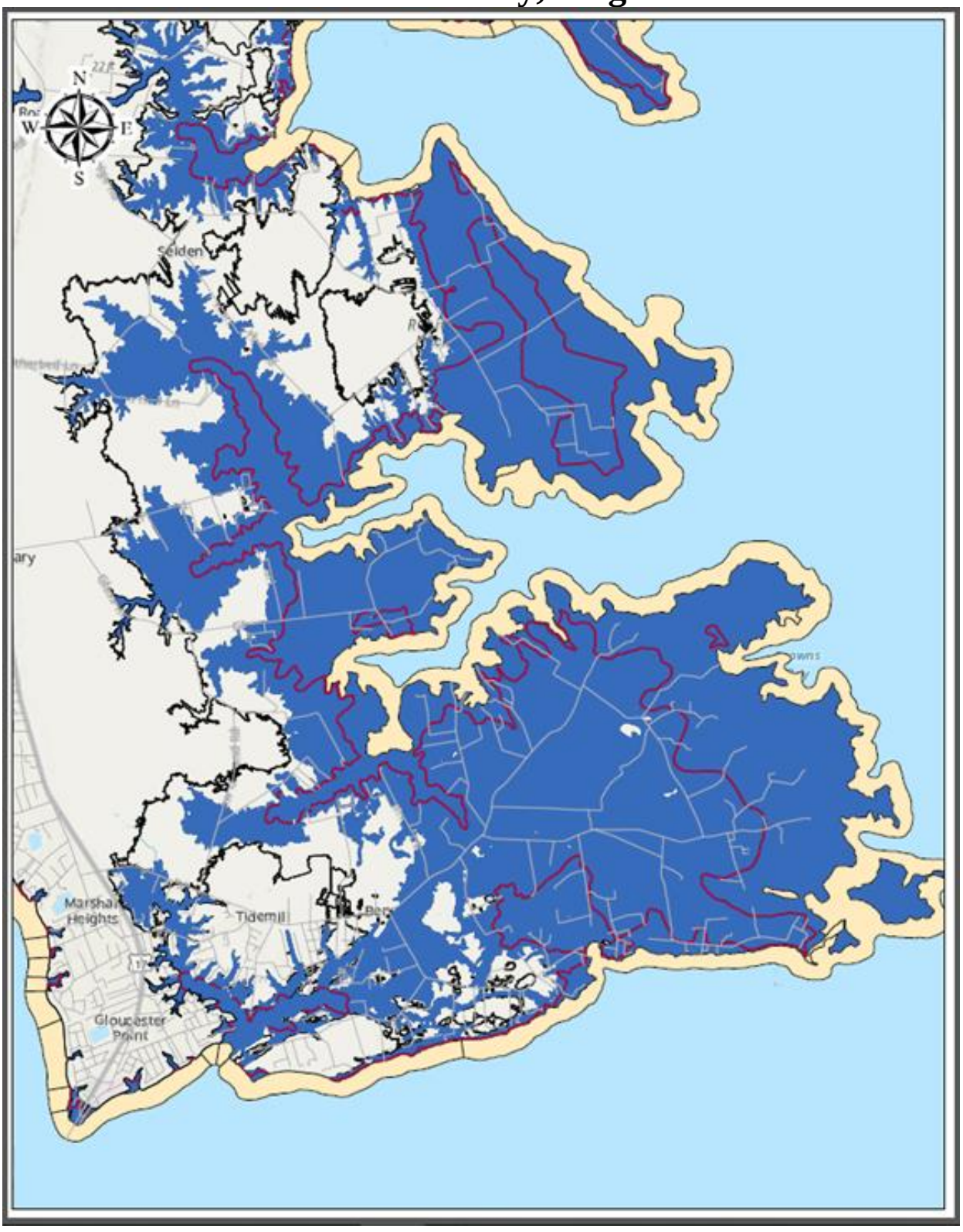
A Coastal Floodplain Management Plan

for

Gloucester County, Virginia



Updated August, 2019

A Coastal Floodplain Management Plan for Gloucester County, Virginia

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Adopted by Gloucester County Board of Supervisors on September 1, 2009.
Updated and Readopted September 2, 2014
Updated and Readopted September 3, 2019

EXECUTIVE SUMMARY

Purpose

This plan was originally adopted by the Gloucester County Board of Supervisors on September 1, 2009 and in accordance with the Community Rating System (CRS) Coordinator's Manual (FIA-15/2013), was reviewed annually and updated in 2014. The plan was updated and readopted on September 2, 2014. What follows is the updated plan prepared for readoption by the Gloucester County Board of Supervisors at their September 3, 2019 meeting. This plan was reviewed annually and updated in accordance with CRS Coordinator's Manual (FIA-15/2017). Additional plan review and updates are planned over the coming year prior to Gloucester's anticipated CRS cycle verification visit.

The purpose of the plan is to analyze the causes of flooding in Gloucester County and identify the vulnerabilities due to flooding within the community. The plan also documents and analyzes the county's existing flood management practices and provides feasible solutions to strengthen the county's overall flood management system, helping to lessen the amount of damage caused by flooding.

During the development of this plan a standard 10-step process was followed. The 10 steps are based on the Federal Emergency Management Agency (FEMA) guidelines and requirements for the Community Rating System (CRS) Program for the development of a floodplain management plan.

Table 1: Community Rating System Planning Steps

Planning Process
1) Organize
2) Involve the Public
3) Coordinate
Risk Assessment
4) Assess the Hazard
5) Assess the Problem
Mitigation Strategy
6) Set goals
7) Review Possible Activities
8) Draft an Action Plan
Plan Maintenance
9) Adopt the Plan
10) Implement, Evaluate, and Revise

Source: FEMA, 2013

Organize to Prepare the Plan

Further to the discussion below regarding development of the original plan, in the same action taken by the Gloucester County Board of Supervisors to adopt the 2009 plan, a formal Floodplain Management Committee was formed with the expressed purpose of guiding plan implementation, providing annual review of plan goals, and providing input to the required 5-year plan update. This committee meets quarterly each year with annual reports to the Board of Supervisors presented in the fall of each year. The resolution forming the committee and annual reports are included in Appendix J.

At the beginning of this plan's conception a six person planning committee was formed to guide the planning process. The committee was made up of Paul Koll, Gloucester County Building Official, Christopher Perez, Gloucester County Planner and then Urban and Regional Planning Graduate Student at VCU, Dr. Mort Gulak and Dr. Avrum Shriar, Professors of Urban Studies and Planning at VCU, as well as Jay Scudder, former Director of Planning, and Mark Westfall, former Emergency Management Coordinator. The committee initially convened on **January 25, 2007** to discuss: the role of the committee in the formation of the plan and to schedule follow up meetings to discuss the plan's progress. The committee also discussed the parameters of the plan, various resources to aid in the risk assessment of the area, the agencies that needed to be involved, the extent that the public would be involved, as well as the time frame for the plan's completion and projected adoption date.

During the initial research and data gathering phase of the plan, committee members provided guidance and assistance as needed. The committee officially convened five times throughout the year and between formal meetings the committee remained in contact through e-mail and phone. The second official committee meeting was held on **April 18, 2007** at which members discussed the work that had been done thus far. The meeting also served as a brain storming session that provided suggestions for improvements to existing ideas and suggested additional information that needed to be included in the plan.

The third meeting, held on **May 2, 2007,** focused mainly on formulating goals and solidifying objectives for the plan. During the first week in **August 2007,** a working draft of the plan was given to all the committee members for review, and by **September 2007,** each member had provided feedback. By **December 2007** a draft plan was completed. The draft plan was presented to the Gloucester County Planning Commission in **April 2008**. The Commission asked to review the plan once it had been accepted by the ISO review board. The ISO review was received late **April 2008**, and the draft plan was revised per ISO recommendations and suggestions. In **May 2009**, the Board of Supervisors passed a resolution directing the Planning Department with assistance from the Department of Codes Compliance to develop a Floodplain Management Plan for the County by **November 2009**. The resolution also approved the formation of an annual review committee whose 16 members will be made up of landowners, residents and business owners of the flood prone area, BOS members, and staff from various county offices. For a copy of the resolution, see Appendix H. The creation of this review committee was reinforced by BOS action when the 2009 plan was officially adopted by resolution, which resolution is provided in Appendix J.

Public Involvement

Public involvement comes the Floodplain Management Committee itself where there are a majority of citizen members and from public input requested at each Committee meeting. Each meeting was publicly advertised with an opportunity for citizen comment as well. In addition, public input on this updated plan was during the August 7, 2014 Gloucester County Planning Commission meeting.

During the development of this plan three public meetings were held in the community for the purpose of informing the public and gaining feedback from Gloucester County citizens about the current coastal flooding problem in their county, the first on **May 10, 2007,** the second on **October 23, 2007,** and the third on **May 14, 2009**. Citizens of Gloucester

County were notified of the public meetings via advertisements in the *Gloucester Mathews Gazette Journal* (a local newspaper), see Appendix G. Four of the six planning committee members (County Staff) were the official presenters at the meetings.

The meetings were held at Achilles Elementary School, a school that is located in the floodplain and in close proximity to the majority of the county's repetitive loss areas. During the first two meetings, a Flood Protection Questionnaire (see Appendix A) was dispensed to survey attending citizens about their personal experiences with flooding in the community, as well as to gauge their general level of education about the flooding hazard of the area. Attending residents were notified of the county's current involvement with the National Flood Insurance Program (NFIP) and its CRS program, a brief history of the county's flooding problem, the existing flood mitigation strategies as well as suggested recommendations in the plan. Open discussion was encouraged in order to formulate new policies and strengthen existing strategies that would improve the area's flooding problem. For the minutes from the first meeting, see Appendix G.

At the third public meeting the Draft Floodplain Management Plan was presented, reviewed, and discussed. The draft plan was available for citizen review through the County website, as well as in the Planning Department. At the meeting each of the suggested recommendations in the plan was discussed. Citizen comment and suggestions were obtained from this meeting and utilized to revise the draft plan before presenting the plan to the Planning Commission for review at their **June 2009** meeting. At the meeting the Planning Commission asked to set a Public Hearing for the **July 2, 2009** meeting. During the **July 2, 2009** meeting of the Planning Commission a public hearing was held regarding the proposed Floodplain Management Plan. The Planning Commission voted 11-0 (with two absent) to forward the Plan to the Board of Supervisors with a recommendation of approval. At the **September 1, 2009** meeting of the Board of Supervisors a public hearing was held regarding the proposed plan.

Coordination with Other Agencies

The plan has been developed with information from communications with the following local, regional, state and federal agencies/ organizations. In **April 2009**, staff sent the draft plan to all of the following agencies (except agencies in *italics*) requesting comments. Comments were obtained from these agencies and utilized to revise the draft plan before presenting the plan to the Planning Commission for review at their **June 2009** meeting. The updated 2014 plan was provided to each department identified below with "2014" after their name. Notes are provided where departments changed name.

Gloucester County
- Department of Planning, 2014 (Planning & Zoning)
- Department of Codes and Compliance 2014 (Environmental Programs & Building Inspections)
- Department of Emergency Services, 2014 (Emergency Management)
- Department of Information Technology (GIS), 2014
- Department of Community Education, 2014
- Department of Public Utilities, 2014
- Department of Public Works, 2014 (Engineering)
- Department of Social Services
- Sheriff's Office
- Public Library

Volunteer Fire and Rescue (Abingdon and Gloucester), 2014 (through FMC)
Non Profit Organizations
Bay Aging, Inc.
Friends of the Library
Private Companies
Dominion Virginia Power
Neighboring Communities
York County
City of Portsmouth
Regional Agencies
Middle Peninsula Planning District Commission, 2014
Tidewater Soil Water Conservation District
Hampton Roads Emergency Management Committee
State Agencies
Virginia Department of Conservation & Recreation
Virginia Department of Transportation
Virginia Department of Emergency Management
Virginia Department of Environmental Quality
Virginia Department of Health
Federal Agencies
FEMA's Community Rating System (Insurance Services Office Inc.)
Federal Emergency Management Agency, Region III (VA)

Data Analysis

To determine the causes and areas most affected by flooding within the county, the plan documents and analyzes:

- Past seasonal coastal storm events that have affected the county and nearby areas
- County Storm Surge Map, 2019 GIS
- County Flood Insurance Rate Maps (FIRM), 2014 FIRMs
- County elevation profiles, 2014 GIS

Complete assessment of community vulnerabilities requires analysis of the following factors:

- Repetitive loss properties
- Pre - FIRM structures in Special Flood Hazard Area (SFHA)
- Vulnerable populations
- Safety hazards
- Critical facilities

Recommendations

The plan documents and analyzes the existing mitigation strategies for Gloucester County and provides feasible recommendations for improving of these tactics. The plan recommends that the county:

- Update, readopt and maintain the Floodplain Management Plan to help strengthen the community's mitigation activities. The County should also consider requiring heightened construction standards in the Coastal A zone. Both actions will help lower flood insurance premiums for policy holders (Section 5.3b).

- Utilize the road improvement priority list as input to prioritize the allocation of scarce resources to projects that support the largest number of unmitigated pre-FIRM structures in the SFHA (Section 5.1b1).
- Continue to monitor State Route 649, Maryus Road and if washouts from flooding persist, recommend that VDOT improve the road to withstand coastal floodwaters by elevating damaged sections and installing more appropriate roadway drainage crossings (Section 5.1b2).
- Encourage VDOT to develop a drainage study identifying the current state of the linked system of roadside and outfall ditches as input to the development of a ditch maintenance program for the southeastern portion of the county (Section 5.1b3).
- Keep detailed records of which roads in the county flood, how often and to what extent (Section 5.1b4).
- Consider permanent road signage with gauges that mark roadway location and high water on frequently flooded roads in the county (Section 5.1b5).
- Increase awareness of the existing mobile phone mass notification system (Code Red) and the fact that citizens must opt-in to the program if they want to be contacted through this medium (Section 5.5b1).
- Continue to send annual mass mailings with specialized information relating to property protection, flood safety and flood insurance to owners of property in flood zones (Section 5.4a).
- Provide a central location where general information on flood preparedness, flood insurance, and floodplain management is easily accessible to the public in a hard copy format (Section 5.4b).
- Advertise the technical assistance opportunities provided by County in relation to flood mitigation and preparedness, preferably in the same central locations where other flood-hazard information is available (Section 5.4c).
- Alert residents as to the importance of securing existing fuel oil and propane tanks by providing tie-down information and methodologies (Section 3.4).
- Request the Virginia Department of Health to examine the public health, safety and economic impacts associated with the increased use of alternative septic systems in flood prone areas (Section 3.4).
- Evaluate the potential impact of sea level rise on the community, particularly with respect to its wetlands, and consider potential management options (Section 2.4).
- Continue to zone for low density residential development and encourage residential clustering within flood-prone areas (Section 5.2a).
- Continue to enforce building regulations throughout the county (Section 5.2b).
- Continue to require and enforce the provisions of the Floodplain Management Ordinance (Section 5.2c).
- Continue to enforce the Chesapeake Bay Preservation Area Ordinance, the Erosion and Sediment Control Ordinance, the Wetlands Zoning Ordinance, the Coastal Primary Sand Dune Zoning Ordinance, and the Storm Water Ordinance (Section 5.6).

- Continue to regularly inspect the County's high hazard dam and perform regular maintenance on it, as well as continue participation in the National Dam Safety Program (Section 5.1a).
- Continue to utilize existing severe weather and hazard identification processes (Section 5.5a).

This plan does not commit Gloucester County to any of the suggested mitigation remedies; it is merely a guide for local officials to use when making decisions about floodplain management within the community.

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1. INTRODUCTION

Gloucester County is located in the southeastern portion of Virginia's Middle Peninsula within close proximity of the Chesapeake Bay. Half of the county's 140,364 acres are bounded by two tidal rivers and the Mobjack Bay: York River on the south and the Piankatank River on the north (Figure 1). The county serves as a bedroom community for neighboring Virginia Peninsula localities (Newport News, Hampton, James City County, Poquoson, York County, and Williamsburg). According to the American Community Survey of the U.S. Census Bureau, as of July 1, 2013 there were approximately 16,004 housing units in the county with 36,858 residents counted in the 2010 census. During a decennial growth spurt in the 1980s, there was pressure to develop on the area's low lying coastal land, much of which has elevations ranging from zero to five feet above mean sea level.

Gloucester County's proximity to the Chesapeake Bay and numerous tidal rivers, coupled with the area's low elevation, create an area with high risk of coastal flooding in the event of a seasonal coastal storm. Depending on the storm's magnitude and proximity to the county, coastal flooding can threaten public safety and local economic viability (FEMA 1987, 2-4).

Figure 1: Gloucester County Regional Context

Source: Google Maps

Over the years the county has taken many steps to protect its citizens from the area's flooding hazards. The county has implemented a number of preventative measures, property protection policies, public information activities, and emergency service measures in an attempt to decrease the flood hazard's impact on the community.

The Federal Emergency Management Agency (FEMA) is responsible for investigating flood hazards in Gloucester County. Their investigations produced various past, the currently effective, and the proposed 2014 Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM) which are used to develop flood risk data for the community and establish flood insurance rates throughout the region. The County and FEMA are

currently working towards implementation of completely new FIS and FIRM products that will become effective November 19, 2014. As with past versions, the new FIRM depicts flooding during a 100-year storm event (storms that have a 1% chance of being equaled or exceeded in any given year). The FIRM accounts for both storm surge driven flooding, as well as flooding caused by heavy rainfall. The map provides base flood elevations for the entire county derived from a detailed hydraulic analysis of the area described in the FIS. The map also provides flood zone designations for the entire county describing the type of flooding experienced.

In 1987, Gloucester became a participating community in FEMA's National Flood Insurance Program (NFIP); this enabled citizens to obtain federally backed flood insurance. Via participation in the NFIP, Gloucester was eligible to join the Community Rating System (CRS) program. While participation in the CRS program is voluntary, the benefits for citizens in participating localities are numerous. Under the program, flood insurance premiums are modified based on a point system which calculates the community's efforts to reduce future flood damage in the area beyond the minimal national standards. These points are used to calculate a community's "Class Rating"; the rating is based on a scale of ten: 10 rating being the worst and 1 rating being the best. In 1994, FEMA conducted an analysis of the county's floodplain management efforts, and in 1995 awarded the County a Class 9 rating in the CRS program. In 1994 the rating affected the annual premiums of approximately 1,528 flood insurance policy holders within Gloucester County by decreasing premiums 5 percent. Since their initial verification and rating, the County has taken action and has been recognized as necessary to climb to a Class 7 rating, leading to a current flood insurance discount of 15 percent. Due to the amount of repetitively flooded properties in the county, adoption of a floodplain management plan is ***required*** to maintain eligibility in the CRS program. To gain further reductions in flood insurance policy premiums the county must gain credits that will qualify the locality for a lower CRS rating.

The purpose of this plan is to document and analyze the county's existing flood management practices and provide feasible recommendations to strengthen the county's overall flood management system, which may lessen the amount of damage caused by flooding.

2. ASSESS THE HAZARD: POTENTIAL CAUSES OF FLOODING IN GLOUCESTER COUNTY

2.1 Coastal Flooding

The county is threatened year-round by three major seasonal coastal storm events: hurricanes, tropical storms, and nor'easters – all of which, historically, have been the main causes of coastal flooding in the county. Nationwide, besides fire, coastal flooding causes nearly 90% of Presidential Disaster Declarations. This type of flooding is typically a result of storm surge, wind driven waves, and heavy rainfall.

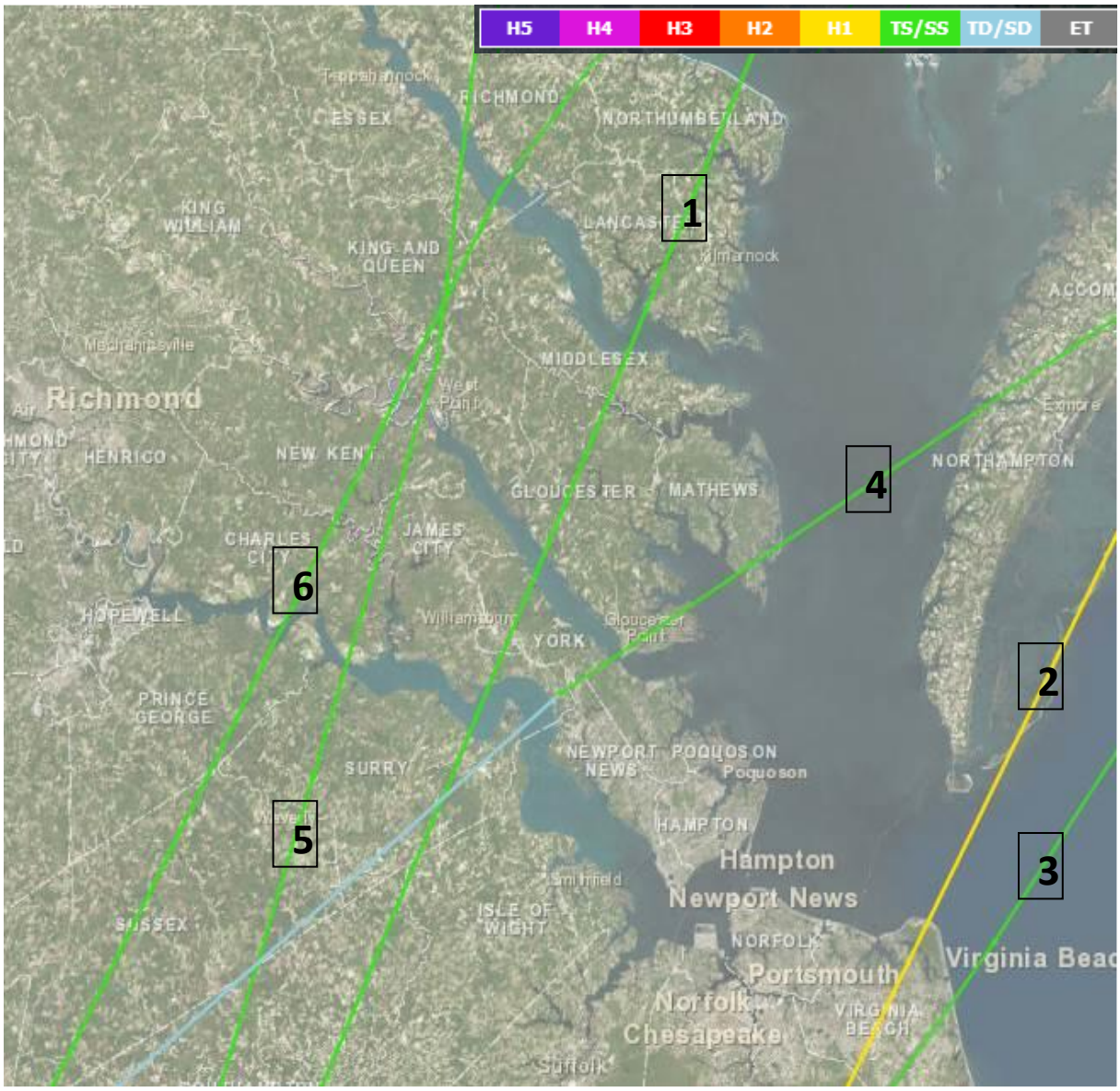
A hurricane is the most severe type of storm that can affect Gloucester County bringing with it extremely high winds, large amounts of rainfall, and storm surge. The storm surge caused by a hurricane carries with it the greatest potential to cause damage to coastal communities because of its ability to travel inland. Hurricanes are most likely to affect the region from June to November (FEMA 1987, 5).

