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Flood Mitigation Plan **(DRAFT COPY)** **Unincorporated Chatham County, Georgia**

I. Introduction

1. This document was prepared to satisfy the certification requirements of the 2006 Coordinators Manual for the National Flood Insurance Program (NFIP)/Community Rating System (CRS). Chatham County participates in the NFIP sponsored by the U.S. Department of Home Land Security's Federal Emergency Management Agency (FEMA) in order to qualify residents for flood insurance. The County also participates voluntarily in the CRS whereby residents qualify for discounted premiums. The County has been an active participant in the CRS since August, 1980.

2. Maintaining and periodically re-evaluating a community's Flood Mitigation Plan is required to continue in good standing the County's certification for discounted rates on flood insurance policies. A Flood Mitigation Plan is required by all CRS communities that have ten or more repetitive loss properties that have not received mitigation. Unincorporated Chatham County has a total of forty-four repetitive loss properties on record with FEMA. A repetitive loss property is one for which two or more claims of \$1,000 or more have been paid by the NFIP within any given 10-year period since 1978. Of those properties, five have been mitigated over recent years via relocation or acquisition/demolition. In some cases, the mitigation projects were accomplished using 75% Federal grant funds. Federal grant opportunities would not be available without a community adopted Flood Mitigation Plan.

3. The purpose of this Flood Mitigation Plan is to protect people and property from potential flooding damages while maintaining good standing with FEMA's NFIP. We intend to accomplish this goal through more restrictive governmental ordinances and regulations designed to provide planning guidance for future development and construction. It is also intended to expand current outreach programs, to maintain our flood mitigation program via assistance through Federal grant programs, and to continue with capital improvement drainage projects to

alleviate structural flooding within our flood prone communities. This plan is expected to educate the residents of Chatham County about the hazards of flooding, suggest loss reduction measures and raise the awareness of the beneficial functions of the floodplain. This plan was developed with consideration of and in support of Chatham Emergency Management Agency's (CEMA) Pre-Disaster Mitigation Plan dated January 2005 and CEMA's Emergency Operation Plan (EOP) dated April 2006.

II. Background

1. This plan was developed and organized following the ten step process under Section 510, Floodplain Management Planning, in the *CRS Coordinator's Manual* and *NFIP/CRS Example Plans (Edition 2006)*.
2. A formal review of the Chatham County Emergency Operations Plan (EOP) was performed and information contained therein was used to develop this plan. Topics relative to specific flood protection needs include evacuation routes within and outside of the county, traffic control points, public information procedures, and flood and hurricane information. A review of the historical data and project information published in the *FEMA Flood Insurance Study, Unincorporated Areas of Chatham County, Georgia*, dated May 19, 1987, and from the *Unincorporated Chatham County Stormwater Capital Improvement Program*, Chatham County Department of Engineering dated May, 1997 was also performed. Related data from these documents were used in the development of the plan.
3. Specific topics relative to flood protection needs are the focus of this plan. In general, some of the topics include discussions on improving public assistance and education, reducing the effect of freshwater flooding through effective land management practices and general flood and hurricane information.
4. The Chatham County Director of Engineering (County Engineer) serves as the CRS Coordinator and will direct the development and implementation of the floodplain management plan. The planning committee includes not only County engineering staff but personnel from Chatham Emergency Management Agency (CEMA) and The Metropolitan Planning Commission (MPC). Key individuals from the engineering staff include the County's Drainage Engineer, the County's Plan Development Coordinator, the GIS/Civil Engineer, the County Plan Reviewer and the CRS Program Manager. CEMA provided an Emergency Management Specialist while The MPC provided a Water Resources Planner. While several committee meetings were held in order to coordinate and draft this plan, many more individual meetings were held between staff members and the CRS Program Manager. The minutes from the formal meeting held during the plan development process can be found at Appendix L.
5. The draft plan was submitted for review and comment from outside agencies. Input was also solicited from various homeowner associations located within the floodplain while attending their monthly meetings as well as from the general public. The draft plan was also submitted to

FEMA's insurance consultant, Insurance Services Office (ISO), representative on one or more occasions for review and comment regarding Activity 510 and general CRS compliance. The final plan was adopted by the Chatham County Board of Commissioners on August 14, 2007, in the form of a resolution. A copy of the resolution is attached to this plan at Appendix A.

III. Hazard Assessment

1. Chatham County consists of approximately 445 square miles located in the southeastern portion of Georgia bordering the Atlantic Ocean. The Atlantic Ocean coastline accounts for approximately 30 miles of Chatham County's eastern border. A vicinity map is at Appendix B.
2. Chatham County is situated on a low coastal plain with much of its area consisting of tidal marshes and swamps. Elevations range from sea level at the coast to approximately 50 feet in the northwestern portion of the County. Chatham County has vast areas of wetlands and natural rainfall runoff detention.
3. Approximately 61 percent of Unincorporated Chatham County's floodplain is marshland/tidal areas which contains some residential, commercial, and limited industrial development. Appendix C contains a map which illustrates the location of the County's major watersheds with the respective Repetitive Flood Loss Communities therein. A total of eight municipalities contribute to the watersheds within Chatham County. Over recent years, the limits of these municipalities have changed due to annexation, thus impacting the overall unincorporated area. The city limits of the various municipalities are shown at Appendix D. The flood basin has been illustrated in the previously developed areas as well as the undeveloped areas. Appendix E contains an *Explanation for the Cause of Flooding within each Repetitive Loss Community*. The flooding explanations presented were derived from various drainage problem studies, windshield surveys performed during some storm events and from citizen comments. A map of each listed community is also provided. This map shows the relative flooding impact of the surrounding or near by properties to identified repetitive loss property. Nuance or non-structural flooding also occurs throughout the county and will be addressed in detail later within this document.
4. Chatham County is subject to a variety of hazards both man made and natural occurring. However for this mitigation plan, the focus is on natural occurring hazards including hurricanes, hurricane surges, coastal storms, rainwater flooding and coastal erosion to name a few. Coastal storms are the type of hazard events that have historically impacted this area most frequently, with more than 113 coastal storms on record since 1960. Coastal storm events are followed by rainwater flooding with at least 10 events on record since 1985 and 5 hurricanes impacting this area on record since 1979.
5. According to the National Oceanic and Atmospheric Administration (NOAA), there has only been one hurricane to impact the Chatham County coastline in the last 28 years. Hurricane David struck the county coastline on September 4, 1979. This was a minimal hurricane with

