Achieving Resilience through Hazard Mitigation

Applying Mitigation Measures to Apalachicola's Vulnerable Historic and Economically Significant Resources

Produced by the City of Apalachicola
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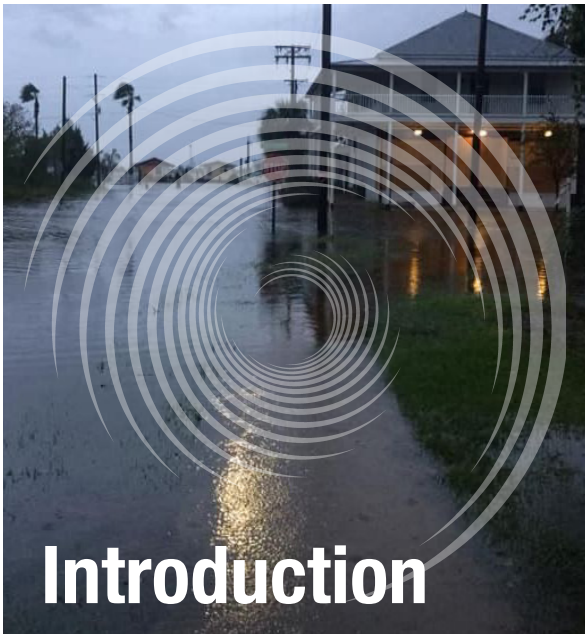
Mississippi State University – Coastal Research & Extension Center
Mississippi-Alabama Sea Grant Consortium



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The City of Apalachicola received a $60,000 hazard mitigation planning grant in 2019 from the Northern Gulf of Mexico Sentinel Site Cooperative to assess and prepare site specific analysis on 10 identified flood-vulnerable structures.

The assessments were conducted for both public and privately-owned historic and commercially-important structures located in flood risk zones. The assessments were prepared by professional, certified floodplain and historic preservation experts and involved preparing non-structural flood mitigation project recommendations for the appropriate flood mitigation adaptive project, a scope of work for the project and a preliminary construction cost estimate for the recommended mitigation measure. The purpose of the analysis was to become more resilient to future sea level rise, seasonal flooding and to reduce flood insurance rates on historic buildings in the flood zone. The mitigation/historic preservation analysis model will serve as a template for conducting similar analyses for other vulnerable properties and is designed to serve as a regional model for communities with similar challenges. The project was a collaborative effort between local and State government and private industry. Staff from the Apalachicola National Estuarine Research Reserve were instrumental in providing photography and videography services and for producing a video of the planning process which may serve as a tool for future projects such as this.

KEY STAFF

Roderick D. Scott – Director of Outreach for Ducky Johnson Home Elevation, LLC., and owner of L&R Resources, LLC. Rod Scott is a certified floodplain manager with more than 25 years of general contracting experience specializing in flood damage recovery and historic structures. Rod has personally worked on all phases of more than 300 flood hazard mitigation/elevation projects and has been published in several national floodplain and structural news and industry publications.

Mark Tarmey - A.I.A., NCARB - Mark Tarmey brings 35 years of experience in Architecture. His Masters of Architecture includes a specialization in Historic Preservation and expertise spanning from colonial wood framed and masonry construction to mid-century modern historic structures. Mark also brings a degree in Urban Design to this project which enables him to be involved in regulatory framework and zoning codes as well as the architectural and construction methods.

Cynthia Clark - Planning Consultant and owner of Bay Media Services. Cynthia Clark worked in a planning consultant capacity with the City of Apalachicola for more than 30 years and has been responsible for updating critical information that has allowed the City to stay at the forefront of floodplain management and resilience planning. Cynthia led the planning effort to complete a 2017 Vulnerability Analysis for the City and has designed/produced many of the City's environmental publications.

THE FOLLOWING STAFF OF ANERR VOLUNTEERED THEIR SERVICES TO THIS PROJECT

Josh Eaton - Coastal Training Program Specialist for the Apalachicola National Estuarine Research Reserve. Josh Eaton works to bring environmental information on important biological and ecological issues from the Reserve to community stakeholders by producing informative workshops and multimedia projects. Josh is a graduate of the University of New Orleans and is familiar with issues relating to sustainability and sea level rise.

Anita Grove - Anita Grove is the Coastal Training Program Coordinator for NOAA's Apalachicola National Estuarine Research Reserve, managed by the Florida Dept of Environmental Protection, Office of Resilience & Coastal Protection. Increased resilience of the communities they serve is a top priority for NOAA and FDEP. Anita also worked as the Executive Director, Apalachicola Bay Area Chamber of Commerce from 1997-2014, and serves as a city commissioner for Apalachicola so she understands the impact disasters can have on a city's economy.

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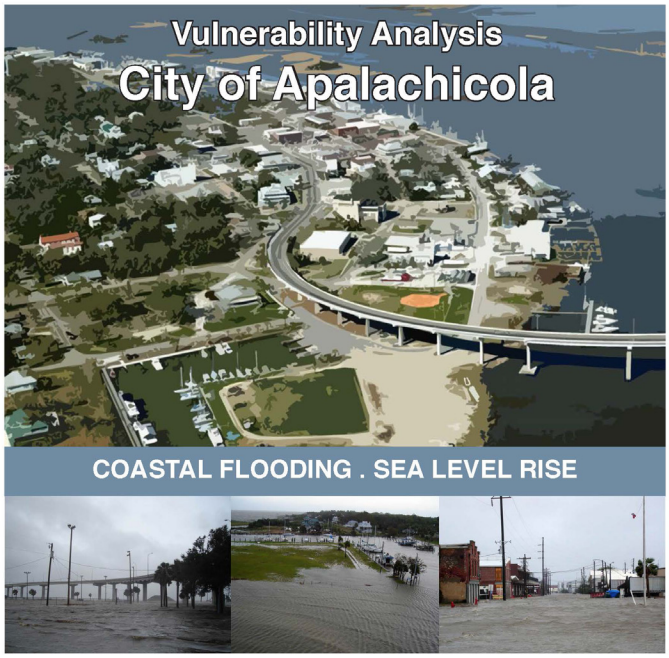
Publication Design: Bay Media Services

Background

Documenting Apalachicola's Vulnerability to Sea Level Rise and the Planning Efforts to Mitigate

The City of Apalachicola is a rural and under-served community in North Florida. The City is made up of approximately two square miles (approximately 1050 acres) with approximately 20,000 linear feet of shoreline. The City is bound on the east by the Apalachicola River, on the south by Apalachicola Bay, on the north by Scipio Creek, and the west by rural development and undeveloped forest land. Elevations within the City generally range between 0 and 16 feet with the lower elevations encompassing the City's downtown commercial district which is entirely located within FEMA's Area of Special Flood Hazard (rated A & V zones). According to the FEMA NFIP program, Apalachicola has several repetitive damaged structures along the coastal waterfront. Many of the city's oldest structures are located in this area and have flooded repeatedly, most recently in Hurricane Michael where the City experienced a 12-foot storm surge. This area is economically important as it contains the bulk of the city's commercial businesses.



Prepared by the City of Apalachicola Planning Department, 2017. Sponsored by the City of Apalachicola and the State of Florida, Department of Economic Opportunity in Coordination with the Florida Department of Environmental Protection. Contract D0108

Apalachicola conducted a Vulnerability Analysis in 2017 to identify projected flood vulnerabilities. The report is available online at www.cityofapalachicola.com

Flood events are increasing in severity and frequency in recent years creating larger numbers of flood losses than in the past. This fact has resulted in rapidly raising the flood insurance premium rates to reflect actual risk. These actual risk rates are expected to be in place by 2025. Apalachicola will need to have as many of their older and historic non-flood map elevation compliant buildings flood mitigated by then to lessen the impacts of this new financial pressure on real estate and the building owners.

In 2017, The City completed a Vulnerability Analysis for the purpose of determining the extent of the City's vulnerability to storm surge and sea level rise using model datasets from the National Oceanic and Atmospheric Administration (NOAA). The City imported the NOAA model datasets (1-6 foot increments) into the City's Geographic Information System (GIS) as layers to show potential impacts of sea level rise on parcel inundation as well as identify areas of impact to critical infrastructure, roads, historic resources, property value and potential economic impact.

The results illustrated the potential vulnerability of the town's critical facilities, infrastructure, property and historic buildings that house commercial businesses critical to the town's economy. The model results indicated that a high inundation scenario could impact more than 116 acres or 11% of the entire City.

Along the downtown commercial district, inundation levels would potentially impact all pre-FIRM commercial construction including several dozen historic resources. The alarming scenario predicts post-FIRM structures may even be impacted from the inundation with expanded impacts stretching five blocks into the City's residential district.

Vulnerable Historic Resources, Critical Infrastructure and Public Properties

There are 39 historic properties projected to be impacted within the high inundation area. Many of these resources date back to the mid 1800s when Apalachicola was originally chartered. Many are iconic brick warehouses that hearken back to the pre-Civil War lumber industry. Many of the beautiful wood-frame historic homes located in the residential high inundation zone pre-date the Federal Flood Insurance program by more than 100 years. The publicly and privately-owned historic structures are critical to the economic viability of the community in that they are used as businesses that support the economy of the town.

According to the vulnerability study, more than 33 acres of roadway in the City, including the entire downtown and Highway 98 - the city's only evacuation route - will be impacted. City Hall is the only City critical infrastructure building located within the high inundation model area. That facility was substantially flooded during the October

10, 2018 Hurricane Michael and City services have since been relocated to another facility outside the flood zone. Public properties will be significantly affected. There are more than 80 publicly-owned properties in the City. Fifty four parcels belong to the City of Apalachicola, 11 belong to Franklin County and 18 are owned by either state or other public organizations. A substantial number of the publicly owned parcels in the City are located within the high model inundation zone.

Financial and Economic Impacts

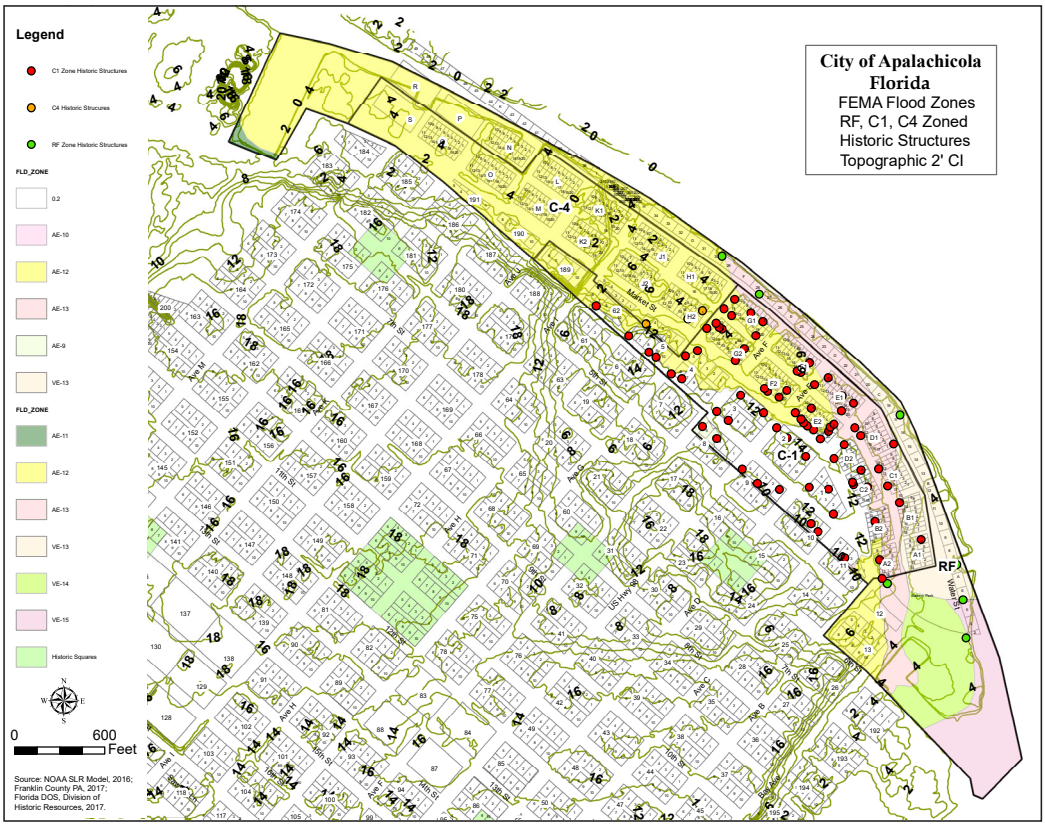
The total assessed value of property in the downtown commercial district is approximately $40 million. Property owners within the downtown commercial district support the majority of the City's economic engine through tourism-related businesses including accommodations, restaurants and retail. The area's proximity to the riverfront make it a vulnerable flood-prone area and most of the district is located with FEMA's Flood Insurance Rate Map rated AE and V zones. Strict building code requirements within flood-prone areas and high flood insurance premiums increase the cost of development within these areas and make development an economic challenge.

Ironically, the most vulnerable area of the City is also the most economically valuable to the City. A growing trend towards tourism statewide has trickled down to Apalachicola and created a pent-up demand for tourism-related businesses in the downtown riverfront district. Considered in its infancy, the short term vacation rental industry is already a $5.6 million industry in Apalachicola. There are currently an estimated 225 accommodation units in the City's commercial district - representing about 20% of the County's lodging supply. Economic research modeling from the Apalachee Regional Planning Council estimate Apalachicola's retail, food service and accommodations combined to soon represent a $6.5 million industry. The tremendous economic importance of the downtown flood-vulnerable district makes it imperative that the City leaders seek alternative mitigation measures to protect and preserve the vulnerable buildings that support that economic engine.

Cultural Impacts

The cultural impacts of coastal vulnerability are directly connected to the economic impacts. Owners of many of the traditional waterfront uses such as seafood processing and water-dependent businesses are no longer able to afford the economic burden of insurance and increased development costs. Many traditional seafood processing plants have been shuttered and replaced with more profitable tourism-based development with new owners that are able to afford the higher costs associated with coastal development. The impacts of projected models could result in a further loss of the traditional water-dependent maritime and seafood related businesses.

Map 14. Historic Resources in the City's Area of Special Flood Hazard (Rated A & V zones)



The City's 2017 Vulnerability Analysis identified historic structures located within the FEMA flood zones. Many of those buildings are commercially important businesses within the downtown historic commercial district.

Excerpted from the 2017 City of Apalachicola Vulnerability Analysis.

Flood History & Risk Assessment

This section excerpted from 2020 Apalachicola Nonstructural Mitigation Assessment prepared by Ducky, LLC and L&R Resources, LLC.

Flooding in Apalachicola and Franklin County originates primarily from two sources: periods of intense rainfall causing ponding and runoff and coastal flooding associated with hurricanes and tropical storms. The floodplains of the local rivers and streams are also subject to flooding during high river stages.

According to previous FEMA flood insurance studies, there has been a long history of flooding impacting the city and surrounding areas. Some of the recorded events which caused appreciable damages are as follows:

- 1915 hurricane near Port St. Joe, Florida
- 1917 hurricane making landfall near Fort Walton Beach
- 1924 storm centering over Port St. Joe, Florida
- 1929 storm centering over Panama City, Florida
- 1936 storm centering over Fort Walton Beach, Florida
- 1950 Hurricane Baker
- 1953 Huricane Florence
- 1956 Hurricane Flossy
- 1972 Hurricane Agnes
- 1975 Hurricane Eloise
- 1979 Hurricane Fredic
- 1985 Hurricane Elena
- 1985 Hurricane Kate
- 1995 Hurricane Erin
- 1995 Hurricane Opal
- 1994 Tropical Storm Alberto
- 2005 Hurricane Dennis
- 2018 Hurricane Michael

Consequences Associated with Flood Risk

Apalachicola's flood risk is derived primarily from extreme coastal storm events, although as a final drainage outlet for the Apalachicola River, the city is vulnerable to flooding from heavy rain events when the coastal drainage outlets are submerged. Apalachicola has a history of flood events since the founding of the community by Europeans. Flood events primarily originate from Apalachicola Bay/Gulf of Mexico as a result of coastal storm events. The most recent event was the result of Hurricane Michael during October 2018.

The occurrence of flooding in and around Apalachicola requires response and recovery efforts of Federal, State, County, local government and the citizens of the community. When flooding occurs, the drain on human and financial resources is significant. Damage to residential, commercial and public facilities impacts the permanent and seasonal workforce as well.

Whether hydrologic conditions remain the same or change in the future, all of the buildings considered in this assessment, in fact all the pre-FIRM buildings in the Apalachicola flood zones are at risk of flooding. This assessment focuses on a sample group of "at risk" buildings and contains the detailed technical assessment used for investigating the incorporation of nonstructural measures for the buildings. Without the incorporation of nonstructural measures, these buildings continue to be at risk of being damaged or destroyed by flooding in the future.

While nonstructural measures are specific to the individual structure being investigated, when considered for mitigation of flood damages, the cumulative effect is to determine a strategy for incorporating a full range of nonstructural measures which are economically feasible, socially acceptable, environmentally adequate and will reduce the cumulative risk of flooding. Each individual building will require a different and unique nonstructural technique because every building is unique. This assessment was conducted as an intensive study of the appropriate flood mitigation project technique with a scope of work and preliminary pre-design budget. This process could be called "grant ready", with only engineering and architecture costs for project development being a required addition for grant writing or for financing the project.