Hurricanes and Tropical Storms

Hurricanes and tropical storms are closely related events being differentiated by their wind speed. Hurricane intensity is tracked and measured by the National Oceanic Atmospheric Association's (NOAA) National Hurricane Center (NHC) in Miami, Florida and they are graded using the Saffir-Simpson Hurricane Damage Scale (see Appendix D). Tropical storms are upgraded to hurricanes if sustained wind speeds reach 74 mph. In 1987, the Norfolk District of the U.S. Army Corps of Engineers tracked all the tropical storms of hurricane force which passed within 250 miles of the county; the average was determined to be one storm per year (FEMA 1987, 3-4).

The National Hurricane Center uses the measurement of a 65 nautical mile (nm) radius to signify that a particular location has experienced a direct hit from a storm, and the 100 nm radius to show events that narrowly missed the area but still had an impact through wave action and strong winds. The two figures below show every major storm event that has passed within close radius of Gloucester County between 1990 and 2017. Figure 2 and Table 2 show storms that passed within a 65 nm radius of the county: Figure 3 and Table 3 show storms that passed within a 100 nm radius of the county. Within the 27-year time frame, the center of just over twice as many storms traveled within 100nm of Gloucester Courthouse as those that traveled within 65nm.

Figure 2: Storms within 65 nm of Gloucester Court House between 1990 and 2017



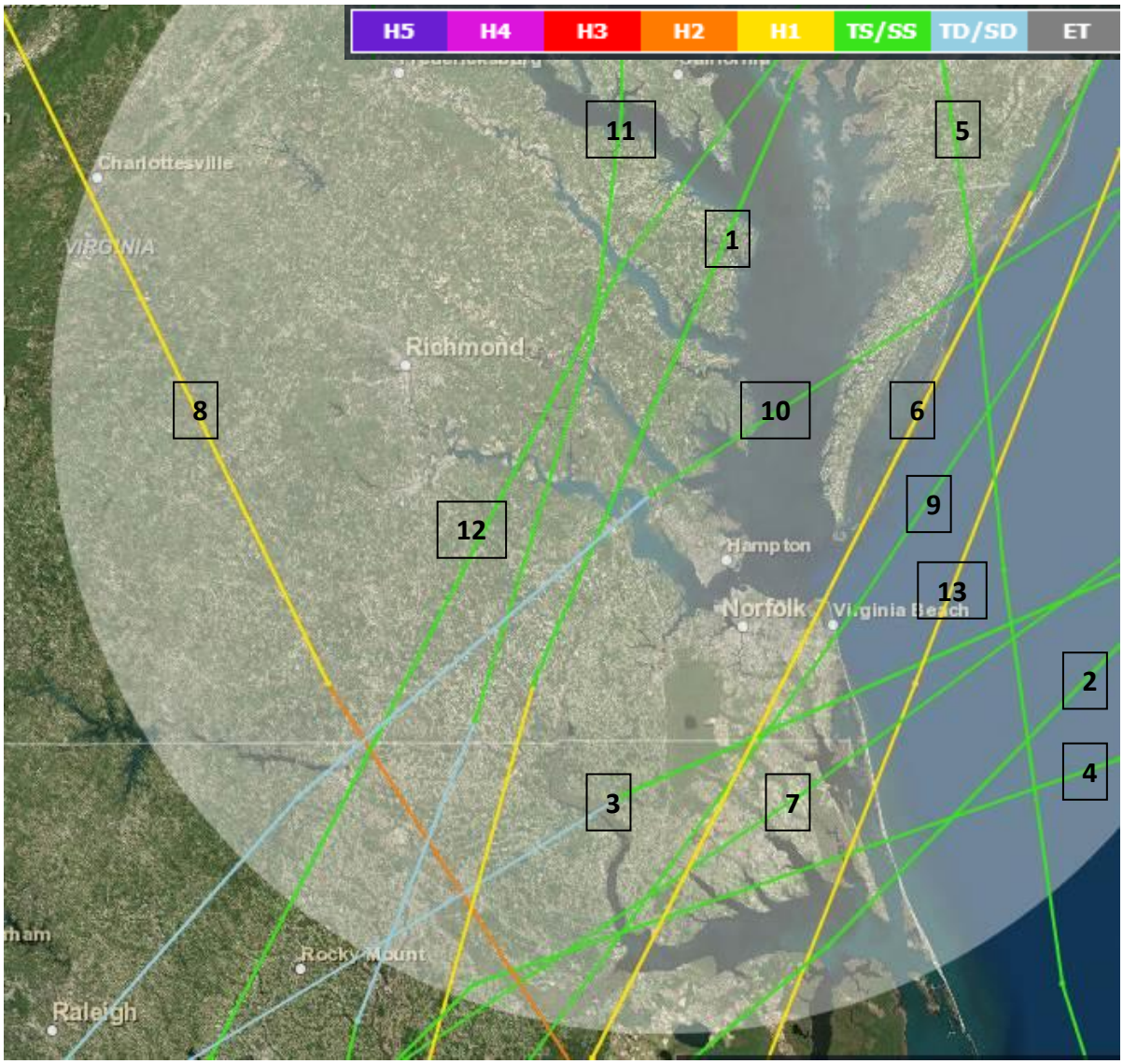
Source: NOAA CSC Hurricane Mapping Tool

Table 2: Storms within 65 nm of Gloucester Court House between 1990 and 2017

Storm ID	Name	Year
1	Bertha	1996
2	Floyd	1999
3	Charley	2004
4	Gaston	2004
5	Ernesto	2006
6	Hanna	2008

Source: NOAA CSC Hurricane Mapping Tool

Figure 3: Storms within 100 nm of Gloucester Court House between 1990 and 2017



Source: NOAA CSC Hurricane Mapping Tool

Table 3: Storms within 100 nm of Gloucester Court House between 1990 and 2017

Storm ID	Name	Year	Storm ID	Name	Year
1	Bertha	1996	8	Isabel	2003
2	Josephine	1996	9	Charley	2004
3	Danny	1997	10	Gaston	2004
4	Earl	1998	11	Ernesto	2006
5	Danielle	1999	12	Hanna	2008
6	Floyd	1999	13	Irene	2011
7	Helene	2000			

Source: NOAA CSC Hurricane Mapping Tool

Nor'easters

Another type of major storm event that causes severe damage to the county is the nor'easter (Figure 4), also known as a "White Hurricane". This type of storm originates with little or no warning and is found along the middle and northern Atlantic coast. Flooding from a nor'easter tends to be caused by wave action combined with wind and restricted to the coastal zone. These storms are most frequent in the winter months, but can occur at any time of the year. They are most prevalent in Virginia between September and April (Middle Peninsula Planning District Commission, 2005).

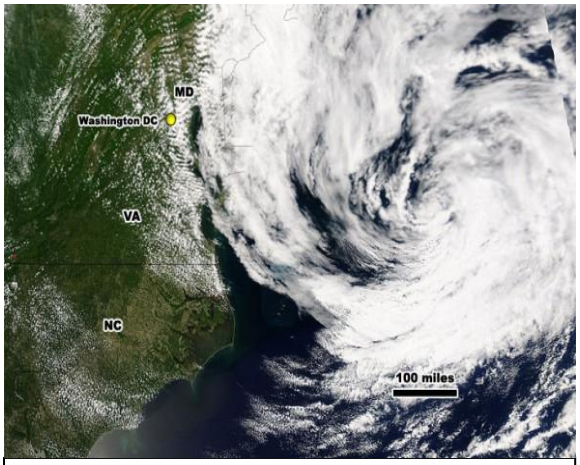
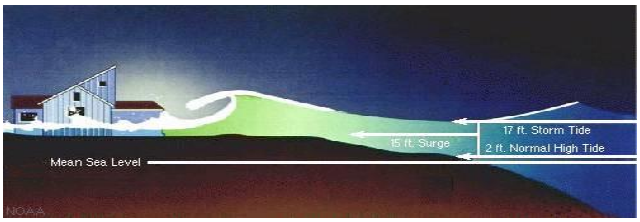


Figure 4: A nor'easter off the United States Eastern Coast.
Source: NASA/Goddard Space Flight Center

2.2 Storm Surge

As hurricanes and tropical storms pass over or near the coast atmospheric pressure drops, causing a large volume of sea water to build up, eventually being pushed ashore by the storm's winds causing a storm surge (Figure 5). The wind is an over-riding factor in storm surge. In the case of Gloucester County, strong East and Northeastern winds can push water from the Chesapeake Bay into the mouth of the York and Rappahannock Rivers and Mobjack Bay, flooding much of the county's low-lying areas (Middle Peninsula Planning District Commission, 2005). The total storm surge height depends on the storm's intensity and proximity to the county, and fluctuation in astrological tides.

Figure 5: Illustration of a Storm Surge



Source: NOAA NWS

When a hurricane or tropical storm makes landfall at high tide, the storm surge and the added water from the tidal fluctuation combine to create a "storm tide". In Gloucester County, the typical tidal range is from 1.2 feet above mean sea level to 1.2 feet below mean sea level (FEMA 1987, 6). If a severe hurricane were to make landfall during high tide, an additional 1.2 feet of water would be added to the highest storm surge possible, which could create a storm tide of 16.2 feet (Rygel, 2005).

Nor'easters, like hurricanes and tropical storms, can dump heavy amounts of rain and produce hurricane-force winds that push large amounts of sea water inland. However, this is not a true storm surge because a nor'easter does not cause an extreme drop in atmospheric pressure like that of a hurricane or tropical storm. Low atmospheric pressure and high winds are responsible for the ocean water's ability to build up and eventually be pushed

ashore; however, unlike a hurricane or tropical storm that makes landfall and slowly loses strength, a nor'easter can linger off-shore, often for many days, racking the coastline with powerful winds, strong waves, and large amounts precipitation (ice and rain). Flooding caused by a nor'easter is unlike flooding caused by a hurricane or tropical storm, because it can last for many days through many tidal cycles with the most severe flooding taking place during high tide. Flooding from a hurricane or tropical storm, on the other hand, is typically of shorter duration, rarely lasting more than one or two tidal cycles. In the event of a nor'easter, there could be multiple high tide levels being added to the storm surge level. For instance, if the storm lasted through three tidal cycles the storm tide could be as high as 18.6 feet (Rygel, 2005).

2.3 History of Hurricane Events in the Area

The August 1933 hurricane was born off the Cape Verde Islands and reached Category 4 strength, but weakened to a Category 2 before making landfall in Nags Head, North Carolina. The storm surge caused by the hurricane caused 18 deaths and $79 million in damages in Virginia. The entire Tidewater area was paralyzed by the storm through loss of communication, electricity, water service and road access (Virginia Department of Emergency Management). According to a 1987 report written by FEMA, this hurricane was the worst ever recorded along the Middle Atlantic coast:

> "*Norfolk reported the greatest 24-hr rainfall in its history, a fall of 6.64 inches. In Gloucester County, widespread damage to homes, cropland, and livestock resulted from the tidal flooding that reached an elevation of approximately 8.8 feet at Gloucester Point. Wells were fouled by the salt water, and the soil saturated by the salt intrusion required several years to return to its former productive state"* (FEMA 1987, 5-8).

The September 18, 1936 hurricane reached Category 3 and came within 25 miles of Virginia Beach, causing $500,000 in damages to homes in the vicinity (Virginia Department of Emergency Management). The storm is documented in FEMA's Flood Insurance Study of Gloucester:

> *"…gale force winds caused much damage throughout the lower Chesapeake bay areas… At Gloucester Point, the elevation of flooding reached 6.4 feet"* (FEMA 1987, 5-8).

On October 14, 1954, Hurricane Hazel devastated Virginia with a toll of 13 deaths and state-wide damages estimated at $15 million (Virginia Department of Emergency Management). The storm is documented in FEMA's Flood Insurance Study of Gloucester County:

> *"Hurricane Hazel caused moderately high tides. The tidal flooding during this hurricane caused considerable salt damage due to the dry antecedent soil conditions. There was also severe damage from the wind and salt spray"* (FEMA 1987, 5-8).

On August 12, 1955, Hurricane Connie made landfall near Cape Lookout, NC and caused

16 deaths and $1 million in damages to Virginia Beach and various parts of the Tidewater waterfront (Virginia Department of Emergency Management). The storm is documented in FEMA's Flood Insurance Study of Gloucester County:

> *"The surge occurred at the time of the astronomical low tide in this area, and the resultant tide was approximately 4.3 feet at Gloucester Point. The extremely heavy rainfall of approximately 9 inches in 24 hours with this hurricane added to the damage inflicted by the tidal flooding"* (FEMA 1987, 5-8).

> *"Disastrous flooding and high waves occurred all along the Atlantic Seaboard from New York to Florida. Great destruction was caused by high waves and breaks superimposed on high tides. The waves and breakers undermined and collapsed buildings; eroded the beaches, roads, and sand dunes; interrupted communication and power lines, and damaged agricultural lands... The elevation of flooding reached 5.8 feet at Gloucester Point"* (FEMA 1987, 5-8).

In more recent years, on July 13, 1996, Hurricane Bertha devastated the local population by making landfall near Cape Fear and passing over Suffolk and Newport News, Virginia. The storm injured nine people and caused several million dollars in damages (Virginia Department of Emergency Management).

September 16, 1999, Hurricane Floyd cost Virginia more than $255 million in damage; fallen trees killed two people and closed nearly 300 roadways. Flooding alone caused $30 – $ 40 million worth of damage. Rainfall in some areas was 12 to 18 inches (Virginia Department of Emergency Management).

September 18, 2003, Hurricane Isabel made landfall near Ocracoke Island, North Carolina with its center traveling across the center of Virginia in a northwesterly direction as shown in Figure 3. Across Virginia, there was $625 million worth of damage and 20 deaths caused by the storm (Virginia Department of Emergency Management). The hurricane created a tidal surge of 6.4 feet at Gloucester Point with wind gusts up to 85 miles per hour throughout Gloucester County (FEMA 2007, 1). This storm provides the modern benchmark for Gloucester with respect to tidal flooding.

September 1, 2006, the remnants of Tropical Storm Ernesto generated strong winds, heavy rainfall, and storm surge. The storm brought 5 to 8 inches of rainfall and severe flooding to eastern Virginia. Communities adjacent to the York River and northward to the Rappahannock River received tides that were 4 to 5 feet above normal, combined with 6 to 8 foot high waves. Flooding and high winds caused the death of seven people and an estimated $118 million in damages. Significant damage was sustained to homes, piers, boats, and marinas across the area. Power outages were widespread across the area (Virginia Department of Emergency Management).

2.4 Sea Level Rise

It has been widely studied and debated that our planet's temperature is rising and that this change in temperature is contributing to higher sea levels through melting of the Arctic ice caps and glaciers. If the earth's temperature is rising, this will have an effect on ocean temperatures as well. An increase in ocean temperature will likely increase the frequency and severity of coastal storms. Combined these factors mean that even less-severe coastal storms may produce more damaging floods.

Scientists at the Virginia Institute of Marine Science (VIMS) compared the affects observed in the Hampton Roads area caused by the August 1933 hurricane and 2003's Hurricane Isabel, which was a category one storm when it hit Virginia. Despite being a categorically weaker storm, Isabel brought water levels that were comparable to those seen in the 1933 storm. Data shows that the monthly mean sea level during Isabel was approximately 1.4 feet higher than the mean sea level from seventy years prior (Pizer, 2009).

NOAA scientists have calculated that sea level in the region has risen an average of about four millimeters per year relative to the land since 1928. A recent report by the U.S. Climate Change Science Program, suggests an additional sea-level rise of more than three feet by 2100 (Pizer, 2009).

The Middle Peninsula Planning District Commission (MPPDC), Hampton Roads Planning District Commission (HRPDC), VIMS and others have prepared studies and assessments of the impacts of sea level rise and recurrent flooding for the Middle Peninsula and Hampton Roads Region. The studies are available on each agencies' website and are valuable tools for the County to assess the potential impact of Sea Level Rise on the community.

The 2009 study by the MPPDC entitled "Assessing the economic and ecological impacts of sea level rise for select vulnerable locations within the Middle Peninsula" provided a look at potential impacts to water resources, agriculture, biodiversity, forestry, coastal ecosystems, aquatic systems, public health, public and private infrastructure and emergency response. The study used select locations in the Middle Peninsula to assess the potential economic impacts from sea level rise based on the direct and indirect impacts associated with changes to a variety of factors, not just damage to homes and properties. Other related studies are available on their website: http://www.mppdc.com/index.php/reports/2009.

HRPDC has also been very active in providing information and research on sea level rise, flooding and coastal management including the 2013 report entitled Coastal Resiliency: Adapting to Climate Change in Hampton Roads (http://www.hrpdc.org/uploads/docs/07182013-PDC-E9I.pdf). This report focuses on providing tools for planning for sea level rise and for providing regional outreach and coordination efforts on sea level rise and related issues.

The Center for Coastal Resources Management (CCRM) at the Virginia Institute of Marine Science (VIMS) presented a study entitled "Recurrent Flooding Study for Tidewater Virginia"[1] to (and at the request of) Virginia's General Assembly in January 2013. The

[1] See Appendix B for reference to Study

CCRM study indicates that a one and a half foot rise in sea level coupled with a three foot storm surge, similar to what would be experienced in a strong tropical storm, would lead to 13% of Gloucester County's land mass being flooded – including 118 miles of roads. Only 3% of the projected flood area is currently developed. The Recurrent Flooding Study recommends a multi-faceted and flexible approach when adapting to sea level rise. For more rural areas, "protection" activities such as shoreline hardening and stormwater management are highly recommended in combination with other strategies, such as "accommodation" – elevating roads and buildings, installing warning systems, and planning evacuation routes, and "management/retreat" – whereby beaches and dunes, wetlands, and marshes are, through planning and zoning, protected from development (management) or people and structures are moved away from flood-prone areas over time (retreat).

2.5 Riverine Flooding

Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snow melt, rapid ice melt or a combination of all three. This type of flooding involves the partial or complete inundation of normally dry land areas. It differs from coastal flooding, which is caused by a combination of rain, storm surge and wave action that affects primarily coastal areas (Webster County, 2008).

Approximately 60% of Virginia's river flooding is the result of flash flooding from tropical systems passing over or near the state. Riverine flooding also occurs because of successive rainstorms. Rainfall from any one storm may not be enough to cause a problem, but with each successive storm's passage over the basin, rivers rise until eventually they overflow their banks. If this occurs in late winter or spring, melting of snow in the mountains can produce additional runoff that can compound flooding problems (Watson, 2005).

There are several types of Riverine flooding including headwater, backwater and interior drainage flooding. Headwater flooding results from significant rain events that occur at the upper reaches of a watershed that then flow downstream within a short period of time. Backwater flooding results when the lower portion of a river or stream is blocked by debris or backed up due to a storm surge along the coast. Interior drainage flooding results when a dam gives way and the water being held in the impoundment is released all at once to the downstream receiving channel (Webster County, 2008).

Periodic flooding of lands adjacent to non-tidal rivers and streams is a natural and inevitable occurrence. When stream flow exceeds the capacity of a normal water course, some of the above-normal stream flow spills over into adjacent lands within the floodplain. Riverine flooding is a function of precipitation levels and water runoff volumes within the watershed of the stream or river (NCDCCPS, 2007).

The major rivers that surround Gloucester County are tidal in nature and they serve as estuarine tributaries of the Chesapeake Bay. Flood hazards vary due to the river's location and the type of storm event taking place.

2.6 Dam Impoundments

All dams in Virginia are subject to the Virginia Dam Safety Act and Dam Safety Regulations unless specifically excluded. The Virginia Department of Conservation and

Recreation (VDCR) – Division of Dam Safety is the state agency responsible for enforcing the Virginia Dam Safety Act and the Virginia Soil and water Conservation Board's Virginia Impounding Structure Regulations and oversees the issuance of Operation and Maintenance Certificates for regulated dams.

In September 2008, Virginia's dam regulations were amended. These amendments aim to treat all dam owners similarly and fairly in accordance with the regulations, increase awareness of dams and their potential impacts within localities and to their citizens, and help to improve the administration of the program. Dams are classified with a hazard potential depending upon downstream losses anticipated in the event of a failure. The hazard potential is unrelated to the structural integrity of a dam but rather it is directly related to potential adverse downstream impacts should the dam fail.

The hazard potentials are classified in the following manner:

- High - dams that upon failure would cause probable loss of life or serious economic damage.
- Significant – dams that upon failure might cause loss of life or appreciable economic damage.
- Low – dams that upon failure would lead to no expected loss of life or significant economic damage. This classification includes dams that upon failure would cause damage only to property of the dam owner, identified as Low Hazard (Special Criteria), which has fewer requirements for regulatory compliance than Low Hazard dams.

Currently there are 11 dams listed in Virginia's inventory of dams within Gloucester County: table 4 lists each dam, their respective hazard potential class, height, and the river each is located on. Of these dams only one is ranked as High Hazard: Beaverdam Reservoir Dam, which is owned, operated and maintained by Gloucester County. The other 10 dams are privately owned and maintained and have either a Hazard Potential Class of Low Hazard (special), Low Hazard or Significant Hazard. Because of the above mentioned high hazard dam, later sections of this plan will primarily focus applicable mitigation activities specifically to the Beaverdam Reservoir Dam. Figure 6 shows the Beaverdam Reservoir Dam Flood Inundation Map which was updated in 2009 and depicts the homes that may be inundated in the event of a Sunny Day Dam Failure (SDDF)[2] and a Probable Maximum Flood Dam Failure (PMF)[3]. The map shows 117 addressed buildings potentially inundated in a SDDF and 288 addressed buildings potentially inundated in a PMF dam failure (Emergency Action Plan, 2009).

Table 4: Dams in Gloucester County

Name	Hazard Potential Class	Top Height	River
Woodberry Farm Dam	Low Hazard	8	Jones Creek
Weaver Dam	Low Hazard	6	Jones Creek

[2]Sunny Day Dam Failure means the failure of an impounding structure with the initial water level at the normal reservoir level, usually at the lowest un-gated principal spillway elevation or the typical operating water level.

[3] Probable Maximum Flood means a flood that might be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region.