wind intensity of 74 mph. Property damage was also caused by tornados that were spawned by the storm. However, the need for stormwater drainage improvements became apparent as a result of extremely heavy rainfall events during October 1994, July 1996 and June 1999. These severe rainfall events were un-named tropical storms that caused county wide structural flooding. A chart entitled Flood Claims by Date, Unincorporated Chatham County, is attached in Appendix F. This chart presents significant rainfall events that have contributed to insurance claims being filed due to flooding since January 1978. Appendix F also contains four additional charts which correlate the relationships between the number of repetitive flood claims filed, the dates of the rainfall events, percentages of claims relative to grouped areas and the areas impacted. The information shown on the charts was derived from FEMA flood claim data. Although numerous factors occurring over the past several years throughout the County contributed to the need for drainage improvements, none were more pronounced than the flooding that occurred to both property and structures during the specific storm events previously mentioned. It should be noted that the "Claims" represent flood loss claims from only those properties with more than one flood insurance claim. This analysis, therefore, does not include flooding of properties with only one claim or those without flood insurance.

6. Unincorporated Chatham County has more than 13,000 buildings located within the 100 year flood zone. These buildings include approximately [redacted] single and multifamily homes as well as approximately [redacted] industrial and commercial structures. There also exist more than [redacted] critical facilities which include but is not limited to police precincts, fire stations, and immediate medical facilities. Major storms and hurricanes have caused coastal flooding to occur in residential and other areas over a number of years. Rainwater flooding is most common in this area and is usually characterized by slow rise of water levels with isolated instances of rapid pooling and overflow flooding where stormwater control structures are compromised or where stormwater controls measures constrained by local tax revenues have been outpaced by development. In general, flood depths within residential areas were determined to range from 1 foot to 1.5 feet based upon feedback from property owners and data extrapolated from the finished floor elevations estimated during windshield surveys. In other locations, flood depths were determined to exceed 4 feet. In some cases, localized flooding has been identified to be caused by clogged storm drains or insufficient storm drain pipe sizes. Some older storm drain pipes are undersized today as a result of recent development in areas. Significant quantities of debris blocking culverts and bridge underpasses exacerbate the potential for flooding.

IV. The Problem

1. In general, Chatham County's flooding problems are mainly due to its low elevations and flat slopes. The flat slopes result in slow storm water movement during periods of heavy rain fall. The storm water also accumulates in low lying areas which may result in flooding. This local flooding condition is further complicated by new developments within areas that were previously wetlands. As a result, there is an increased demand on existing storm drainage systems because previously existing pervious wetland areas are being transformed into impervious residential, commercial and industrial areas. In addition, many of the storm drainage systems have not been

adequately maintained or are in need of repair and improvement.

2. Natural floodplains generally include marsh areas and low lying areas along canals. Open parks such as Henderson and Bacon Park Golf Courses also have natural floodplains. Our natural floodplains reduce flood damages by allowing flood waters to spread out over large areas which helps facilitate absorption into the ground, reduce flow rates and serve as a flood storage area to reduce downstream peaks. We should all do our part to help keep our floodplains and floodplain waters free of contaminants such as oil, paint, anti-freeze and pesticides. These chemicals pollute the marsh waters, thus decreasing the water quality that local wildlife depends upon for their habitat. Chatham County also have barrier islands such as Little Tybee, Ossabaw, Cabbage and Wassaw Islands. These islands serve as a natural protective barrier to incoming hurricane forces such as wave attack and serve to reduce tidal and wind energies. These islands serve as natural aquatic habitats, wetlands, marshes and estuaries.

3. Chatham County also have several river corridors which are the strips of land that flank major rivers in Georgia. These corridors are of vital importance in that they help preserve those qualities that make a river suitable as a habitat for wildlife, a site for recreation, and a source for clean drinking water. River corridors also allow the free movement of wildlife from area to area within the state, help control erosion and river sedimentation, and help absorb floodwaters.

4. The Coastal Georgia Regional Development Center prepared a Regional River Corridor Protection Plan for counties within their jurisdiction. The Plan describes the ten local governments and the associated rivers that are affected by the River Corridor Protection Act, and puts forward a regional plan for the protection of river corridors. The plan provides for construction of road crossings, acceptable uses of river corridors, maintenance of a vegetative buffer along rivers for a minimum of 100 feet from the river's edge (residential structures are allowed within the buffer zone), timber production standards, wildlife and fisheries management, recreation, and other uses. Chatham County is one of the eight coastal counties affected by the River Corridor Protection Act and therefore, as required, has adopted a Regional River Corridor Protection Plan for the Savannah River.

5. The maintenance of a 100-foot natural vegetative buffer, often referred to as a “riparian buffer”, on both sides of any protected river is required under the River Corridor Protection Act. Similarly, under the State of Georgia Erosion and Sedimentation Act, one provision requires that land-disturbing activities shall not be conducted within 25 feet of the banks of any State waters, thus mandating a riparian buffer 25 feet in width.

