsibilities.
- DoD Standard 15: Terrorism Threat Assessment
- DoD Standard 16: Antiterrorism Physical Security Measures
- DoD Standard 26: Vulnerability Assessments of Installations
- DoD Standard 29: Facility and Site Evaluation and/or Selection Criteria

As noted above, the *Georgia State Minimum Standard Fire Code* (International Fire Code with Georgia State Amendments) is applicable in Chatham County. The *Georgia State Minimum Standard Fire Code* establishes regulations affecting or

relating to structures, processes and premises and safeguards from the hazards of fire and explosion arising from the storage, handling or use of structures, materials or devices; from conditions hazardous to life, property or public welfare in the occupancy of structures or premises; and from fire hazards in the structure or on the premise from occupancy or operation.

Section 2703.9.2 states that security, storage, dispensing, use and handling areas shall be secured against unauthorized entry and safeguarded in a manner approved by the fire code official.

Section 2703.9.3 addresses protection from vehicles and states that guard posts or other approved means shall be provided to protect storage tanks and connected piping, valves and fittings; dispensing areas; and use areas subject to vehicular damage.

Other relevant guidance includes:

- *Recommendations for Bridge and Tunnel Security*, U.S. Department of Transportation Federal Highway Administration, 2007.
- *Protective Measures Infrastructure Category: Maritime Transportation*, U.S. Department of Homeland Security, 2005.
- *Protective Measures Infrastructure Category: Chemical and Hazardous Materials Industry*, U.S. Department of Homeland Security, 2005.

3. Community values and historic and special considerations

As previously noted, Chatham County contains many historical and cultural facilities, as well as significant economic drivers associated with riverport operations in the county. Port operations, including two Georgia Ports Authority (GPA) facilities, and numerous other manufacturing and distribution facilities associated with the riverport could be targets of sabotage or terrorist attack or could be used as an entry port for individuals seeking to bring dangerous materials into the U.S. covertly. Chatham County's port facilities and many of its historic, cultural, and tourist sites are within close physical proximity.

Historic and cultural facilities are included within the broader critical facility list and can often be mitigated in many of the same ways as other existing buildings. However, there are certain special considerations regarding these facilities. Mitigation measures must not interfere with the historical designation of the structure. Local historic ordinances include the Mid-City (Thomas Square) District Zoning Ordinance, City of Savannah Historic Preservation Ordinance, Victorian District Design Manual, and Pin Point Historic District Ordinance. A list of local zoning codes and ordinances

is available from the MPC. There are several federal regulations and publications that provide guidance regarding the types of alterations that can be made to these structures.

Another special consideration in Chatham County is that of transient populations such as students who may only reside in the county for portions of the year and tourists. The mitigation actions identified by this plan include several efforts to provide education and outreach to all persons within the County, including students and tourists.

4. New and existing buildings and infrastructure

The effects of terrorism can vary significantly from loss of life and injuries to property damage and disruptions in services such as electricity, water supply, public transportation, and communications. Mitigation efforts for other hazards will also help to prevent damage from terrorist incidents. This all-hazards mitigation approach builds upon existing programs that mitigate other natural and technological hazards while focusing on security of the public. With this all-hazards approach in mind, institutions can and should:

- Recognize facility vulnerabilities and find structural mitigation strategies to reduce them.
- Assess and enhance security measures at critical facilities.
- Design and install vehicle barrier systems at critical facilities.
- Implement mitigation strategies to increase security and thus reduce the attractiveness of high-profile targets.
- Implement coordinated emergency management systems, enhance regional communication, and make regional situational awareness a priority so that local and national law enforcement can effectively counter terrorist planning activities.

B. Special Multi-Jurisdictional Strategy and Considerations

The components of this plan, including many of the mitigation actions identified in the previous section, are designed to create a multi-jurisdictional strategy for mitigating effects of a terrorism incident. The vulnerabilities discussed in Chapter 2 illustrate the comprehensive nature of impacts from terrorism. An event is capable of affecting multiple jurisdictions in Chatham County. Reviewing the Pre-Disaster Mitigation Critical Facility and Critical Infrastructure Assets Inventory, the 501 structures or buildings identified are controlled by utilities, local government agencies, school districts, health care organizations, independent and municipal fire departments, Federal government agencies including military installations, private educational organizations, state agencies including universities, cultural, historical and religious institutions.

Additional considerations include multiple highway and other transportation links that connect with adjacent counties to the south and west and to South Carolina to the north. Local, state and federal governments have jurisdiction regarding portions of the highway system, with the State of Georgia Department of Transportation responsible for many bridges. The Intracoastal Waterway connects north and south and, like U.S. highways, involves federal jurisdiction. CSX Transportation System, Inc., Norfolk Southern Railroad and Amtrak, Inc., also operate within Chatham County and are governed by federal rules and regulations.

In summary, most mitigation actions will necessarily involve multi-jurisdictional considerations. Additionally, several municipality specific actions are identified above and summarized in the table below.

C. Local Public Information and Awareness Strategy

Chatham County uses a multi-faceted approach to informing its diverse public about terrorism and its potential impacts. Public education efforts include up-to-date CEMA, law enforcement, and other web sites; brochures regarding family, business, and hospitality industry preparedness; information about and monthly tests of emergency warning sirens; and preparedness for the elderly, for special needs residents, and for residents with pets. CEMA offers an automatic e-mail/text alert system, “CEMA Alert,” free to residents. CEMA representatives speak to community organizations and at community events. CEMA also partners with local organizations to gauge residents’ understanding of local natural and human-caused hazards and mitigation and preparedness measures and participates in regional and state hazard awareness campaigns.