Haynes Dam	Low Hazard	15	Carter Creek
Robins Dam	Significant Hazard	16	Wilson Creek
Cow Creek Dam	Significant Hazard	16	Cow Creek
Burke Dam	Significant Hazard	21	Burke Mill Stream
Cypress Shore Dam	Low Hazard	15	Trib. Piankatank River
Haines Pond Dam	Low Hazard	9	Carvers Creek
Beaverdam Reservoir Dam	High Hazard	39	Beaverdam Creek
Wood Duck Pond Dam	Low Hazard	12.7	Fox Mill Run
Leigh Lake Dam	Low Hazard, Special	12	James Creek

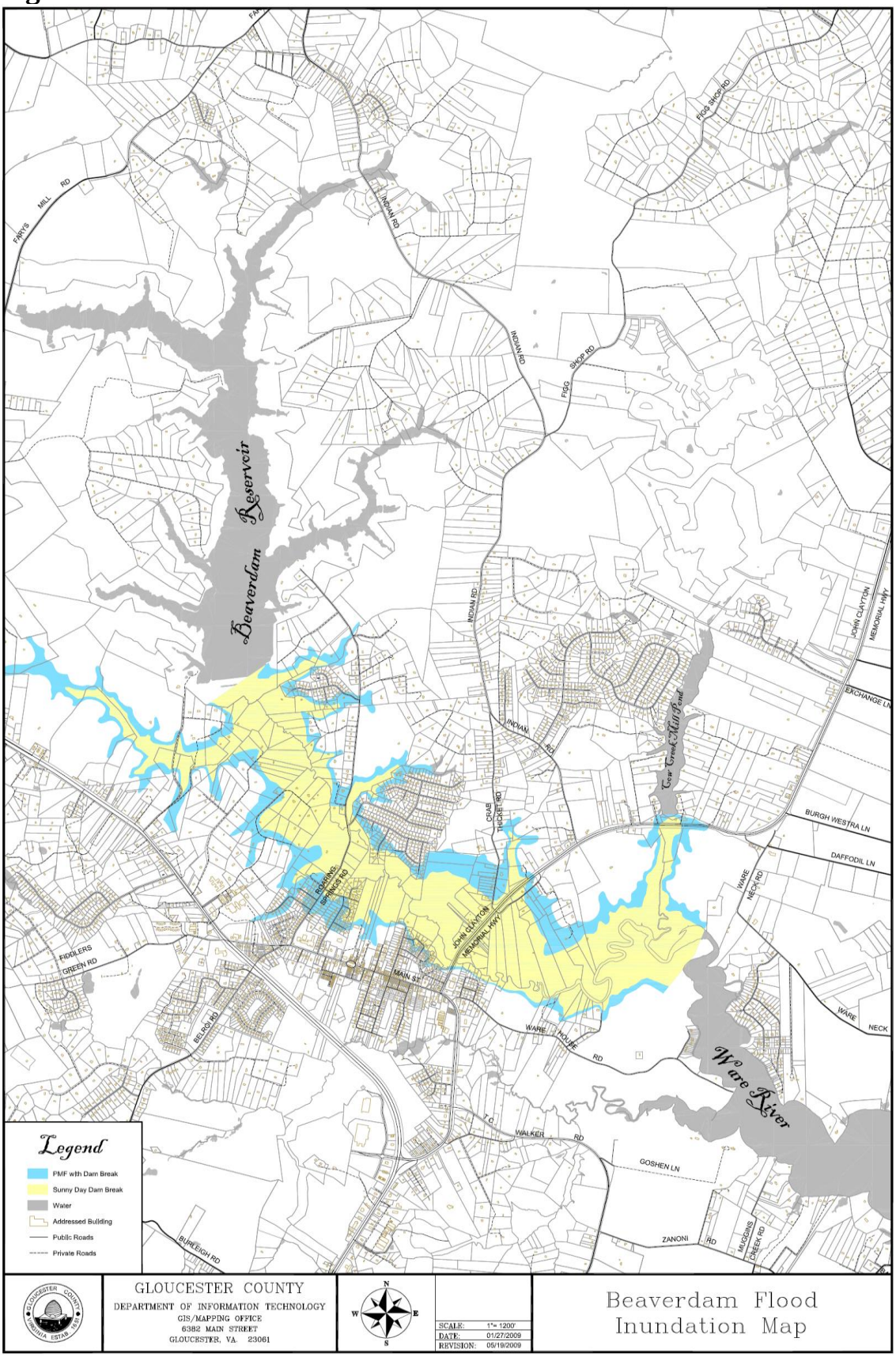
Source: VDCR 2013

There is no established database in Virginia of historic dam failures. Most dam failures occur due to a lack of maintenance of the dam facilities in combination with excessive precipitation events, such as seasonal coastal storms or thunderstorms.

Dam failures pose risks when there are large populations located downstream from the dams. On-going dam inspections and Virginia's participation in the National Dam Safety Program maintained by FEMA and the U.S. Army Corps of Engineers serve as preventative measures against dam failures.

Failure of dams may result in localized major impact. Impact includes loss of human life, economic loss, lifeline disruption, and environmental impact such as destruction of habitat. Secondary impacts from dam failure include flooding of surrounding areas.

Figure 6



Source: County Base GIS layers were provided by United States Census Bureau, the Built Structure layer (April 2009) was provided by Gloucester County DIT, and the Innundation Area layer was provided by Wiley & Wilson 2008.

3. ASSESS THE PROBLEM: VULNERABILITY OF THE COMMUNITY

3.1 Property Damage

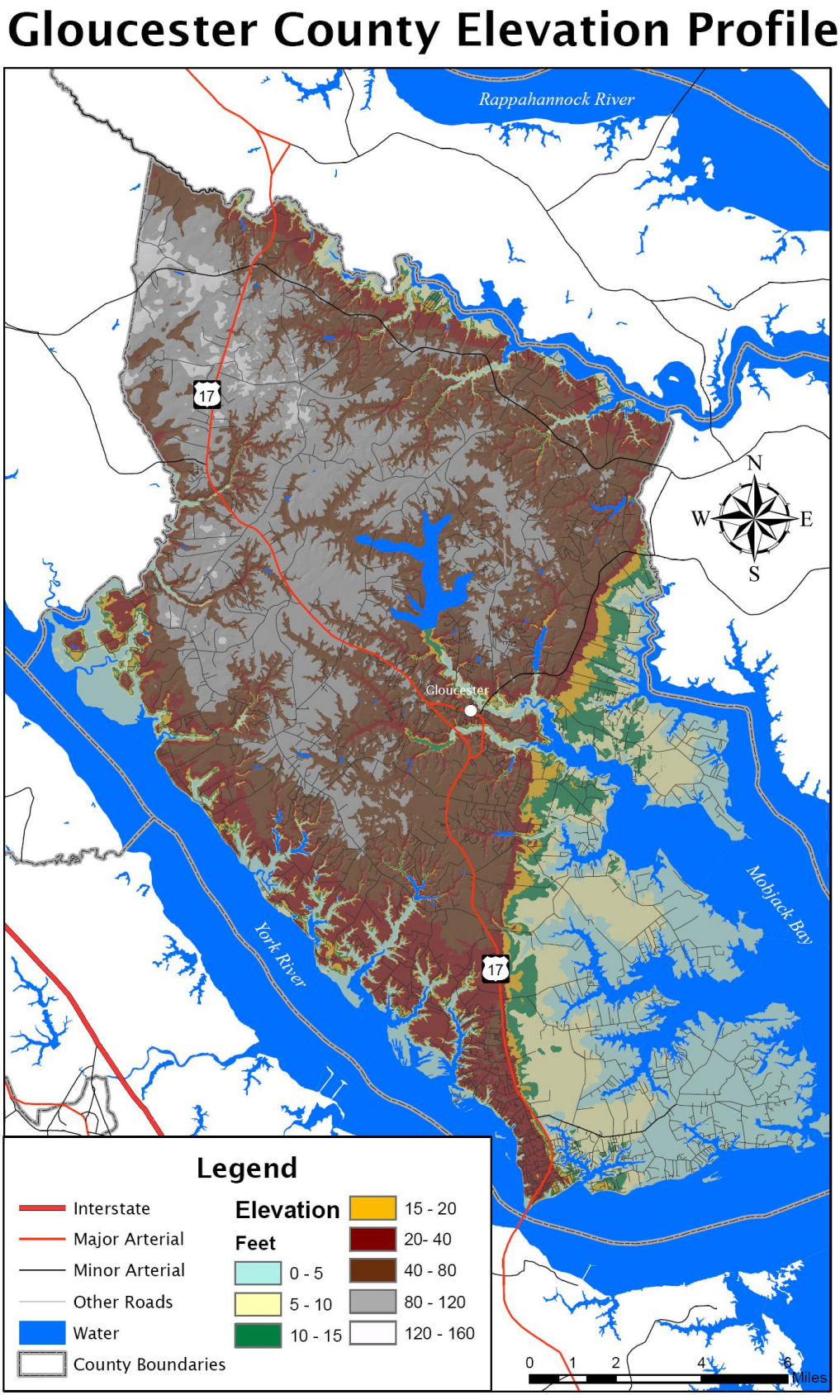
Elevation Profile of Gloucester County

Along its western and northwestern boundaries, Gloucester County has a maximum elevation of 160 feet above sea level, while most of the eastern and southeastern lands range from zero to five feet above mean sea level (Figure 8). For the southern portions of the county, Route 17 can easily be used as an elevation marker due to its bisecting qualities: it separates the majority of the low lying land on the southeastern portion of the county from the higher elevated portions of land on the southwestern portions of the county. The southern portion of Route 17 is constructed on land that is 20 to 40 feet above sea level. This is significant because elevation drops dramatically as one travels towards the eastern shore. The rapid elevation change is associated with a much larger bowl-shaped depression, known to scientists as the Chesapeake Bay Impact Crater (Powars 2000, 7).

In the East and Southeastern portions of the county the land is mainly flat and characterized by marshland and shoreline. This land is the most vulnerable to coastal flooding because there is little, if any, difference in elevation and not much in the way of vegetation that serve as a barrier to storm surge (Figure 7).

Figure 7: Typical landscape of SE Gloucester County.

Figure 8



Source: County Base GIS layers were provided by United States Census Bureau and the Elevation GIS layers were provided by USGS.

Special Flood Hazard Area

FEMA investigated the flood hazards in Gloucester County from 1983 to 1987. This investigation yielded the county's FIS and FIRM, both of which are used to develop flood risk data for the community and establish flood insurance rates throughout the region. The FIRM depicts flooding during a 100-year storm event (storms that have a 1% chance of being equaled or exceeded in any given year). The FIRM accounts for both storm surge driven flooding, as well as flooding caused by heavy rainfall. The map provides base flood elevations for the entire county derived from detailed hydraulic analysis of the area described in the FIS. The map also provides flood zone designations for the entire county describing the type of flooding experienced.

In 2003, Gloucester County's FIRM was converted to digital form (known as Q3 data). The Q3 data is not as detailed as the hard copy FIRM; it contains the 100-year and the 500-year floodplain boundaries (including velocity zones), and flood insurance zone designations but lacks base flood elevations.

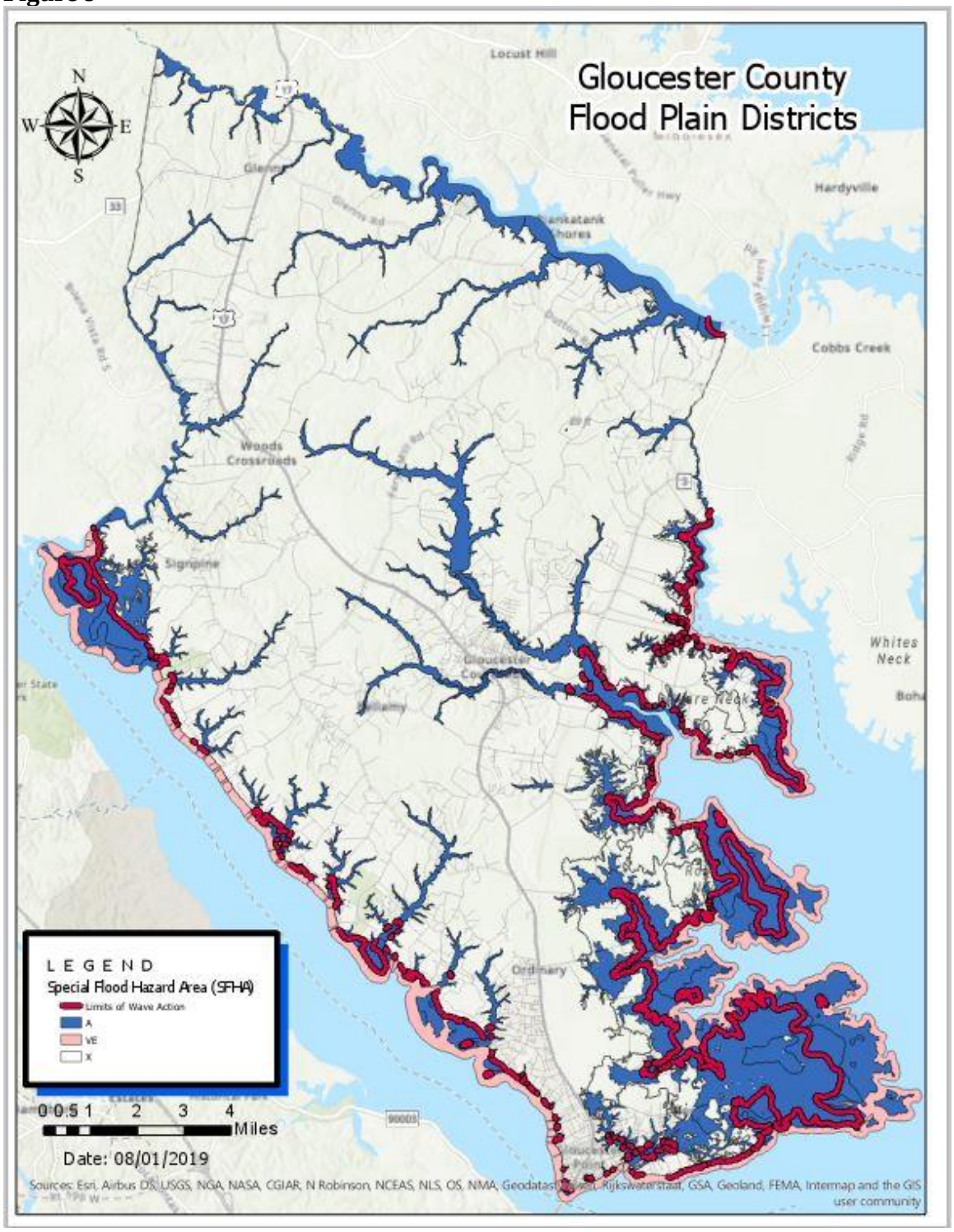
FEMA recently finished a complete update of the FIRM and FIS for Gloucester County (Figure 9). The effective date of the new FIRM and FIS is November 19, 2014, and the updated FIRM layer is integrated into the County's Geographic Information System (GIS) providing citizens an opportunity to compare existing and future flood zones. Below are definitions for zones located in Gloucester County:

- Zone VE and V - SFHA along the coast, inundated by the 100 year flood with high velocity hazard caused by wave action.
- Zone A - SFHA inundated by the 100 year flood for which no detailed flood profiles or elevations are provided.
- Zone AE – SFHA inundated by the 100 year flood determined by detailed methods with base flood elevations shown on the FIRM.
- Zone AO – SFHA inundated by the 100 year flood where flooding is anticipated to average depth of 1 to 3 feet, where a clearly defined channel does not exist, where the path of flooding is unpredictable, and where velocity flow may be evident.
- Zone X and X500 – areas are outside of the 100 year floodplain, not classified as SFHA.

The updated FIRM utilizes a new SFHA classification to describe the type of flooding described below:

- Zone Coastal A - wave action associated with the VE Zone (3 feet high and greater) does not automatically cease at the delineation of the AE Zone. To address this issue, the AE Zone category has been divided by FEMA by the Limit of Moderate Wave Action (LiMWA) to form the Coastal A Zone between the VE zone and AE Zone. The LiMWA represents the approximate limit of the 1.5 foot breaking wave. The effects of wave hazards between the VE Zone and the LiMWA will be similar to, but less severe than those in the VE Zone.

Figure 9



Source: Gloucester County Information Technology/ GIS Department, 2019, 2014 FIRM Dataset

Addressed Structures in the Special Flood Hazard Area

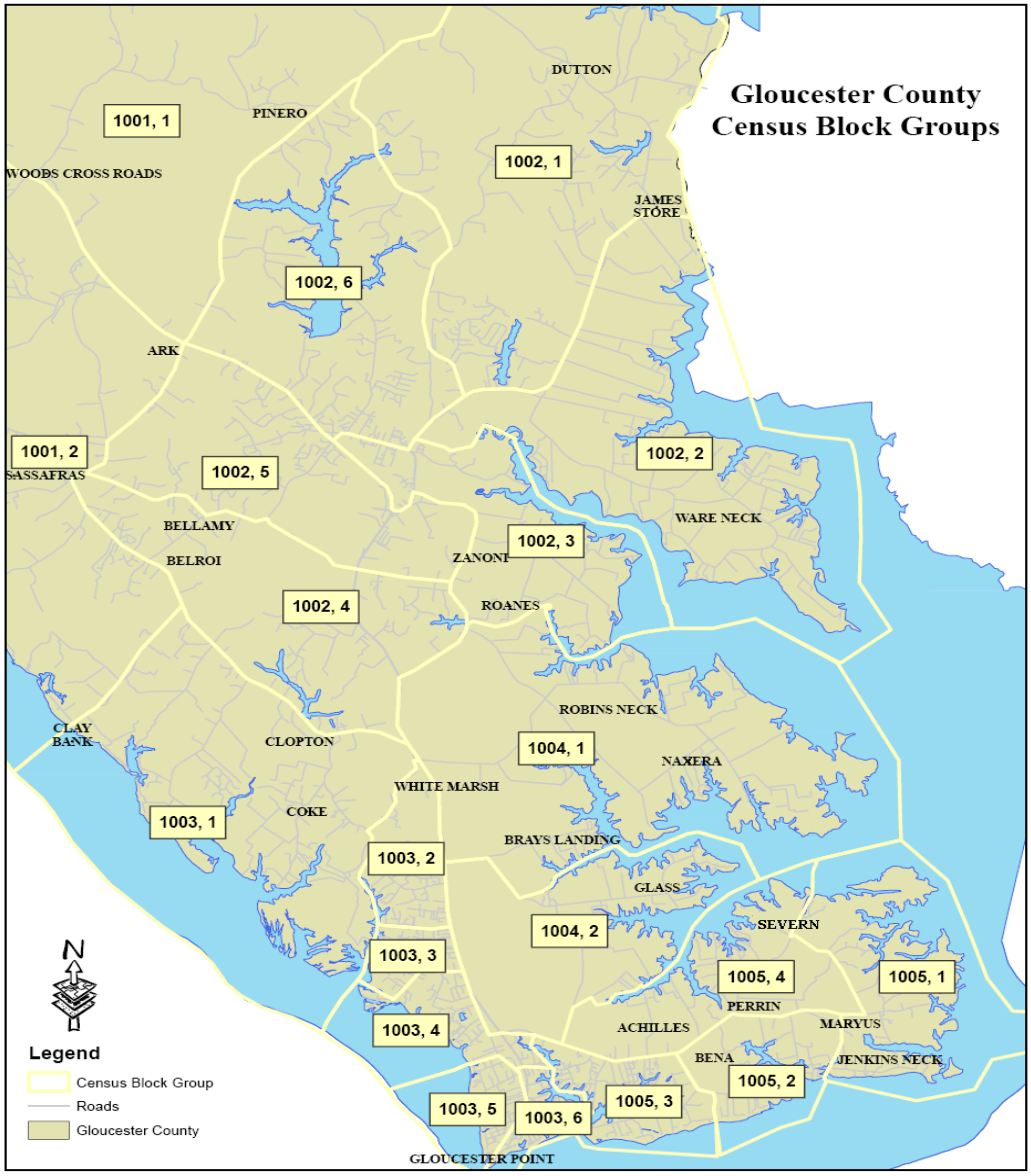
In 2005, a study conducted by the Middle Peninsula Planning District Commission (MPPDC) listed the number of addressed structures in Gloucester that are located in each special flood hazard area (VE, AE, A). The total number of addressed structures in the SFHA at that time was 2,233. Of these 1,062 or 48% are located in Census Tract 1005, Block Group 1, 2, 3 and 4 (Figure 10), which is comprised of what is locally known as Jenkins Neck, Maryus, Severn, Achilles, Bena, Perrin, and portions of Gloucester Point (southeastern portion of Gloucester County). Another 453 or 20% are located in Census Tract 1004, Block Group 1 (locally known as Robins Neck and White Marsh) and Block Group 2 (locally known as Glass). Another 301 or 13% are located in Census Tract 1002, Block Group 1 (locally known as Dutton) and Block Group 2 (locally know as Ware Neck), (Middle Peninsula Planning District Commission, 2005). Figure 10 shows the location of each of these areas with relation to Gloucester County. To view the entire study with relation to Gloucester, see Appendix B.

Pre-FIRM Structures in the Special Flood Hazard Area

The above referenced study conducted by the MPPDC also analyzed Gloucester County's addressed structures with relation to the year they were built. According to the study, 12,065 of the 15,260 structures (79%) in Gloucester County were built prior to 1989, before flood risks of the area were officially identified, and are classified as pre-FIRM structures (Middle Peninsula Planning District Commission, 2005). Most pre-FIRM structures were not built with flood-proof techniques and thus are more vulnerable to flooding.

Of the county's 12,065 pre-FIRM structures 1,950 or 6% are located in a Special Flood Hazard Area (VE, AE, A), and in 2005 had a total estimated value of $214,482,700. Of these, 973 or 50% are located in Census Tract 1005, Block Groups 1, 2, 3 and 4 (Figure 10) which is made up of Jenkins Neck, Maryus, Severn, Achilles, Bena, Perrin, and portions of Gloucester Point (southeastern portion of Gloucester County). In 2005, the total estimated value of these area's pre-FIRM structures was $98,658,900. Notably there are 388 or 20% of the total located in Robins Neck/ White Marsh and Glass. In 2005, the combined total estimated value of these area's pre-FIRM structures was $45,215,800. Of the total, 253 or 13% are located in Dutton and Ware Neck. In 2005, the combined total estimated value of these area's pre-FIRM structures was $34,426,800 (Middle Peninsula Planning District Commission, 2005). Figure 10 shows the location of each of these areas with relation to Gloucester County. To view the entire study with relation to Gloucester, see Appendix B.