6. Riparian buffers are of particular importance to the overall protection of water quality and habitat, especially within the Lowcountry and coastal areas of Georgia. Scientific research and documentation cite many reasons for riparian buffers, including: a) to reduce the volume and velocity of stormwater run-off in order to protect the hydrological profiles of the surrounding waterways; b) to reduce the sediment and pollutants going into the open water; c) to provide upland wildlife habitat areas and; d) to help maintain the in-stream temperatures provided by the shade within the tree canopy of the buffer system.

7. The primary effect of the buffer on not only the waterbody, but the overall watershed as well, is to reduce non-point source pollution from the human activities upstream from the riparian area. Run-off water filtered through a well-maintained buffer zone carries fewer nutrients, chemicals and sediment into the waters and helps to protect the natural profile of the shoreline. For example, studies show that a minimal buffer of 35 feet will often remove over 60 percent of sediment and pollutants before they enter the water, thereby greatly reducing the detrimental impacts to the area.

8. With this in mind, in 2001 the MPC set forth development standards in the Island's Area Community Plan for Chatham County's Oatland, Talahi, Whitmarsh, and Wilmington Islands that established a minimum riparian buffer of 35 feet, 30 percent of which may be altered by pruning and selective clearing for access and to maintain view corridors. Such practices as these result in reduced stormwater run-off essential for environmental protection and flood control; buffering adjacent neighborhoods, and enhancing community appearance.

9. Georgia's coastal marshlands and beaches are seen as one of the State's greatest resources and a defining characteristic feature of Chatham County.

10. Chatham County has enacted a zoning district for marsh conservation. According to the county's 2001 zoning ordinance, the purpose of the Conservation Marsh (C-M) District is to encourage all reasonable public and private uses and developments of the marshlands. The uses are not to be significantly detrimental to the biological ecology, aquatic life, wildlife, recreation, and scenic resources of the marshlands. The uses will not pollute the inlets and coastal waters with human or industrial wastes or the long-term silting that would result from unduly disturbing the marshlands. The purpose of the C-M district is to protect and conserve a natural land and water condition for the recreational, economic and general welfare of the citizens of Chatham County.

11. Chatham County, as well as other communities, are especially vulnerable to hurricanes and hurricane surges. Although this region has been impacted the least by hurricanes when compared to other natural hazards over recent years, a single hurricane can impact 230,730 people or devastate 99 percent of the population during a single event. Such a storm could severely damage 35-100 percent of structures and up to 89 percent of the County's more than 500 critical facilities. A single hurricane has the potential to cause overall damage to community structures and buildings (residential, commercial and governmental) that could easily exceed \$38.4 billion at Fair Market Values. An example of the extent of devastation is illustrated in the Hurricane Storm Surge Inundation Map. This map estimates the extent of flood water encroachment as caused by Category 1 through 5 hurricanes. The map which also illustrates all of Chatham County relative to neighboring surrounding counties is attached at Appendix G.

12. The Chatham County Hurricane Storm Surge Inundation Map data identifies a potential cost of \$1.133 billion in damages. Affected buildings could be as many as 72,228 which equates to \$29.79 billion at Fair Market Values for residential and commercial properties. The potential

dollar impact on Chatham County's Critical Facilities and Critical Infrastructure Inventory Assets could reach well in excess of \$2.0 million in structural replacement building content values.

13. Damage to residential and commercial property has the potential to adversely affect Chatham County's ability to collect ad valorem taxes. Property taxes are billed based on an assessed value as of January 1st of each year. Hurricane season runs from June 1st to November 30th. Value notices are issued during May and June and have a 60 to 90 day appeal period. Damages which occur during June, July or August could give reason to appeal the current valuation. In the event of a major incident, property that has not been rebuilt or restored would be subject to a new assessment as of the next January 1st assessment year. This has the potential of significantly reducing Chatham County's revenues which would thus impact other services. The sales and hotel/motel tax revenues will also be adversely affected for any significant periods of power loss or other interruptions of normal business or tourist activity. Eighty percent of Chatham County's General Fund M&O operating revenues are derived from taxes. In FY2007, budgeted revenues include \$100 million in ad valorem real and personal property taxes, and \$10 million in sales tax. Our Special Service District budget receives 60% of its revenue from taxes. This includes \$18 million in ad valorem taxes, and \$645 thousand in hotel/motel tax. Currently, there is no mechanism available to Chatham County to offset this potential loss of revenue.

14. The National Hurricane Center's Sea, Lake and Overland Surges from Hurricanes (SLOSH) modeling for Chatham County Surge Zones indicates that 76 percent of the County's population and 57 percent of its more than 500 critical structures/buildings can be affected for a loss of \$26.9 billion at Fair Market Values. The SLOSH model used to produce this data only included Categories 1 through 3 hurricanes. Chatham County is subject to Category 4 and 5 hurricanes resulting in increased damage and devastation.

15. Significant amounts of rainwater and coastal storms, which has been known to cause both structural and nuisance (non-structural) flooding, has the potential to adversely impact approximately 64 percent (148,634 people) of Chatham County's population and as many as 35 percent of its critical facilities (175 various structures). Such losses would result in excess of \$21.59 billion at Fair Market Value. This data was obtained from the NFIP's data on the 100 Year and Local Historical Flooding map for Chatham County. The total number of buildings that can be affected is more than 36,000. Significant amounts of rainwater can also cause nuisance flooding which can impair traffic flows. Although the occurrences are limited, the inconveniences caused by nuisance flooding has prompted the Chatham County Department of Public Works to map and monitor these areas during severer weather conditions. Nuisance flooding occurs countywide and is typically limited to surface streets within neighborhoods and small communities. Within these areas, the storm drain systems are usually of inadequate capacity or are in need of maintenance and/or repair to handle the sudden large volumes of rainwater. A map has been included at Appendix H which shows the known flood prone (nuisance flooding) areas as related the areas flood insurance claims. Appendix H contains a partial table named, "HOT SPOTS INFORMATION SHEET" which list the names of streets and intersections and provides detailed information about each flood prone area.