Nonstructural flood risk adaptive measures require different implementation methods than structural measures. Since each privately-owned structure is typically occupied, nonstructural project implementation must be agreed to by each building owner. Nonstructural flood mitigation project measures are proven methods and techniques directed at reducing flood risk and now the rapidly rising flood insurance premium rates for buildings in flood plains. Numerous structures across the nation are subject to reduced risk and no damages due to implementation of nonstructural measures. Nonstructural measures are very effective for both short- and long-term flood risk and flood damage reduction and can be very cost effective when compared to other types of flood risk management (levee systems, detention, and channel modification) measures.

The ability of nonstructural measures to be implemented in smaller increments, each increment producing benefits, is an important characteristic of this form of flood risk management. Also important is the ability to implement measures over immediate and long periods such that layering of measures, each one providing a higher degree

of risk reduction, is possible and given both Federal and non-Federal funding constraints, may be probable.

Nonstructural Flood Risk Adaptive Measures
The overall purpose of a nonstructural flood risk adaptive measure is to reduce flood risk, decrease flood damages, flood insurance premium rates and loss of life. Flood risk adaptive measures reduce risk by modifying the characteristics of vulnerable structures and structures that are subject to flooding or modifying the behavior of people living in or near floodplains. In general, nonstructural measures do not modify the characteristics of floods (stage, velocity, duration) nor do they induce development in a flood plain that is inconsistent with reducing flood risk. Some nonstructural measures that can be formulated for implementation include removing structures from the flood plain by relocation or acquisition; wet or dry floodproofing structures; implementing flood warning and emergency preparedness activities; and implementing flood plain regulation. The National Flood Insurance Program-NFIP is also considered among nonstructural measures since it contains programs to provide minimum standards for floodplain regulation, to provide insurance and to provide flood hazard mitigation. Some flood risk adaptive measures considered for flood damage reduction by the federal government, such as wet flood proofing of historic buildings instead of elevating or dry flood proofing doesn't result in a reduction of flood insurance premium rates. The intent of this study is to identify nonstructural projects that will reduce flood insurance premium rates.

Some of the basic considerations used to develop nonstructural measures are as follows:
• Relocate structures from the flood plain to low flood risk location, X-zone.
• Acquire the floodplain land on which the relocated buildings previously existed and enforce deed restrictions so the land will never again be developed for uses that are subject to flood risk.
• Acquire flood plain land that is in existing open space use to prevent future development that could be at flood risk.
• Acquire structures within the flood plain, demolish them and enforce deed restrictions to prevent future development that could be at flood risk.
• Elevate buildings above the required elevation, flood map minimum plus local freeboard.
• Dry flood proof building (traditional building water proofing).
• Wet flood proof structures (retrofitting existing structures below a design flood elevation with water resistant materials and allowing flood water and allowing flood water to flow through the building).
• Develop evacuation procedures.
• Develop public alert flood warning systems.
• Develop and implement emergency flood preparedness plans.
• Employ educational outreach programs aimed at reducing flood risk.

Each of these general categories of nonstructural measures can be applied as a single measure or can be applied in combination one another or with structural measures to reduce or eliminate flood risk. The range of benefits, costs and residual damages associated with application of each measure is broad. The extent and severity of social and economic impacts associated with the various measures can be likewise broad and must be identified for any plan. Depending on the nonstructural measures selected for application and the relative percentage of each applied, the future land use pattern of the area could look considerably different in specific areas.

The consequences associated with locating damageable property and people within flood plain areas can be extreme to property owners and flood plain occupants. Within the context of this assessment, an objective is to identify strategies and measures that can be used in tandem to reduce flood risk. Some strategies and measures may be more appropriate for Federal action while others will be more attuned to local regulatory action and administration. In either case, these measures must be effective, socially acceptable, environmentally suitable and mindful of the existing neighborhood and community social and economic systems within which they would be implemented. It is the intent of this assessment to identify such nonstructural measures.

Specific nonstructural flood protection options, along with the individual assessments are discussed further in the Nonstructural Assessment Report included in this document.

Land Use & Zoning

Apalachicola's historic commercial properties represent a major economic factor in the town's growing tourism economy. Economic research modeling from the Apalachee Regional Planning Council estimate Apalachicola's retail, food service and accommodations combined represent a $6.5 million industry. However, because of their proximity to the coast, many of the City's commercial properties are also among the most vulnerable to flooding.

In addition to the natural threats of rising sea levels and storm surge, the cultural significance of Apalachicola's historic buildings is also threatened by the economic realities of doing business in vulnerable flood zones. Owners of many of the traditional waterfront uses such as seafood processing and water-dependent businesses say they are no longer able to afford the economic burden of insurance and increased development costs. Many traditional seafood processing plants have been shuttered and replaced with more profitable tourism-based development with new owners that are able to afford the higher costs associated with coastal development.

Zoning Regulations
All of the project site properties are located in either the C-1, C-4 or RF zoning district.

The provisions of the C-1 District are intended to apply to areas that can serve the general needs of the community wherein a large variety of retail commercial, financial, professional, office, service and other general commercial activities are permitted. This district accommodates certain residential applications (either short term or permanent) provided such residential development is combined with a first floor commercial endeavor.

The C-4 district intent is to provide for the economic needs of the City residents by accommodating a variety of light commercial land uses in areas convenient to transportation and central water/sewer facilities. This district accommodates certain residential applications (either short term or permanent) contingent on certain restrictions being met. According to the City's land development code, residential development proposed for this district should be combined with a first floor commercial endeavor. It is to be understood that the C-4 district is primarily commercial in nature –any provision for residential use shall accept existing commercial uses in the district and accept overall general commercial noise, traffic, smells, etc. It is the district intent that all development within the district be consistent with the intent of Section VI Historic and Cultural Preservation Regulations and have an aesthetic compatibility with the nature of the adjacent Historic Downtown. The overall district is to create pedestrian friendly flow of commerce throughout the downtown area that encourages local residents and visitors to patronize both the retail, business, dining and drinking establishments in the area and experience the traditional resource-based industries and attractions of the district.

The RF districts provides for a variety of uses along the Apalachicola waterfront to meet the need for both water dependent activities such as seafood related and boating, with such water enhanced activities as tourism related and residential development. The area to be zoned as Riverfront shall be limited to that which has traditionally served as the center of the City's economy. Furthermore, to guide the development in a manner consistent with the protection and conservation of the basic functions and productivity of the Apalachicola River/Bay systems.

Zoning regulations in the C-1 and C-4 zoning district provide for 80% lot coverage and zero lot line setbacks, a standard that was adopted in the early 90s as a nod to preserving the original historic development pattern of the City during the 1800s. Seafood processing uses in the adjoining RF district are allowed 100 percent lot coverage.

Historic Designation
All of the project sites are considered historic and are included on the State Master Site File Identification List. All of the project sites, as well as the entire C-1, C-4 and RF district, fall within the Historic District. It is the district intent that all development within the district have an aesthetic compatibility with the nature of the Historic Downtown. The overall intent is to create a pedestrian friendly flow of commerce throughout the downtown area that encourages local residents and visitors to experience the traditional resource-based industries and attractions in and adjacent to the district.

In 2017, the zoning code was changed to further protect historic resources. Now, existing historic buildings that exceed lot coverage or are not able to meet required infrastructure requirements are generally exempted from many of the land development redevelopment provisions if redevelopment efforts exceed substantial improvement thresholds.

Additionally, an administrative floodplain management variance may be granted to documented nonconforming historic buildings that seek to renovate in excess of the 50% market value of the property.

Land Use & Zoning

Land Use
All of the project sites in the C-1 and C-4 zoning district falls within the City's Commercial Land Use designation. The commercial category comprises three percent of the use of all land within the City. The commercial category includes land used for retail and wholesale trade, offices, hotels, motels, restaurants, service outlets, automobile service stations, and repair facilities. It also includes land used for seafood processing and distribution warehousing and storage. The commercial downtown business district with its dense arrangement of early 190O structures is most commonly used for offices and retail stores and seafood processing.

The intensity of land use while low overall/ varies with the use of land. For example along the riverfront in the downtown central business district, seafood processing establishments are permitted 100% lot coverage to maximize the use of the riverfront for water dependent activities. As you move away from the river/ however/ the lot coverage or intensity restrictions increase to areas where lot coverage is limited to 60% in the neighborhood highway commercial areas.

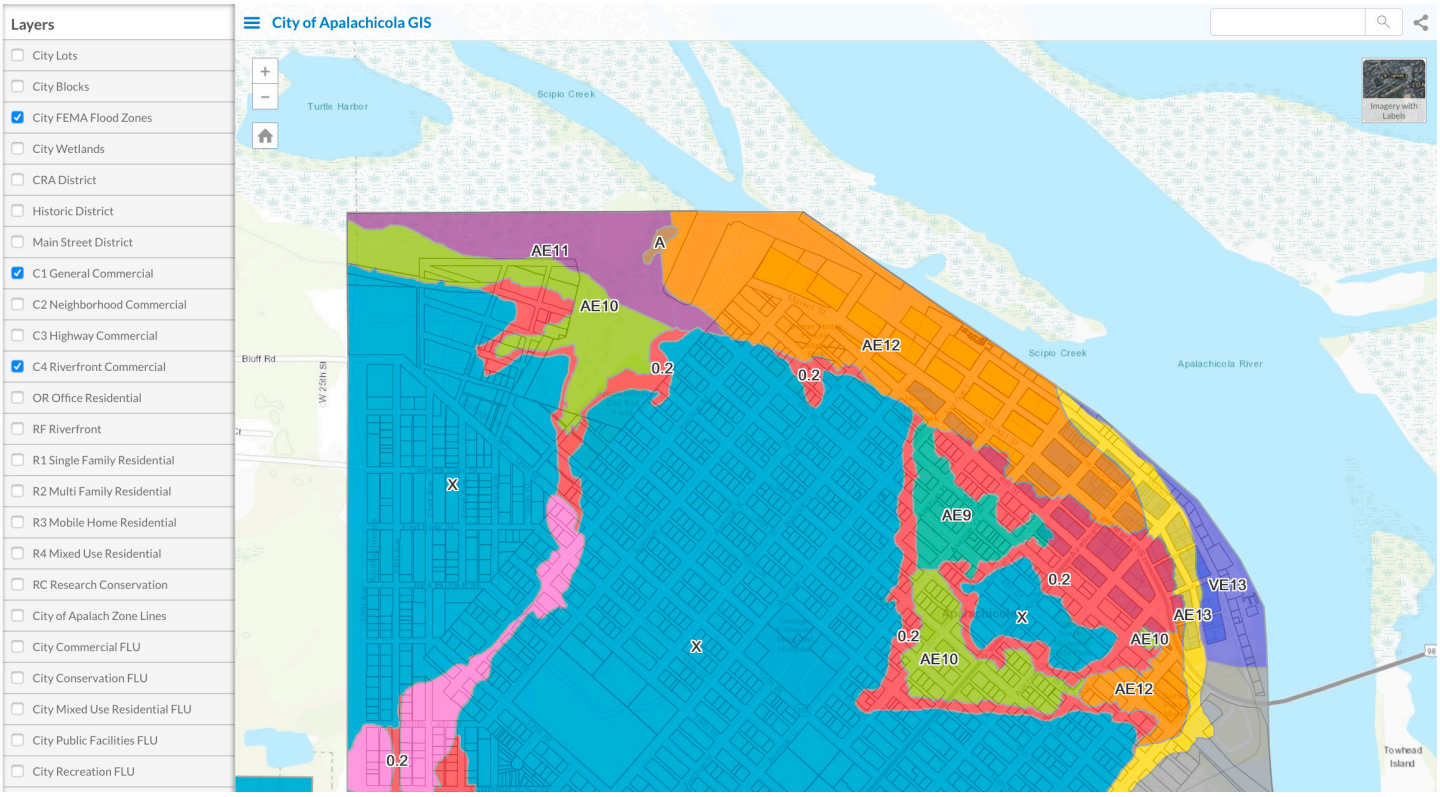
Vulnerable to Flooding
Not unexpectedly, most of the C-1, C-4 and RF district properties have been historically vulnerable to coastal flooding The SLR projected inundation model exacerbates the potential future vulnerability of the area as well.

All of the subject properties fall within the AE12 and 13 zones with an elevation requirement of 13 and 14 feet respectively. Most of the C-1 and C-4 property in this zone averages between 4-6 feet in elevation although there is an area directly adjacent to the river with a 2 foot elevation. The V zone property is located along south Water Street and affects the lots directly adjacent to the river. The elevation of this property is lower, averaging between 2-4 feet.

The City adopted its most recent Floodplain Management Ordinance in 2013. In it, the City adopted provisions that require a one foot free-board above the required base flood elevation (BFE) requirements. All new construction within the City is required to meet and exceed the required BFE by one foot.

The following section of the report addresses the basic history of each of the properties, the zoning, land use and flood hazard vulnerabilities of each. Depending on the proposed method of mitigation, a general discussion of the resulting development challenges in meeting mitigation goals is also addressed.

Comprehensive GIS Zoning, Land Use and FEMA flood zone map
The map below incorporates each of the City's parcels into one GIS overlay map with individual attribute layers which may be clicked on and off for a comprehensive look at each lot as it relates to zoning, land use and FEMA flood zones.



The City's online GIS map identifies flood zone overlays in each of the City's zoning and land use districts. Online at www.cityofapalachicola.com

Land Use & Zoning

Apalachicola Center for History, Culture and Art.
86 Water Street. MSF FR00339.

History
This public property is a fireproof historic brick wall constructed building located on Water Street across from the City's Riverfront park. It is known historically referred to as the Harrison-Raney Cotton Warehouse but is known locally as the Apalachicola Center for History, Culture and Art. (HCA).The building is documented as being constructed in 1840. The building is listed within the Historic Element of the Apalachicola Comprehensive Plan as a contributing structure and is on the State Master File listing as FR00339.

This warehouse is one of the two remaining granite and brick Greek revival buildings built along Apalachicola's Water Street when "Cotton Was King." Originally, there were more than 50 three-story buildings, with granite posts and lintels defining the entrances, similar to buildings still found today on Water Street in New York. They continue to be a visual reminder of the close economic and social connection between this once thriving cotton port and the Port of New York. The end of the cotton era in Apalachicola caused the vacating of the buildings, most of which eventually were destroyed over time by hurricanes, fires and non-use.

Harrison and Raney, who had commercial interests in Apalachicola, built this building in 1836, following the purchase of one of the 30 x 80 foot lots laid out by the Apalachicola Land Company after the Forbes Purchase title settlements. Eventually, an impressive row of wharf-front brick and granite buildings resembling those at the New York City waterfront was built to support the cotton trade that brought prosperity to Apalachicola. Bales of cotton often filled Water Street. The first floor of the building was used to store bales of compressed cotton received from inland cities for shipment to New York , Boston, and to foreign ports, as well as a place to sell other wares. The other two floors supported the business aspects of the Port of Apalachicola's trade. Over the years, the warehouse was also used as a ships' chandlery, saloon, hardware store, honey warehouse and for general purpose storage.

The first Keeper for the National Register of Historic Places, William Murtagh, wrote in 1993 that the cotton building presently used as the City Hall, as well as this building, are important because "they are the only remaining skeletons of what started this town." Funding from the Florida Communities Trust Preservation 2000 Funds gave the City the opportunity to acquire this 176 year old building from a private party in 2005, and it is currently used as the City's History, Culture and Art Center.

Zoning and Land Use
Today the City-owned Cotton warehouse is used as a cultural and arts center known as the Apalachicola Center for History, Culture and Art (HCA). The HCA building is located in the City's C-1 general commercial district and carries a Commercial Land Use designation.

Vulnerability Assessment
The HCA building is located in FEMA's Area of Special Flood Hazard Zone AE13 which requires a Base Flood Elevation (BFE) of 14 feet. As surveyed, the first floor elevation is 6.5 feet, rendering the building 6.5 feet below the minimum flood mitigation elevation requirements for that respective flood zone.

Old City Hall
1 Avenue E. MSF FR00344.

History
This granite and brick Greek revival building once served as the Apalachicola City Hall until October 10, 2018 when Hurricane Michael flooded and substantially damaged the building. The building was the first of more than fifty identical three-story warehouse structures built on Water Street in the 1830's to accommodate the burgeoning Port of

Apalachicola. These warehouses were constructed on land purchased from the Apalachicola Land Company, in accordance with the "New York Contract." This term referred to the Apalachicola Land Company's parent company, the New York Land Company, which developed nearly identical warehouses , which are still standing on New York's Water Street as part of New York's South Street Seaport area.

With the decline of this Port in the late 19th century, all but this building and the Harrison-Raney building at 86 Water Street were lost due to fire, hurricanes and the lack of maintenance. William Murtagh, the first U.S. Keeper of the National Register of Historic Places, on seeing these remaining 1830's buildings, wrote: "These two remaining buildings are crucially important, because they are the remaining skeletons of what started this town."