Figure 10: Gloucester County Census Block Groups

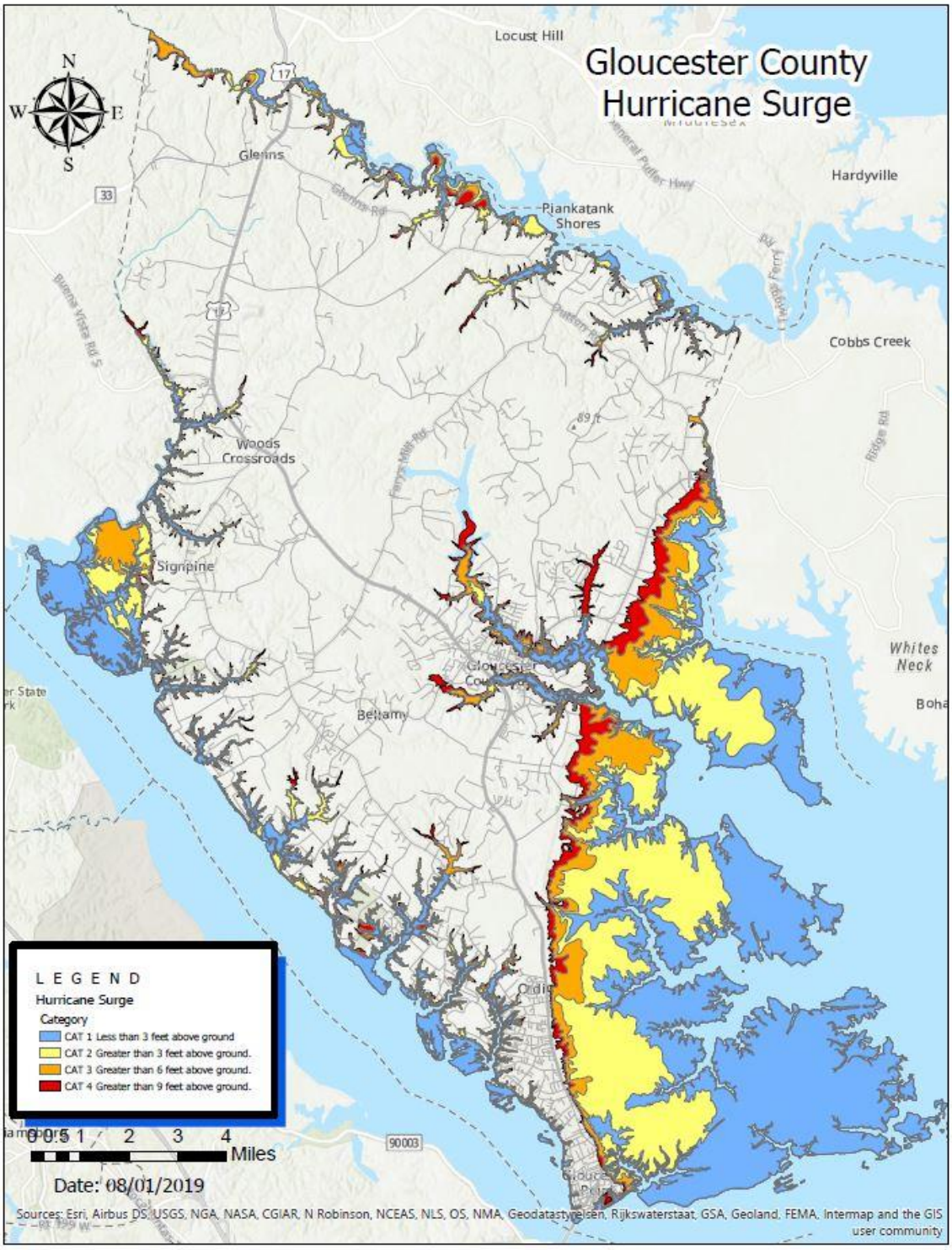


Source: Gloucester County Information Technology/ GIS Department.

Storm Surge Map

Another tool to determine the vulnerable areas of a community is the storm surge map. A storm surge map reflects the anticipated worst case hurricane storm surge inundation (at astronomical high tide) from a direct hit from the hurricane as it makes landfall. These maps do not show areas that may be flooded by excessive rainfall; they only depict flooding as a result of storm surge (Hampton Roads Emergency Management Committee, 2006). Also, these maps do not indicate depth of flooding (Gloucester County, 2006). Gloucester County's surge map (Figure 11) illustrates possible storm surge inundation areas in the county. In every storm surge scenario the eastern and southeastern portion of Gloucester County experience the highest risk of storm surge flooding. As the intensity of a hurricane grows, areas further inland are at higher risk of flooding from storm surge. Due to the rapid increase in the county's elevation levels as one travels inland, the intrusion of storm surge caused by increasing storm strength does not change dramatically, i.e. the area impacted by the storm surge from a Category 3 or 4 hurricane is not much greater than from a Category 2 hurricane (Figure 8).

Figure 11



Source: County Base GIS layers were provided by United States Census Bureau and the Storm Surge GIS layers were provided by Gloucester County Information Technology/ GIS Department. (This figure is not 100% accurate due to the storm surge being shown extending past the Beaverdam Reservoir Dam. The construction of the dam now eliminates this from occurring).

Potential Structural Vulnerability to Storm Surge Inundation

The 2005 study conducted by the MPPDC also analyzed Gloucester County's potential structural vulnerability to storm surge inundation caused by Category 2, 3, and 4 hurricanes.[4] Throughout Gloucester County, nearly 23% of all addressed structures (3,443 total) lie within the predicted storm surge for a Category 2 hurricane. A storm surge from a Category 3 hurricane had the potential to affect 26% of the county's addressed structures (3,994 total), and in 2005 had the potential for $459 million in damages. A storm surge from a Category 4 hurricane had the potential to affect 600 additional structures, and in 2005 it was estimated to cause over $527 million in property loss (Middle Peninsula Planning District Commission, 2005).

The MPPDC's study determined that the census block groups with the most potential to be severely affected by storm surges are in Census Tract 1005, Block Group 1, 2, 3 and 4 (Figure 10) which is comprised of Jenkins Neck, Maryus, Severn, Achilles, Bena, Perrin, and portions of Gloucester Point (southeastern portion of Gloucester County). Every built structure within these four census block groups lies within the predicted storm surge from a Category 2 hurricane - a total of 1,798 structures; in 2005 it was estimated at $196,380,100 in potential property losses.

Other census block groups with high potential to be severely affected by storm surge are in Census Tract 1004, Block Group 1 locally known as Robins Neck and White Marsh and Block Group 2 locally known as Glass (Figure 10). In Block Group 1, 80% of the built structures run the risk of inundation by a storm surge from a Category 2 hurricane - a total of 377 structures, in 2005 it was estimated at $46,898,800 in potential property losses. In Block Group 2, 68% run the risk of inundation by the same surge, a total of 265 structures; in 2005 it was estimated at $29,097,000 in potential property losses.

Another census block group with high potential to be severely affected by storm surge is in Census Tract 1002, Block Group 2 locally known as Ware Neck (Figure 10). A little over 55% of the block group's built structures run the risk of inundation by a storm surge from a Category 2 hurricane – a total of 339 structures, in 2005 it was estimated at $48,205,800 in potential property losses (Middle Peninsula Planning District Commission, 2005).

Repetitive Loss Areas

FEMA classifies Repetitive Loss Properties as those that that have made flood damage claims of $1,000 or more twice within a 10-year period. FEMA classifies Severe Repetitive Loss Properties as any property that has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000. The properties on the list are subject to change over time, and will depend on the frequency and severity of the seasonal coastal storms that affect the area. As of December 31, 2011, there were 128 repetitive loss and 12 severe repetitive loss properties in Gloucester. Of the 140 repetitive loss properties, 138 are residential and the other 2 are businesses. The county's severe repetitive loss properties are residences. Gloucester is classified as a "Category C" repetitive loss community (> 10 repetitive loss

[4] (Note: Category 1 and Category 5 hurricane surge data is not analyzed in the structural vulnerability study due to data limitations.) (For study see Appendix B).

sites) and must tailor its floodplain management plan specifically to the county's repetitive loss areas.

Due to Privacy Act requirements, Repetitive Loss & Severe Repetitive Loss properties will be generalized based on location, and will further be known as a Repetitive Loss Areas. These areas and the amount of repetitive loss properties in them will aid in the county's determination of which portions of the county have the most frequent and severe flood related damages to residences, and will be high priority target areas for future mitigation activities. The majority of the county's repetitive loss properties are located on low lying land that forms the various necks that protrude into and form the Mobjack Bay which are characterized by "southeastern" and "central" in Table 5 and Figure 10.

Table 5: Repetitive Loss Areas

Repetitive Loss Areas	Area of the County	Number of Properties
Maryus	Southeastern	32
Glass	Southeastern	21
Severn	Southeastern	17
Perrin	Southeastern	15
Jenkins Neck	Southeastern	14
Ware Neck	Central	13
Bena	Southeastern	9
Achilles	Southeastern	7
Zanoni	Central	4
Hayes	Central	2
Claybank	Southwestern	1
Dutton	Northeastern	1
Naxera	Central	1
Roanes	Central	1
Signpine	Northwestern	1
Wicomico	Southwestern	1

Source: FEMA, 2008

As of April 30, 2014 Gloucester County has experienced a total of 1,338 flood losses since January 1, 1978 with total payments of $30,280,135.40. As of December 31, 2011, of the 140 repetitive loss properties, 37 had been mitigated against damages caused by flooding through either elevation or demolition of the primary structure, or through acquisition of the property. Regardless, these properties remain on the list due to the required time frame that must pass since each repetitive loss property last had an insurance claim. Throughout this plan, once a property has received flood mitigation it will no longer be considered as a primary target area for future mitigation strategies. Later sections of this plan focus applicable mitigation activities specifically to the properties or areas that have not received mitigation against damages caused by flooding.

Highest Priority Target Areas Based on Vulnerability

Areas in the county that are the most vulnerable to flooding will be considered the target areas for future flood mitigation activities, and classified as such. Rather than utilize repetitive loss properties as the sole indicator of an area's vulnerability, a combination of four indicators will be utilized: 1) highest concentration of addressed structures in the SFHA 2) highest concentration of pre-FIRM structures in the SFHA 3) highest percentage of structural vulnerability to storm surge inundation and 4) highest amounts of repetitive loss properties. Utilizing a combination of these four indicators will help justify areas in the county that may not have been affected by a seasonal coastal storm in recent history but have high potential for catastrophic results in the event of a seasonal storm. This decision is based on the very nature of seasonal coastal storms, which are characterized by their unpredictability with regard to frequency, duration, strength and trajectory. The amount of repetitive loss properties in an area can dramatically change from coastal storm event to coastal storm event. If the county were to utilize repetitive loss properties as the sole indicator of vulnerability it would be placing too much emphasis on past storms rather than preventing future damages from future coastal storms.

Based on this plan's analysis of the 2005 study conducted by the Middle Peninsula Planning District Commission (which was discussed in the previous four sections), the area of the county that is most vulnerable to flooding is the southeastern portion of the county, which includes the most addressed structures in the SFHA, possesses the most pre-FIRM housing in the SFHA, and has the highest percent of structures predicted to be inundated in a storm surge, as well as has the highest number of repetitive loss properties in the county. Because of these findings, Jenkins Neck, Maryus, Severn, Achilles, Bena, Perrin, and portions of Gloucester Point (southeastern portion of the county) are considered the highest priority target area for future flood mitigation strategies in the county.

Other target areas in the county are Robins Neck and White Marsh, Glass, Dutton, and Ware Neck.

3.2 Vulnerable Populations

In Gloucester County, 3,857 residents (10.5%) are living in the county's most severe coastal flood hazard area, Census Tract 1005 (southeastern portion of the county). This is down from the figure of 3,884 residents reported in the 2009 plan which is partially due to the success of hazard mitigation activities. In order to maximize the effectiveness of this plan, it is imperative to identify vulnerable segments of the population at risk of coastal flooding hazards. By understanding the population at risk, emergency management planners will be better equipped to review the effectiveness of the existing flood mitigation practices and address the unmet needs of the area. To assess the social vulnerability of the high hazard area, age, disability, and income levels were estimated from the 2008 – 2012 American Community Survey (ACS) by the U.S. Census Bureau [5] and analyzed at the Census Tract level.

[5] See Appendix B for reference to sources of U.S. Census data

Age and Disability

According to the 2008 – 2012 ACS estimate, Census Tract 1005 is largely made up of middle-aged residents (median: 42.4 yrs); 21.2% of the population is under the age of 18, one third of which are children under five years old. The southeastern portion of the county also has a moderate number of elderly (17.6% 65 or older). Previous population projections by age for the county showed large increases in the elderly population in coming decades with 22% of the county being elderly by 2020, and almost 37% by 2030. These projections now appear to be credible; Gloucester's elderly population has grown by 17% since 2000.

The area's disabled population includes a wide range of age groups. According to the 2008 – 2012 ACS estimate, 12.5% of all residents in this Census Tract are living with a disability, and 31.2% of those 65 years of age and older have some form of disability.

Young children, the elderly, and the disabled populations are important to consider due to their lesser capacity to protect themselves in hazardous situations, and their limited levels of mobility (Sorensen, 2006).

Income

According to the 2008-2012 ACS estimate (in 2012 dollars) , annual income levels in Census Tract 1005 have become less evenly distributed: 21.5% of households earn less than $24,999, 21.9% $25,000 - $49,000, 20.3% $50,000 - $74,999, and 36.3% earn over $75,000. 9% of households in census tract 1005 earn over 150,000 per year.

Typically, low income households face higher levels of risk from flooding because they can least afford the costs associated with relocation, property protection (e.g. elevating structure), repair and cleanup (e.g. tree removal, floor replacement, and appliance replacement) (Sorenson, 2006).

3.3 Critical Facilities

Critical facilities are those that are crucial to the everyday functioning of a community, or that provide essential services during emergencies and are charged with providing special care to vulnerable populations. The vulnerability of critical facilities can be assessed by their location in a flood zone as depicted in the digitized FIRM, as well their location in an area potentially inundated by storm surge from a hurricane (Figure 12) (NOAA CSC Risk and Vulnerability Assessment Tool).

Fire and Rescue

Gloucester has six fire and rescue stations throughout the county (Appendix I). The Gloucester Volunteer Fire and Rescue Squad maintains three stations that serve the northern portion of the county (Stations 1, 4 and 6). Abingdon Volunteer Fire and Rescue maintains three stations that serve the southern portion of the county (Stations 2, 3 and 5). None of Gloucester's six fire and rescue stations are located in a flood zone; however, Station 2 (located in the southeastern portion of the county) could be inundated during a storm surge from a Category 2 hurricane (Figure 12). Previous coastal flooding caused by documented hurricane induced storm surges has not hindered the station's ability to

respond. No other fire and rescue station in Gloucester is located in an area potentially inundated by storm surge.

Shelters

Gloucester utilizes several public schools as shelters during emergency events. Only one of the nine public schools in Gloucester County - Achilles Elementary School (located in the southeastern portion of the county) - is within a flood zone, classified AE (area inundated by the 100 year flood). This school is also located within the predicted extent of storm surge flooding caused by a Category 1 hurricane (Figure 12); however, Achilles Elementary School is not used as a shelter during seasonal storms because of its vulnerability to flooding.

Public Water (Beaverdam Reservoir)

Gloucester County provides various public services and facilities for its residents, including those related to water supply and sewage disposal. The Beaverdam Reservoir and its associated water treatment plant provide portions of the county with public water. The facility is located just north of the courthouse area and is contained by an earthen dam. The reservoir covers approximately 655 acres and is surrounded by a 300 to 600 foot buffer of county owned forestland that makes up the Beaverdam Reservoir Park (Middle Peninsula Planning District Commission, 2005). The impounding structure for Beaverdam Reservoir, Beaverdam Reservoir Dam, is classified as a "High" hazard dam.

Dams are classified with a hazard potential depending upon downstream losses anticipated in the event of a failure as opposed to their structural integrity.

The dam was constructed in accordance with plans approved by the Virginia Department of Conservation and Recreation (VDCR). In addition, VDCR has issued the required operational certificates directing/confirming the safe operation of this facility. There have never been any flooding problems related to the dam structure serving the reservoir. Portions of the reservoir are located in flood zones AE and A, and according to county storm surge maps the downstream side of the dam itself has the potential to be inundated by a storm surge from a Category 3 hurricane. However, this does not pose any significant risk to the dam given it is designed to pass the probable maximum flood (PMF) which vastly exceeds a 100 year flooding event. The dam's emergency spillway was tested during 1999's Hurricane Floyd and behaved as designed with water flowing downstream using the primary and emergency spillways.

Private Water

Where public water is not available or citizens chose not to use available public water, Gloucester County citizens use thousands of private deep and shallow wells (Gloucester County, 2002). Depending on the location of an individual household, the well system may be in a flood zone or in an area potentially inundated during a storm surge. These private water supplies are susceptible to contamination during flooding (see "Safety and Health Hazards" below) and usually are a key factor for attention in post disaster remediation.

Public Sewer and Private Sewage Disposal

Portions of Gloucester County are served by public sewer. Sewage from these areas is collected and pumped by pump stations that are owned by the county to underground force main pipes that are owned by the Hampton Roads Sanitation District (HRSD). The HRSD force mains lead from the courthouse area along Route 17, under the York River and to Hampton Roads where the sewage is treated. The system is a closed underground system (force main) that does not sustain damages during severe flooding events. However, there were two pump stations in the Gloucester Courthouse area (Pump station #11 and Pump station #13) that sustained damage during Hurricane Floyd in 1999. The county maintains standby pumps to provide continuous service in the event a pump station is damaged by flooding (or other means).

Other portions of the county utilize septic tanks for private sewage treatment. Depending on the location of an individual household, the septic tank may be in a flood zone or in an area potentially inundated during a storm surge.

According to the Virginia Department of Health there are many residences that utilize either public sewer or private septic systems that also utilize public water. This may pose a special problem during storm events. In cases where the sewage system becomes disabled (either by disability of a mechanical appurtenance or through a power outage) and a water supply remains uncompromised, the result is usually a back-up of sewage into the structure or an exposure of sewage on the ground surface (as experienced after Hurricane Isabel) (see "Safety and Health Hazards" below).

Roads

Gloucester County residents primarily utilize Rt. 17 - George Washington Memorial Highway - as the main artery of the County. The four lane highway runs North-South through the center of the County. Unfortunately VDOT does not keep records of which roads flood and to what extent. In an effort to identify the roads that are most vulnerable to damage from coastal flooding, road closure data was obtained from VDOT and utilized in the plan. Rt. 17 has not been closed[6] due to flooding in past storm events.

Regardless, two segments of the road are located in a flood zone, classified AE (area inundated by the 100 year flood), and are potentially affected by storm surge. The first is near the Court House area of the County and would be potentially inundated by a storm surge from a Category 1 hurricane. Box culverts were utilized during the design and construction of the road at the area located near the Court House to divert water under the roadway, these culverts are capable of flowing large amounts of water before flooding the road above. The second area is located at the southern end of the County and has potential to be inundated by a storm surge from a Category 3 or 4 hurricane (Figure 12).

Notably, the majority of roads in the southeastern portion of the county are built in a flood zone, (classified as VE and AE), and would be inundated during a Category 1 hurricane. And all the roads in this area of the county would be potentially inundated in a Category 2 hurricane (Figure 12). Over a seven year time frame (1999 – 2006) which included 1999's

[6] The definition of a road closure by VDOT is when a road is closed due to damages to the road which make it impassable, such as a washout. Closures caused by downed trees were not considered in this list, nor was a temporary "closure" caused by standing water considered in the list.

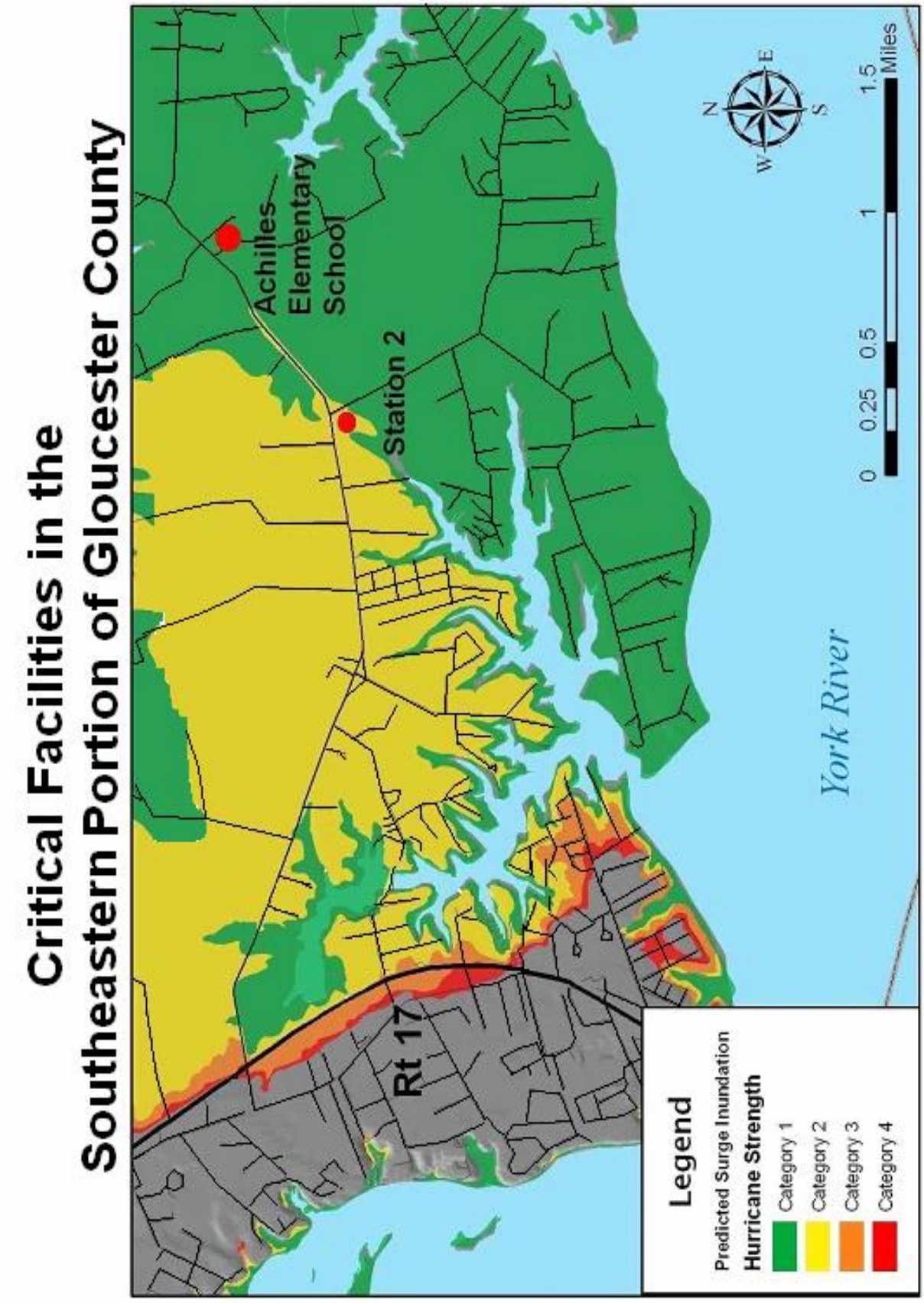
Hurricane Floyd, 2003's Hurricane Isabel, and 2006's Hurricane Ernesto, there has only been one road in the southeastern portion of the county (on one occasion) that has been closed[4] due to flooding - Rte. 649 (Maryus Road) from Hurricane Ernesto in 2006. While there have been no other closures[4] in this area of the county during the 7 year time frame, per VDOT recommendation Route 646 (Jenkins Neck Road) will be considered as a high risk road because it has flooding during every coastal storm event in recent years. In this plan the road closure data for the County will primarily focus on roads that have flooded on two or more occasions during the seven year period mentioned above (Table 6). The causes of the road flooding will be discussed in further detail in Chapter 5 in the Structural Improvement Activities section.

Table 6: Road Closures due to Flooding from 1999 - 2006

Rte.	Road Segment
605	Indian Road at Beaverdam Reservoir.
606	Farys Mill Road at Beaverdam Park second entrance.
610	Salem Church Road at the fourth bend.
614	Featherbed Lane at second bend.
614	Segment: Hickory Fork Road at Haynes Mill Pond. *(This road segment was fixed in 2006 and has not been closed since).*
625	Ditchley Drive nearest the North River.
662	Allmondsville Road at the bend.
1208	Greate Road at the boat landing.

Source: VDOT, 2007

Figure 12



Source: County Base GIS layers were provided by United States Census Bureau, and the Storm Surge GIS layers were provided by Gloucester County Information Technology/ GIS Department.