16. Please refer to the map at Appendix H to review a graphical representation of all flood loss insurance claims as of August 2006. The data used to generate this map was obtained from FEMA Region IV during September 2006. The black dots on the map represent single flood loss claims while the red dots represent repetitive flood loss claims. The nuisance flood prone areas are indicated by the numbered white boxes on the map. According to FEMA's data, Unincorporated Chatham County has more than 11,000 flood insurance policy holders. Of those, more than 746 flood loss insurance claims have been filed since 1978. It should also be pointed out at this time that there perhaps exists an unknown number of properties within Unincorporated Chatham County that have experienced flood damage losses that do not have flood insurance.

17. Early notification of adverse weather conditions which produce flooding emergencies could significantly increase the county's ability to rapidly and efficiently evacuate its citizens and visitors. Emergency evacuation route maps can be found in the phone book and road side signs identify evacuation routes out of harms way. Additionally, the inbound lane reversal procedures, which are in place along Interstate 16, will significantly increase the evacuation efforts. Early notification is also vital to evacuation, mitigation and preparedness activities. Chatham County employs several alerting mediums to maximize warning to the threat area. The combination of all available avenues does not, however, reach 100 % of the threatened population. An aggressive education campaign is in place through the Chatham County Engineering Department and CEMA to distribute mitigation and preparedness information county-wide. Warnings are managed in three phases. Phase one warnings are issued through the National Oceanographic and Atmospheric Administration (NOAA), All Hazards Alert Monitors. This notice serves the general population. Should the threat be such that additional warnings are required, the Emergency Broadcast System (EBS) is activated and the alert is distributed through all available television and radio outlets. Finally, CEMA maintains the option of activation the County Emergency Warning Siren Network should the threat pose an immediate and extreme threat to life or property. Even through deployment of these methods, there is no guarantee that the entire population in the threatened area is notified of the emergency. Expanding the warning capability to a fully functioning system would include the installation gauges to monitor rising river and stream water levels. Observed water levels above a defined threshold alert emergency management officials so that analysis can be conducted. If the threat is such that notification is required, emergency management officials activate one or all three of the methods defined above.

18. The various causes of flooding and the resulting complications listed previously have had some detrimental impacts within and around the communities of Wilmington Park, Romney Place, the Louis Mills Canal area, Halcyon Bluff Subdivision, Golden Isles Subdivision, Georgetown, and the Quacco Canal areas. As stated earlier, some 746 structures within Unincorporated Chatham County have received insurance claim pay-outs for flood damages. These structures include repetitive flood damaged buildings as well as buildings that have been subjected to flood damage only once. The total sum of the insurance claims paid as of August 2006 totals more than \$ 4.1 million.

19. As stated earlier in this report, Chatham County includes eight municipalities and the unincorporated area. In 1980, the population of the City of Savannah was approximately 2.5 times the combined population of the other municipalities and unincorporated county. By the year 2000, this factor was less than 1.5. Many of the same conditions that influenced regional growth affected the growth of the non-urbanized areas of the county. The most significant factor was the development of the islands east of Savannah. Although the municipalities in West Chatham County experienced double digit growth between 1990 and 2000, much of this growth was the result of annexations of land formerly in the unincorporated area. But in spite of the loss by annexation of almost 9,000 acres in West Chatham County, the population of the unincorporated area doubled between 1980 and 2000. Most of this growth was located on Wilmington, Whitemarsh, Talahi, and Skidaway Islands.

20. The MPC reviews the historic population growth according to the decennial census and assumes that the population will grow at that same rate over the planning period. The MPC has developed a method of estimating population growth each year based on the number of residential building permits issued during the year. The population estimated according to this method is re-calibrated every ten years when the actual census count is published.

21. Although the decennial census is considered the most accurate estimation of population, a well-documented problem with the census is that marginal and minority populations are generally under counted. In Chatham County, the under count is exacerbated by the number of students, military, second-home owners, and retirees who are full or part time residents but who may not report their primary residence in Chatham County. Approximately 25 percent of the population of Chatham County at any given time is not included in any official population count. The uncounted population includes commuters who live in surrounding counties but who work and trade in Chatham County; second-home owners who spend only part of the year in the county; students at local universities which attract state, national, and international students; military personnel who are stationed in the region temporarily; and tourists.

22. Estimating the population based on the number of building permits is useful in planning for roads and utilities because a residential dwelling unit represents the potential for population regardless of the occupant's official residence. The lag between the time the building permit is issued and the time the house is fully occupied can be calculated by comparing the difference between the lines representing MPC Permits and the MPC Projections. The time lag averages between 4 and 5 years according to the data in Chatham County.

23. Most of the population growth in the next 25 years is expected to be in the west areas of the County. Stable neighborhoods in the City and County will experience very little growth, and the population of many of the built-out neighborhoods will show a decline. The decline, however, is not attributable to people moving out of the neighborhood but to a decline in the number of people living in a household.

24. In 1960, the average household size in Chatham County was 3.47 people. In 2000, the

average had decreased to 2.58. The national household average size in 2000 was 2.67 and in the south region (Maryland to Texas) household size was 2.64. The smaller household size in Chatham County reflects the number of retirees who have moved into the area. This trend is expected to continue as the area becomes attractive to retirees as an alternative to other areas in the sunbelt which have become congested. In 2030, the household size in Chatham County is expected to be 2.38.

25. On average, population increase in Chatham County from 1960 - 2000 averaged 0.07 % where the average population increase from 2000 - 2005 averaged 2.0 %. As seen in the graph at Appendix I, the trend for population increase for Chatham County is on a continual rise through the year 2030.