Over the years, this warehouse was used as a commission store, office space, saloon, and cannery storage. Since its purchase by the City of Apalachicola more than 60 years ago, the warehouse has been used as the fire station, police station, jail and City Hall. In 2005, with the assistance of funding from the Florida Secretary of State, Division of Historical Resources, the first two floors of this building were restored. Up until the October 10, 2018 hurricane Michael, the building was used by the City to house City Hall and other city operations. Today it sits vacant.

The City Hall Building is listed within the Historic Element of the Apalachicola Comprehensive Plan as a contributing structure within the City's Historic District. It is listed on the State of Florida Historic Master Site File list as FR00344.

Zoning and Land Use
Today the old City Hall building sits vacant but represents one of the most economically-valuable commercial properties in the City because of its location to the river and hub of the downtown. The building is located in the City's C-1 general commercial district. This C-1 zoned parcel falls within the City's Commercial Land Use designation.

Vulnerability Assessment
The former City Hall building is located in FEMA's Area of Special Flood Hazard Zone AE13 which requires a Base Flood Elevation (BFE) of 14 feet. As surveyed, the first floor elevation is 6.4 feet, rendering the building 7.4 feet below the minimum flood mitigation elevation requirements for that respective flood zone.

Popham Building
Water Street, Wharf Lot 7-8. MSF FR00288

The Popham building is a two-story 61,000 square foot metal warehouse building located on and over the Apalachicola River at the south end of Water Street. Built in 1923 by 19th century entrepreneur William Lee Popham, the building was intended to be an oyster production factory to process, can and warehouse a promised glut of oysters that Popham envisioned coming as the result of a land scheme he launched that included an oyster lease as part of a land purchase deal. At one time, the words "POPHAM OYSTER FACTORY NO. 1" were spelled out in oyster shells on the front of the building. The wooden building covered with metal siding was built on pilings that extended out over the water. The two-story central section of the building was distinguished by four gabled bays.

The oyster processing plan never panned out for Popham and the building had many uses over the years, including a lumber warehouse and a marine works before it was closed and abandoned in the mid 80s. The Popham Building was purchased by the City of Apalachicola with a Florida Communities Trust, Stan Mayfield Working Waterfronts Grant in 2010 for $800,000. The Florida Department of Community Affairs worked with the City of Apalachicola to purchase the facility due to the State's expressed desire to preserve "working waterfronts." The City of Apalachicola was then awarded $533,000 by the Triumph Gulf Coast Board In September of 2018 to restore and bring the Popham Facility up to a usable condition. Of the $533,000 grant, $410,000 was identified for structural repairs and improvements. Hurricane Michael damaged the building in excess of the funding granted and the City continues to seek funding to restore the building.

The Popham Building is listed within the Historic Element of the Apalachicola Comprehensive Plan as a contributing structure. It is identified on the State Master Site File as FR00288.

Land Use & Zoning

Zoning
The Popham building is located in the City's Riverfront (RF) commercial zoning district and falls within the City's Commercial Land Use designation.

Vulnerability Assessment
The Popham Building is located in the FEMA Velocity VE-13 flood zone. Flood mitigation for the lowest flood risk and lowest flood insurances rates will require the lowest structural member be at 14 feet.

Ice House
247 Water Street FR00282

This large brick warehouse is the former site of an early power generating plant and ice house located along the river. It is actually two separate properties, separated by a common wall.

The Crystal Ice Company incorporated and built the brick ice house on the waterfront between Avenues F & G around 1924. The brick building adjacent to the ice plant to the northwest was the power plant for the City of Apalachicola. The two-story portion at the northwest end of the building was where the generators were housed.

In 1926 the Crystal Ice and Power Company was organized with Arthur Corry, J. E. Graves, Sr. and J. E. Graves, Jr. as the original stockholders. They took over the business of the Crystal Ice Company and also of supplying power to the City of Apalachicola. In 1931 the power business was sold to Florida Power in St. Petersburg, and the ice business was sold to the Florida West Coast Ice Company, which was housed in the Power & Light Building in St. Petersburg also. The power plant was discontinued after transmission lines tied Apalachicola to Florida Power's electric grid. The ice company continued to operate under various owners, eventually returning to the name Apalachicola Ice Company. In later years the building housed various seafood businesses. The brick exterior of the ice house was covered with stucco in the 1990s.

The foundations of these two buildings are extremely solid. The original construction drove cypress pilings into the riverside along the shoreline, then smaller ones between the larger pilings until a stable foundation for heavy buildings was achieved. Then, the concrete flooring was poured. The building is unique in that it features multiple curved archway doors. Up until the late 80s and early 90s, the southern end of the warehouse housed the I.D. Wade Riverside Seafood and Ice Company and the north adjoining warehouse housed the Apalachicola Times offices. The building is unique in that it features multiple curved archway doors. Today, the southern end of the warehouse building is used as a riverfront event venue and is currently undergoing renovation. The northern end is a private residence.

The Power Generator building(s) are listed within the Historic Element of the Apalachicola Comprehensive Plan as contributing structures. It is identified as Master Site File identifier FR00282

Zoning
The Riverside Seafood (Ice House) building is located in the City's Riverfront (RF) commercial zoning district and falls within the City's Commercial Land Use Classification.

Vulnerability Assessment
The Ice House Building is located in the FEMA AE-13 flood zone. Flood mitigation for the lowest flood risk and lowest flood insurances rates requires the lowest structural member be at 14 feet.

Sponge Exchange
16 Avenue E FR00329

History
Although its exact date of construction is unknown, the brick Sponge Exchange on the corner of Avenue E and Commerce Street predates the Civil War. It is shown on an 1857 survey of the mouth of the Apalachicola River prepared by the U., S. Coast Survey. The single-story building has three doors but no windows. Two of the doors open on the northwest façade toward Avenue E while the third doorway is located on the northeast side of the building. The doors were all originally semi-circular brick arches. The northern most door facing Avenue E was altered at some point with a concrete lintel to enlarge the opening, but the original configuration has been restored.

The building was mostly used as a warehouse in the past. In 1874 Herman Ruge acquired the structure. He was involved in the local sponge industry, and it is probably from this period that the building acquired its present name. Photographs show the street in front of the Sponge Exchange being full of sponges. Because of its brick construction and metal roof the building survived the 1900 fire that destroyed most of the other buildings downtown. It is one of the oldest commercial structures in Apalachicola.

The Sponge Exchange is listed within the Historic Element of the Apalachicola Comprehensive Plan as a contributing structure. It is listed on the State Master Site File as FR00329.

Zoning
The Sponge exchange is located in the City's C-1 general commercial district and falls within the City's Commercial Land Use designation.

Vulnerability Assessment
The Ice House Building is located in the FEMA AE-12 flood zone. Flood mitigation for the lowest flood risk and lowest flood insurances rates will require the lowest structural member be at 13 feet.

Dixie Theatre
21 Avenue E MSF FR00302

History
The Dixie Theater was opened on April 1913, by Alex Fortunas. The two-story brick structure featured a screen for showing movies and a stage for live performances. On the street flanking the entrance to the theater were two 16 feet by 16 feet stores.

The Dixie served as Apalachicola's premiere entertainment venue for many years. In the 1950s a drive-in theater opened west of town. That and competition from television lead to the demise of the Dixie. It shut its doors in 1967. For the next thirty years the Dixie sat empty and deteriorating. In the late 1990s Rex and Cleo Partington purchased the building and completely reconstructed it. The only original portions of the structure are the side and rear walls. The Dixie reopened on July 31, 1998.

The Dixie Theatre is listed within the Historic Element of the Apalachicola Comprehensive Plan as a contributing structure. It is listed on the State Master Site File as FR00302.

Zoning
The Dixie Theatre is located in the City's C-1 general commercial district and is located within the City's Commercial Land Use designation.

Vulnerability Assessment
The Dixie Theatre is located in the FEMA AE-12 flood zone. Flood mitigation for the lowest flood risk and lowest flood insurances rates will require the lowest structural member be at 13 feet.

Land Use & Zoning

Wefing Building
252 Water Street MSF FR00174

History
Built in 1913, the this one story brick warehouse building housed Wefing's Marine Hardware, a ship chandlery serving the town's commercial fishing industry. The one-story brick building uses cast iron columns and lintels to support the store front, as was typical with commercial structures in Apalachicola at that time period. The business supplied everything necessary for the vessels that called Apalachicola home or were just passing through the area. As the business grew additional space was added to the north and the west of the existing brick building. The Currently the building houses the Honey Hole Liquor Store while retaining much of the original signage from Wefing's.
The Wefing's Marine building is listed within the Historic Element of the Apalachicola Comprehensive Plan as a contributing structure. It is listed on the State Master Site File as FR00174.

Zoning
The Wefing Building is located in the City's C-1 general commercial district and is within the City's Commercial Land Use designation.

Vulnerability Assessment
The Wefing's Marine building is located in the FEMA AE-13 flood zone. Flood mitigation for the lowest flood risk and lowest flood insurances rates will require the lowest structural member be at 14 feet.

Net Factory
266 Water Street MSF FR00378

History
The Net Factory building, as it is often called, is also the site of the original Coca Cola bottling factory once located on Water Street in the early 1900s. The building was constructed in the early 1900s and shows up in the 1931 Sanborn Fire maps.

The Net Factory building is listed within the Historic Element of the Apalachicola Comprehensive Plan as a contributing structure. It is listed on the State Master Site File as FR00378.

Zoning
The Net Factory Building is located in the City's C-1 general commercial district and falls within the City's Commercial Land Use designation.

Vulnerability Assessment
The Net Factory building is located in the FEMA AE-13 flood zone. Flood mitigation for the lowest flood risk and lowest flood insurances rates will require the lowest structural member be at 14 feet.

Powers Building
15 Commerce Street MSF FR00212 & FR00385

History
The Powers Building (1902) is a fire-proof brick wall building located one block from the City's Riverfront Park. The building was constructed after a large fire estoryed multiple wood frame buildings in the City in 1901.

The Powers building is listed within the Historic Element of the Apalachicola Comprehensive Plan as a contributing structure. It is listed on the State Master Site File as FR00212 & FR00385.

Zoning
The Net Factory Building is located in the City's C-1 general commercial district and falls within the City's Commercial Land Use designation.

Vulnerability Assessment
The Power's building is located in the FEMA AE-12 flood zone. Flood mitigation for the lowest flood risk and lowest flood insurances rates will require the lowest structural member be at 13 feet.

Bowery Inn Building – Isabell's
161 Commerce Street MSF FR00307

History
Located in the heart of Apalachicola's Bowery District, this two story gable ended building is part of the rich history of Apalachicola's early Greek families. The building is the former location of the Nichols' family general store. The building is listed on the National Register of Historic Places and is listed within the Historic Element of the Apalachicola Comprehensive Plan as a contributing structure. It is listed on the State Master Site File as FR00307.

Zoning
The is located in the City's C-1 general commercial district and falls within the City's Commercial Land Use designation.

Vulnerability Assessment
The Bowery Inn building is located in the FEMA AE-12 flood zone. Flood mitigation for the lowest flood risk and lowest flood insurances rates will require the lowest structural member be at 13 feet.

Nonstructural Assessment Overview

Excerpted from 2020 Apalachicola Nonstructural Mitigation Assessment prepared by Ducky, LLC through L&R Resources, LLC and Behm Hazard Mitigation, LLC. The full report may be viewed online at www.cityofapalachicola.com on the Resilience Planning page.

This nonstructural flood mitigation assessment was conducted for the City of Apalachicola, FL using funding from Northern Gulf of Mexico Sentinel Site Cooperative, Mississippi State University Coastal Research & Extension Center, Mississippi-Alabama Sea Grant Consortium.

The City of Apalachicola hired Ducky Recovery who retained the services of Behm Hazard Mitigation, LLC and L&R Resources, LLC to produce the study.

The ten sample buildings in this assessment were selected by the City and volunteering property owners. The list consists of nonresidential buildings, both City owned and privately owned. The nonstructural assessment focuses on buildings in the 2019 preliminary Federal Emergency Management Agency (FEMA) Special Flood Hazard Area in property parcels located closest to the water. The buildings selected are all listed on the National Register. The buildings are all identified as pre-Flood Insurance Rate Map (pre-FIRM).

The objective of this assessment is to identify the appropriate nonstructural flood hazard mitigation technique for each building, create a scope of work for the identified technique, as well as developing a preliminary budget for the identified project.

The City's Nonstructural Flood Mitigation Assessment is available to review online at www.cityofapalachicola.com

Nonstructural Flood Risk Adaptive Measures

The overall purpose of a nonstructural flood risk adaptive measure is to reduce flood risk, decrease flood damages, flood insurance premium rates and loss of life. Flood risk adaptive measures reduce risk by modifying the characteristics of vulnerable structures and structures that are subject to flooding or modifying the behavior of people living in or near floodplains. In general, nonstructural measures do not modify the characteristics of floods (stage, velocity, duration) nor do they induce development in a flood plain that is inconsistent with reducing flood risk. Some nonstructural measures that can be formulated for implementation include removing structures from the flood plain by relocation or acquisition; wet or dry floodproofing structures; implementing flood warning and emergency preparedness activities; and implementing flood plain regulation. The National Flood Insurance Program-NFIP is also considered among nonstructural measures since it contains programs to provide minimum standards for floodplain regulation, to provide insurance and to provide flood hazard mitigation. Some flood risk adaptive measures considered for flood damage reduction by the federal government, such as wet flood proofing of historic buildings instead of elevating or dry flood proofing doesn't result in a reduction of flood insurance premium rates. The intent of this study is to identify nonstructural projects that will reduce flood insurance premium rates.

Some of the basic considerations used to develop nonstructural measures are as follows:

- Relocate structures from the flood plain to low flood risk location, X-zone.
- Acquire the floodplain land on which the relocated buildings previously existed and enforce deed restrictions so the land will never again be developed for uses that are subject to flood risk.
- Acquire flood plain land that is in existing open space use to prevent future development that could be at flood risk.
- Acquire structures within the flood plain, demolish them and enforce deed restrictions to prevent future development that could be at flood risk.
- Elevate buildings above the required elevation, flood map minimum plus local freeboard.
- Dry flood proof building (traditional building water proofing).
- Wet flood proof structures (retrofitting existing structures below a design flood elevation with water resistant materials and allowing flood water and allowing flood water to flow through the building).

• Develop evacuation procedures.
• Develop public alert flood warning systems.
• Develop and implement emergency flood preparedness plans.
• Employ educational outreach programs aimed at reducing flood risk.

Each of these general categories of nonstructural measures can be applied as a single measure or can be applied in combination one another or with structural measures to reduce or eliminate flood risk. The range of benefits, costs and residual damages associated with application of each measure is broad. The extent and severity of social and economic impacts associated with the various measures can be likewise broad and must be identified for any plan. Depending on the nonstructural measures selected for application and the relative percentage of each applied, the future land use pattern of the area could look considerably different in specific areas.

The consequences associated with locating damageable property and people within flood plain areas can be extreme to property owners and flood plain occupants. Within the context of this assessment, an objective is to identify strategies and measures that can be used in tandem to reduce flood risk. Some strategies and measures may be more appropriate for Federal action while others will be more attuned to local regulatory action and administration. In either case, these measures must be effective, socially acceptable, environmentally suitable and mindful of the existing neighborhood and community social and economic systems within which they would be implemented. It is the intent of this assessment to identify such nonstructural measures.

Floodplain and Flood Risk Characteristics
The source of most major historic floods in the assessment area is significant storm surge from the Gulf of Mexico along with Apalachicola Bay. Due to the relatively long lead time to the storm event warning is generally adequate to enable human intervention to reduce flood damages from occurring to most personal property by implementing closures or evacuating valuables. The depths of flooding in coastal Apalachicola varies with the intensity of the storm, flood surge and rainfall associated with the storm.

Executive Order 11988; Floodplain Management (EO11988)
This Executive Order (EO1988) was issued by President Carter on 24 May 1977. In issuing EO11988, the President stated "in order to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplains and to avoid direct and indirect development wherever there is a practicable alternative, it is hereby ordered that each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impacts of floods on human safety, health and welfare and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities…" This nonstructural flood mitigation project study report contained herein was conducted in complete compliance with EO11988, meaning that any nonstructural measures that are incorporated into alternatives recommended for implementation support the vision of EO11988.

Critical Facilities
Structures/facilities which provide services for health, welfare and public safety may become inoperable in a flood event and result in additional adverse impacts or hardship on the affected population are considered critical facilities. They are essential in a flood to provide health, welfare and human safety to the public. Critical facilities are generally those services required during the flood such as police and fire protection, emergency operations, evacuation sites and medical services. Facilities which house the elderly, disabled, or requiring medical assistance, require extensive evacuation time are considered significant. Facilities that could, if flooded, add to the severity of the disaster such as waste water treatment plants and toxic material storage sites are considered critical. Each significant and critical facility within the guidelines of EO11988 should be located at a flood free site. If this is not possible or practicable, the facility should be located external to the .2% annual chance exceedance flood event (500-year) floodplain. If this is not possible or practicable, the facility must be, at a minimum, protected to the extent that it can function as intended during all floods up to and equal to a 500-year event.