3.4 Safety and Health Hazards

Flooding has the potential to cause a significant amount of safety and health hazards in the county. Nationally, the most deaths from flooding occur while attempting to evacuate the flood-prone area. Victims become trapped in their vehicles and drown while driving through floodwaters that appear shallow but turn out to be deep (Des Plaines Engineering Department 2002, 23). In Gloucester there have been very few deaths caused by flooding; one of the more recent deaths occurred on September 18, 2003 (Hurricane Isabel) when an individual died of a heart attack after their vehicle became partially submerged and they attempted to push the vehicle to dry land, unsuccessful the driver returned to the vehicle and suffered a heart attack as the vehicle was being swept away in high waters. Other recent storm related deaths in the County have come about from trees falling on residential structures during or after a storm event (Middle Peninsula Planning District Commission, 2005).

While death is ultimately the worst hazard possible, there are other significant health and safety hazards that can result from flooding events, such as an abundance of solid waste and debris, the spread of disease by mosquitoes, fuel spills and chemical waste, exposure to raw sewage caused by septic tank failure, possible damage or destruction of private water supply, and exposure to mold spores. The possibility of flooding causing serious safety hazards are amplified when flooded areas become inaccessible to emergency responders (fire, rescue squad, and police personnel) by high water and or flood related road damage (Des Plaines Engineering Department 2002, 23). Gloucester County's road network has experienced damage caused by coastal flooding on numerous occasions (VDOT, 2007). These were briefly discussed in Section 3.3 Critical Facilities and will be discussed in further detail in Chapter 5 in the Structural Improvement Activities section.

Solid Waste and Debris

Hurricanes and associated storms typically generate large amounts of solid waste through wind damage and/or flooding. Solid wastes generated may include woody debris, demolition waste, spoiled food, household goods and products, and other municipal solid wastes. After a hurricane, solid waste management facilities typically experience significant increases in waste intake rates due to the cleanup efforts which may strain their normal capabilities. Nonetheless, they are still required to meet all regulatory and permit requirements, or obtain temporary modifications of their permits as approved by the Department of Environmental Quality (DEQ, 2009).

Originally adopted on June 29, 1998 and revised August 9, 2001 the Gloucester County Disaster Solid Waste Plan appropriately plans for an increased amount of solid waste generated by coastal storm events. In the plan it is estimated that a Category 4 hurricane could generate 126,000 cubic yards of waste materials in just seven square miles of the County's most densely populated areas. Because of this, the Disaster Solid Waste Plan is an important part of the County's overall emergency preparedness planning. The plan sets forth relevant County policies and provides procedures to be followed when the plan is implemented.

For example; in the event of a major disaster, such as a federally declared disaster, but without waiting for such a declaration, the County may, in accordance with the plan, arrange for the activation of the temporary debris storage and reduction site at the VDOT

Park and Ride on Route 216. The County will make appropriate payments for the operation of this site. Individual residents, non-resident land owners, and businesses who transport their own material to the disposal site are acting as County agents in self-hauling debris, they shall sign a statement to the affect that they are giving the approximate load size along with their name, address, and telephone phone number when dropping the material. Any persons who are collecting brush or debris and transporting it for others for a fee are classes as "commercial haulers". All commercial haulers, whether working for a County citizen, County business, or the County itself shall deposit their material at the landfill only. The above procedure is just one of the many described in the plan, for all procedures see the Gloucester County Disaster Solid Waste Plan, 2001.

While the county has planned for the increased amounts of solid waste due to major storm events, residents can help reduce the amount of waste that goes into the landfill by recycling specific types of solid waste and debris. Woody debris (downed timber, logs, stumps and brush) can be sorted by size and processed for various reuse projects such as mulch or firewood. The remaining waste should be taken to the landfill or temporary debris storage facility for separation and disposal.

Other Types of Debris

While the above mentioned reuse efforts can tremendously cut down on the amount of waste that goes into the landfill, there are other types of debris (treated wood, propane cylinders, demolition waste, asbestos containing waste, lead paint abatement waste, construction waste, household hazardous waste, and petroleum contaminated waste) that must be properly disposed of or reused due to the potential hazards to human health if ingested or inhaled (DEQ, 2009).

Spread of Disease by Mosquitoes

Large amounts of standing water brought about by excess rain and flooding from coastal storms creates unusually large amounts of additional habitat for mosquitoes to breed. Mosquitoes are known carriers of West Nile Virus, Eastern Equine Encephalitis, Dengue Fever, Yellow Fever, and other diseases.

The mosquito problem is divided up into two distinct waves of activity that occur after a flooding event. The initial influx or first wave of mosquitoes belong to a group known as flood water mosquitoes which include the salt marsh and pastureland mosquitoes. These mosquito species deposit their eggs on soil and in depressions that are subject to periodic flooding. When flooded, the eggs hatch simultaneously resulting in large swarms of mosquitoes five to seven days after the flooding event during the warmest times of the year. These mosquitoes are primarily annoyance species that play minor roles in disease transmission.

After the initial wave of flood water mosquitoes disperses, a new group of mosquitoes move into the new pools of standing water left after the flood waters begins to recede. This new group of mosquitoes prefer habitats with calm, temporary or permanent pools of standing water to deposit their eggs. Many of the most important disease vectoring mosquitoes belong to this group of standing water mosquitoes and compose the second wave of mosquito invaders.

Neither the County nor the state has any available data on the health problems caused by mosquito invasions after coastal flooding events in Gloucester. This is most likely because such incidents are not always reported or confirmed to be directly related to the coastal flooding event. On April 16, 2007 Gloucester County first adopted an Integrated Mosquito Management Program (IMMP) that is implemented through the Gloucester County Mosquito Control Commission (GMCC). This program is intended to specifically address mosquito control measures in the county. The county currently has five (5) Mosquito Control Districts which are all generally located in the southern half of the county; these districts were established in accordance with Section 32.1-187 of the Code of Virginia. The boundaries of these districts are discussed in the County Ordinance under Chapter 9.5 "Health and Sanitation", Article II "Mosquito Control District." For more information on the plan, see the Integrated Mosquito Management Program, 2007 (as revised).

Fuel Spills and Chemical Waste

A long lasting hazard comes from flood water's ability to mix and spread dangerous substances such as fuel or other chemical waste throughout a community. These materials also can seep into the ground water, causing serious health problems for people served by wells (Des Plaines Engineering Department, 2002).

A significant cause of fuel spills come from unanchored fuel tanks taken away by flood waters. When the water levels subside the scattered tanks can leak fuel onto the ground where it can be absorbed into the soil and gradually work its way into the groundwater (FEMA, 2006). Gloucester County's building code mandates that all newly installed fuel tanks in a flood zone be securely bolted or strapped down to a concrete foundation. This provision acts as a safety measure to keep the tanks from floating away during flooding. Unfortunately, the mandate does not require pre-existing fuel tanks to be bolted or strapped down.

Chemical waste coming in contact with floodwaters is primarily caused by the amount of chemical waste stored in the average home (Des Plaines Engineering Department, 2002). In order to address this problem Gloucester County runs bi-annual household chemical collections. The collection program can help to minimize the scattering of chemical waste during coastal flooding; the exact dates and times are advertised in the community newspaper, The Beehive.

Exposure to Raw Sewage Caused by Sewage Disposal System Failure

On-site sewage systems are susceptible to flood events and may result in the exposure of untreated sewage directly to humans or indirectly to humans via contact with creatures (e.g. dogs, cats, rats, flies, cockroaches, fleas or a host of others) that may have contact with the contaminated floodwater. Human disease contracted through direct or indirect exposure to untreated sewage includes Salmonella, Shigellosis, Cholera, Viral Hepatitis A, Gastroenteritis and Amebiasis. Untreated sewage that finds its way to local tidal waterways may contaminate shellfish harvesting areas and impact a major Gloucester industry.

Conventional sewage disposal systems are below ground and can naturally recover from flooding as flood waters subside and the soil dries. According to the VDH the primary cause of damage to conventional systems is the uprooting of trees. As flood waters and rainwater saturate soils, trees become extremely susceptible to being uprooted/knocked over by strong winds. Over time as a tree grows, its roots may become entangled in nearby

drain fields and if the tree is uprooted by strong winds, the drain field can be uprooted as well. According to the VDH the uprooting of trees during past storm events has been the number one cause of conventional septic tank damage in Gloucester County.

While uprooted drain fields can be avoided through the use of above ground alternative sewage disposal systems, during a storm event these systems experience their own problems and are extremely vulnerable to flooding events. Many alternative systems utilize mounds of sand to filter septic waste; these mounds as well as the systems which process the waste tend to be washed away during flooding events, releasing large amounts of untreated sewage. If the system is not washed away, these systems tend to be damaged by flood waters or debris. The systems typically rely on electricity to properly function and as such prolonged electrical outages that are accompanied by flooding can lead to system failure. The mechanical parts that these systems rely on, when exposed to debris, tend to break during or after a storm event. When damaged these systems fail to work properly and can back up and release large amounts of untreated sewage. Due to the increased use of this technology and the anticipated expansion of this use in flood prone areas, the public health, safety and economic impacts of development in these areas should be examined. This is especially critical in areas impacted by storm surge.

Damage or Destruction of Private Water Supply

Private water supplies, most often associated with drinking water wells, are significantly affected by flooding and as such alternative water supplies are usually a first response issue after a disaster. The potential for contamination is present when well inundation with flood water that may be tainted by raw sewage or by chemicals released during a flood event occurs. Residents should not drink well water until it is tested.

Exposure to Mold Spores

Extensive water damage from flooding increases in the likelihood of mold contamination in buildings. Approximately 100,000 species of fungi exist but fewer than 500 fungal species cause infections in humans, generally through respiratory exposure. Infections from mold might be localized to a specific organ or disseminated throughout the body. Prolonged exposure to high levels of mold (and some bacterial species) can produce an immune-mediated disease known as hypersensitivity pneumonitis (CDC, 2006). After a flooding event buildings should be cleaned, dried out, and then inspected for signs of mold growth. If signs of mold are present, the building may need professional mold treatment or extensive structural repairs.

4. GOALS

The following goals and objectives relate to appropriate actions that Gloucester County can implement to lessen the amount of damage caused by coastal flooding.

Goal 1: Protect public and private property from damage caused by coastal flooding hazard.

Objective 1.1: Prevent roadways in the county from being damaged during coastal flooding.

Objective 1.2: Protect new and existing development in the county's flood-prone areas from damage caused by coastal flooding hazards.

Objective 1.3: Protect critical facilities from being damaged during coastal flooding.

Goal 2: Maximize citizen actions to protect private properties.

Objective 2.1: Ensure that residents are given adequate warning of potential coastal floods.

Objective 2.2: Ensure that residents can easily obtain all general and property specific information relating to flooding and flooding risk.

Existing hazard mitigation strategies and recommendations for improvement are identified in Chapter 5.

5. HAZARD MITIGATION ACTIVITIES

Over the years, the county has taken many steps to protect its citizens and property from flooding hazard. The county's current hazard mitigation activities can be grouped into the following categories:

1. Structural Improvement Activities
2. Preventative Activities
3. Property Protection Activities
4. Public Information Activities
5. Emergency Service Measures
6. Natural Resource Protection

In order to clearly distinguish the efforts the county has already implemented from this plan's recommendations for improvement; each will be designated as such. If there are no additional recommendations for improvement, the recommendation for the section will merely endorse the continuation of the county's existing effort.

5.1 Structural Improvement Activities

Structural improvement activities are a special type of mitigation project that aims to keep flood waters from damaging critical facilities. Structural improvement projects have many advantages as well as many shortcomings. When appropriate, these improvements may provide long term protection against specific flood related damages. The shortcomings of these improvements depend on the nature of the improvement, but generally they are very expensive and require regular maintenance (Des Plaines Engineering Department 2002, 33).

The following structural improvement activities have been, or should be, implemented in Gloucester County:

a. The Beaverdam Reservoir Dam Maintenance
b. Road Improvements

5.1a The Beaverdam Reservoir Dam

As discussed in earlier sections, the Beaverdam Reservoir is located in the central portion of Gloucester and it is contained by an earthen dam. The reservoir covers approximately 655 acres, and is surrounded by a 300 foot to 600 foot buffer of County owned forestland that makes up the Beaverdam Reservoir Park (Middle Peninsula Planning District Commission, 2005). The dam was constructed in accordance with plans approved by the Virginia Department of Conservation and Recreation (VDCR). In addition, VDCR issued required operational certificates directing/confirming the safe operation of this facility.

What Has Been Implemented: There have been no flooding problems related to the dam structure serving the reservoir. Portions of the reservoir are located in flood zones AE and A, and according to county storm surge maps the downstream side of the dam itself has the potential to be inundated by a storm surge from a Category 3 hurricane. However, this does not pose any significant risk to the dam given it is designed to pass the probable maximum flood (PMF) which vastly exceeds a 100 year flooding event. The dam's emergency spillway was tested during Hurricane Floyd in 1999 when the impoundment

structure behaved as designed with water flowing downstream using the primary and emergency spillways.

There is no established database in Virginia of historic dam failures. However, most dam failures occur due to a lack of maintenance of the dam facilities in combination with excessive precipitation events, such as seasonal coastal storms or thunderstorms.

The Gloucester County Public Utilities Department conducts weekly inspections of the dam and provides regular maintenance to the facility in accordance with the Emergency Action Plan developed for the facility. The county also participates in the National Dam Safety Program maintained by FEMA and the U.S. Army Corps of Engineers, which provides the county with dam safety research and training, and grant assistance opportunities to maintain dam safety. No improvements to Gloucester County's preventative measures against dam failure are needed.

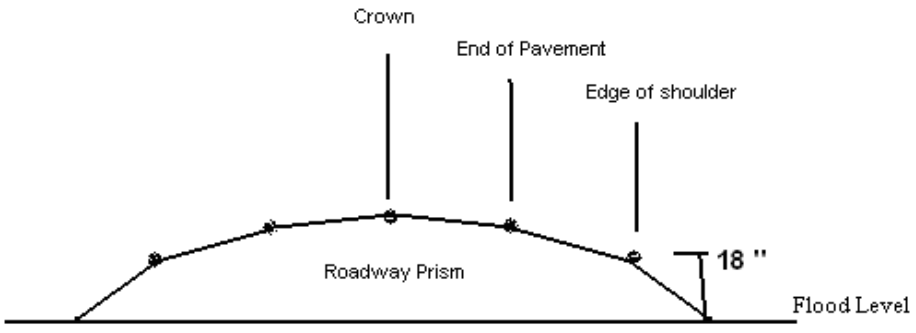
Recommendation 5.1a: The County should continue to regularly inspect the dam and perform regular maintenance, as well as continue to participate in the National Dam Safety Program.

5.1b Road Improvements

Gloucester County roadways are used as evacuation routes as well as the primary means for emergency responders to reach properties after coastal flooding events. Roadways damaged by coastal flooding can hinder emergency responders' ability to reach these areas. Roads in a flood zone can be damaged by floodwaters if they are built below prescribed levels of flood protection or without proper drainage (USDA, 1998).

What Has Been Implemented: The Virginia Department of Transportation (VDOT) utilizes specialized design criteria for protection of roadways against flooding. The Department's usual criteria are to have the lowest edge of the road shoulder elevated 18" above the prescribed level of flood protection (Figure 13). The prescribed level of protection are as follows: the ten year flood level for secondary roads, the 25 year flood level for primaries and arterials, and the 100 year flood level for emergency evacuation routes (VDOT, 2007).

Figure 13: Depiction of VDOT Prescribed Roadway Section

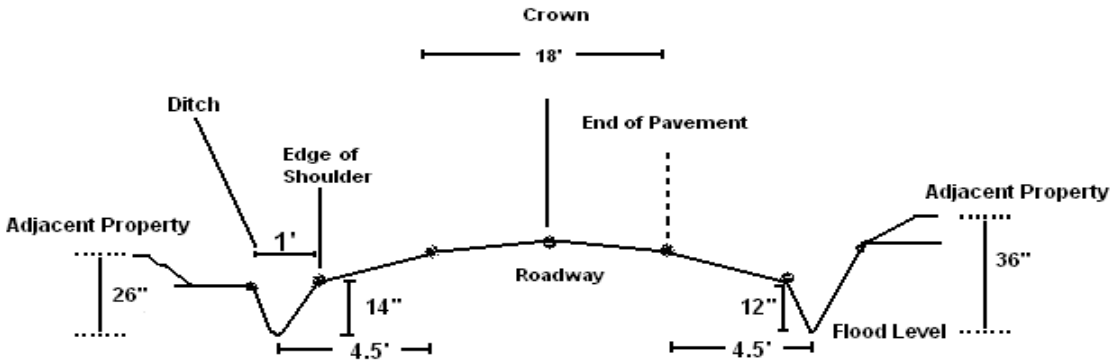


Source: VDOT, 2007

Under the Byrd Act of 1932, VDOT assumed responsibility for all the public roads in Gloucester County. The majority of roads in the county that serve coastal areas predate

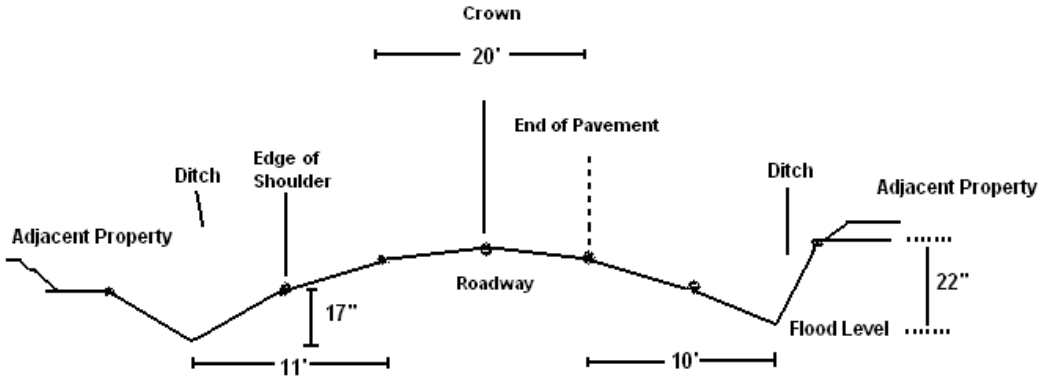
Gloucester County's FIS and FIRM which provide base flood elevations. Thus the exact identification of the appropriate flood level was not used to protect these roads. The figures below depict various road segments in the southeastern portion of the county, all of which are built differently than the prescribed roadway above (Figure 13). The figures below depict the variable lengths or lack of shoulders along the roadways, the variable depth or lack of ditching along roadways, and the height of adjacent property to that of the roadway's pavement.

Figure 13a: Depiction of Roadway Section at 2339 Low Ground Road



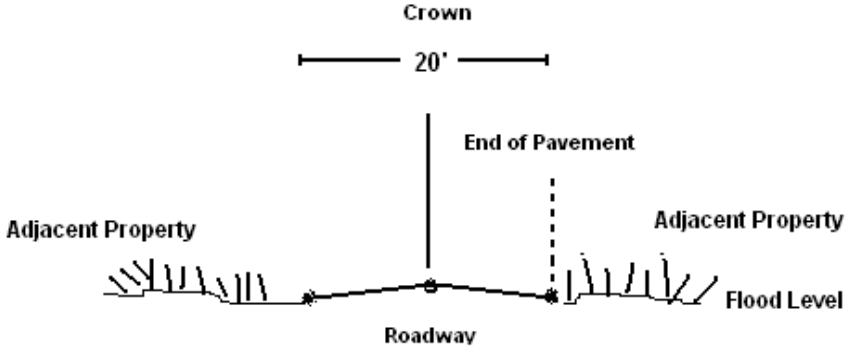
Source: Field Survey, 2009

Figure 13b: Depiction of Roadway Section at Haywood Seafood on Maryus Road



Source: Field Survey, 2009

Figure 13c: Depiction of Roadway Section at 10021 Maryus Road



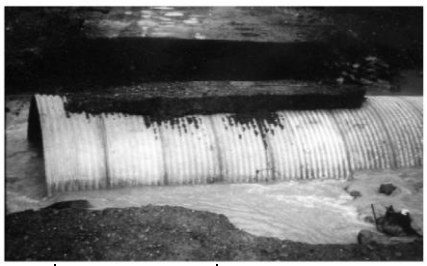
Source: Field Survey, 2009

VDOT also uses roadway drainage crossings to protect roads from flooding; these crossings divert tidal streams under roadways through culverts (Figure 14). This protection measure prevents tidal streams from eroding land the road is built on, avoiding damage to the road (USDA, 1998). Roadside ditches are used to drain rainwater from roadways (Figure 15). During the three community meetings many citizens commented on the amount of debris and sediment clogging the area's ditches, causing the flooding problem in the southeastern portion of the county to be exacerbated during coastal storms.

ge Crossing in the
tion of the County.

Figure 15: Roadside Ditch in the Southeastern Portion of the County.

Inadequate drainage problems arise when water volume surpasses the culvert's capacity, forcing water to either side of the culvert or over the road, causing erosion of the roadway segment (Figure 17), (USDA, 1998). Clogged culverts can hinder the performance of the roadway drainage crossings, causing damage to the road. Debris carried by floodwaters can become lodged inside or around the entry of the culvert, preventing water from flowing under the road (Figure 18). Water is then forced to either side of the culvert, or over the road, causing erosion and eventual damaging the road (USDA, 1998). When the flow of floodwaters is allowed to spread out laterally prior to entering a culvert, debris can accumulate and increase the chance of clogging the culvert (Figure 18), (USDA, 1998). Figure 17 is an example of a culvert inlet that is too wide, increasing the chance of clogging. In order to avoid clogging; the culvert's inlet basin should be designed to maintain the natural channel configuration of the stream, promoting debris passage through the culvert (Figure 18), (USDA, 1998).



f Damaged Roadway Drainage

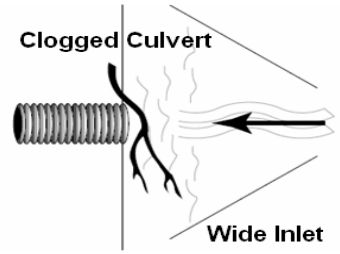
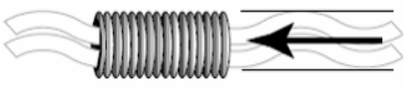


Figure 17: Example of a Clogged Culvert Caused by a Wide Inlet **Source: USDA, 1998**

Figure 18: Culvert Inlet that Maintains Natural Channel Configuration



Source: USDA, 1998

Recommendations for Improvement: VDOT is responsible for the maintenance of roadside ditches and culverts along and under state maintained roads. In many cases, receiving channels, sometimes called outfall ditches, are not maintained due to lack of easements. Many of these ditches have lost capacity over the years as they have been left to the impacts of natural processes. It is recommended that in order to maintain the overall capacity of culverts and ditches in the southeastern portion of the county that a drainage study be conducted identifying the current state of the linked system of roadside and outfall ditches. Such a study would generate the basis for a future maintenance program. The maintenance program will designate who is responsible for clearing ditches and culverts as well as establish who will pay for such services, and establish a schedule for appropriate maintenance. The possibility of utilizing incarcerated individuals from the County Jail to clear ditches should be considered. VDOT in combination with County officials should be involved in the preparation of this study and maintenance program.