V. Coordination with Other Agencies

1. The request and selection for outside agency participation were based upon property protection, public safety and jurisdictional boundary of adjacent municipalities. The organizations and agencies were contacted to see if any of our proposed project or governmental policies would impact any projects they are proposing to undertake and to see if they could in some way support our proposed flood mitigation efforts. The following agencies were contacted and requested to participate in the development of our flood mitigation plan.

- The Chatham County Department of Building Safety & Regulatory Services
- The Chatham County Department of Public Works and Parks Services
- The eight county included municipalities consist of: City of Savannah, Tybee Island, Pooler, Bloomingdale, Port Wentworth, Garden City, Thunderbolt and Vernonburg
- The U. S. Army Corp of Engineers
- The Georgia Department of Natural Resources/Floodplain Management (DNR)
- The Office of the County Attorney
- The Georgia Emergency Management Agency
- The State of Georgia NFIP Coordinator
- The U.S. Department of Homeland Security's Federal Emergency Management Agency's Region IV Office (FEMA)
- The National Weather Service; The National Oceanic and Atmospheric Administration
- Savannah Economic Development Authority (SEDA)
- Georgia Department of Economic Development
- Chatham County Board of Education
- Chatham Environmental Forum
- The American Red Cross
- Chatham County Health Department
- The Salvation Army
- Homebuilders Association of Greater Savannah
- Georgia Environmental Protection Division (EPD)
- Savannah Area Chamber of Commerce

- State of Georgia Insurance Commissioner

2. Each of the agencies and local governments above were provided a description letter which explains the Flood Mitigation Plan's development process along with a copy of the draft plan for review. We requested that written comments, suggestions and recommendations be provided to us within 10 business days of receiving the plan. Comments were requested to be submitted to us via e-mail, fax or letter. Additionally, each agency was extended an invitation to participate in the July 12, 2007, Flood Mitigation Planning meeting which was held in the Engineering Conference Room of the Old Court House. They were also invited to attend and participate in presenting the plan to the public at the Public Information meeting held on August 9, 2007, at the Author Mendonsa Hearing Room of the Metropolitan Planning Commission. Copies of the description letters and invitations sent to each agency can be found at Appendix J.

3. The plan development effort also included presenting the draft plan to the Local Emergency Planning Commission (LEPC) committee members at the May 23, 2007 meeting. The LEPC committee members consist of approximately 55 emergency management professionals from various local emergency management agencies, governments and area large private employers. Each of the members were asked to take a copy of the draft plan back to their office for review with their colleagues and staff. They were asked to review common problems, applicable developments policies, mitigation strategies, any observed conflicts in policies, programs and regulations that may exist. They were requested to submit comment, recommendations and suggestions to the CRS Program Manager by June 6, 2007. A roster of the LEPC committee member organizations and their submitted comments can be found at Appendix K.

VI. Public Involvement

1. Another important initial step in the planning process was to involve the public. Public information meetings were held in many of the County's flood prone areas during the planning process to allow for public comment, suggestions and recommendations regarding their natural hazards, problems and possible solutions. Some of the frequent flood areas visited included the Georgetown, Gray's subdivision, Willow Lakes and Henderson subdivision.. Where possible, the flood planning committee members attended homeowner association meetings during their regular monthly meeting sessions. The attendees were introduced to the planning process and were provided with a copy of the draft plan to review. Following the plan presentation, the attendees were requested to offer comments and suggestions to improve the plan. They were asked to review the plan not only with respect to their general community but with respect to the county as a whole. In other cases, meetings were conducted with the Homeowner association board members such as at Georgetown and Henderson. Meeting minutes from each gathering can be found at Appendix L.

2. Several local advisory groups and other homeowner associations within our identified flood prone areas were contacted and provided the opportunity to review the draft plan. They were requested to return any comments, suggestions and recommendations in writing to us within 10

working days of receiving the plan. Some of the groups and organizations included but was not limited to the Savannah Area Chamber of Commerce, and the homeowner associations of Hampton Place, South Bridge, Stone Bridge, Dutch Island and The Landings. The submitted comments, suggestions and recommendations can be found at Appendix L.

3. The most up to date version of the draft plan as it existed during the month of June 2007, was placed on the Chatham County web site for review and comment. Web site users were requested to review the plan and was encouraged to offer input to the planning committee. A link was provided to allow web site users to respond directly from the site. The plan remained on the web site for approximately 4 weeks during the month of July 2007. Additionally, a one page questionnaire which describes the plan and its purpose was published in the Penny Saver on April 25, 2007. Chatham County citizens were requested to submit information concerning natural hazards and specific flood or drainage related problems that they have experienced and to offer possible solutions to these problems. Readers were requested to make comments and suggestions to the Chatham County Department of Engineering in writing via fax, letters or e-mails. More than 14,000 questionnaires were published and distributed at a cost of approximately \$1,800.00 to Chatham County. Although responses to the questionnaire are still trickling into the County Engineering Department, as of August 31, 2007, approximately [REDACTED] citizens and interested parties had either submitted "hard copies" of responses to the office or had phoned into the office to express their concerns. In general, the majority of the comments received stated, "No flooding or drainage concerns to report." This is most likely due the fact that during the time period the questionnaires were mailed, Chatham County was experiencing an extreme drought and had a significant rain deficit. All questionnaires that were received via the US mail, fax or e-mail were replied to in accordance with the means stipulated on the document. A multitude of phone calls from interested citizens were entertained. We also received a host of voice mail messages. Callers were generally interested in knowing if they were in the floodplain and what flood zone they were located in. The exact number of phone calls and voice mail messages received was not tracked, however, an estimated 30 calls per month was received. All callers and voice mail messages requesting a reply from this office was accommodated. A copy of the Penny Saver one page questionnaire insert can be found at Appendix M. The responses from Chatham County citizen and interested parties can also be found at Appendix M of this document.