Common Nonstructural Flood Risk Adaptive Measures
The following nonstructural flood risk adaptive measures are commonly utilized for reducing flood risk within urban and rural areas across the nation. Each measure must meet specific criteria that would make it acceptable to addressing the flood characteristics and site conditions for individual buildings. Some measures, due to the characteristics of the flood event, site location and building characteristics, are more implementable than others. This assessment strives to identify the most effective measure for implementation.

Acquisition with Demolition and Salvage of Buildings.
This nonstructural measure consists of purchasing the at-risk building and the associated land from the owner as part of the measure. The building is ultimately demolished or may be sold to others and relocated to a location external to the floodplain. In some instances, communities are finding a benefit in salvaging materials (exterior and inte-

rior construction materials, wiring, plumbing, fixtures) from acquired buildings rather than filling up landfills with the demolished buildings. Development sites, if needed, can be a consideration as part of project development in order to have locations where displaced people can construct new homes or businesses.

Relocation of Buildings. This measure requires physically moving the at-risk building and purchasing the land upon which the building is located. This measure achieves a high level of flood risk reduction when buildings can be relocated away from the floodplain. Development of risk-free relocation sites where buildings could be moved to achieve the planning objectives of reducing flood risk and retaining such aspects as community tax base, neighborhood cohesion, or cultural and historic significance can be part of any relocation project.

Elevation of Building. This measure requires lifting the entire building or the habitable area to above a specific flood elevation, as shown in Figure 1. Elevation of the building will require addition to or replacement of the original foundation. All utilities for the building must be located at or above the required elevation. Access for the disabled will need to be addressed with this type of project.

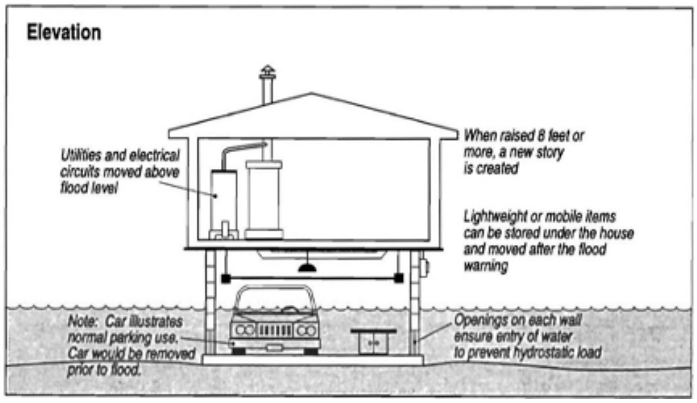


Figure 1 Elevation of Building

Dry Flood Proofing.
This measure consists of waterproofing the exterior of the at-risk building to prevent the penetration of flood waters. This measure is generally acceptable with commercial buildings, but will require certification from a licensed engineer or architect. Based upon previous testing by the US Army Corps of Engineers during the 1970's, a "conventionally" constructed wooden exterior building can be dry flood proofed up to 3-feet on the exterior walls. This would be appropriate for the older building stock located throughout Apalachicola, where wood was a common exterior construction material. Due to improvements in building construction methodology (fasteners, strapping, materials, etc.) dry flood proofing may be acceptable up to 4-foot of height. Exterior materials such as reinforced concrete and reinforced masonry may support flood loads in excess of 4-feet. A structural analysis of the wall strength is required if the flood proofing system is proposed for a higher level of protection. A sump pump with independent power supply (battery backup) in case the utility company power is lost is required to remove any flood waters that seep into the building during the event. Closure panels are required for all openings. Figure 2 illustrates a building with dry flood proofing.

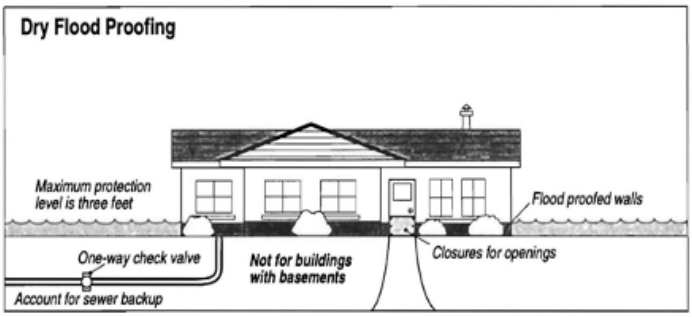


Figure 2 Dry Flood Proofing a Building

Wet Flood Proofing.
This measure is applicable as either a stand-alone measure or as a measure combined with other nonstructural measures such as elevation and dry flood proofing. As a stand-alone measure, all construction materials and finishing materials to a specific height are required to be water resistant. An example is shown in Figure 3. All utilities must be elevated above the design flood elevation. Wet flood proofing is applicable to commercial and industrial buildings and should be considered for combining with a flood warning system, flood preparedness and flood response plan. This measure is generally not applicable to deep flood depths and high velocity flows due to possible failure of structural walls.

Figure 3 Building with Wet Flood Proofing

Nonstructural Assessment Overview

Public Alert Flood Warning, Flood Emergency Preparedness, Evacuation Plans and Pertinent Equipment Installation.
These measures are classified as nonphysical nonstructural techniques and are applicable to the entire study area. Any flood risk management plan should consider the development of flood warning systems and emergency preparedness planning. The development of such plans and the support equipment can become an integral feature of a project. Reunification sites should be a featured component of any evacuation plan.

Floodplain Regulation and Floodplain Management.
Floodplain regulation and floodplain management have proven to be very effective in reducing flood risk and flood damage. The basic principles of these tools are founded in the National Flood Insurance Program (NFIP) which requires minimum standards of flood plain management and floodplain regulation for those communities that participate in the NFIP. While the minimum standards have not resulted in substantial flood risk reduction, incorporation of more stringent building codes and zoning ordinances may meet community objectives of eliminating flood risk. Communities can establish more stringent ordinances.

National Flood Insurance Program.
The NFIP contains 3 basic parts; flood insurance, flood mitigation and floodplain regulation. In terms of reducing flood risk, only flood mitigation and floodplain regulation have a direct impact in theory. In regards to the flood insurance part of the NFIP, flood insurance simply spreads the flood risk across multiple properties as does any property insurance program. It does not reduce flood risk. It shares flood risk. In terms of the NFIP as a nonstructural measure to truly reduce flood risk, the flood mitigation and floodplain regulation parts of the NFIP are those measures. Five mitigation programs exist within the NFIP. They are the Hazard Mitigation Grant Program-HMGP, Pre-Disaster Mitigation grant program -PDM, Flood Mitigation Public Assistance Program – 406 and the Severe Repetitive Loss – SRL program. Minimum floodplain management standards in the NFIP regulations, within the floodplain regulation part of the NFIP, serves as nonstructural flood mitigation measures.

Temporary Flood Risk Measures
Reducing flood risk is an objective which should be conducted through permanent measures. Knowing the characteristics of flooding, such as the available warning time for making preparations, the projected depth of the floodwaters and the areal extent of flooding, along with the anticipated duration, all factors which will allow community officials, business owners, building owners and homeowners to make personal decisions regarding their ability to reduce property damages. Temporary flood proofing measures are those which, in order to protect a structure and its contents, must be implemented every time there is a risk of flooding. While the most effective and efficient process for reducing property damages is to implement permanent measures, where even features such as a doorway and window barriers can be readily installed, there may be the need for interim temporary measures until permanent measures can be implemented. It is recommended that each owner transition to more permanent prevention measures as soon as reasonably possible.

This section of the report focuses on the use of temporary measures and precautions which should be considered prior to implementation. The responsibility for flood proofing, including the detailed planning, purchase of flood proofing materials and implementation belongs to the owner or tenant of the building.

Each owner or tenant should weigh the costs associated with implementing temporary flood proofing measures numerous times as opposed to the long term security and peace of mind that come with implementing permanent measures.

Common Temporary Flood Risk Adaptive Measures.
The most common temporary measures that are recommended for the buildings in Apalachicola are:
1. Polyethylene sheeting hung on the structure exterior (usually to the height of 3ft above the fist floor elevation and continued on the ground surface 4 feet from the building exterior), in combination with door and window enclosures.
2. Clear liquid sealant applied to the structure exterior, in combination with caulking of large cracks in the exterior and placement of door and window closures.
3. Sandbag berms located all around all or a portion of the building exterior.
4. Any of the barriers certified through the National Flood Barrier Testing and Certification Program: http://nationalfloodbarrier.org

A key difference between these temporary measures is that hydrostatic forces are applied to the structure walls when using the polyethylene sheeting and clear liquid sealant measures, but not with sandbag berms or the certified barriers.

Nonstructural Assessment Overview

Implementing Temporary Measures.
Implementing temporary measures can be successful in reducing or preventing flood damages when conducted correctly. The scope of this study allows the evaluation of the individual building and their sites adequately to recommend a specific flood mitigation strategy, a scope of work and a preliminary budget for the proposed project pre-formal design efforts.

• Because of the serious nature of flooding and because of unknowns associated with the depth, velocity and duration of flooding, as well as the precise structural condition of each building, it is generally considered wise to allow no temporary floodproofing measures to be placed to a height which exceeds 3 feet above the elevation of the first floor of the structure. The hydrostatic forces of the flood waters can cause a catastrophic collapse to the walls of the building due to the lack of lateral resistance from the building as the flood waters rise higher against the sides of the building. And, since the characteristics of a flood (the depth, velocity and duration) may change during a flood event, it must be noted that it is possible for failure of foundations, walls and closure panels to occur at a flood depth of less than 3 feet. It is highly recommended that after the flood proofing measures are implemented, all persons evacuate the structure to a predetermined location of safety.

• Though obvious, it must be stated that a structure could be exposed to a flood event of a depth greater than for which a temporary flood proofing measures have been erected.

• Smaller more frequent storm events that can cause localized flooding can occur in Apalachicola. In these events, there may not be sufficient warning time for the owners or tenants to implement the temporary measures.

• Preparing a building for a flood requires a significant effort and it is impossible to accurately predict, even one day in advance the depth to which flood waters from an approaching storm may rise. Therefore, the owner or tenant cannot be certain that the projected flood event will actually occur. The building owner or tenant must find his own comfort level and balance the risk of not having the building properly flood proofed, verses the risk that the effort to flood proof was not necessary.

• In order to prevent unsanitary water from backing up into the building during a flood, the owner should ensure that the sanitary drain line is fitted with an anti-back flow device.

• Downspouts and associated drainages must be considered. If a certified barrier or sandbag berm is erected, the downspouts need to be modified so they can be directed over the barrier; this would greatly reduce the amount of water to be pumped from within the protected area. Also, there may be drain lines that carry water from the down spout that pass under the certified barrier or sandbag berm, which must be plugged to prevent water from flowing through the line into the protected area.

• If the exterior construction is not sufficient to withstand a significant water load the force of water at a depth of 3 feet (or perhaps less) could collapse walls. Therefore, it is recommended that when the temporary measures include placement of polyethylene sheeting on exterior of a building, a thick layer of plywood (up to 1 inch) be attached to the exterior surface of the building up to the level of protection. The plywood could be attached to wall studs using countersunk threaded anchors with bolts and sheeting would be placed over the plywood. Again, Structural elevation by a certified professional or contractor is recommended.

Flood Characteristics Dictating Temporary Measures.
There are numerous characteristics associated with temporary flood proofing, many of which may be unknown to the owner or tenant. Some of these include;
1. characteristics of the flood itself (depth, duration and velocity).
2. The precise condition of the building being protected (condition of the foundation, crawlspace, basement and type of construction of the first floor and side walls).
3. The surrounding site conditions (whether the soil is permeable or impermeable and the density of landscaping, the location of utilities as well as other external features).

Planning and Preparation of Temporary Measures.
The information provided in this report section is the basis for developing temporary flood mitigation measures to reduce the possibility of extensive flood damages. In order for floodproofing to be successful, a thorough plan for each individual building needs to be developed and implemented. The plans will vary building to building, depending on the building type, projected depth of flooding, the velocity of the floodwaters, the time available to implement the measures and the availability of flood proofing materials. In some instances, due to the depth of flooding or the projected velocity of the floodwaters, rather than attempt to keep flood water out of the building, it may be more cost effective to remove or to elevate to a higher interior location, those items (business records, electronics, computers, heirlooms, artwork, etc.) which contain a high value, intrinsic or monetary, so as to avoid exceptional loss.

Nonstructural Assessment Overview

For individuals wishing to implement temporary flood proofing measures, a plan should be developed to ensure that the measures can be employed as quickly as possible when the threat of flooding is imminent. Locations for storage of the materials and equipment should be designed far in advance of an event. Storage can occur on or off site; however, if equipment and materials are maintained off-site, arrangements should be made to transport these materials and equipment to the site for implementation. Because the limited time available to install temporary measures is a critical factor in the prevention of flood damages, site preparation, maintaining the proper inventory of flood proofing materials and having a well prepared emergency response plan are crucial to the successful outcome. Early preparation can make the difference between minimal dollar damages and a catastrophic loss. While even the best laid plans may go awry, nationwide data indicate that the owners who pay attention to the details, establish a thorough step-by-step process for implementing their temporary flood proof measures and prepare themselves and their buildings prior to the start of storm season, fare far better than those individuals who rush against time to install temporary measures which have not been thoroughly planned out.

It is imperative that the building owner or tenant determine the type and amount of materials required to be on hand each year through the forecasted flood season. A checklist of these items or material requirements should be prepared, including the sequence of placement of materials in order to establish the most time-effective process for implementing the temporary measures. Each year prior to the start of the flood season, the owner or tenant should review the checklist, replace damaged or missing items and prepare to implement the entire flood proofing measure during the first signs or indication of imminent flooding. In addition, the owner and or tenant should develop a procedure for ensuring that all employees, residents and others who may have been in the building prior to the flood event are accounted for after evacuation. This may be accomplished by contacting all personnel via cell phone and or by arranging to meet at a designated location.

Once the owner or tenant has established a temporary protection plan for the building, it may be beneficial to test the plan for efficiency and effectiveness in order to optimize the plan. The flood fight materials and equipment should be stored in such a manner that they will not be damaged and should be monitored on a regular basis to ensure that these materials will be effective when and if needed. For instance, blue plastic can become damaged with holes from animals or normal weathering and should be replaced if any damage and plywood should be stored such that it will not rot or be damaged by termites or storage in a wet or damp environment.

While the protection of the building and the building contents are of high importance, during any flood event there is a possibility of extensive damage to the building. It is worth repeating that, in order to prevent extensive loss or damage to high value items, it is recommended that the emergency response plan also consider relocating away from the building or to a higher elevation, those items which would be difficult or impossible to replace.
Again, it is imperative that each building owner understand that the intent of these proposed measures is to provide only temporary protection from flooding. After the temporary measures have been implemented, after the sump pump(s) has been positioned and flooding appears to be imminent, the owner and all associated persons should evacuate the premises during the flood event. There is always a possibility that catastrophic failure of a building or loss of life could occur during a flood event.

Site Preparation.
The type and amount of site preparation will vary with each building. For many buildings, one of the recommendations is that, in order to prevent floodwaters from entering a building and causing damage, the site surrounding the building be prepared to a condition which allows relatively easy and quick installation of temporary flood proofing measures. For each building, the owner or tenant should try to achieve at least 4ft of leveled access area around all exposed sides of the structure. The placement of polyethylene (also known as polyurethane or plastic) sheeting and/or sandbags as a preventative barrier to flooding requires a leveled surface in order to resist seepage into the protected area. While shrubs, flowers and trees provide character and value to a property, it is important that they be removed from within the “leveled access area” in order to establish a preventative barrier to flooding. If the owner is unable to remove landscape items, it is important that a uniform barrier of protection be established by placing polyethylene sheeting or sandbags as close to the protruding plant as possible to develop a cohesive barrier between the ground and the employed flood proofing measures. Even a small weakness in the flood proofing measure would result in catastrophic failure and damage.

In certain circumstances, it will benefit the owner to identify appurtenances such as fence posts, gates, storage sheds and utility boxes which may prevent the establishment of a waterproof barrier. These items should be removed as much as possible from the “leveled access area.” Utilities and HVAC units must be considered. Where possible, vital utilities and HVAC units should be raised in height to a reasonable level. Otherwise provisions in the flood proofing plan need to include the protection of these utilities and

units. Also, these items are usually associated with wall openings through which flood waters may enter a building. These openings must be sealed, along with any other holes or cracks in the exterior walls and foundation.

Materials and Equipment Required for Temporary Measures. The owner should ensure that the materials recommended for protecting the building have been obtained prior to the stat of the flood season. Materials required for implementing a preventive barrier to flooding should be stockpiled in an accessible location. Materials remaining from the previous flood season should be inspected to determine condition for reuse. Some of the more frequent materials required for implementing successful temporary flood proofing measures includes:

• Polyethylene sheeting. This sheeting material (also known as a visqueen, polyethylene or plastic sheeting) is often recommended for use when employing a temporary waterproof barrier around a building. The sheeting should be purchased in rolls, typically 5-6 mils thick and will be cut long enough to extend from no more than 3 feet above the first floor of the building to, a minimum, 4 feet out from the building. The further the “leveled access area” and polyethylene extend beyond the building, the longer the flow path for the flood waters to enter a building, including crawlspace and basement, is extended, increasing the resistance to flooding. The shorter the flow path is to a foundation, resulting in complete of the crawl space or basement. Once the flood waters have access to the crawl space or basement, it becomes more difficult to remove the floodwaters and to prevent or limit damages.