Unfortunately, VDOT does not keep records of which roads flood and when. In an effort to identify the roads that are most vulnerable to damage from coastal flooding, road closure data was obtained from VDOT.[7] A seven year time frame (1999 – 2006) was considered because of the likelihood that the roads have not been structurally improved since 1999 and because of the relevance of the most recent storm events: 1999's Hurricane Floyd, 2003's Hurricane Isabel, and 2006's Hurricane Ernesto. During this time frame there has only been one road in the southeastern portion of the county (on one occasion) that has been closed[8] due to flooding damage - Rte. 649 (Maryus Road) from Hurricane Ernesto in 2006. There have been no other closures[6] in the southeastern portion of the county during the 7 year time frame. Per VDOT recommendation, Route 646 (Jenkins Neck Road) will be considered as a high risk road because it has flooding during every coastal storm event in recent years. For purposes of relevance road closure data for the rest of the county focuses primarily on roads that have been closed[6] on two or more occasions due to flooding during the seven year period (Table 7).

[7] The road closure data does not describe the cause of flooding; the information merely informs us which road segments experienced closures due to flooding and when they were closed.

[8] A road closure by VDOT is caused by damages to the road which make it impassable, such as washout. Closures caused by downed trees were not considered in this list, nor was a temporary "closure" caused by standing water considered in the list.

Table 7: Road Closures due to Flooding from 1999 - 2006

Rte.	Road Segment
605	Indian Road at Beaverdam Reservoir.
606	Farys Mill Road at Beaverdam Park second entrance.
610	Salem Church Road at the fourth bend.
614	Featherbed Lane at second bend.
614	Segment: Hickory Fork Road at Haynes Mill Pond. *(This road segment was fixed in 2006 and has not been closed since).*
625	Ditchley Drive nearest the North River.
662	Allmondsville Road at the bend.
1208	Greate Road at the boat landing.

Source: VDOT, 2007

What Has Been Implemented: According to VDOT, a triple line of pipe on State Route 649/Maryus Road was replaced in the summer of 2006 and the segment was elevated approximately one (1) foot. Also, in September of 2006 VDOT completed a construction project which relocated Route 614 from the Haynes Mill Pond dam to a bridge several hundred yards downstream. The road over the dam has not been officially abandoned, but it is blocked off and no longer in use. Other than the roads mentioned above, there have been no other major elevation improvements to the roadways in the county that have experienced damage from flooding since 1999. When a road segment is damaged by flooding; it initially receives an emergency repair, and later when funds become available is rebuilt to current VDOT standards.

Recommendations for Improvement - Due to the costs associated with road construction and the limited funds available each year, it is not currently feasible for the county or VDOT to implement structural improvements on each of these roads. Thus a priority listing was created to indicate which road segments should be improved before others. Priority was given to road segments that support the largest number of pre-FIRM structures in a flood zone. Most pre-FIRM structures were not built with flood-proof techniques and are vulnerable to flooding. The number of unmitigated pre-FIRM structures in each flood zone was obtained through county GIS maps and county property records. All of the roads in the study are secondary roads. Because Maryus Road and Haynes Mill Pond have received alterations in recent years, these roads were not considered in the priority list, the county should continue to monitor these roadways before and after a flooding event, if they continue to receive damage due to flooding they will be placed back on the road improvement priority list.

Road Improvement Priority List

1st Priority: Rte. 646 (Jenkins Neck Road)

The road supports over 100 structures, of which 90 are estimated to be pre-FIRM in a flood zone.

2nd Priority: Rte. 625 - Segment: Ditchley Drive nearest the North River

The road segment supports 65 structures, 27 are pre-FIRM in a flood zone.

3rd Priority: Rte. 662 - Segment: Allmondsville Road at the bend

The road segment supports ten structures; six are classified as pre-FIRM in a flood zone.

4th Priority: Rte. 614 - Segment: Featherbed Lane at the second bend

The road segment supports 15 structures; three are classified as pre-FIRM in a flood zone.

5th Priority: Rte. 610 - Segment: Salem Church Road at 4th bend

The road segment supports three structures; one is classified as a pre-FIRM in a flood zone.

6th Priority: Rte. 605 - Segment: Indian Road at Beaverdam Reservoir

The road segment supports eight structures; none are classified as pre-FIRM or in a flood zone.

7th Priority: Rte. 606 - Segment: Farys Mill Road at Beaverdam Park second entrance

The road segment supports no structures.

8th Priority: Rte. 1208 - Segment: Greate Road at the boat landing

The road segment supports no structures.

The roadway improvement priority list for Gloucester County is visually depicted in Figure 19.

To further address the road conditions of the southeastern portion of the county, VDOT staff was asked to determine the extent to which the area's roads must be raised to meet the agency's prescribed level of protection (see Appendix C). However, because there has been only one road closure[6] in the southeastern portion of the county (Maryus Road) during the last three hurricane events it appears the roads utilize adequate road drainage crossings. Maryus Road experienced a closure[6] from Hurricane Ernesto in 2006 because a roadway drainage crossing washed out during the storm. The exact cause of the washout is unknown; it could have been caused by lack of elevation, by inadequate drainage crossing, or by a blocked drainage crossing culvert.

According to VDOT's prescribed level of protection; Maryus Road should be elevated above the ten year flood level (see Appendix C). To structurally improve Maryus Road to withstand floodwaters, sections of the road that have been closed due to flooding should be elevated to VDOT's prescribed protection level of the 10-year flood level and the number and size of culverts under the roadway should be increased and properly designed to allow coastal flood waters to flow freely. As previously noted, VDOT has since replaced a triple line of pipe on Maryus Road and elevated the segment approximately one (1) foot. Continued monitoring of the roadway is needed, and if problems with flooding persist, additional structural improvement activities should be considered.

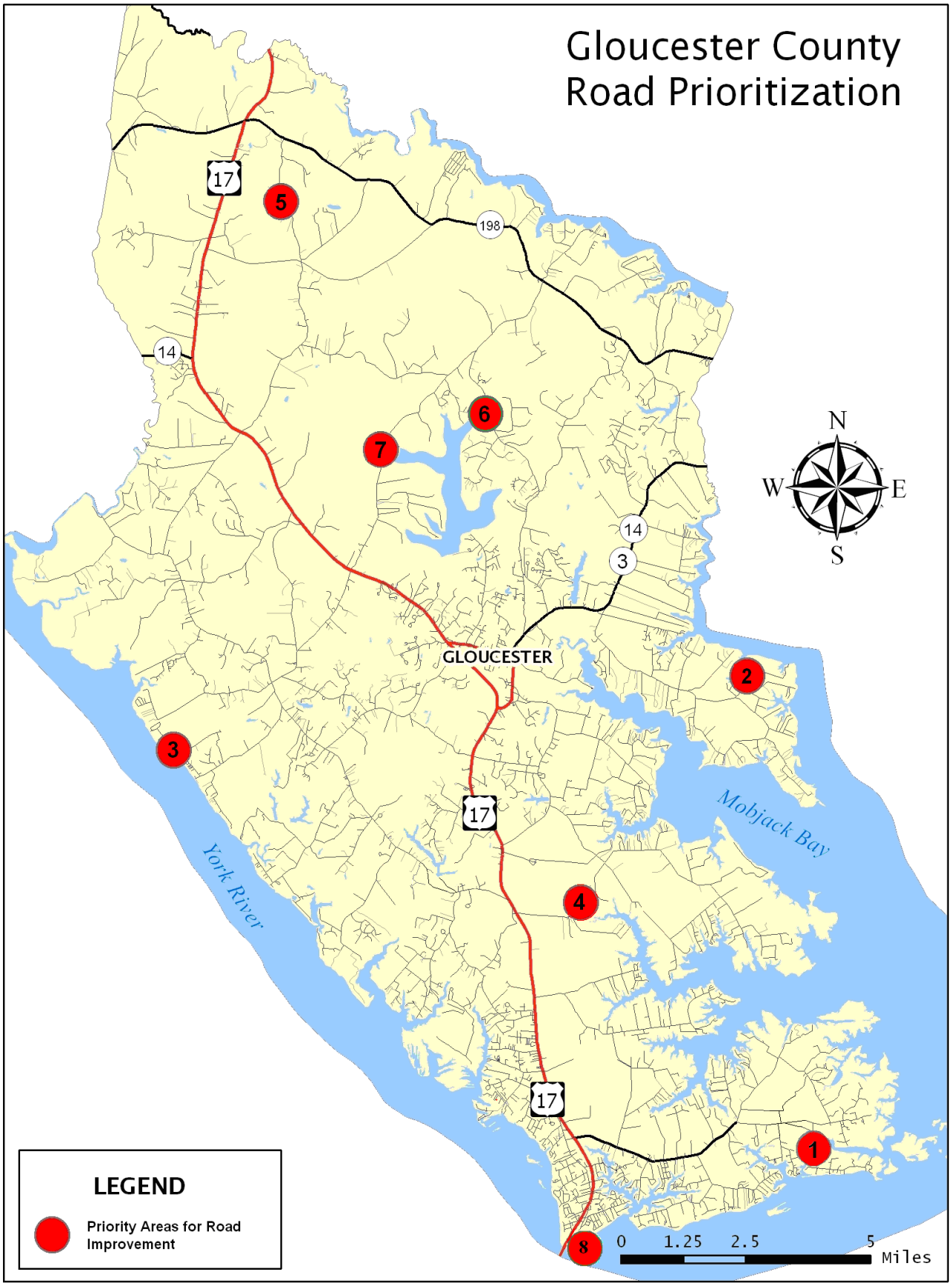

Gloucester County
Road Prioritization
17
198
14
5
6
7
14
3
GLOUCESTER
2
3
17
York River
Mobjack Bay
4
17
1
8
N
W
E
S
LEGEND
Priority Areas for Road Improvement
0
1.25
2.5
5
Miles

Figure 19

Source: County Base GIS layers were provided by United States Census Bureau.

Roadway Signage

It was expressed through citizen comment that there are many other roads in the county which have frequently flooded in addition to those which have been officially closed by VDOT. Low lying roads in the county become extremely dangerous or impassable as floodwaters rise. In some instances residents who are attempting to evacuate the area are forced to drive through standing water on flooded roadways. This is very dangerous and vehicles can easily loose contact with the road surface and hydroplane off the road or become buoyant and possibly be carried away by high waters. Various localities throughout the nation employ warning signs that measure height of water to warn drivers of water depths atop roadway surfaces. Similarly, in some areas the edge of the road may not be visually apparent when covered by a relatively shallow depth of flood water. In these cases, indicators marking the extent of roadway right of way would assist drivers with navigating down the centerline where the roadway crown would offer the preferable egress path.

What Has Been Implemented: Currently VDOT does not keep records of which roads in the county frequently flood. Nor does VDOT employ flood warning signs on frequently flooded roads before a storm event, but rather only after a flooding occurrence do they place temporary portable "Caution High Water" signs on roadways where standing water is reported after a flooding event.

The County has coordinated with VDOT to determine whether VDOT or the County will bear the cost to install and maintain the signs. A meeting was held on June 21, 2019 at VDOT's Saluda Residency.

Recommendations for Improvement: The County should keep detailed records of which roads in the county flood, how often and to what extent. Permanent signage should be placed along all frequently flooded roadways in the county. These signs should clarify the roadway alignment and warn of the flooding hazard as well as provide gauges that allow drivers to determine how deep standing water on the road's surface is (Figure 20).

Figure 20: Example of a Roadside Flood Gauge
Source: Google

Recommendation 5.1b1: Together with VDOT, the County should utilize the road improvement priority list as input to prioritize the allocation of scarce resources to projects that support the largest number of unmitigated pre-FIRM structures in the SFHA.

Recommendation 5.1b2: The County should continue to monitor State Route 649/ Maryus Road and if washouts from flooding persist should recommend that VDOT improve the road to withstand coastal floodwaters by elevating damaged sections and installing more appropriate roadway drainage crossings.

Recommendation 5.1b3: The County should develop a drainage study identifying the current state of the linked system of roadside and outfall ditches as input to the development of a ditch maintenance program for the southeastern portion of the county.

Recommendation 5.1b4: The County should keep detailed records of which roads in the county flood, how often and to what extent. This function should be performed by Emergency Operations Center staff when that function is operational.

Recommendation 5.1b5: The County should consider permanent road markers along frequently flooded roads marking the road's path in a submerged state and signage with gauges that indicate inundation extent that mark historical high water levels.

5.2 Preventive Activities

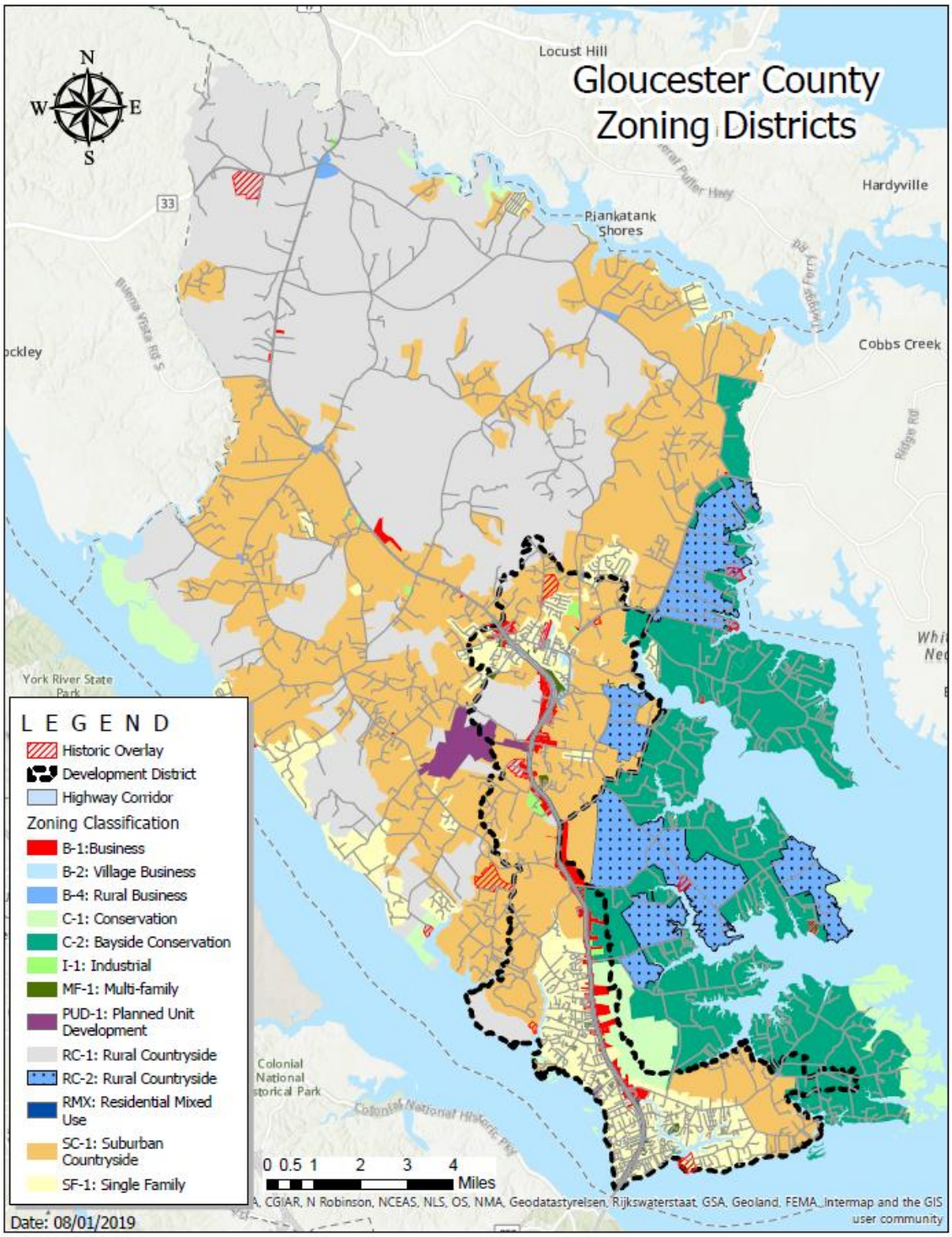
Preventative activities aim to minimize the amount of future development in the flood hazard area and prepare both pre-existing and new development in the hazard area to withstand flooding. Preventative activities can be implemented and enforced only by the local government (Des Plaines Engineering Department, 2002).

The following preventative activities have been implemented in Gloucester County:
a. Planning and Zoning
b. Building Regulations
c. Floodplain Development Regulations

5.2a Planning and Zoning

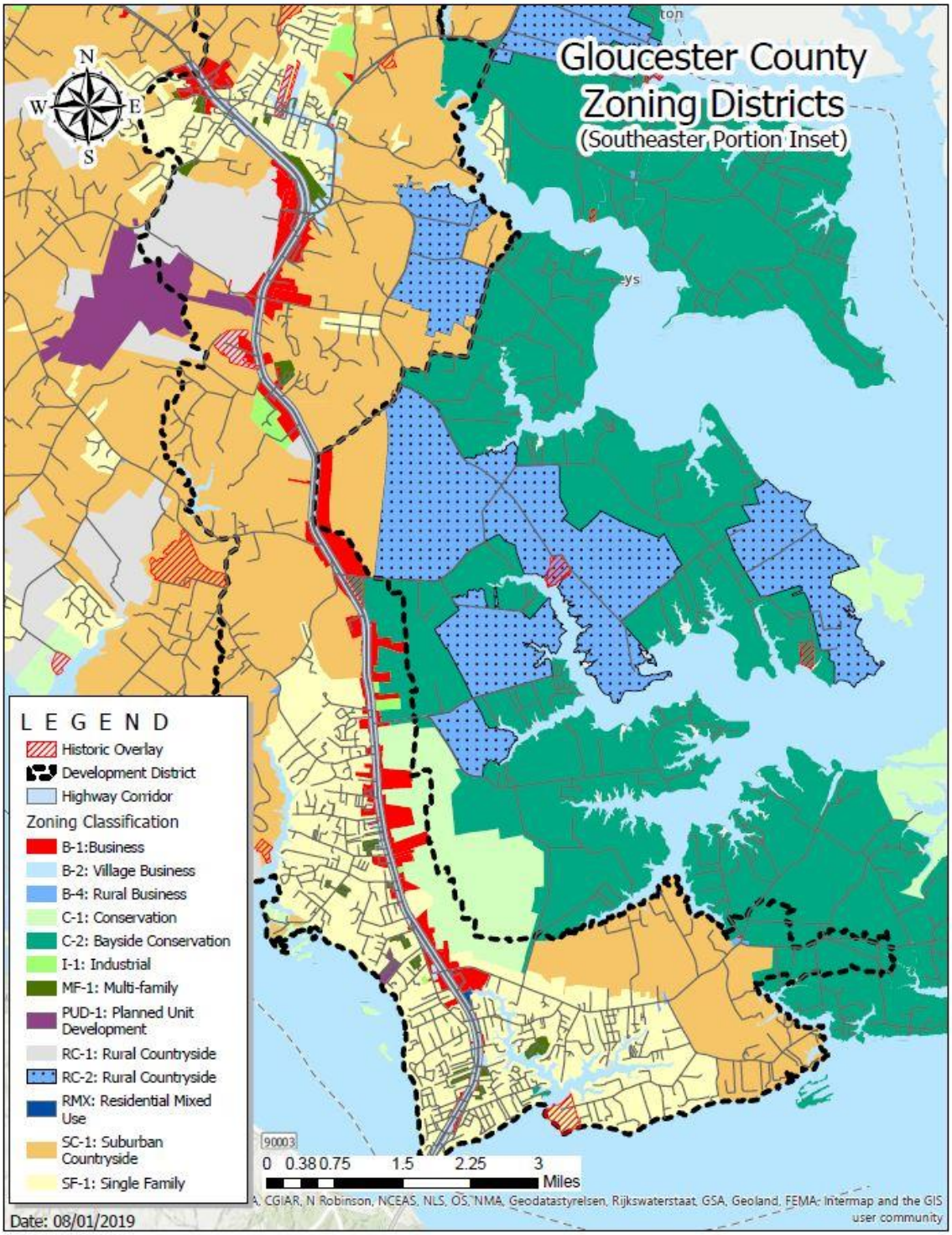
Gloucester's Comprehensive Plan was adopted in 1991 and has been updated numerous times, with the addition of the Natural Resources and Environmental Quality Chapter to comply with the Chesapeake Bay Preservation Act, the Dragon Run Special Management Plan and two Village sub-area plans. The county is currently updating the entire document however the major themes of the plan continue to be encouraging growth within the development district, preserving rural character where it exists, and protecting environmental resources. The county relies on the county's zoning ordinance to implement the plan through the establishment and enforcement of land use designations. The county's zoning ordinance was last broadly updated in 1998. Figure 21 depicts the zoning for the entire county and Figure 22 provides a more detailed view of the zoning for the southeastern portion of the county.

Figure 21



Source: County Base GIS layers were provided by United States Census Bureau and the County Zoning GIS layers were provided by Gloucester County Information Technology/ GIS Department.

Figure 22



Source: County Base GIS layers were provided by United States Census Bureau and the County Zoning GIS layers were provided by Gloucester County Information Technology/ GIS Department.

What Has Been Implemented: The zoning maps show that the vast majority of the county's flood-prone areas are currently zoned Conservation (C-1), Bayside Conservation (C-2), and Rural Conservation (RC-2), all of which limit residential development to low density development. Each of these designations has a minimum lot size requirement for new development and promotes clustering (Table 8).

Table 8: Zone Lot Size Requirement

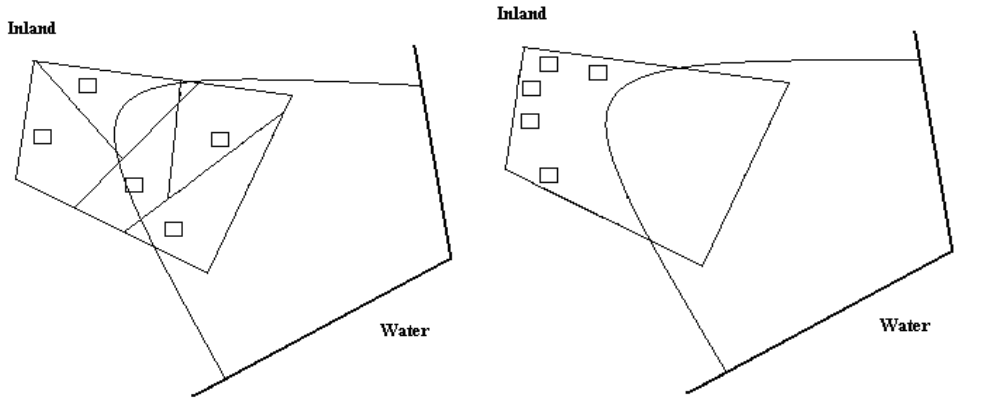
Zone	Lot Size Requirement
Conservation (C-1)	No new residential development permitted
Bayside Conservation (C-2)	One dwelling unit per 5 acres
Rural Conservation (RC-2)	One dwelling unit per 5 acres
Suburban Countryside (SC-1)	One dwelling unit per 2 acres
Single Family Residential (SF-1)	One dwelling unit per 2 acres *(without sewer & water)*
Single Family Residential (SF-1)	Two dwelling units per acre *(sewer & water)*

Source: Gloucester County, 2014 Zoning Ordinance

The minimum lot size and density requirements help to limit the number of houses in the area. During major coastal flooding fewer structures in the flood-prone area means less potential for damage.