4. A public information meeting was held on August 9, 2007 at 6:00 PM in the Author Mendonsa Hearing Room of the Metropolitan Planning Commission located at 112 East State Street, Savannah, Georgia 31401. An announcement regarding the meeting was published in the Savannah Morning News on July 25, 2007. This forum allowed all attendees an opportunity to perform one final review of the plan and to offer suggestions, comments and recommendations prior to the plan being submitted to the Board of Commissioners for adoption. A copy of the announcement published in the news paper along with a copy of the meeting minutes can be found at Appendix N.

5. Although we requested specific comments, suggestions and recommendations from various

neighborhood advisory groups, **none were provided**. We did however, receive comments from two different outside agencies. These organizations included the Georgia Department of Natural Resources and the Chatham Environmental Forum. Their comments and suggestions were reviewed and considered by the planning committee. Submittals that were considered viable by the planning committee were integrated into the final draft of this plan. The comments and suggestions from the two agencies mentioned are attached at Appendix O.

VII. Review of Possible Activities

Based on a thorough review of the comments and suggestions gathered by the interested agencies and individuals and the planning committee, the activities selected were: the implementation of preventive flooding measures, property and natural resource protection, public outreach, emergency services, and capital improvement (structural) projects. These activities were selected because of their immediate and direct impact potential to reduce flood water levels, the immediate need for community improvements, natural area preservation and funding limitations.

a. Preventive flooding measures are typically imposed indirectly in an effort to reduce the potential for flooding. These methods can primarily be associated with permitting issues as well as enforcement of open space and green space ordinances. Chatham County currently administers and enforces the Stormwater Management and Flood Damage Prevention Ordinances. Although development within the flood plain and wetland areas cannot be prevented in all cases, it is discouraged. However, developers are required to mitigate all fill material placed within the floodplain below the 100 year base flood elevation (BFE). Chatham County also aggressively enforces stormwater detention for site development. It is important that this effort be expanded to include the regional considerations rather than only localized benefits. Low Impact Development (LID) combined with green growth guidelines is a proven way to prevent flooding. The stormwater that is created site by site can be managed site by site to lessen the overall impact to the coastal waterways. The realization of these efforts would not only require the participation from other municipalities within the County but cooperation from adjacent counties as well. A multi-jurisdictional managed stormwater program could produce significant reductions in flood water levels as well lessened periods of inundation. A review of the current floodplain regulations could also be performed to consider requiring a one foot of free board over the 100 year base flood elevation and by increasing the requirements on drainage study projects to be designed to the 100 year storm event. These activities are recommended to be included in the plan because the feasibility of additional measures (such as imposing increased zoning restrictions, green space, conservation easements and more restrictive multi-jurisdictional stormwater management policies) has been examined and determined to further reduce the potential for flood damages to development within flood prone areas.

b. In order to properly assess the need for adequate property protection within our repetitive flood loss areas, a site by site survey is required. Each community's floodplain and geology has its own particular needs and characteristics which potentially affect the flooding in the nearby areas. With buildings and other man-made structures, modifications such as retrofitting,

elevating structures and acquisition/demolition and/or relocations may be sufficient and adequate to reduce local flood water levels. As stated earlier, Unincorporated Chatham County has a total of forty four repetitive loss properties on record with FEMA. Of those properties, five have been mitigated over recent years through relocation or acquisition/demolition. In some cases, the mitigation projects were accomplished using 75% Federal grant funding. Another property protection medium is provided through the purchase of flood insurance. Property owners should be encouraged to purchase adequate flood insurance to protect their interest. These activities are recommended to be included in the flood plan because they offer direct, short term flood protection to the citizens.

c. Natural resource protection within our County's can begin by protecting our floodplains. Floodplains are flat or lowland tracts of land adjacent to lakes, wetlands, and rivers that are typically covered by water during a flood. The ability of the floodplain to carry and store floodwaters should be preserved in order to protect human life and property from flood damage. However, undeveloped floodplains also provide many other natural and economic resource benefits. Floodplains often contain wetlands and other areas vital to a diverse and healthy ecosystem. By making wise land use decisions in the development and management of floodplains, beneficial functions are protected and negative impacts to the quality of the environment are reduced. Protection of Unincorporated Chatham County's wetland and open space areas could be achieved by re-delineating and re-identifying those sensitive areas to alert developers, builders, engineering consultants and municipalities of the protected and restricted areas. Chatham County has recently taken steps to review and revise its Stormwater Management Ordinance, Flood Damage Prevention Ordinance and the Engineering Policy to be more restrictive in order to better protect the natural resources. This is another successful activity that is recommended to be expanded to include more restrictive protection policies to protect the environment.

d. The goals of implementing a successful Flood Mitigation Plan for Unincorporated Chatham County are to reduce flood losses, promote awareness of flood insurance and increase the overall quality of life for the community. One way of achieving this goal is through increased public knowledge with regard to floodplain protection. Public outreach campaigns are presently being utilized within Chatham County. They exist in the form of such programs as "Adopt a Stream" and "Adopt a Wetland." These are statewide programs of the Georgia Department of Natural Resources, Environmental Protection Division, designed to promote and increase water quality awareness, public education and community involvement in protecting one of our most valuable resources - water. Adopt-A-Stream operates in Chatham County through the Chatham County - Savannah Metropolitan Planning Commission. Additional public acknowledgment is usually delivered in the form of road sign notices, periodical publications, public radio and television broadcast and the telephone directory.

e. Volunteers adopt a segment of a stream, canal, or other body of water for one year. During this year, Adopt-A-Stream groups select various monitoring activities that best suit their own goals and interests and are committed to studying and protecting the streams, rivers, lakes and wetlands of the State. Georgia Adopt-A-Stream (AAS) is funded in part by the U.S.