VIII. Transportation Incidents

A. Identification and Analysis of Mitigation Options

1. Structural and non-structural mitigation

See definitions of Structural and Non-Structural mitigations in the Glossary, Annex F. Relevant examples can be found in the subsections that follow and in section E. below.

Chatham County maintains an aggressive public education and public information program using a variety of media, a system of outdoor warning sirens, and the electronic CEMA Alert to inform the public about potential, occurring and/or imminent hazards. See section E. below.

2. Existing policies, regulations, ordinances and land use

Regulations and ordinances impacting transportation incidents in Chatham County include federal, state and local laws and regulations, including Transportation Security Administration and Federal Aviation Administration regulations related to operations at the Savannah-Hilton Head International Airport and other air services within the county, and U.S. Department of Homeland Security (DHS) and U.S. Customs and Border Protection, and other federal regulations related to port operations and activities on the Savannah River. DHS also provides a Small Vessel Security Strategy.

Federal regulations, such as U.S. Department of Transportation/U.S. Coast Guard Navigation Rules, and local ordinances address management of river traffic in the navigable channel of the Savannah River.

Local, state and federal governments share responsibility for street and roadway maintenance and signage. The Georgia Department of Transportation (GDOT) has responsibility for many of the bridges in Chatham County, including maintenance and damage assessment.

U.S. Environmental Protection Agency (EPA) regulations determine the markings and procedures for hazard materials that are transported.

3. Community values, historic and special considerations

Chatham County is both a cargo transportation and distribution hub and a tourist destination. The importance of key river-related infrastructure, including port

facilities and key bridges, such as the Eugene Talmadge Memorial Bridge (U.S. Highway 17) over the Savannah River just north of historic downtown Savannah, which connects Georgia with South Carolina to the north, illustrate the relevance of mitigation for transportation incidents.

As previously noted, Chatham County contains many historical and cultural facilities. These facilities are included within the broader critical facility list and can often be mitigated in many of the same ways as other existing buildings. However, there are certain special considerations regarding these facilities. Mitigation measures must not interfere with the historical designation of structures. Local historic ordinances include the Mid-City (Thomas Square) District Zoning Ordinance, City of Savannah Historic Preservation Ordinance, Victorian District Design Manual, and Pin Point Historic District Ordinance. A list of local zoning codes and ordinances is available from the MPC, including several that address signage, which can be relevant in providing transportation-related information. There are several federal regulations and publications that provide guidance regarding the types of alterations that can be made to these structures.

Another special consideration in Chatham County is that of transient populations such as students who may only reside in the County for portions of the year and tourists. The mitigation actions identified by this plan include several efforts to provide education and outreach to all persons within the County, including students and tourists. Transient population understanding of hazards can be particularly important from the standpoint of boating and bridge safety to reduce the likelihood of transportation incidents impacting major bridges and the navigable channel of the Savannah River.

4. New and existing buildings and infrastructure

Codes and Standards: Ensure that adequate training and enforcement of rules, regulations and standards for intermodal transportation carries are being carried out within the appropriate industries and facilities. This can also include public outreach and education.

D. Special Multi-Jurisdictional Strategy and Considerations

The components of this plan, including many of the mitigation actions identified in the previous section, are designed to create a multi-jurisdictional strategy for mitigating the effects of transportation incidents. The vulnerabilities discussed in Chapter 2 illustrate the comprehensive nature of impacts from a transportation incident. An event is capable affecting multiple jurisdictions in Chatham County. Reviewing the Pre-Disaster Mitigation Critical Facility and Critical Infrastructure Assets Inventory, the 501 structures or buildings identified are controlled

by utilities, local government agencies, school districts, health care organizations, independent and municipal fire departments, Federal government agencies including military installations, private educational organizations, state agencies including universities, cultural, historical and religious institutions.

Additional considerations include multiple highway and other transportation links that connect with adjacent counties to the south and west and to South Carolina to the north. Local, state and federal governments have jurisdiction regarding portions of the highway system, with the State of Georgia Department of Transportation responsible for many bridges. The Intracoastal Waterway connects north and south and, like U.S. highways, involves federal jurisdiction. CSX Transportation System, Inc., Norfolk Southern Railroad and Amtrak, Inc., also operate within Chatham County and are governed by federal rules and regulations.

In summary, most mitigation actions will necessarily involve multi-jurisdictional considerations. Additionally, several municipality specific actions are identified above and summarized in the table below.

C. Local Public Information and Awareness Strategy

Chatham County continues to use a multi-faceted approach to informing its diverse public about transportation incidents and their potential impacts. Public education efforts include an up-to-date CEMA web site and links to Georgia Department of Transportation information; brochures regarding family, business, and hospitality industry preparedness; information about and monthly tests of emergency warning sirens; and preparedness for the elderly, for special needs residents, and for residents with pets. CEMA offers an automatic e-mail/text alert system, “CEMA Alert,” free to residents. CEMA representatives speak to community organizations and at community events about the range of hazards that could impact Chatham County. CEMA also partners with local organizations to gauge residents’ understanding of local hazards and preparedness measures and participates in regional and state hazard awareness campaigns.