The county's Comprehensive Plan encourages clustering in each of these zones to protect the area's scenic and environmental features through the preservation of open space and to facilitate floodplain management activities. Clustering can be used to protect structures that develop within various portions of the county's flood-prone area (National Research Council, 2006). For properties located further inland but still within a flood-prone area, clustering can prevent damage to structures by locating them on higher ground. Rather than subdividing a 25 acre lot into 5 acre sub lots where multiple properties would sustain damage during minor flooding events, clustering can keep most of the 25 acre lot undeveloped and allows owner to sell development rights to five potential home owners who can cluster their houses on the highest area on the 25 acres (Figure 23). This helps avoid flood damage for all of the properties built on the original lot.

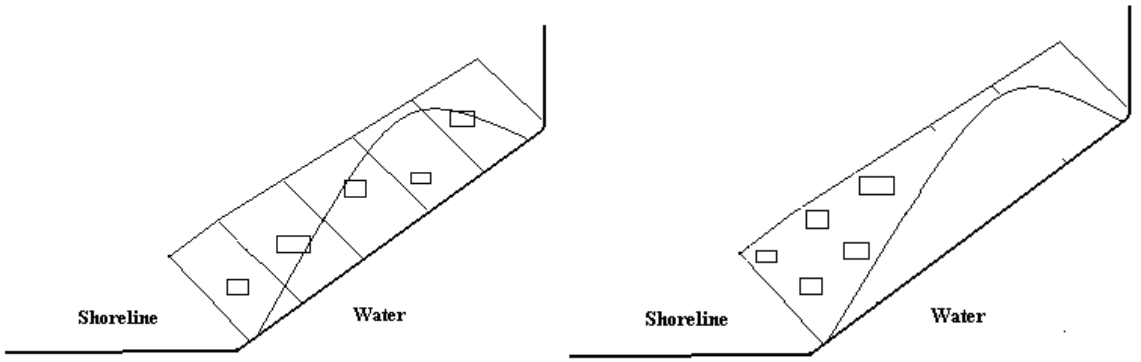
Figure 23: Clustering Inland



Typical Lot Subdivision **Residential Cluster Lot**

Figure 24 shows how clustering can protect structures developed on the coast by building structures in reduced wave hazard areas on the lot.

Figure 24: Clustering on the Coast



Typical Lot Subdivision **Residential Cluster Lot**

During major coastal flooding events within the county, such as a Category 2 Hurricane surge, the complete inundation of the southeastern portion of the county is likely and thus clustering does not provide as much a benefit to development than during minor flooding events.

Recommendation 5.2a: The County should continue to zone for low density residential development and encourage residential clustering within flood-prone areas.

5.2b Building Regulations

The implementation of flood-resistant building regulations for new construction can create safer communities across the county. These standards include criteria to protect buildings from forces of nature associated with hurricanes, such as high winds and heavy rainfall (Des Plaines Engineering Department, 2002).

What Has Been Implemented: The Virginia Uniform Statewide Building Code (USBC) prescribes mandatory building regulations for construction, maintenance, grading and proper drainage of structures to prevent water damage to the building. Gloucester County Building Inspectors conduct regular inspections throughout the construction process, including foundation, exterior and interior framing, electrical, and plumbing (Gloucester County, 2007).

The county's Subdivision Ordinance governs how land may be subdivided into individual lots and mandates subdivision standards and procedures in regards to the construction, location and infrastructure that will serve the lots, including sidewalks, utility lines, and drainage ways (Gloucester County, 2014). Gloucester County building regulations are governed by state law and are adequate.

Recommendation 5.2b: Gloucester County should continue to enforce building regulations throughout the county.

5.2c Floodplain Development Regulations

The National Flood Insurance Program (NFIP) sets minimum standards for participation in the program. The majority of the provisions are in the county's building code and subdivision ordinance. Others are accounted for in the county's Floodplain Management Ordinance, which was first adopted in 1987 to manage present and future development in flood-prone areas. The County's ordinance is currently under review and revision to

reference and incorporate a new FIS and FIRM that will become effective on November 19, 2014.

What Has Been Implemented: The Ordinance delineates and describes eight flood districts (Figure 9) and general development provisions for each (Table 9). The Ordinance also mandates a permit requirement and a Design Flood Elevation (DFE) requirement for all development in a flood zone (Gloucester County, 2002).

Table 9: Development Provisions for Flood Districts

Zone	Inundated by 100 year Flood	Base Flood Elevations Shown	Flood Insurance Mandated by Lenders
AE	Yes	Yes	Yes
A	Yes	No	Yes
AO	Yes	No	Yes
Coastal A (LiMWA)	Yes	Yes	Yes
VE and V	Yes	Yes	Yes
X and X500	No	No	No

Source: Gloucester County Floodplain Ordinance, 2014

The development provisions establish general and specific requirements for all development in each flood district according to the type of flooding that the area is expected to encounter. The development provisions for zones V and VE establish where and how to build the structure in order to avoid damage from wave action, while provisions for zones A, AO, and AE establish how to build the structure in order to avoid still-water flooding (see 5.3a Elevation and Acquisition Projects section of this plan for additional details on building provisions). Construction standards in the Coastal A zone may either be consistent with those or A/AO/AE or V/VE. The Floodplain Management Committee recommended the latter at their June 4, 2014 meeting. Taking this action provides additional CRS points and better protect structures in the area where moderate wave action is predicted. The Gloucester Board of Supervisors approved the enhanced construction standards for Coastal A zones in September of 2014.

Building permit requirements mandate the identification of each proposed structure's lowest flood elevation, existing ground elevation, and the 100 year flood elevation. The permit also requires identification of the method for elevating the proposed structure above the Base Flood Elevation (BFE). These requirements help County officials keep track of development in the flood zone.

The Gloucester County Design Flood Elevation requirement mandates that all new construction and substantially damaged structures (those facing restoration costs of up to 50% of the total value of the structure before the damage occurred) in a flood zone be elevated at least two additional feet above BFE. This requirement exceeds the NFIP's minimum standard by requiring the additional two feet, and helps to better protect new development from the type of flooding the county experiences. (See 5.3a Elevation and Acquisition Projects section of this plan for additional details on benefits of elevation.) No improvements to Gloucester County's Floodplain Management Ordinance beyond those currently in process are needed.

Recommendation 5.2c: The county should continue to require and enforce the provisions of the Floodplain Management Ordinance. To provide increased protection, consideration should be given to requiring V/VE zone construction standards in the Coastal A zone.

5.3 Property Protection Activities

Property protection activities consist of modifications of pre-existing structures to protect against flood damage. Most activities are managed and funded by individual property owners, but local government can encourage property protection activities by seeking financial assistance for the community through government grant programs (St. Tammany Parish, 2004).

Property protection activities in Gloucester County have been implemented through:
a. Elevation and Acquisition Projects
b. Purchasing Flood Insurance

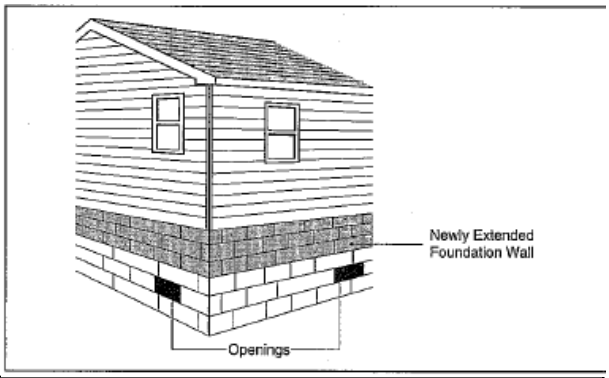


Figure 26: Typical Residential Elevation within an AE and E Zone **Source: FEMA, 1994**

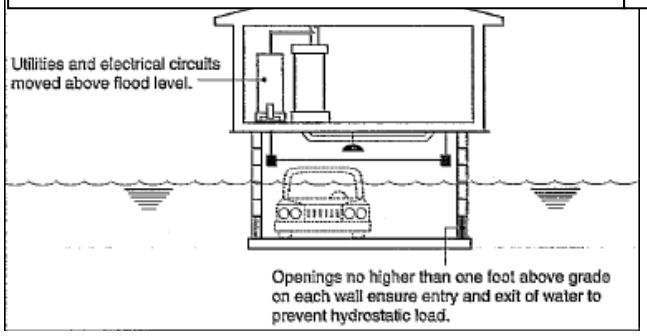


Figure 25: Typical Residential Elevation within a VE and V Zone **Source: FEMA, 1994**

5.3a Elevation and Acquisition Projects

Structural elevation can reduce or eliminate future flood damage, lower flood insurance premiums, add value to the house, and increase parking and storage space in the house. The elevation method applied to a structure depends on the flood zone designation. If a structure is located in an area with high wind velocity and wave action (VE and V zone and possibly the Coastal A zone depending on local ordinance), elevating can be done only through the use of columns or piles which are embedded sufficiently below the soil to withstand erosion (Figure 25). This allows water and floating debris to flow under the structure, thereby avoiding structural damage (FEMA, 1994). If a structure is located in an area with potential for only low to moderate water depth and velocity (AE, AO, or A zone) elevating above the BFE may only require raising the structure using a solid wall elevation technique (Figure 26). This technique uses steel supports to raise the structure and then extends the foundation walls. However, the enclosure area under the building

must have openings to allow for the entry and exit of flood waters to avoid hydrostatic forces which could cause the structure to collapse (FEMA, 1994). Both of these techniques can also be used to elevate pre-existing structures above the BFE. Gloucester Volunteer Fire and Rescue Squad has warned that their current equipment is limited in flood related scenarios with structures elevated over 30 feet. They currently have an aerial device which has a height of 95 feet, however in areas affected by flood this apparatus may not be able to respond due to terrain and the weight from the vehicle. If there were a situation that would require them to perform a rescue from a residence the longest ground ladder they carry is 35 feet in height. They ask that when or if structures are raised that the highest window not exceed 30 feet for rescue purposes.

What Has Been Implemented: The elevation and acquisition of properties significantly reduces flood damage to new and pre-existing development in the flood zone. Unfortunately, both are very costly endeavors. For residents who cannot afford the costs associated with these mitigation techniques, the county actively pursues and organizes grant funding opportunities, when funding is available. As an eligible community under the FEMA Hazard Mitigation Grant Program (HMGP), the county can apply to receive funding for the acquisition, demolition, and elevation of damaged structures after major coastal storms hit the area. The amount of funding received through the program is determined by the amount of damage sustained during the event and the strength of the grant proposal. Residents who are interested in receiving financial assistance to elevate their home can place their name on a list that the county refers to when considering which properties to offer a slot on the grant proposal. The county has an active and on-going Hurricane Residential Recovery Program in the southeastern portion of the county. The county has successfully applied for and received grant funding from HUD/VDHCD as well as FEMA/VDEM to implement the program.

A HUD/VDHCD Grant was awarded to Gloucester under the Urgent Needs Grant Program after Hurricane Isabel in 2003. This $700,000 grant was used to elevate and reconstruct seven (7) homes in the SE portion of the county. These properties did not receive new foundations but rather new walls, kitchens and electrical.

There have been six (6) rounds of Hazard Mitigation Assistance (HMA) Funds awarded to the county through the FEMA/VDEM Hazard Mitigation Grant Program. These were awarded after Hurricane Isabel, Tropical Storm Gaston, Tropical Storm Ernesto, Nor'Ida, and the winter 2010 storms to once again repair damage to the SE portion of the county.

The post Hurricane Isabel FEMA Hazard Mitigation Grants amount to just over $11,000,000 expended over twelve (12) phases. There were a total of 108 properties approved for assistance. Through July 2014, fifty seven (57) houses have been elevated and twenty two (22) other properties have been purchased and the houses on them demolished. Twenty two (22) additional houses await elevation and seven (7) properties are pending sale to the county

The County has hired , Summit Design & Engineering Services, PLLC to write the grant application and to manage these projects once funded. The county plans to pursue additional grant funding opportunities to continue with the residential mitigation activities.

5.3b Purchasing Flood Insurance

Flood insurance is not a strategy to avoid flood damage; it merely helps offset the costs of repairing or rebuilding a property after flood damage has occurred. The purchase of flood insurance is a smart investment for any home owner. It has been reported that select private insurance companies are "blue lining" the Tidewater area for flood insurance. Allstate has recently stopped writing new flood insurance policies in 19 coastal communities: Accomack, Gloucester, Isle of Wight, King and Queen, Lancaster, Mathews, Middlesex, Northumberland, Northampton, Southampton, Surrey, Sussex, York counties and Chesapeake, Franklin, Hampton, Newport News, Norfolk, and Virginia Beach. Nationwide is also withdrawing from any new coastal coverage in Gloucester, Mathews, areas in Middlesex, and areas in Essex. State Farm reportedly will not write new flood insurance policies within one mile of shoreline. These three private insurance companies make up 55% of the private insurance market in Mid-Atlantic Region (Middle Peninsula Planning District Commission, 2009).

What Has Been Implemented: In 1987, Gloucester became a participating community in FEMA's National Flood Insurance Program (NFIP). This participation enables citizens to obtain federally backed flood insurance for their properties based on the property's location. As a participating member of the NFIP, Gloucester became eligible to join the CRS program and currently holds a Class 6 rating leading to a 20% flood insurance premium discount. While participation in the program is voluntary, the benefits for citizens are great. The county currently has approximately 1,528 flood insurance policy holders (Middle Peninsula Planning District Commission, 2005).

Recommendations for Improvement: To gain further reductions in flood insurance policy premiums the county must gain credits that will qualify the locality for a lower CRS rating. One way to maintain CRS credit is through the maintenance of this floodplain management plan for the county, which describes ways to improve existing flood mitigation techniques. One way to gain additional CRS credit is to require V/VE zone construction standards in the Coastal A zone.

Recommendation 5.3b: The County should readopt this Coastal Floodplain Management Plan at least every five years to help strengthen the community's mitigation activities as well as lower insurance premiums for policy holders. The County should also consider requiring heightened construction standards in the Coastal A zone.

5.4 Public Information Activities

Conducting public information sessions and providing citizens with all available information relating to the hazards and protection measures will help strengthen the community's overall resistance to flood hazards through increased public awareness. There are many ways that community leaders can get both general and property specific information to citizens.

Public information activities in Gloucester County have been implemented through:
a. Community Educational Outreach Projects
b. Public Libraries and the County Website
c. Technical Assistance and Map Information

5.4a Community Educational Outreach Projects

Community educational outreach projects are run by the county and meant to provide citizens with general flood hazard information. The projects encourage citizens to take an active role in educating themselves of their property's flood hazards so that they may take the necessary steps to protect themselves and their property from flooding.

What Has Been Implemented: Gloucester County Departments of Community Education and Emergency Management work with various County Offices that have been tasked with specific outreach projects in order to administer a comprehensive community information, education, and involvement program, which consists of the following:

- An informational telephone helpline, which is operational during hurricanes and other local emergency situations (Organized by the Department of Emergency Management).
- An annual flood hazard awareness campaign throughout the community (Organized by the Department of Emergency Management and Building Inspections).
- The publication of informational brochures and fliers for special county meetings and forums related to flooding (Organized by the Department of Emergency Management).
- The development of the *Citizens Preparedness Guide* (a free seasonal hurricane preparedness guide that provides citizens with general information of the area's coastal flooding hazard, how to prepare for a hurricane, and what to do after a hurricane), (Organized by the Department of Emergency Management).
- The Community Emergency Response Team (CERT) program that educates citizens about disaster preparedness for hazards that may affect their area. It trains citizens in basic disaster response skills such as fire safety, search and rescue, team organization, and disaster medical operations. It also encourages its members to take an active role in their community by participating in emergency preparedness projects (Organized by the Department of Emergency Management).
- An annual hurricane preparedness exposition, which involves local radio stations, businesses (such as Wal-Mart, Lowes, and Home Depot), and county citizens. Each business is responsible for providing in-store displays with preparedness items and educational posters demonstrating techniques and materials that can retrofit a home to decrease or avoid flood damage (Organized by the Department of Emergency Management).
- Annual hazard awareness campaigns throughout the community, in relation to fires, hurricanes, and tornados (Organized by the Department of Emergency Management).
- Emergency information updates for severe weather and natural disasters (Organized by the Department of Emergency Management).

Recommendations for Improvement: The existing educational outreach programs effectively utilize outreach media to provide general flood safety and preparedness

information to the public. The county should strengthen its program by specifically targeting property owners in flood zones with a specialized educational program that provides detail specific information relating to property protection, flood safety and flood insurance. The program should be aimed at educating and motivating the average property owner in the flood zone to investigate and implement property protection techniques. The program should highlight examples of property protection techniques that have been implemented in the local area (success stories). The program should identify and resolve common misunderstandings that many property owners in the flood zone may have. By providing specialized information to residents in the flood zone the county can help lower the amount of damage in the flood zone. One way to organize enhanced public outreach is through a "Program for Public Information" (PPI) as defined by the CRS program, which program provides for a broad based public information dissemination strategy.

Recommendation 5.4a: The County should continue to send an annual mass mailing (in the Beehive) with specialized information relating to property protection, flood safety and flood insurance to owners of property in flood zones. The County should also consider creating a Program for Public Information.

5.4b Public Libraries and the County Website

Public libraries and the Gloucester County website are key resources for both general and property specific information on flood hazard preparation and mitigation.

What Has Been Implemented: The public libraries in Gloucester County maintain an array of books on hurricanes, flood hazards, flood safety, and flood mitigation techniques. A search for "flood" and related topics in the Gloucester County Public Library's catalog found seven references that would be of use to property owners seeking information on flood mitigation techniques, and additional titles provided general information on various types of natural disasters and historic flood information throughout the United States.

The county maintains an official website that gives citizens 24 hour access to the homepages of every department and service in the locality. The website has extensive hazard-related educational materials for citizens, including:

- Gloucester Connection Email News Service (A free county email news service that alerts citizens about Emergency Management and Community Education programs).
- Links to local travel alerts, weather, and tidal readings.
- Emergency preparedness information (online brochures and handouts).
- Emergency resource links for children and seniors.
- A link to Gloucester County Television Channel 48 (Local Government Channel).
- The *Citizens Preparedness Guide (*seasonal hurricane preparedness guide).
- The *Middle Peninsula Hazards Mitigation Plan* (describes all natural hazards in the area).
- This Floodplain Management Plan

The County webpage also boasts an impressive web-based Geographic Information System (web-GIS), maintained by the Department of Information Technology/GIS. The web-GIS is a computer map-making application that allows anyone with computer access to obtain information on any property in the county. Notably, this application allows users to create detailed maps relating to parcel and structure location, hurricane surge, flood zones, topography, and aerial photography. These features enable the general public to take an active role in educating themselves about the flood risk in their area.

Recommendations for Improvement: Residents in Gloucester County need a central location where they can get all the information they need to prepare for flooding events caused by severe weather. One potential solution is for Gloucester County libraries to host a permanent educational flood preparedness display with printed educational material relating to flooding in the area. The display should have hard copies of all the material available online including county surge maps and flood zone maps, and the Beehives' Citizens Preparedness Guide. Public flood hazard education sessions may also be held at the libraries. In addition, the library could pull all books related to flood preparedness from normal circulation and group them with the display as reference items not available for check-out, allowing residents to have continued access to these books.

Recommendation 5.4b: The County should adopt a central location where general information on flood preparedness, flood insurance, and floodplain management is easily accessible to the public in a hard copy format.

5.4c Technical Assistance and Map Information

Providing citizens easy access to property specific flood hazard information increases the community's overall awareness of potential flood hazards and may motivate property owners to take steps to mitigate their property against flood hazards. However, this information is useless if community members cannot understand its technical jargon or easily access it on-line. Therefore technical assistance opportunities are a vital part of disseminating property-specific information (St. Tammany Parish, 2004).

What Has Been Implemented: County residents in search of property specific flood hazard information can utilize the FEMA Flood Insurance Rate Map (FIRM), which are located in the Building Inspections Office at the Gloucester Courthouse area as well as available online. For assistance interpreting the FIRM, citizens can contact staff in the Building Inspections Department. Citizens can rely on library resources and County officials in the Building Inspections Department as a starting point for ideas and suggestions on various retrofitting strategies specific to their property. Building Inspections staff visit properties in the community and offer suggestions for improvements.

Recommendations for Improvement: Gloucester County currently provides basic technical assistance for citizens seeking FIRM interpretations and retrofitting ideas, but there is little advertisement of these services. With proper advertisement, these services will be more extensively utilized by citizens seeking property-specific information, helping them to take steps to make their properties and the community more resistant to flood hazards. This could be bolstered by the development of an official Program for Public Information (PPI).

Recommendation 5.4c: Gloucester County should advertise the technical assistance opportunities it provides in relation to flood mitigation and preparedness, preferably in the

same central locations where other flood-hazard information is available, as suggested in Recommendation 5.4b.

5.5 Emergency Service Measures

Emergency service measures are designed to protect life and property in the event of a disaster or crisis situation. This plan is primarily interested in the emergency service measures which protect property.

Emergency service measures have helped strengthen the community's resistance to flood hazards through:
a. Hazard Identification
b. Warning

5.5a Hazard Identification

The local community relies on the Emergency Management Department and the National Weather Service to identify the time, location and severity of projected flooding in Gloucester County. Through advanced hazard identification emergency services can prepare citizens to take the appropriate actions to minimize the loss of property due to extreme conditions (St. Tammany Parish 2004, 7-12).

What Has Been Implemented: Hurricanes, tropical storms, and nor'easters are identified and tracked by the National Oceanic and Atmospheric Administration (NOAA) National Hurricane Center in Miami, Florida with local interpretation provided by the National Weather Service office located in Wakefield, Virginia. The Emergency Management Department considers available information to determine how severely projected weather patterns will affect the community. The Department utilizes local tide tables, online tide projections, and a computer modeling program, SLOSH (Sea, Lake, and Overland Surges from Hurricanes), to run surge models based on information from the NOAA's National Hurricane Center.[9] The model runs help staff identify the areas of the county most likely to be affected by coastal flooding from specific storms. No improvement to Gloucester County's hazard identification process is needed.

Recommendation 5.5a: The County should continue to utilize its hazard identification process.

5.5b Warning

Once a possible flooding threat has been identified, the public must be warned. Proper precautions or evacuations can then be taken to prevent or decrease loss of life and property. Advanced warnings of oncoming seasonal coastal storms can provide residents with additional preparation time that may be utilized to install or properly prepare any last minute property protection measures.

[9] Gloucester utilizes tidal readings from 4 tidal stations; the Mobjack Bay station (NOAA), the Yorktown United States Coast Guard (USCG) Training Center station (updated every 4 hours), the Sewell's Point station (updated every 8 hours), and the Chesapeake Bay Bridge tunnel station (updated every 8 hours). Notably Virginia Institute of Marine Science (VIMS) station on Oyster Point Pier provides "real time" readings (updated every six minutes). The County is working with the United States Geological Survey (USGS) to install a new tidal station within the Mobjack Bay area.

What Has Been Implemented: The National Weather Service can issue either a Hurricane Watch (hurricane conditions within 36 hours), or a Hurricane Warning (sustained winds >74 mph expected within <24 hours) (NOAA: NWS). More specific warnings are communicated by Emergency Management staff. Gloucester County utilizes a mass notification system, "Code Red" that allows quick and targeted contact with citizens via home telephone and mobile telephone (where citizens opt-in) to alert them of what they need to do to be safe in the event of an emergency. The mass notification system is a hosted solution with designed redundancy to ensure full time functionality. In the event an enhanced level of citizen notification is needed, the local fire stations, Sheriff's Office, and a volunteer citizens group (CERT) can provide the manpower to make door to door notification possible, provided their number of available manpower allows for it. Bay Aging (a nonprofit organization that supports elderly citizens in the community) participates in door-to-door checks of elderly citizens and organizes a program to bring food to elderly citizens who choose to stay at home during evacuations.