Environmental Protection Agency. Adopt-A-Stream involves volunteers of all ages and backgrounds, including individuals, school groups, scout troops and civic organizations. There are a variety of levels of involvement in Adopt-A-Stream, from quarterly visual surveys and litter pick ups, to monthly chemical testing and one time habitat improvement projects.

f. There is also an "Adopt -A- Wetland" program that highlights freshwater wetland values and functions, and guides volunteers through the monitoring of soils, vegetation and hydrology. A separate Coastal Adopt-A-Wetland Monitoring manual and program created by University of Georgia (UGA) Marine Extension Service provides guidance for volunteers interested in monitoring coastal habitats and the biological and chemical parameters specific to marine conditions. The purpose of the Adopt-A-Wetland program is to heighten awareness of wetlands and their values. This manual will introduce the functions and values of wetlands and present the basics of understanding the plants, soils and hydrology in wetlands.

g. Community awareness and participation could be increased with the addition of flood safety and property protection, flood insurance and flood hazard information. We are attempting to accomplish this task through multi- jurisdictional outreach programs to the community, by providing local libraries, real estate, insurance agents and lending institutions with flood protection information and flood maps. Thus far, a recent joint effort under (CRS Activity 310) between Unincorporated Chatham County and the City of Savannah was executed with success. This activity is recommended to be made a part of the plan because it is financial feasible and it offers relatively quick returns with respect to property protection.

h. Emergency warning and placement of emergency response equipment is a significant advantage to any community during a pending significant storm event. While Chatham County has an existing Emergency Warning Network, it should be expanded with additional emergency warning sirens and water monitoring devices in those traditionally threatened communities. Chatham County is fortunate to have an aggressive emergency response community. These disciplines (fire, police, EMS, public works, etc.) have the capability to quickly mobilize and stage for maximum response. Additional planning among all emergency responders would significantly help to better serve the initial response activities. This activity is recommended to be included in the plan because with more aggressive planning and an expanded multi jurisdictional effort, emergency response time during an event will be significantly decreased.

i. The construction of capital improvement (structural) projects to improve the stormwater conveyance infrastructure will have a significant reduction on flood water levels. Some of these improvements include channel widening, and crossing upgrades to increase capacity, and bank stabilization and access roads to maintain the drainage system's capacity. This activity is recommended to be included in the plan to offer long term flood protection.

j. A more detailed explanation for the cause of flooding within the repetitive flood loss communities has been addressed at Appendix E. Detailed studies have been performed on each repetitive flood loss community. The study includes identifying the cause of flooding and suggests possible solutions to relieve the problem. Construction activities have already been

scheduled for many of these communities.

VIII. Action Plan

The action plan was developed from a thorough review of the six categories listed above. All six of categories were chosen to be a part of the action plan for this initial Flood Mitigation Plan. Implementing preventive flooding methods and the public outreach campaign provides relatively immediate short term flood relief. The long term flood relief comes from the construction of various structural related projects and the cooperative efforts of a multi-jurisdictional managed storm-water plan. A short term project is one that can be initiated and completed within approximately 6 months.

A summary of the selected project activities is provided below. Additional information regarding on going and proposed capital improvement projects in association with the repetitive loss communities can be found at Appendix E and in the Unincorporated Chatham County Stormwater Capital Improvement Program.

a. Chatham County's Stormwater Management Ordinance and Flood Damage Prevention Ordinance are preventive flooding measures that presently provide regulation regarding development in the floodplain areas. The current regulations typically apply to specific development sites as opposed to the development of a master plan for an entire area or community. Existing watersheds and floodplain areas would benefit significantly if the current ordinance was amended to include planning for entire areas or communities. With such an endeavor, the cooperation of surrounding municipalities will be needed for support and assistance. This approach will allow the application of hydrologic and hydraulic data to be used in a macro-scale approach. Flood water levels can be controlled and reduced over much larger areas. This effort will also require the assistance of the U.S. Army Corp of Engineers with possible additional assistance from consulting engineering design firms. Administration of ordinances and regulatory services are included in the normal operating expenses (Special Services District) or are funded from development permitting fees.

Chatham County's stormwater management ordinance was implemented to place controls on surface water runoff that can carry pollutants and nutrients into nearby rivers and streams. Uncontrolled stormwater drainage and discharge may have a significant adverse impact on health, safety, the welfare of Chatham County and the quality of life of its citizens. One of the many objectives of the ordinance is to establish stormwater controls through intergovernmental agreements. This objective is realized through provisions of the ordinance that apply throughout the Unincorporated Chatham County area and to drainage systems maintained by intergovernmental agreements between the County and municipal jurisdictions. Currently, the Department of Engineering advises The Board of Commissioners of Chatham County, other Chatham County Departments and other local governments on issues related to stormwater management. Through expanded efforts and cooperation between the associated local governments, Countywide surface runoff can be significantly reduced. The task at hand involves

further engaging local governments for increased cooperation in stormwater management practices. Execution and implementation of the Stormwater Management Ordinance is performed through fees generated from issued permits.

b. There are more than 620 properties that have submitted at least one flood loss claim since 1978 and an untold number of residents that have suffered structural flooding damage that did not have flood insurance. Therefore it is safe to assume that the current 39 repetitive loss properties that require property protection from flooding will most likely increase with the next significant rain event or storm. Various long term structural projects located throughout the County will benefit from these properties in time, however, a more immediate approach is needed. A large number of the 39 repetitive loss property owners have expressed interest in the County's buy-out program. By continuing to pursue Federal grant funds for acquisition/demolition projects, the resulting open-space helps to protect surrounding properties by recreating the atural absorption capacity/flow regime and permanently removes the current home owner from harms way. This activity is administered and managed by the CRS Project Manager. Funding is provided by way of Federal grant (75%) with the remaining 25% provided by Local Government through Special Purpose Local Option Sales Taxes.