• Connectors for Attaching Polyethylene Sheeting to Building Exterior. The type of connector needed depends upon the type of exterior surface of the building to which the sheeting is being fastened. Hooks, whether self-tapping or through drilled anchor connection, are normally recommended for use in fastening the polyethylene sheeting to the building. Spacing of the hooks should be such that no span is greater than 2 feet. Hooks should be placed permanently for continuous use from one flood season to the next.

• Water Resistant Tape for Polyethylene Sheeting. For firm cohesiveness between the polyethylene sheeting and the exterior structure surface or between adjacent polyethylene sheets, this type of tape is recommended for use. These tapes incorporate PVC additives and are ideal for use in outdoor situations. Consideration should be made for vinyl coated cloth tapes for effectiveness where product performance is critical: these taps can withstand harsh weather conditions and can be used for repairs to many surface types. It is further recommended that tapes containing water resistant properties, all weather properties, brittle resistance and anti-aging properties be obtained.

• Closures, Panels (plywood and other materials). A temporary closure system consisting of 1 inch plywood or OSB is often recommended for flood barrier construction at doorways and windows; no closure should have a horizontal or vertical span in excess of 3 feet without incorporating additional supports. Because 1 inch paneling may be expensive, a 1 inch closure can be pre-made by using a grid of screws to connect two boards of lesser thickness. Vent openings can usually be protected with a lesser thickness. Vent openings can usually be protected with a lesser thickness. Do not use materials that are not water resistant. The closure panel should be measured, cut and identified for the specific location in the temporary barrier and should be available for use from one flood season to the next. The panels should be held in place with water resistant caulking, nails, screws and/or liquid nail. For doorways which open inwards, or for over the top of window glass, the closure panel should extend onto the exterior wall.

• Sand and Sandbags. Considered to be one of the most durable and easily deployed flood fighting products on the market, sandbags are an integral component of many temporary barriers to flooding. Sandbags should be made of nylon or polyethylene. Generally, bags can be placed in a single row up to 3 bags high. Berms built more than 3 bags high should be built in a pyramid fashion; these bags should be built as wide as they are high. These berms should be filled between half-way and two-thirds full, should not be tied and should be placed with the top of the bag tucked under the bag. After the placement of each layer, the bags should be walked on to provide a better seal with adjacent bags. The bags in each course should be placed so that they cover to the maximum possible extent the joints in between the bags in the same course and also between the bags in the course below. Additional guidance on sandbagging is available from the Corps of Engineers.

Sandbag closures at doorways and similar openings can work well but must be sealed at the ends. The owner may prefer to use a plywood or other type of closure panel.

• Caulk and Clear Sealant for Structure Exterior. For any portion of the building to be protected consists of brick, stone, cinder block, or tile a water-resistant sealant may be recommended for use. It is best to use a clear liquid sealant, which may be applied by brush, roller, or sprayer. The sealant should be applied to all porous surfaces, which have been thoroughly cleaned and dried to allow deep penetration and maximum resistance to the effects of water. The sealant should be extended above the area of proposed protection for best coverage. While at this time,

no government testing programs have rated these commercial sealants, manufacturer's information indicate that commercial sealants may last up to 20 years without discoloration. Removal of these sealants has required sand blasting in the past. Sandblasting of brick, especially softer historic brick can damage the brick and possibly increase permeability and water damage. If there are cracks in the exterior of the masonry that may signal foundation compromise. If you try to fill a void in masonry walls, make sure you look into the below grade foundation to add material to any cracks there as well.

• Certified Temporary Flood Barriers. Preventing flood waters from entering a building requires the use of temporary barriers. While there are many products marketed as flood barriers, very few have positively tested and been certified for preventing damages. The Association of State Flood Plain Managers (ASFPM) in collaboration with FM approvals and the US Army Corps of Engineers National Nonstructural Committee (NNC) have implemented a national program of testing and certifying flood barrier products used for flood proofing and flood fighting. The purpose of this program is to provide an unbiased process of evaluating products in terms of resistance to water forces, material properties and consistency of product manufacturing. This is accomplished by testing the product against water related forces in a laboratory setting and periodic inspection of the product manufacturing process for consistency of the product relative to the particular product that received the original water and material testing. The laboratory testing may not reflect real world experiences in a flood event. For additional information on this program and a list of certified products, visit http://nationalfloodbarrier.org/.

• Interior Drainage Pump and Power Supply. In order to prevent flood damages due to seepage of flood waters through the temporary flood barrier or resulting from a rising water table, it may be necessary to install pumps. Pumps will be needed inside the building to collect seepage. At a minimum, one pump with a capacity of at least 20 gallons per minute should be considered for installation inside the building for every 2,000 square feet of floor space.

Flood Insurance Study Data

According to the 2014 effective FEMA flood insurance study, Franklin County is subject to coastal flooding caused by extra tropical cyclones and hurricanes. Extra tropical cyclones can occur at any time of the year but are more prevalent in the winter. The prime hurricane season is from August to October during which time 80 percent of all hurricanes occur. September is the worst month for hurricanes during which 32 percent of the total occur. Hurricanes are of shorter duration than northeasters and generally last through only one tidal cycle.

Coastal flooding is not limited to hurricane activity as extra tropical cyclones have resulted in significant tidal flooding along the Florida panhandle. Extra tropical cyclones can develop in the Gulf of Mexico and along strong frontal boundaries and can potentially occur at any time of year, but most frequently in the winter and spring months. Typically, these storms have centers that are colder than the surrounding air, with strongest winds in the upper atmosphere, and lower wind velocities and higher central pressures than a major hurricane; however, wind velocities associated with an extra tropical cyclone can easily reach tropical storm and Category 1 hurricane levels. In addition, the high winds of an extra tropical cyclone can last for several days, causing repeated flooding and excessive coastal erosion. The long exposure of property to high water, high winds, and pounding wave action can result severe property damage.

The coastal areas of Franklin County are, for the most part, surrounded by barrier islands. St. George Island and Little St. George Island, for example, offer some protection to the coastal area along St. George Sound and Apalachicola Bay from wave action. It is expected, however, that portions of the barrier islands would be overtopped during the larger storm events.

In 1973, the state of Florida established a Coastal Construction Control Line that now includes the coastal beaches of St. George Island, Dog Island, and Alligator Point. The purpose of this line is to control coastal land use and building construction methodology for areas susceptible to direct storm surge, erosion and wave runup.

Still water elevations were determined for the 10-, 2-, 1-, and 0.2-percent annual chance exceedance floods for the flooding sources studied by detailed methods. Areas of the Florida coastline subject to significant wave attack are referred to as coastal high hazard zones. The USACE has established the 3.0-foot breaking wave as the criterion for identifying the limit of coastal high hazard zones (USACE, 1975). The 3.0-foot wave has been determined as the minimum size wave capable of causing major damage to conventional wood frame and brick veneer structures.

Description & General Recommendations

A site visit was conducted by the assessment team for each of the 10 sample buildings identified by the City of Apalachicola. The field visit allowed the assessment team to observe each building from the exterior/interior and to reaffirm the previous data collected for each individual building. Structure and site conditions, as well as flood elevations were compiled with field observations onto structure data/assessment sheets. The compiled information on the structure data/assessment sheets help to demonstrate the potential flood risk and were used to identify potential nonstructural measures for implementation.

The Base Flood Elevation (1% annual chance exceedance flood elevation) was targeted for mitigation recommendations. Each building was assessed and recommendations focused on mitigating buildings by utilizing elevation, dry flood proofing, or a combination of techniques. Nonstructural flood risk adaptive measures which would be compliant with the NFIP and would reduce flood insurance premiums for the building owner were primarily considered for potential implementation.
The nonstructural measures presented in this report are stand-alone techniques for individual buildings or combination techniques to provide the most effective level of flood risk management through property damage reduction.

The following assumptions were incorporated into the assessment:

1. Inventory data adjusted based on field observations.
2. Dry flood proofing is limited to four-feet in height unless the structure appears to have the structural integrity to be capable of withstanding greater forces.
3. Dry flood proofing was recommended if the flood elevations exceeded the building walls capability to resist the flood depth without structural failure.
4. If the flood BFE elevation is greater than the first-floor elevation and a basement/crawlspace exists, the first floor cannot be dry flood proofed without abandoning the basement/crawlspace by the placement of fill material.
5. Where practical, a combination of nonstructural techniques were considered.

6.0 Recommendation of Nonstructural Flood Risk Adaptive Measures
Based upon the data collected for the 10 sample buildings and the potential depth of flooding for the 1% annual chance exceedance flood event, the recommended mitigation measures are identified in Table 3. The heart of the nonstructural assessment regarding the recommended nonstructural technique for each of the sample buildings is provided in Enclosure A which contains the individual assessment sheets for each individual building.

Table 1
Recommended Nonstructural Mitigation Measures

Structure ID #	Address	Occupancy	Proposed Nonstructural Technique
FR00339	1 Ave E	Public	Option 1:Elevate Building
FR00339	86 Water St	Public	Option1: Elevate Building
FR00288	1 Bay Ave	Public	Elevate Building
FR00307	161 Commerce St	Commercial	Elevate Building
FR00302	21 Ave E	Commercial	Dry Flood Proof
FR00282	247 Water St	Commercial	Wet Flood Proof/Dry Flood Proof
FR00378	266 Water St	Commercial	Dry Flood Proof
FR00212	15 Commerce St	Commercial	Elevate Interior
FR00329	15 Ave E	Commercial	Elevate Interior
FR00174	252 Water St	Commercial	Option 1: Elevate Building

The scope of effort for this assessment was to determine the most acceptable type of nonstructural mitigation measure which would be compliant with city ordinances, state standards, while meeting the requirements of the NFIP program. In addition, a proposed project cost and scope of work has been included in this report. The annual benefits derived from each individual mitigation measure will still need to be calculated for state and federal grant applications. By estimating the reduction in future flood damages, where those prevented damages are the benefits of implementing a nonstructural measure, then annualized, a comparison of annual benefits and costs can be conducted to determine the benefit to cost ratio (BCR) for each building. A BCR greater than 1.0 indicates that the proposed nonstructural measure has more benefits than costs and is worth further consideration for implementation.

Floodplain Management Recommendations for Minimizing Damages
In addition to the nonstructural measures recommended in the previous sections, there are additional low impact measures/actions which should be considered for minimizing future flood damages in the vicinity of existing properties. Simple precautionary actions can be the difference between a minor clean-up and a major replacement after a flood event.

Local Drainage and Utility Protection
While it was not part of the scope of work for this assessment, but during the field investigations, it became apparent from viewing the sample structures and adjacent buildings that local drainage problems and exterior utility concerns were prevalent within the study area and that owners could take some remedial actions to minimize future damages. As shown in Figure 6, these are two examples of local drainage problems and exterior utility

concerns which can adversely impact a building. Many of the downspouts discharging rooftop runoff (photograph on left) were not properly directing water away from the foundation, causing erosion, and thereby exposing and weakening the foundation and providing potential pathways for floodwaters to enter or further damage some structures. Similarly, the external HVAC system is susceptible to flooding if not properly elevated.

Localized Interior Drainage and Utilities

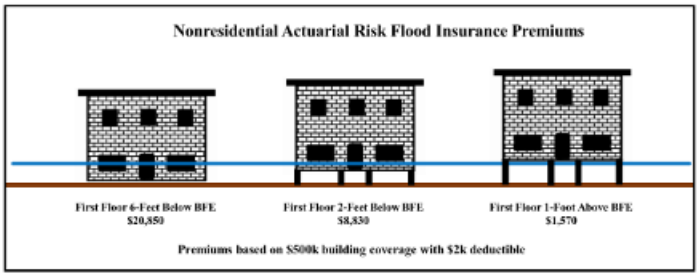
It is recommended that the owner secure and stabilize the HVAC platform to ensure that in the future, surging floodwaters do not cause the platform to fail.

Flood Insurance Premium Reduction from Nonstructural Measures

Implementation of nonstructural measures can result in reduced flood insurance premiums under the NFIP for certain building types, when implemented appropriately. Insurance premiums for buildings located within the Special Flood Hazard Area are a function of the elevation of the first floor of the building (which may be a basement or crawlspace floor, if either exists) with respect to the BFE. The lowest habitable floor elevation will dictate the premium rate for flood insurance. The closer the habitable floor is located to or below the BFE will result in higher flood insurance premiums. It is important to note that the insurance is based upon a single flood event, the 1% ACE flood event and not a range of flood events.

Nonresidential Flood Insurance Premium Rates

Nonresidential buildings, otherwise known as commercial businesses, are located through the business district of Apalachicola and are at significant flood risk. Incorporating flood reduction mitigation measures, such as elevation, shown in Figure 7, will result in lower premiums as insurance rates become actuarial over time. Elevation of the entire structure as portrayed in the figure, elevating the interior of the structure, or utilizing dry flood proofing techniques can also result in reduced flood insurance premiums.



Nonresidential Actuarial Flood Insurance Premiums

Residential Flood Insurance Premium Rates

For residential buildings, elevation as a mitigation measure has the effect of reducing the flood insurance premium because the building is being moved away from the flood risk. If the residential structure is elevated to be above the 1% flood, there is still a possibility that a larger flood event could occur. The figure below illustrates the potential reduction in flood insurance premium for a sample structure elevated on extended foundation walls.

Flood insurance is moving toward actuarial rates and the benefit of elevating a residential building to above the flood risk will not only result in lower premiums, but will also result in lower flood damages for the frequent flood events.

Residential Actuarial Flood Insurance Premiums

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A: Zone A is the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Assessment General Recommendations

Zone AE: Zone AE is the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone V: Zone V is the flood insurance rate zone that corresponds to the 1-percent annual chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE : Zone VE is the flood insurance rate zone that corresponds to the 1-percent annual chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

FEMA was directed by Congress, under the Homeowner Flood Insurance Affordability Act of 2014 (HIFAA), to produce guidelines for building owners regarding alternative mitigation efforts, other than building elevation, acquisition, or relocation, to reduce flood risk to residential buildings which cannot be entirely elevated above the BFE due to external constraints. This request by Congress requires alternative forms of mitigation measures to be considered in the calculation of flood insurance premium rates. At the time of the publication of this report, the guidelines had not been finalized. It is anticipated that the guidelines will offer premium reductions for achieving first-floor elevations which are not able to achieve the full BFE height.

For nonstructural mitigation of commercial buildings, a reduction in flood insurance premiums may be obtainable if the flood risk for an individual building can be reduced through mitigation measures such as elevation or dry flood proofing. As discussed in section 2.4.2, dry flood proofing is the prevention of flood waters from entering a commercial structure through implementation of engineered systems.

If dry flood proofing is a consideration for reducing flood risk, it is recommended that the building owner employ closure barriers which have been certified through the National Flood Barrier Testing and Certification program. The program, established to measure the performance of flood fight products as described in ANSI 2510 guidance, has the goal of providing a standardized process for products in terms of their resistance to floodwaters, their material properties, and consistency of product manufacturing. The program was established in partnership between the Association of State Floodplain Managers, FM Approvals, and the US Army Corps of Engineers. Products are tested against water forces at the USACE Engineer Research and Development Center laboratory, tested against material forces in an FM Approval laboratory setting, and undergo periodic inspection of the manufacturing process for consistency of product. Additional information can be found here: nationalfloodbarrier.org/

Managing Flood Risk
Existing hydrologic and hydraulic analyses indicates that the flood hazard along the Lower Apalachicola River and Apalachicola Bay has the potential to be very severe.

Based upon the nonstructural assessment of 10 sample structures to determine an estimation of their exposure and vulnerability to flooding, there are several potential opportunities for managing the flood risk. From this assessment it appears that flood risk can be managed through implementation of nonstructural measures and by increasing preparedness planning managing future development, and increasing the amount of flood insurance policies. These measures are discussed in greater detail below.

Flood Preparedness Planning
Community outreach initiatives such as providing flood information pamphlets and flood maps, conducting workshops, erecting high water mark and flood history signs, can increase the awareness of flood risk among residents and draw interest toward incorporation of long-term flood risk activities. Results from this assessment may be used by local and county officials to conduct emergency preparedness activities such as evaluating roles and responsibilities, flood fight plans, and response capabilities in the event of a flood.

Future Development
Local zoning and/or building codes may be used to reduce flood risk for new construction and for community efforts in managing flood risk required by the NFIP. Given the flood risk identified along the Lower Apalachicola River and Apalachicola Bay, it is highly recommended that the communities coordinate with the State Emergency Management Agency (FDEM) regarding potential ordinances that could be adopted by a community for increasing their long-term flood resiliency.

Risk Management through Flood Insurance
Since the City of Apalachicola currently participates in the NFIP, flood insurance is available for all buildings in the community regardless of their flood zone designation. Whether or not a building is modified by implementing a nonstructural measure, flood insurance is advocated because future flooding could be greater than what has been experienced in the past or may be more severe than what a building has been mitigated to withstand.