c. The County has an aggressive natural resource protection program. Since the initial Flood Mitigation Plan was initiated during December 2001, field inspectors have been employed to patrol the County for construction and stormwater Best Management Practies (BMP) violations under the requirements of the National Pollutant Discharge Elimination System (NDPES) and wetland infringements. Thus, the County commands greater control of construction projects and private residential home projects. Chatham County continues to review and revise its Land Disturbance Activities Ordinance, Stormwater Management Ordinance, Flood Damage Prevention Ordinance and the Engineering Policy to be more restrictive in order to better protect the natural resources. This project activity is the responsibility of the County Plan Review Coordinator and is financed as part of the normal operating expenses (Special Services District).

d. Over recent years, our public outreach activities has been expanded to reach a wider variety of the community. This project is administered and managed by the CRS Program Manager. Although this effort is improved, there remains room for improvement. An expanded effort will primarily consist of visiting the repetitive loss communities to address specific questions and concerns generated during the initial mitigation plan review meetings. Said meetings, programs and activities will be conducted annually. The County will seek to increase public awareness relative to flood prevention, property protection and stormwater maintenance and care. The expanded effort will primarily consist of visiting the repetitive loss communities and properties to address specific questions and concerns generated during the initial mitigation plan review meetings. This effort will be incorporated into Chatham County's various existing annual outreach programs. This project as well as the others will be financed as part of the normal operating expenses (Special Services District).

e. The County's Emergency Warning Siren Network is currently managed by CEMA. Through development of a 5-year Master Plan, CEMA plans to upgrade older sirens and establish new sites sufficient to ensure a 90% coverage area of the County. Unfortunately, monitors to measure water levels are not included in the 5-year Master Plan. The Emergency Warning Network Master Plan is funded through local funds (Capital Improvement Planning , SPLOSH, fiscal budget. etc.) Incorporation of water levels monitors will have to be funded through grant opportunities.

f. Chatham County has a comprehensive, Countywide drainage capital improvement program which is managed by the Department of Engineering. Funding is provided by approved Special Purpose Local Option Sales Taxes (SPLOST). Several projects will specifically address and mitigate flooding in some of the repetitive loss communities. Although there are other communities within Chatham County that have been subjected to flooding, the following repetitive loss communities are impacted most severely:

(1) The Wilmington Park Community. Flooding routinely occurs during heavy rains within the Wilmington Park area. The flooding is attributed to inadequate capacity of canals and roadway culverts. Improvements include widening the canal and replacing the culvert under Wilmington Park Road. Other improvements include improvements to the drainage system in area of Montford Road. The project is being implemented in phases. The Wilmington Island Road Culvert was replaced and a new trash screen installed in November 2001. Future phases remain in the planning and design stage of work.

(2) The Georgetown Community. Flooding routinely occurs during heavy rains within the Georgetown area, especially in the Kings Grant area of Georgetown. The flooding is attributed to inadequate canal and roadway culvert capacity, and undersized street collectors. The project is being implemented in two phases. Phase I improvements which were complete in November, 2001, include upgrading the roadway crossing at Grove Point Road, construction of an in-line detention pond, and canal widening. Planned improvements include upgrading the stormwater collector inside Kings Grant. The design of the collector improvements is underway and easement acquisition is in progress. Construction is expected in late 2007.

(3) The Golden Isles Community. Flooding routinely occurs during heavy rains within the Golden Isles area. The flooding is attributed to inadequacies of the roadside drainage system and the receiving drainage canal. Improvements include widening the canal and deepening the roadside drainage system. The project is being implemented in phases. Improvements to the outfall canal were completed in 1997. Design of improvements to the roadside ditches and collector canals is complete as is the acquisition of easements for construction. Construction is expected in 2008.

(4) The Halcyon Bluff Community. Flooding routinely occurs during heavy rains within the Halcyon Bluff area. Flooding is attributed to inadequate capacity of the collector drainage system and its propensity to clog with debris. Improvements include installation of larger

stormwater collector pipes and replacement of drainage inlets with different configurations less prone to clogging. The project is under construction and expected to be completed in 2007.

IX. Plan Implementation. The CRS Coordinator is responsible for implementing the Flood Mitigation Plan. The Planning Committee will prepare periodic progress reports that will be used to prepare the annual evaluation report that is submitted to FEMA for recertification.

A.G. Bungard, P.E.
County Engineer
CRS Coordinator

APPENDICES:

- A. Resolution by Chatham County Board of Commissioners
- B. Vicinity Map
- C. Major Drainage Basins and General Locations of Repetitive Flood Loss Communities.
- D. Chatham County Municipal Jurisdictions
- E. Explanation for the Cause of Flooding within each Repetitive Loss Community with associated vicinity maps
- F. Flood Claims by Date, Unincorporated Chatham County; Claims by Grouped Areas; Claims by Area; Claims compared to Month/Year of Claim
- G. Chatham County Hurricane Storm Surge Inundation Map
- H. Map showing ALL flood insurance claims, known nuisance flood areas and a detailed table describing the particulars of the flood prone areas called “Hot Spots Information Sheet”
- I. Graphic Representation Of Population Trends
- J. Copies of the Plan Description Letters and copies of the Invitation Letters sent to outside agencies, local government and the public which include the following address listing:
(1) Outside agency, (2) Local governments, (3) Homeowner Associations
- K. Local Emergency Planning Commission (LEPC) Roster and Plan Comments
- L. Public Information Meeting Minutes and Flood Mitigation Planning Committee meeting minutes
- M. One page Questionnaire insert in Penny Saver with citizens replies
- N. Savannah Morning News Public Meeting Announcement and meeting minutes
- O. Outside agency comments