Assessment Conclusions

Assessment Conclusions
The City of Apalachicola is located along the Apalachicola River and Apalachicola Bay on the eastern side of the Florida Panhandle. Numerous historic residential and non-residential buildings reside within the 1% annual chance exceedance floodplain and are at risk of flooding. The City of Apalachicola received a grant from NOAA through Mississippi State University – Coastal Research & Extension Center and the Mississippi-Alabama Sea Grant Consortium to produce the flood mitigation assessment to identify proposed nonstructural measures on a sampling of 10 buildings which have incurred flood damages in the past.

As a function of this assessment, the primary characteristics of flooding, such as depth, velocity, duration, and areal extent were combined with structure attributes for each of the 10 sample buildings to determine the flood risk for the target 1% annual chance exceedance flood event. From this information, proposed nonstructural measures for each building were determined. The measures proposed were scaled to the flood risk for the individual building. As an example, if the 1% annual chance exceedance flood depth were no greater than a foot or two above the first floor elevation of a structure, elevating or dry flood proofing the building would significantly decrease the flood risk and ensure that the building remains active on the property tax rolls, and provides continuation of function soon after a flood event.

Since flooding within the assessment area could occur as a result of a tropical storm or hurricanes that produce a coastal flood event, this assessment also provides practical information for the implementation of temporary measures as a stop-gap consideration prior to implementing permanent measures. Materials and equipment needs are described in section 2.5 in an effort to provide the owner/tenant with enough background information to develop a successful temporary measures flood response plan.

With regards to the implementation of permanent nonstructural measures, the assessment identified one practical nonstructural flood risk reduction technique for each of the sample buildings, with a couple of price/equipment options and a scope of work, which could be implemented to reduce flood risk and increase resiliency. The following table provides a summary of the 10 assessment structures and Enclosure A contains copies of the individual assessment sheets for each of the buildings, identifying the proposed nonstructural measure for consideration.

Apalachicola Structure Assessment Summary
The recent 2018 Hurricane Michael caused flood damages to many buildings with a high probability of recurrence for future damages. In addition, the rapid rise in flood insurance premiums on these pre-FIRM high flood risk buildings is creating issues of property value and property tax revenue losses. This assessment should be used as a tool to educate community officials, residents, and business owners about the risk of flooding as well as the potential opportunities for reducing the flood risk through the nonstructural techniques presented.

Apalachicola Structure Assessment Summary

Address	Structure Identity	Occupancy	Building Value ($)	Parcel Value ($)	Total Value ($)	Proposed Mitigation
1 Ave E	Old City Hall	Public	314,770	302,000	616,770	Option 1: Elevate
86 Water St	HCA Warehouse	Public	---[1]	60,000	60,000	Option 1: Elevate
1 Bay Ave	Popham	Public	---1	---1	---	Elevate
161 Commerce St	Bowery Inn	Com	119,340	54,000	173,340	Elevate
21 Ave E	Dixie Theatre	Com	316,595	88,200	404,795	Dry Flood Proof
247 Water St	Ice House	Com	90,990	240,000	330,990	Wet and Dry Flood Proof
266 Water St	Net Factory	Com	46,105	54,000	100,105	Dry Flood Proof
15 Commerce St	Powers	Com	160,325	90,000	250,325	Elevate Interior
15 Ave E	Sponge Exchange	Com	54,475	60,000	114,475	Elevate Interior
252 Water St	Wefing Marine	Com	45,375	54,000	99,375	Option 1: Elevate

[1]Building Value was not available for this public structure at the time of report publication.

[2]Parcel Value was not available for this public structure at the time of report publication.

Public Property Assessments

This section of the Apalachicola Flood Mitigation Assessment Report provides an indepth look at individual sites and selected proposed flood mitigation treatment options. The public assessment files are accessible online at www.cityofapalachicola.com.

City Hall/Old Cotton Warehouse
1 Ave E, Apalachicola, FL

Front View

Side View

Side View

Rear View

The City Hall building is one of two surviving 1830 era cotton warehouse buildings along the road adjacent to the docks of Apalachicola. The building is a contributing building to the National Register listed (1975) Apalachicola Historic District. The building was previously rehabilitated to house the Apalachicola City Hall.

The building is constructed of older historic bricks, creating a thick wall building on the ground floor. This building is 7.4 feet below the minimum flood mitigation elevation requirement, including the locally required 1-oot free board. The building needs some maintenance to the brick construction, called repointing, which refers to the mortar joint replacement common to this era construction. The interior finishes were removed to the 3-foot level from the finished floor after the flood event to enable flood recovery and repair of the building. This exposed the interior brick construction which revealed the need for re-pointing. Repointing of the mortar joints will enhance the building wall strength and resistance to water penetration.

The flood hazard mitigation assessment of the building requires an examination of multiple variables relating to the building and the flood elevation. The high flood elevation required at this site, AE-13, restricts the possible flood hazard mitigation techniques appropriate for the building due to the finished floor elevation of 7.4 feet. The un re-enforced brick walls of the building prevent dry flood proofing of the building exterior walls due to the potential of wall collapse due to hydrostatic pressures. The flood hazard mitigation of the building will require an elevation on site project including a new foundation with crawl space and flood venting. Stairs and an elevator will be required for access to the building. All utilities need to be elevated to the level of the top of the finished floor.

The City Hall/Cotton Warehouse building is a fireproof historic brick wall constructed building located on Water St across from the city docks. This building was constructed in 1840(circa), when Apalachicola was the third largest cotton shipping port in the US. The building is listed on the National Register of Historic Places and is one of only 2 remaining original cotton Warehouses located along Water Street. The building is 6.5 feet below BFE and has 4 double opening front and a rear single-entry door openings. The entry doors are at or just above grade. This level of flood depth doesn't afford the opportunity to dry flood proof the building, due to the fact that the unreinforced brick walls can't resist that level of hydrostatic pressures.

Structure Information/Data			
Structure Identifier Number	FR00339	Ceiling height (ft)	8
Occupancy type	Commercial	Freeboard (ft)	1
Number of Structural Corners	4	First Floor Elevation (FF) (ft)	6.4
Number of Stories	2	Lowest Adjacent Grade (LAG) (ft)	5.6
Building Construction Matl	Brick	Basement/Crawlspace Elevation	n/a
Foundation Material	Brick	Max 1% Flood Velocity	Stillwater
Slab/Crawlspace/Basement	Slab	Base Flood Elevation (BFE)	AE-13
Condition (Good/Fair/Poor)	Fair	FF minus BFE (ft)	-6.6
1st Floor Window Count	6	FF minus LAG (ft)	0.81
1st Floor Pedestrian Door Count	2	Flood Depth (BFE-LAG) (ft)	7.4
1st Floor Vehicle Door Count	0	Perimeter Distance (ft)	220

The flood mitigation assessment has investigated the existing building in relation to the FEMA flood map minimum elevation requirement. The assessment also analyzed the types of flood hazard mitigation techniques that could be considered for the building and which type of technique would result in an optimum flood risk reduction along with insurance savings. The elevation of the building is the best solution for reducing flood risk and flood insurance and come into compliance with the base flood elevation.

Proposed flood hazard mitigation project: The method of flood hazard mitigation selected for this building is to elevate the building. This type of flood mitigation project will reduce flood risk and flood insurance premiums when the project is completed.

Cotton Warehouse/City Hall building with BFE Illustrated

Scope of work for the mitigation project:
1. Financing secured
2. Final designs are completed and estimates are sought
3. Contracts finalized
4. Permitting
5. Re-pointing of bricks to strengthen walls
6. Prepare for elevation, disconnect utilities, shore building, insert structural steel
7. Elevation of the building
8. Construction of new foundation, re-connection of building to new foundation
9. Reconnect plumbing, electrical
10. Build stairs and ADA facilities
11. Elevation Certificate updated after the project is completed
12. Local certificate of occupation and final certification of the flood proofing system

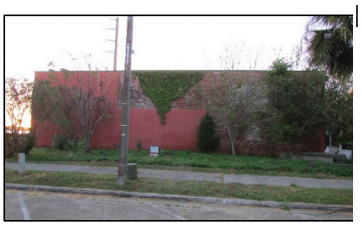
Proposed project budget

Pre-design plans:	
Building elevations illustrating the flood mitigation system installed	$ 2,000
Soil profile bore and evaluation	$ 5,000
Designed construction plans	$ 20,000
Subtotal	$ 23,500
Post-design plans:	
Permits	$ 2,000
Porta toilet	$ 1,000
Site soil stabilization	$ 300
Brick courses re-pointing	$ 8,000
Prep/elevate building, remove steel after building connected to new foundation	$ 160,000
New foundation	$ 155,000
Relocation of utilities to above BFE, install sewer backflow preventor	$ 10,000
Build stairs and ADA facilities	$ 50,000
Final Elevation Certificate	$ 500
15% contingency	$ 61,574
Subtotal	$ 448,374
Total	$ 471,874

Public Property Assessments

Apalachicola Center for History, Culture & Art (HCA)
86 Water St, Apalachicola, FL

Front View



Side View

Side View

Rear View

The Apalachicola Center for History, Culture & Art (1840 circa) is one of two surviving cotton warehouses that once lined the docks of Apalachicola in the decades prior to the Civil War. The building is constructed of older historic bricks, creating a thick wall building on the ground floor. This building is 7.4 feet below the minimum flood mitigation elevation requirement, including the locally required 1-foot free board. The building needs some maintenance to the brick construction, called repointing, which refers to the mortar joint replacement common to this era construction. The interior bricks are exposed which facilitates this important maintenance activity. Re-pointing of the mortar joints will enhance the building wall strength and resistance to water penetration.

The flood hazard mitigation assessment of the building requires an examination of multiple variables relating to the building and the flood elevation. The high flood elevation required at this site, AE-13, restricts the possible flood hazard mitigation techniques appropriate for the building due to the finished floor elevation of 6.5-feet. The nonreinforced brick walls of the building prevent dry flood proofing of the building exterior walls due to the potential of wall collapse due to hydrostatic pressures at the 7-foot flood elevation. The flood hazard mitigation of the building will require an elevation on site project including a new foundation and pier construction enabling low value storage below the first floor. Stairs and an elevator will be required for access to the building. All utilities need to be elevated to the level of the top of the finished floor.

Proposed Flood Mitigation Project

The HCA Warehouse/Apalachicola Museum building is a fireproof historic brick wall constructed building located on Water St across from the city docks. This building was constructed in 1840(circa), when Apalachicola was the third largest cotton shipping port. The building is listed on the National Register of Historic Places. The HCA Warehouse/Museum building is one of only 2 remaining original cotton Warehouses along Water St. The building is 6.5-feet below BFE and has 4 double front door store front and a rear, single-entry door opening. All of the entry doors are at or just above grade. This level of flood depth doesn't afford the opportunity to dry flood proof the building due to the fact that the unreinforced brick walls can't resist that level of hydrostatic pressures.

The flood mitigation assessment has investigated the existing building in relation to the FEMA flood map minimum elevation requirement. The assessment also analyzed the types of flood hazard mitigation techniques that could be considered for the building and which type of technique would result in an optimum flood risk reduction along with insurance savings. The elevation of the building is the best solution for reducing flood risk and flood insurance and come into compliance with the base flood elevation.

Public Property Assessments

Structure Information/Data			
Structure Identifier Number	FR00339	Ceiling height (feet)	9
Occupancy type	Commercial	Freeboard (feet)	1
Number of Structural Corners	4	First Floor Elevation (FF) (feet)	6.5
Number of Stories	2	Lowest Adjacent Grade (LAG) (feet)	6
Building Construction Matl	Brick	Basement/Crawlspace Elevation	n/a
Foundation Material	Brick	Max 1% Flood Velocity	Stillwater
Slab/Crawlspace/Basement	Slab	Base Flood Elevation (BFE)	AE-13
Condition (Good/Fair/Poor)	Good to fair	FF minus BFE (feet)	-6.5
1st Floor Window Count	0	FF minus LAG (feet)	0.5
1st Floor Pedestrian Door Count	4 double	Flood Depth (BFE-LAG) (feet)	7
1st Floor Vehicle Door Count	0	Perimeter Distance (feet)	220

HCA Warehouse building with BFE Illustrated

Proposed flood hazard mitigation project:
The method of flood hazard mitigation selected for this building is to elevate the building. This type of flood mitigation project will reduce flood risk and flood insurance premiums when the project is completed.

Scope of work presented for the mitigation project:
1. Financing secured
2. Final designs are completed and estimates are sought
3. Contracts finalized
4. Permitting
5. Re-pointing of bricks to strengthen walls
6. Prepare for elevation, disconnect utilities, shore building, insert structural steel
7. Elevation of the building
8. Construction of new foundation, re-connection of building to new foundation
9. Reconnect plumbing, electrical
10. Build stairs and ADA facilities
11. Elevation Certificate updated after the project is completed
12. Certificate of occupation

Proposed project budget

Pre-design plans: Building elevations illustrating the flood mitigation system installed	$ 2,000
Soil profile bore and evaluation	$ 5,000
Designed construction plans	$ 20,000
Sub total	$ 27,000

Post-design plans:

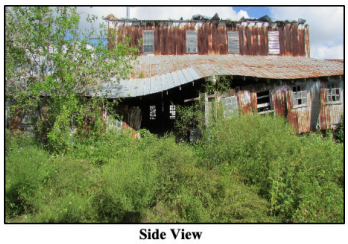
Permits	$ 2,000
Porta toilet	$ 1,000
Site soil stabilization	$ 300
Re-pointing of bricks to strengthen walls	$ 8,000
Prep/elevate building, remove steel after building connected to new foundation	$ 160,000
New foundation	$ 155,000
Relocation of utilities to above BFE, install sewer backflow preventor	$ 10,000
Build stairs and ADA facilities	$ 50,000
FEMA Elevation Certificate	$ 500
15% contingency	$ 58,020
Subtotal	$ 444,820
Total	$ 471,820

Public Property Assessments

Popham/Apalachicola Boatworks
Water St, Apalachicola, FL

Front View

Side View



Side View

The Popham building is a wood frame constructed building located on Water Street next to the Hwy 98 bridge over the Apalachicola River. The building was constructed in 1923 as an oyster processing and packing facility. In 1948 a new owner made some major repairs and opened up the interior. The building was the major boat repair facility until closed in the early 1980's. In 2009, the State of Florida helped the City purchase the building and plans are to renovate it as the community maritime museum. The building is a contributing structure in the National Register listed Apalachicola Historic District. The building is 13-feet below BFE and has substantial damages due to Hurricane Michael. This level of flood depth and wood frame construction over water doesn't afford the opportunity to dry flood proof the building.

The flood mitigation assessment has investigated the existing building in relation to the FEMA flood map minimum elevation requirement. The assessment also analyzed the types of flood hazard mitigation techniques that could be considered for the building and which type of technique would result in an optimum flood risk reduction along with insurance savings. The elevation of the building is the best solution for reducing flood risk and flood insurance and come into compliance with the base flood elevation.

Proposed flood hazard mitigation project: The method of flood hazard mitigation selected for this building is to elevate the building. This type of flood mitigation project will reduce flood risk and flood insurance premiums when the project is completed. There is work required to repair hurricane damages prior to the building being elevated.

Scope of work for the mitigation project:

1. Financing secured
2. Final designs are completed, and estimates are sought
3. Contracts finalized
4. Permitting, City, USACE, FL
5. Clean storm debris, repair/stabilize building as needed for elevation
6. Prepare for elevation, disconnect utilities, shore building, insert structural steel
7. Elevation of the building
8. Construction of new foundation, re-connection of building to new foundation
9. Reconnect plumbing, electrical
10. Build stairs and ADA facilities
11. Elevation Certificate updated after the project is completed
12. Certificate of occupation

Structure Information/Data			
Structure Identifier Number	FR00288	Ceiling height (feet)	9-14
Occupancy type	Commercial	Freeboard (feet)	1
Number of Structural Corners	6	First Floor Elevation (FF) (feet)	5.5
Number of Stories	1.5	Lowest Adjacent Grade (LAG) (feet)	1
Building Construction Matl	Wood	Basement/Crawlspace Elevation	n/a
Foundation Material	Wood piles	Max 1% Flood Velocity	Stillwater
Slab/Crawlspace/Basement	n/a	Base Flood Elevation (BFE)	VE-13
Condition (Good/Fair/Poor)	Poor	FF minus BFE (feet)	- 7.5(10ft)VE
1st Floor Window Count	32	FF minus LAG (feet)	4.5
1st Floor Pedestrian Door Count	3	Flood Depth (BFE-LAG) (feet)	12
1st Floor Cargo Door Count	3 double doors	Perimeter Distance (feet)	289.5

Proposed project budget

Pre-design plans:	
Soil profile bore and evaluation	$ 5,000
Designed construction plans including elevation illustrations	$ 50,000
Subtotal	$ 55,000
Post-design plans:	
Permits	$ 2,000
Porta toilet	$ 1,000
Temp power	$ 1,000
Site soil stabilization	$ 300
Dumpsters/fees	$ 5,000
Building clean/repair	$ 275,000
Prep/elevate building, remove steel after building connected to new foundation	$ 200,000
New foundation	$ 125,000
Electrical/Plumbing final scope TBD	$ 100,000
Relocation of utilities to above BFE, install sewer backflow preventor	$ 10,000
Build stairs and ADA facilities	$ 75,000
FEMA Elevation Certificate	$ 600
Subtotal	$ 794,900
TOTAL	$ 849,900

Popham building with BFE Illustrated

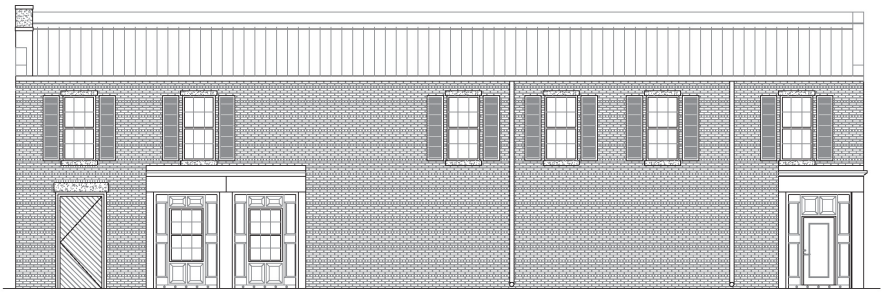
Architectural Renderings

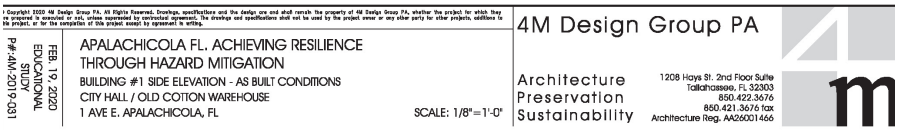
The City contracted with Historic Preservationist and Architect Mark Tarmey with the 4M Design Group to produce historically-compatible renderings of each of the project sites in an effort to combine floodplain management requirements with historic preservation standards for renovation. Based on the hazard mitigation team's findings, Mr. Tarmey's team researched, measured and developed historically compatible and aesthetically-pleasing floodproofing options for the historic structures. In some cases, the architectural team's recommendations differed from the mitigation team on floodproofing methods.

Former City Hall Cotton Warehouse

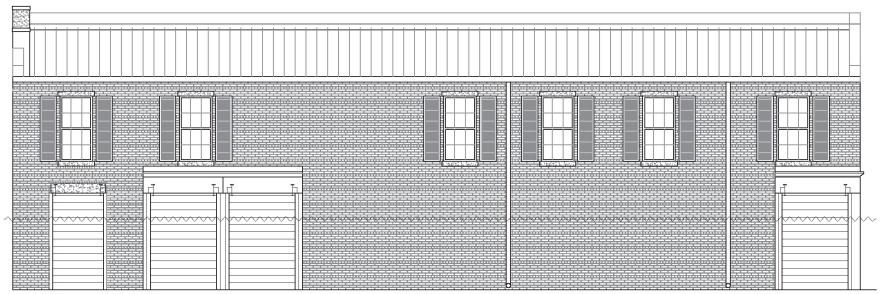
1 Ave E
Apalachicola, FL

This publically-owned structure is a 150+ year-old brick grade-level warehouse. The mitigation team recommends elevation for consistency with FEMA regulations. The architectural recommendation is to install backflow valves and aluminum flood shielding on all first floor openings and external coasting on masonry surfaces.

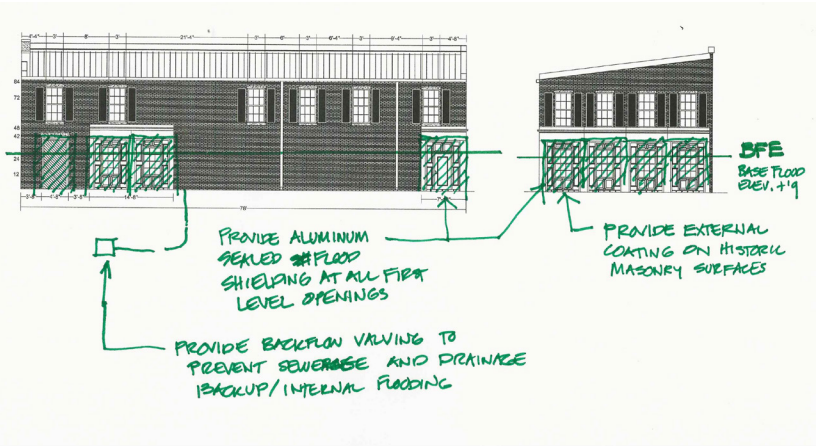




As-Built side elevation



Proposed floodproofing side elevation



Former City Hall
Cotton Warehouse
1 Ave E
Apalachicola, FL

P#:4M-2019-031
FEB. 19, 2020
EDUCATIONAL STUDY

APALACHICOLA FL. ACHIEVING RESILIENCE THROUGH HAZARD MITIGATION
BUILDING #1 FRONT ELEVATION - AS BUILT CONDITIONS
CITY HALL / OLD COTTON WAREHOUSE
1 AVE E. APALACHICOLA, FL
SCALE: 1/8"=1'-0"

4M Design Group PA
Architecture
Preservation
Sustainability

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Tallahassee, FL 32303
850.422.3676
850.421.3676 fax
Architecture Reg. AA26001466

As Built City Hall - front elevation

P#:4M-2019-031
FEB. 19, 2020
EDUCATIONAL STUDY

APALACHICOLA FL. ACHIEVING RESILIENCE THROUGH HAZARD MITIGATION
BUILDING #1 FRONT ELEVATION - PROPOSED FLOOD MITIGATION
CITY HALL / OLD COTTON WAREHOUSE
1 AVE E. APALACHICOLA, FL
SCALE: 1/8"=1'-0"

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Proposed Floodproofing City Hall - front elevation

Architectural Renderings

HCA Warehouse building with BFE Illustrated

Apalachicola Center for History, Culture & Art (HCA)

86 Water St
Apalachicola, FL

This publically-owned structure is a 150+ year-old brick grade-level warehouse. The mitigation team recommends elevation for consistency with FEMA regulations. The architectural team recommends implementing measures to make the existing grade-level structure flood resistant. The architectural team recommends the installation of aluminum flood panels over the first floor doors.

P#:4M-2019-031
FEB. 19, 2020
EDUCATIONAL STUDY

APALACHICOLA FL. ACHIEVING RESILIENCE
THROUGH HAZARD MITIGATION
BUILDING #2 FRONT ELEVATION - AS-BUILT CONDITIONS
HCA WAREHOUSE / MUSEUM
86 WATER ST. APALACHICOLA, FL
SCALE: 1/8"=1'-0"

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Sustainability

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As-Built front elevation

P#:4M-2019-031
FEB. 19, 2020
EDUCATIONAL STUDY

APALACHICOLA FL. ACHIEVING RESILIENCE
THROUGH HAZARD MITIGATION
BUILDING #2 FRONT ELEVATION - PROPOSED FLOOD MITIGATION
HCA WAREHOUSE / MUSEUM
86 WATER ST. APALACHICOLA, FL
SCALE: 1/8"=1'-0"

4M Design Group PA
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Proposed Floodproofing front elevation

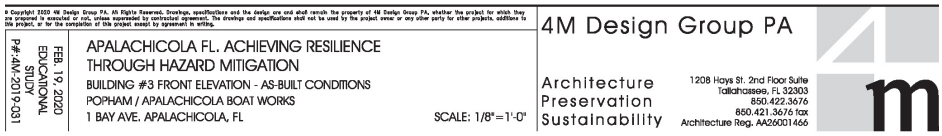
Architectural Renderings

Popham building with BFE Illustrated

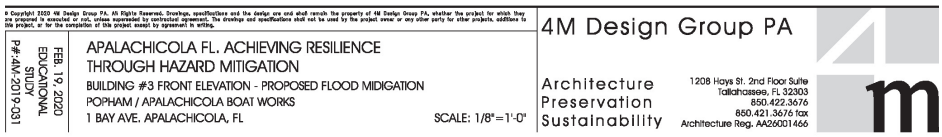
Popham Building Apalachicola Boatworks

Water St,
Apalachicola, FL

This publically-owned structure is a metal and wood-frame warehouse structure over the water. The mitigation team recommends elevation for consistency with FEMA regulations. The architectural team recommends wet flood-proofing to required BFE.



As-Built front elevation



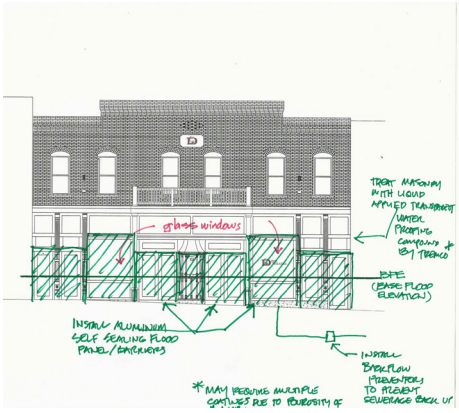
Proposed Floodproofing front elevation

Architectural Renderings

Dixie Theatre

21 Avenue E
Apalachicola, FL

This two-story 100-year+ brick structure is a grade-level building. The mitigation team recommends dry floodproofing. The architectural team's recommendation is dry floodproof also. The recommendation from the architectural team is to install backflow valves and aluminum self-sealing flood panels on first floor and external coating on masonry surfaces.



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FEB. 19, 2020
EDUCATIONAL STUDY

APALACHICOLA FL. ACHIEVING RESILIENCE THROUGH HAZARD MITIGATION
BUILDING #5 FRONT ELEVATION - AS-BUILT CONDITIONS
DIXIE THEATHER
21 AVE E. APALACHICOLA, FL
SCALE: 1/8"=1'-0"

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As Built front elevation

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P#:4M-2019-031
FEB. 19, 2020
EDUCATIONAL STUDY

APALACHICOLA FL. ACHIEVING RESILIENCE THROUGH HAZARD MITIGATION
BUILDING #5 FRONT ELEVATION - PROPOSED FLOOD MITIGATION
DIXIE THEATHER
21 AVE E. APALACHICOLA, FL
SCALE: 1/8"=1'-0"

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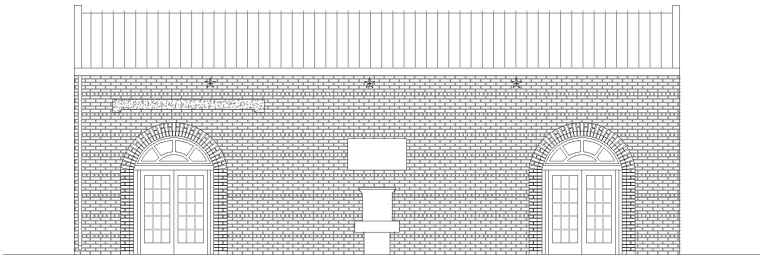
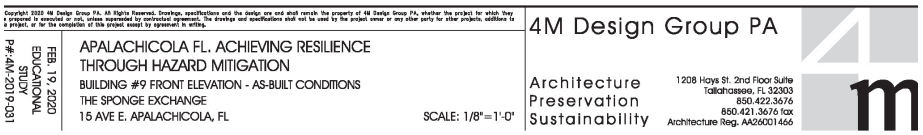
Proposed Floodproofing front elevation

Sponge Exchange

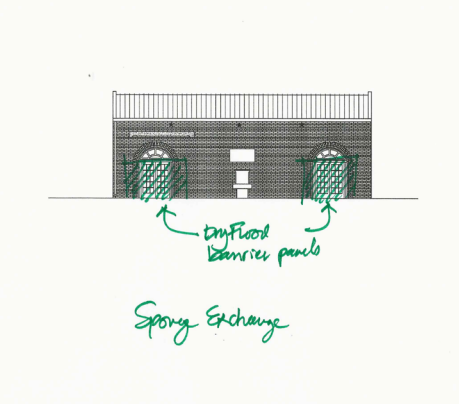
15 Avenue E
Apalachicola, FL

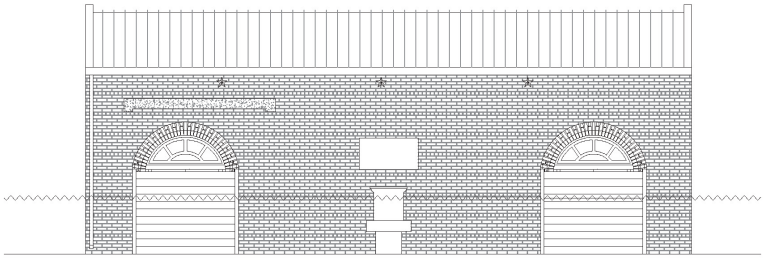
This 100-year+ brick structure is a grade-level building. The mitigation team recommends dry floodproofing. The architectural team's recommendation is dry floodproof also. The recommendation to install flood panels.

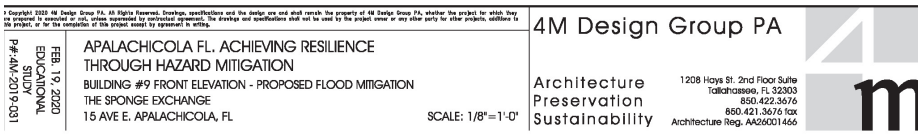




As Built front elevation







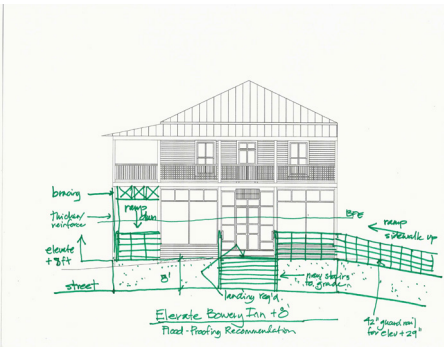
Proposed Floodproofing front elevation

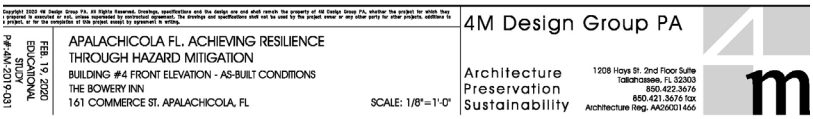
Architectural Renderings

Bowery Inn

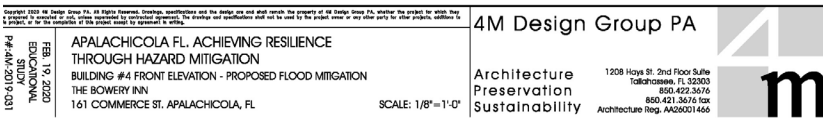
161 Commerce Street
Apalachicola, FL

The mitigation team's proposed method of mitigating this two-story wood-frame commercial building is to elevate. The architectural team recommends elevation with raised sidewalks/ramp for access.





As Built Bowery Inn - front elevation



Proposed Floodproofing front elevation

Architectural Renderings

Bowery Inn
161 Commerce Street
Apalachicola, FL

P#:4M-2019-031
EDUCATIONAL STUDY
FEB. 19, 2020

APALACHICOLA FL. ACHIEVING RESILIENCE THROUGH HAZARD MITIGATION
BUILDING #4 SIDE ELEVATION - AS-BUILT CONDITIONS
THE BOWERY INN
161 COMMERCE ST. APALACHICOLA, FL
SCALE: 1/8"=1'-0"

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Architecture Reg. AA26001466

As-Built side elevation

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EDUCATIONAL STUDY
FEB. 19, 2020

APALACHICOLA FL. ACHIEVING RESILIENCE THROUGH HAZARD MITIGATION
BUILDING #4 SIDE ELEVATION - PROPOSED FLOOD MITIGATION
THE BOWERY INN
161 COMMERCE ST. APALACHICOLA, FL
SCALE: 1/8"=1'-0"

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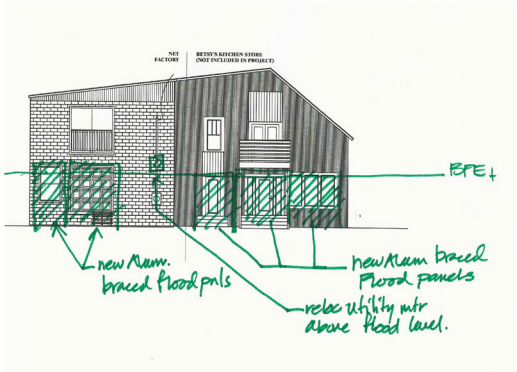
Proposed Floodproofing side elevation

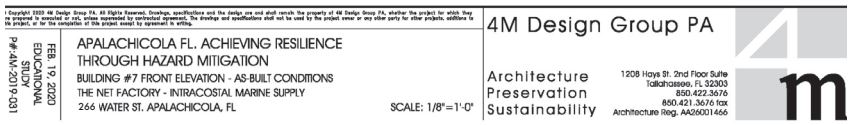
Architectural Renderings

Net Factory Intracoastal Marine Supply

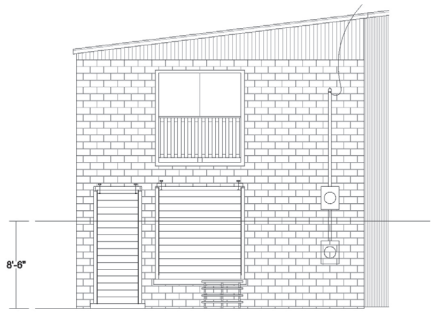
266 Water St,
Apalachicola, FL

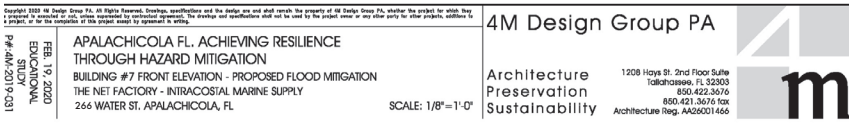
This historic two-story brick warehouse is recommended for dry floodproofing by the mitigation team. The architectural recommendation concurs with dry floodproofing and recommends the installation of aluminum braced flood panels on first floor and the relocation of utilities above flood level.





As-Built front elevation





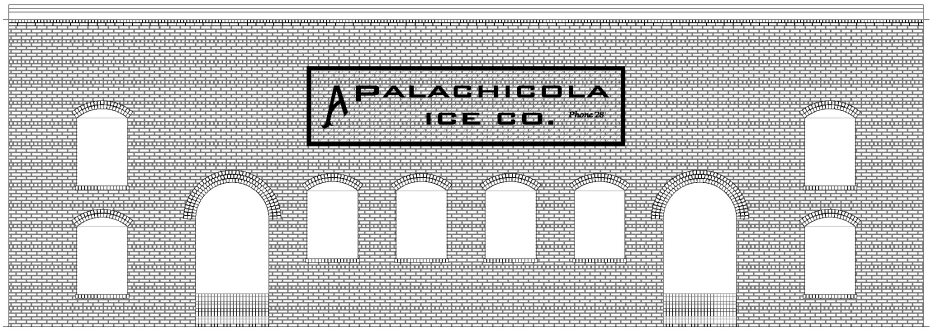
Proposed Floodproofing front elevation

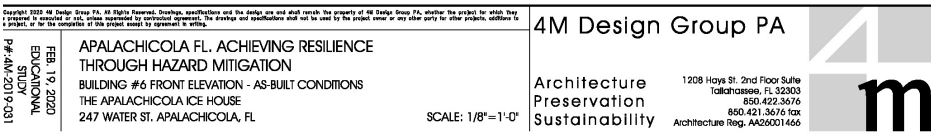
Architectural Renderings

Apalachicola Ice Company

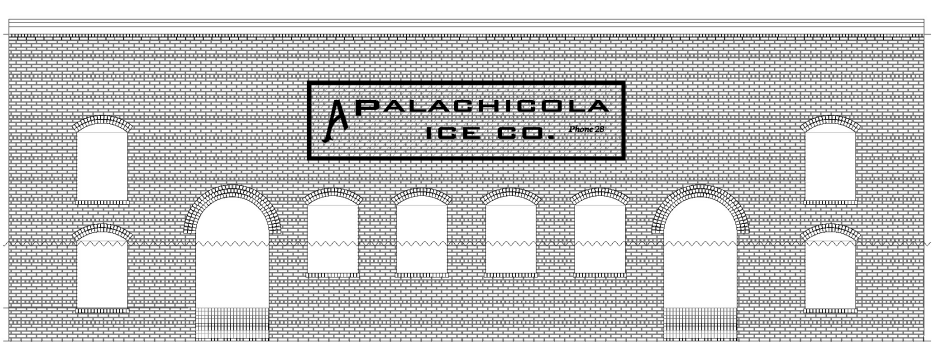
247 Water St,
Apalachicola, FL

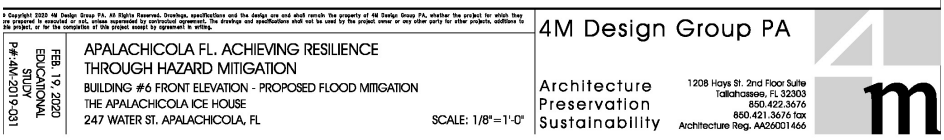
This historic two-story brick warehouse is recommended for wet and dry floodproofing by the mitigation team. The architectural recommendation concurs.





As-Built front elevation





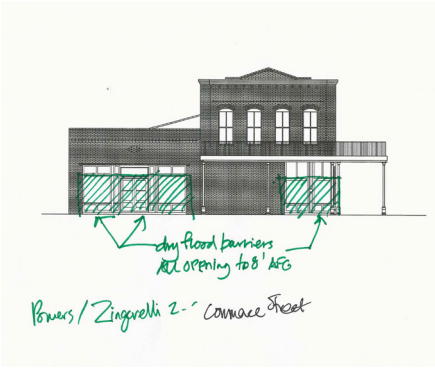
Proposed Floodproofing front elevation

Architectural Renderings

Powers Building

15 Commerce Street
Apalachicola, FL

This privately-owned structure is a 150+ year-old brick grade-level warehouse. The mitigation team recommends interior floor elevation for floodproofing. The architectural team recommends implementing measures to make the existing grade-level structure flood resistant. The architectural team recommends the installation of aluminum flood panels over the first floor doors.



FEB. 19, 2020
EDUCATIONAL STUDY
P#-4M-2019-031

APALACHICOLA FL. ACHIEVING RESILIENCE THROUGH HAZARD MITIGATION
BUILDING #8 SIDE ELEVATION - AS-BUILT CONDITIONS
POWERS / ZINGERELLIS STORE
15 COMMERCE ST. APALACHICOLA, FL
SCALE: 3/32"=1'-0"

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Architecture Reg. AA26001466

As-Built front elevation

FEB. 19, 2020
EDUCATIONAL STUDY
P#-4M-2019-031

APALACHICOLA FL. ACHIEVING RESILIENCE THROUGH HAZARD MITIGATION
BUILDING #8 SIDE ELEVATION - PROPOSED FLOOD MITIGATION
POWERS / ZINGERELLIS STORE
15 COMMERCE ST. APALACHICOLA, FL
SCALE: 3/32"=1'-0"

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1208 Hays St. 2nd Floor Suite
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Proposed Floodproofing front elevation

Architectural Renderings

Powers Building

15 Commerce Street
Apalachicola, FL

P#: 4M-2019-031
FEB. 19, 2020
EDUCATIONAL STUDY

APALACHICOLA FL. ACHIEVING RESILIENCE
THROUGH HAZARD MITIGATION
BUILDING #8 FRONT ELEVATION - AS-BUILT CONDITIONS
POWERS / ZINGERELLIS STORE
15 COMMERCE ST. APALACHICOLA, FL
SCALE: 3/32"=1'-0"

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1208 Hays St. 2nd Floor Suite
Tallahassee, FL 32303
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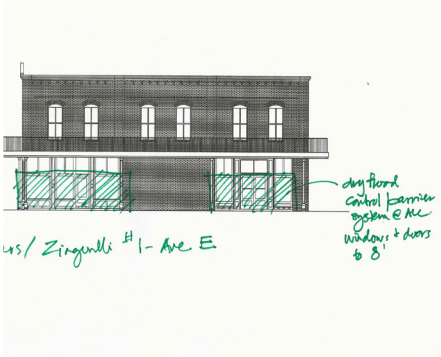
Architecture Reg. AA26001466

As-Built front elevation



P#: 4M-2019-031
FEB. 19, 2020
EDUCATIONAL STUDY

APALACHICOLA FL. ACHIEVING RESILIENCE
THROUGH HAZARD MITIGATION
BUILDING #8 FRONT ELEVATION - PROPOSED FLOOD MITIGATION
POWERS / ZINGERELLIS STORE
15 COMMERCE ST. APALACHICOLA, FL
SCALE: 3/32"=1'-0"

4M Design Group PA
Architecture
Preservation
Sustainability
1208 Hays St. 2nd Floor Suite
Tallahassee, FL 32303
850.422.3676
850.421.3676 fax
Architecture Reg. AA26001466

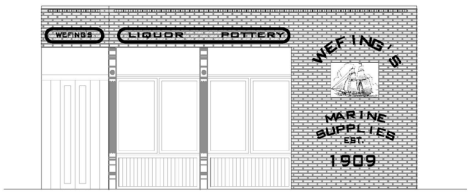
Proposed Floodproofing front elevation

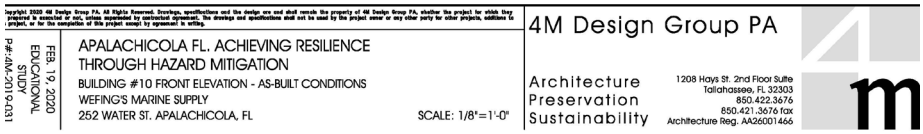
Architectural Renderings

Wefing Marine Bldg.

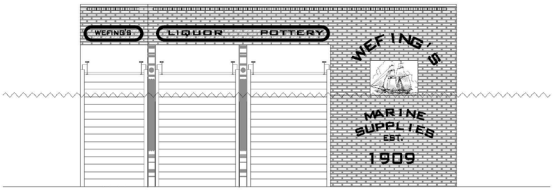
252 Water Street
Apalachicola, FL

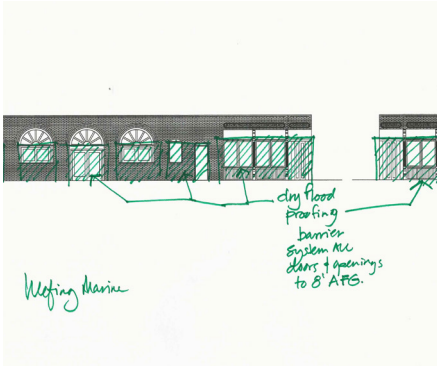
This is a privately-owned brick grade-level warehouse. The mitigation team recommends elevation for floodproofing. The architectural team recommends implementing measures to make the existing grade-level structure flood resistant. The architectural team recommends the installation of aluminum flood panels over the first floor doors.

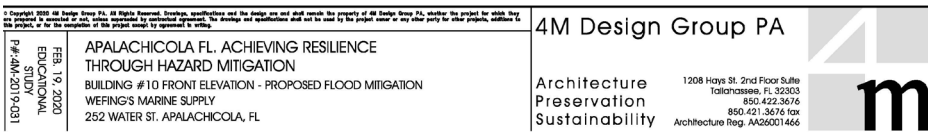




As-Built front elevation







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Architectural Renderings

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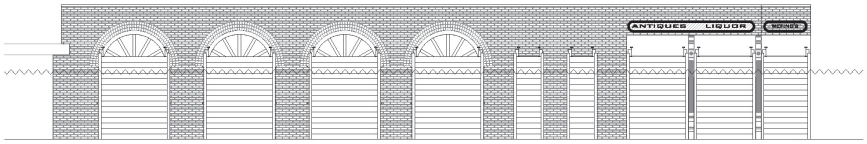
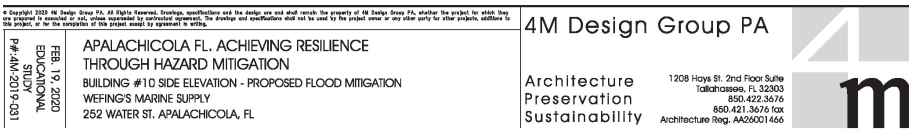
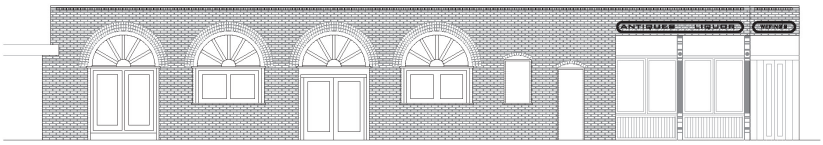
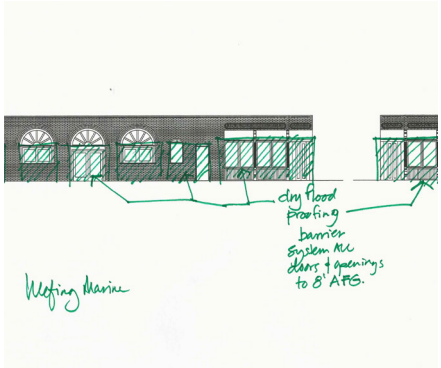
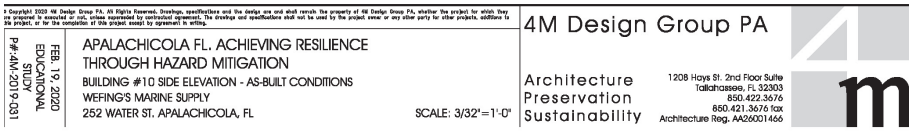




As-Built front elevation







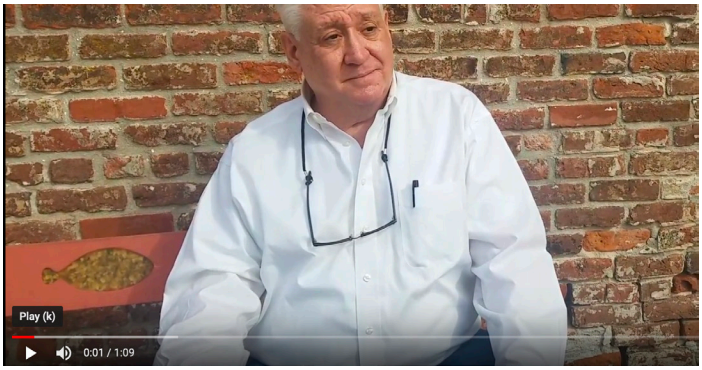
Proposed Floodproofing front elevation

Videography

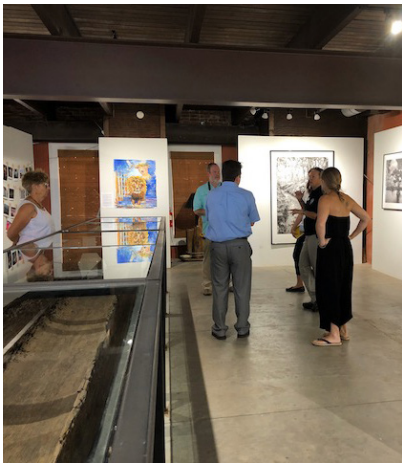
The Apalachicola National Estuarine Research Reserve contributed to the project by aiding with the production of a documentary short about the City of Apalachicola and the challenges it faces with sea level rise. The staff attended a “crash course” on videography put on by the Mississippi State University video department and then spent several days collecting footage. Staff interviewed several key figures brought in on the project, including flood mitigation specialists and architects brought in to give professional opinion, as well as local politicians, residents, and business owners in order to get a variety of voices. Once the interviews and the B-Roll footage were completed the ANERR communications team edited together a rough documentary short about the town and the obstacles it deals with as a small city with a rich historical business district situated very close to a rising water body.

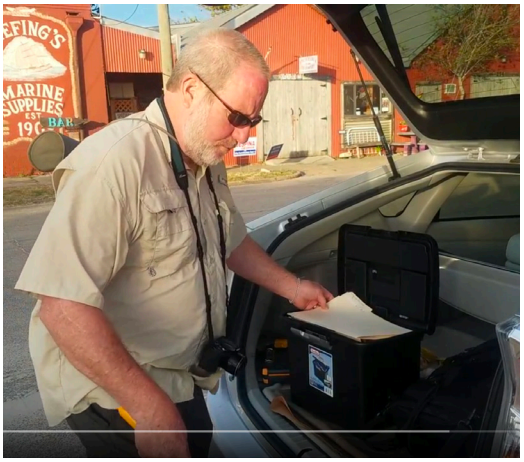
The finished video is online at:
https://youtu.be/P62SmZ8619E

B-roll footage is available on online at:
https://drive.google.com/drive/folders/14jn-L52eZp9cnGpE_ujoAojhBk7CbfcwX?usp=sharing



Videography





The project was documented by staff in photography and videography throughout the stages of completion. The images were uploaded to a dropbox and shared with grant providers for use in the creation of a video that may serve as a future training model.

gallery director.mp4	Josh Eaton	Sep 13, 2019 Josh Eat
randy advantages of non structural.mp4	Josh Eaton	Oct 18, 2019 Josh Eat
randy advice to communities.mp4	Josh Eaton	Oct 18, 2019 Josh Eat
randy further steps.mp4	Josh Eaton	Oct 18, 2019 Josh Eat
Randy name and title.mp4	Josh Eaton	Oct 18, 2019 Josh Eat
randy overcoming challenges.mp4	Josh Eaton	Oct 18, 2019 Josh Eat
randy simplified goals.mp4	Josh Eaton	Oct 18, 2019 Josh Eat
randy unique challenges.mp4	Josh Eaton	Oct 18, 2019 Josh Eat
rod close up car (windy audio).mp4	Josh Eaton	Sep 20, 2019 Josh Eat
rod explanation outside wefings.mp4	Josh Eaton	Sep 20, 2019 Josh Eat
ron w fema.mp4	Josh Eaton	Sep 13, 2019 Josh Eat

This Report is Available online at
www.cityofapalachicola.com

Produced by the City of Apalachicola
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www.cityofapalachicola.com 850-653-8222

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