Gloucester County participates in the Emergency Alert System (EAS). This system is a network of AM and FM radio and television stations that can be activated in case of an emergency. Local news stations are great resources before, after, and during a storm. They provide up-to-date information that, unlike the internet, is accessible to the majority of the public.

Recommendations for Improvement: The County's existing emergency warning system relies on home telephone, mobile telephone (where citizens opt in), television, radio, email, and door-to-door service as its primary means to warn citizens of pending severe weather. For many citizens home telephone lines have become a thing of the past due to the decreasing costs of mobile phones and the increasing need to communicate on the go. The county can strengthen its mass notification process by more broadly advertising the availability of citizen opt-in to mobile phone notification. By providing additional opportunities for citizens to receive early warnings of seasonal coastal storms citizens will have more time before the storm arrives, which can be used to implement any last minute protection measures to their homes.

Recommendation 5.5b1: The County should increase awareness of the existing mobile phone mass notification system and the fact that citizens must opt-in to the program if they want to be contacted through this medium.

Recommendations for Improvement: The originally adopted Floodplain Management Plan included a recommendation to install an outdoor emergency warning system based on sirens (with loud speaker capability) in areas of frequent congregation throughout the community. Given the improvements made with mobile phone mass notification and the gradual nature through which coastal flood hazards are forecasted and become apparent, a siren system is no longer recommended.

5.6 Natural Resource Protection

Natural resource protection is a special type of mitigation activity that aims to preserve or restore natural areas through regulations. These regulations may indirectly benefit floodplain management activities in flood hazard areas (Des Plaines Engineering Department, 2002).

What Has Been Implemented: Gloucester County adopted the Chesapeake Bay Preservation Ordinance in 1991 as a response to the Chesapeake Bay Preservation Act (CBPA). The CBPA is a land use management program that aims to reduce sediment and pollution emptied into the bay through runoff from bordering lands. All of Gloucester County has been designated a Chesapeake Bay Preservation Area, due to its proximity to the Bay. The ordinance requires development in the county to meet certain performance standards that aim to minimize the type and the amount of runoff that goes into the bay. The ordinance designates areas of the county nearest the shoreline as Resource Protection Areas (RPA). The ordinance also designates Resource Management Areas (RMA) that buffer the RPA. The RMA is located landward and adjacent to the RPA, and includes all other land in the County including areas with highly erodible soils, steep slopes, highly permeable soils, and non-tidal wetlands. These are land areas most prone to erosion, flooding, and groundwater contamination as a result of improper development (Gloucester County, 2005).

The ordinance requires a 100 foot RPA buffer zone along all shorelines. The 100 foot buffer requirement acts to restore the natural functions of the floodplain and indirectly helps to minimize flood damage to new development along the coast, by forcing new development to occur further from the shoreline and from potential wave action and tidal flooding.

The ordinance aims to improve environmental health by requiring the preservation of vegetation along the coast. The ordinance recommends that native vegetation should be retained wherever practical, and new plants should be introduced in locations that will be most affected by runoff. By mandating that vegetation be preserved along the coast the ordinance helps prevent erosion and sedimentation in case of a flood (FEMA, 1994). These buffers help to slow storm water runoff and protect against shoreline erosion. Other notable ordinances linked to the Chesapeake Bay Preservation Area Ordinance are the Erosion and Sediment Control Ordinance, which establishes requirements for the control of erosion and sedimentation in the county, the Wetlands Zoning Ordinance, the Coastal Primary Sand Dune Zoning Ordinance, and the Storm Water Ordinance (effective July 1, 2014). The ordinances guide development including requiring, in some cases, storm water maintenance agreements.

Recommendation 5.6: The County should continue to enforce the Chesapeake Bay Preservation Area Ordinance, the Erosion and Sediment Control Ordinance, the Wetlands Zoning Ordinance, the Coastal Primary Sand Dune Zoning Ordinance, and the Storm Water Ordinance.

6. ACTION PLAN

Chapter 2 defines the flood problem that the county faces. Chapter 3 analyzes the county's vulnerabilities. Chapter 4 sets two overall goals and five objectives for this plan and Chapter 5 describes existing mitigation strategies and recommendations for effectively achieving these goals. This chapter describes a plan of action for implementing the recommendations.

Goal 1: Protect public and private property from damage caused by coastal flooding hazard.

Objective 1.1: Prevent roadways in the County from being damaged during coastal flooding.

Recommendation 5.1b1 (Structural Improvement Activities): Together with VDOT, the County should utilize the road improvement priority list as input to prioritize the allocation of scarce resources to projects that support the largest number of unmitigated pre-FIRM structures in the SFHA.

Department Responsible: County Administration, Planning & Zoning and Emergency Management

[Tasks]

1) The County Administration Department, Planning & Zoning Department and Emergency Management Department should coordinate with the VDOT Residency Office and the Board of Supervisors to allocate transportation funds towards road repair for prioritized roads (when funds become available). The County and VDOT should seek non-traditional funding sources for this work recognizing that the transportation improvements provided, from a capacity perspective, do not compare favorably with alternative secondary road upgrade needs in the County.

Time Table: Ongoing
Budget Impacts: Minimal staff time

Recommendation 5.1b2 (Structural Improvement Activities): The County should continue to monitor State Route 649/ Maryus Road and if washouts from flooding persist should recommend that VDOT improve the road to withstand coastal floodwaters by elevating damaged sections and installing more appropriate roadway drainage crossings. This will help ensure emergency responders can gain access to 276 pre-FIRM structures built in the SFHA after a major coastal flooding event.

Department Responsible: Emergency Management

[Tasks]

1) Continue to monitor State Route 649/ Maryus Road during future storm events.
2) If needed the County Administration Department and the Emergency Management Department should coordinate with the VDOT Residency Office and the Board of Supervisors to allocate transportation or emergency management funds towards repairing Maryus Road to VDOT's current Secondary Road Standards.
3) VDOT should perform a road elevation and drainage study on the road to determine the specifics of needed improvements.

Time Table: Years 1 & 2
Budget Impacts: Minimal amount of staff time
Transportation Budget

Recommendation 5.1b3 (Structural Improvement Activities): The County should develop a drainage study identifying the current state of the linked system of roadside and outfall ditches as input to the development of a ditch maintenance program for the southeastern portion of the county. This will help residents in flood prone areas of the County safely utilize the roadways within their community during normal storm events as well as provide additional time for evacuation during the days before a coastal storm event.

Department Responsible: Engineering, Environmental Programs, Emergency Management, and Planning & Zoning

[Tasks]

1) The Engineering Department should coordinate with other County departments and the VDOT Residency Office and the Board of Supervisors to determine how best to develop and fund a drainage study as the first step towards developing a ditch maintenance program that meets VDOT standards and adequately addresses the concerns of citizens in the area.

Time Table: Years 1 & 2
Budget Impacts: Minimal amount of staff time
Transportation Budget

Recommendation 5.1b4 (Structural Improvement Activities): The County should keep detailed records of which roads in the county flood, how often and to what extent. This will help determine which additional roads in the county need to be considered for structural improvements and or other mitigation strategies.

Department Responsible: Emergency Management

[Tasks]

1) The Emergency Management Department should collect and record information during flooding events when the Emergency Operations Center is active and coordinate with the VDOT Residency Office to corroborate data.

Time Table: Continuous, starting year 1
Budget Impacts: Minimal amount of staff time

Recommendation 5.1b5 (Structural Improvement Activities): The County should consider permanent road markers along frequently flooded roads marking the road's path in a submerged state and signage with gauges that indicate inundation extent that mark historical high water levels. This will help make it safer for residents to stay on roads with shallow flooding and gauge the depth of water on roadways before attempting to pass the road. These signs should be located on the lowest shoulders of the road and should be checked for proper functioning prior to a storm event.

Department Responsible: Engineering

[Tasks]

1) The Engineering Department should coordinate with the VDOT Residency Office and the Board of Supervisors to determine how best to locate and fund a signage

program that meets VDOT standards and adequately addresses the concerns of citizens in the area.

Time Table:	Years 1 & 2
Budget Impacts:	Minimal amount of staff time Transportation Budget

Objective 1.2: Protect new and existing development in the County's flood-prone areas from damages caused by coastal flooding.

Objective 1.3: Protect critical facilities from being damaged during coastal flooding.

Recommendation 5.2a: (Preventative Activities): The County should continue to zone for low density residential development and encourage residential clustering within flood-prone areas.

Recommendation 5.2b: (Preventative Activities): Gloucester County should continue to enforce building regulations throughout the county.

Recommendation 5.2c: (Preventative Activities): The County should continue to require and enforce the provisions of the Floodplain Management Ordinance.

Recommendation 5.3a (Property Protection Activities): The County should continue to acquire properties through a voluntary program according to the priority list in order to increase the amount of land preserved as open space, and to reduce the amount of flood damage to new and existing properties in the flood prone areas of the community

Department Responsible: County Administration, Building Inspections, Planning & Zoning, Engineering, Finance, and Emergency Management.

[Tasks]

1) Adopt a priority acquisition list for repetitive loss properties
2) Apply for FEMA grants when directed by the Board of Supervisors
3) Continue to manage grant funded acquisition projects through the internal County Hazard Mitigation Management Team (HMMT).

Time Table:	Continuous starting Year 1
Budget Impacts:	Fair amount of staff time

Recommendation 5.3b: (Property Protection Activities): The County should readopt this Coastal Floodplain Management Plan at least every five years to help strengthen the community's mitigation activities as well as lower insurance premiums for policy holders. The County should also consider requiring heightened construction standards in the Coastal A zone.

Department Responsible: County Administration, Building Inspections, Planning & Zoning, Engineering, and Emergency Management

[Tasks]

1) Bring the updated plan to the Planning Commission for review and citizen input
2) Bring the updated plan to the Board of Supervisors for approval
3) Brief the Board of Supervisors and obtain direction relative to construction standards in the Coastal A zone.

4) Floodplain Management Committee Provides annual maintenance of the adopted plan

Time Table: Year 1 and then ongoing
Budget Impacts: Fair amount of staff time

Recommendation 5.6: (Natural Resource Protection Activities): The County should continue to enforce the Chesapeake Bay Preservation Area Ordinance, the Erosion and Sediment Control Ordinance, the Wetlands Zoning Ordinance, the Coastal Primary Sand Dune Zoning Ordinance, and the Storm Water Ordinance.

Recommendation 3.4: (Safety & Health Hazards): The County should alert residents as to the importance of securing existing fuel oil and propane tanks through the dissemination of tie-down information and methodologies.

Department Responsible: Department of Environmental Programs and Emergency Management

[Tasks]

1) Provide educational information to citizens conveying the importance of securing fuel tanks
2) Coordinate with local fuel oil and propane vendors as an avenue to reach end users

Time Table: Year 1 and then ongoing
Budget Impacts: Minimal amount of staff time

Recommendation 3.4: (Safety & Health Hazards): The County should request the Virginia Department of Health to examine the public health, safety and economic impacts associated with the increased use of alternative septic systems in flood prone areas.

Department Responsible: Emergency Management, Virginia Department of Health, and the Board of Supervisors

[Tasks]

1) Identify impacts to the community
2) Develop educational information to citizens that rely on alternative septic systems in flood prone areas

Time Table: Year 1 & 2
Budget Impacts: Fair amount of staff time

Recommendation 2.4: (Sea Level Rise): As more data become available the County should evaluate the potential impact of sea level rise on the community, particularly with respect to its wetlands, and consider potential management options.

Department Responsible: County Administration, Emergency Management, Environmental Programs, Planning and Zoning, and the Board of Supervisors

[Tasks]

1) Gather information as it becomes available
2) Identify impacts to the community
3) Develop policy which addresses these impacts

Time Table: Year 3

Budget Impacts: Large amount of staff time

Recommendation 5.1a: (Structural Improvement Activities): The County should continue to implement the annual dam inspection and regular maintenance program, as well as continue to participate in the National Dam Safety Program.

Goal 2: Maximize citizen actions to protect private properties.

Objective 2.1: Ensure that residents are given adequate warning of potential coastal floods.

Recommendation 5.5a: (Natural Resource Protection Activities): The County should continue to utilize its hazard identification process.

Recommendation 5.5b1: (Emergency Service Measures): The County should increase awareness of the existing mobile phone mass notification system and the fact that citizens must opt-in to the program if they want to be contacted through this medium.

Departments Responsible: Emergency Management and Community Education

[Tasks]

1) Publicize the service (Local newspaper and on the county website)

Time Table: Year 1 and ongoing
Budget Impacts: Minimal amount of staff time
Minimal advertising costs

Objective 2.2: Ensure that residents can easily obtain all general and property specific information relating to flooding and flooding risk.

Recommendation 5.4a (Public Information Activities): The County should continue to send an annual mass mailing with specialized information relating to property protection, flood safety and flood insurance to every property owner in a flood zone.

Departments Responsible: Building Inspections, Emergency Management, and Community Education

[Tasks]

1) Develop information to be included in the community newspaper mailed to all residents (Beehive)
2) Update information annually and send prior to coastal flood season

Time Table: Year 1 and ongoing
Budget Impacts: Minimal amount of staff time

Recommendation 5.4b: (Public Information Activities): The County should adopt a central location where general information on flood preparedness, flood insurance, and floodplain management is easily accessible to the public in a hard copy format.

Department Responsible: Building Inspections, Emergency Management, Library

[Tasks]

1) Determine an appropriate location, possibly the library or Building Inspections office.

2) Collect and inventory existing educational material from every department in the county.
3) Obtain additional copies of material from original source (as needed).
4) Develop additional educational material (as needed).
5) Install the educational material at appropriate location
6) Advertise the activity to residents (Local newspaper and on the County website)

Time Table:	Year 1
Budget Impacts:	Minimal amount of staff time
	Costs to purchase additional educational materials
	Costs to print additional educational materials
	Minimal advertising costs

Recommendation 5.4c: (Public Information Activities): Gloucester County should advertise the technical assistance opportunities it provides in relation to flood mitigation and preparedness, preferably in the same central locations where other flood-hazard information is available, as suggested in Recommendation 5.4b.

A mass mailing (through the Beehive) that advertises the various technical assistance opportunities the county offers should be sent to every residence in the county. These services should continue to be advertised on the County's website.

Department Responsible: Building Inspections

[Tasks]

1) Consider the formation of a Program for Public Information (PPI)
2) Develop material that explains the technical assistance opportunities the County offers
3) Send mass mailings

Time Table:	Year 1
Budget Impacts:	Staff time dependent on formation of PPI

7. PLAN ADOPTION

The initial Gloucester County Virginia Floodplain Management Plan was adopted by the Board of Supervisors at their September 1, 2009 meeting. The resolution though which the Board adopted the plan is included in Appendix J. The resolution also authorized the formation of a Floodplain Management Committee charged with annually reviewing progress toward plan goals and providing input for inclusion in the required five-year update. The annual reports from the Committee are also included in Appendix J. The preceding plan incorporates updates to the 2009 plan bringing it up to date for 2019.

A schedule for adoption of the updated plan is:

- Floodplain Management Committee
    - Public Hearing, August 14, 2019
    - Recommendation

- Board of Supervisors/Public Review
    - Review, Approval, and Adoption, September 2019

8. PLAN MAINTENANCE

The following activities should be conducted following adoption by the BOS of this plan.

The monitoring, evaluating and updating of this plan shall be done on a yearly basis and shall be the responsibility of the Floodplain Management Committee and staff charged with this task. The first yearly evaluation of the adopted Floodplain Management Plan will be done after FEMA's final approval of the plan. For consistency purposes, the same evaluation tool should be used by the review Floodplain Management Committee to annually review the plan.

1) A written evaluation tool will be distributed approximately 1 month before the annual evaluation date for the plan.
2) The Floodplain Management Committee (comprised of greater than 50% citizens) will provide input for evaluation.
3) Convene meeting of the committee to go over evaluations
4) Develop goals and mini-strategies to be accomplished in the next year for the plan.
5) Provide the Board of Supervisors with a written evaluation report of progress/ obstacles/ opportunities in implementing mitigation strategies in the plan.
6) Identify possible future revisions to the plan and notify the Board of Supervisors in writing of the suggested revisions.
7) Provide follow-up assistance as requested by committee members with strategy implementation.

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APPENDICES

Appendix A: Flood Protection Questionnaire

Flood Protection Questionnaire

Gloucester County is in the process of preparing a floodplain management plan. When completed, the plan shall be used by County officials as a guide to assist in the planning and development of current and future development within flood zone districts of the County. This questionnaire is part of the planning effort. The questionnaire is anonymous and voluntary, but the more information the County has, the better. Information from the questionnaire will be used for internal planning purposes and will not be distributed.

Property Location: ( ) Bena ( ) Achilles ( ) Severn ( ) Maryus ( ) Jenkins Neck ( ) Perrin
( ) Other _____

1. Has your home or property ever been flooded or had a water problem? ( ) Yes ( ) No
   If "yes," please complete this entire questionnaire.
   If "no," please complete questions 6-9.

2. In what years did it flood? _____

3. Where did you get flood waters and how deep did it get?

   ( ) In yard only
   ( ) In crawl space under the house
   ( ) In basement
   ( ) Over first floor: _____ deep.
   ( ) Water was kept out of house by sandbagging.

4. What do you feel was the cause of your flooding? Check all that affect your building.

   ( ) Seasonal coastal storm events: hurricane, tropical storm, or nor'easter
   ( ) Unusually high tide
   ( ) Excessive rain which caused road gutter system to backup
   ( ) Standing water next to house
   ( ) Other _____

5. Have you ever installed any flood protection measures on your property?

   ( ) Elevation of home
   ( ) Flood proof home ex) used flood-resistant building materials
   ( ) Installed a pump system
   ( ) Moved things to higher levels within house (Second Flood or Attic)
   ( ) Backup power system/ generator
   ( ) Other _____

6. When did you move into the building? _____ When was your building built? _____

7. Do you have flood insurance?

8. Do you want information on protecting your house from flooding? [10]

Source: Des Plaines Engineering Department, 2002

[10] This form has been modified and adapted to Gloucester County from a pre-existing questionnaire used in preparing the Repetitive Loss Plan for Des Plaines Illinois.

Appendix B: Middle Peninsula District Committee Structural Vulnerability Study

Vulnerability of addressed structures to category 2, 3, and 4 hurricanes in Gloucester County

	Blck Grp 1 Cns Trct 1001	Blck Grp 2, Cns Trct 1001	Blck Grp 1, Cns Trct 1002	Blck Grp 2, Cns Trct 1002	Blck Grp 3, Cns Trct 1002	Blck Grp 4, Cns Trct 1002	Blck Grp 5, Cns Trct 1002	Blck Grp 6, Cns Trct 1002	Blck Grp 1, Cns Trct 1003	Blck Grp 2, Cns Trct 1003	Blck Grp 3, Cns Trct 1003	Blck Grp 4, Cns Trct 1003	Blck Grp 5, Cns Trct 1003	Blck Grp 6, Cns Trct 1003	Blck Grp 1, Cns Trct 1004	Blck Grp 2, Cns Trct 1004	Blck Grp 1, Cns Trct 1005	Blck Grp 2, Cns Tact 1005	Blck Grp 3, Cns Trct 1005	Blck Grp 4, Cns Trct 1005		Gloucester Totals:
Total Population: Census 2000	2421	4216	3133	1110	1021	1966	1681	2972	2777	1782	1509	1967	1673	1184	795	689	623	648	1642	971	Total Population: Census 2000	
Housing Units: Total	1026	1691	1243	582	474	703	753	1022	1055	652	616	869	740	578	430	306	311	311	746	386	Housing Units: Total	14494
Total number of structures (based on E911 GIS data)	1171	1834	1438	615	484	789	837	1103	1147	693	618	656	658	565	467	387	336	315	715	432	Total number of structures (based on E911 GIS data)	15246
Median value of owner-occupied housing from Census 2000	$97,100	$85,700	$113,500	$142,200	$120,300	$117,400	$100,600	$109,200	$114,100	$91,200	$89,200	$111,400	$118,700	$123,700	$124,400	$109,800	$79,000	$117,400	$123,700	$102,800	Median value of owner-occupied housing from Census 2000	
Number of structures potentially damaged by a **Category 2** hurricane	37	126	72	339	73	0	0	1	41	20	19	67	13	135	377	265	336	315	715	432	Number of structures potentially damaged by a **Category 2** hurricane	3443
Potential property loss by a **Category 2** hurricane	$3,592,700	$10,798,200	$8,172,000	$48,205,800	$8,781,900	$0	$0	$109,200	$4,678,100	$1,824,000	$1,694,800	$7,463,800	$1,543,100	$16,699,500	$46,898,800	$29,097,000	$26,544,000	$36,981,000	$88,445,500	$44,409,600	Potential property loss by a **Category 2** hurricane	$393,361,000
Percent of Total Structures potentially damaged by a **Category 2** hurricane	3.16%	6.87%	5.01%	55.12%	15.08%	0%	0%	.09%	3.57%	2.89%	3.07%	10.21%	1.98%	23.89%	80.73%	68.48%	100%	100%	100%	100%	Percent of Total Structures potentially damaged by a **Category 2** hurricane	22.56%
Number of structures potentially damaged by a **Category 3** hurricane	106	162	112	502	101	0	0	8	100	24	19	82	23	213	389	295	336	315	715	432	Number of structures potentially damaged by a **Category 3** hurricane	3994
Potential property loss by a **Category 3** hurricane	$10,292,600	$13,883,400	$12,712,000	$71,384,400	$12,150,300	$0	$0	$873,600	$11,410,000	$2,188,800	$1,694,800	$9,134,800	$2,730,100	$26,348,100	$48,391,600	$32,391,000	$26,544,000	$36, 981, 000	$88,445,500	$44,409,600	Potential property loss by a **Category 3** hurricane	$459,387,600
Percent of Total Structures potentially damaged by a **Category 3** hurricane	9.05%	8.83%	7.79%	81.63%	20.87%	0%	0%	.73%	8.72%	3.46%	3.07%	12.50%	3.50%	37.70 %	83.30%	76.23%	100%	100%	100%	100%	Percent of Total Structures potentially damaged by a **Category 3** hurricane	26.17%
Number of structures potentially damaged by a **Category 4** hurricane	137	223	154	550	144	0	1	25	189	51	47	110	68	332	401	304	336	315	715	432	Number of structures potentially damaged by a **Category 4** hurricane	4594
Potential property loss by a **Category 4** hurricane	$13,302,700	$19,111,100	$17,479,000	$78,210,000	$17,323,200	$0	$100,600	$2,730,000	$21,564,900	$4,651,200	$4,192,400	$12,254,000	$8,071,600	$41,068,400	$49,884,400	$33,379,200	$26,544,000	$36,981,000	$88,445, 500	$44,409,600	Potential property loss by a **Category 4** hurricane	$527,124,800
Percent of Total Structures potentially damaged by a **Category 4** hurricane	11.70%	12.16%	10.71%	89.43%	29.75%	0%	.12%	2.27%	16.48%	7.36%	7.61%	16.77%	10.33%	58.76%	85.87%	78.55%	100%	100%	100%	100%	Percent of Total Structures potentially damaged by a **Category 4** hurricane	30.10%

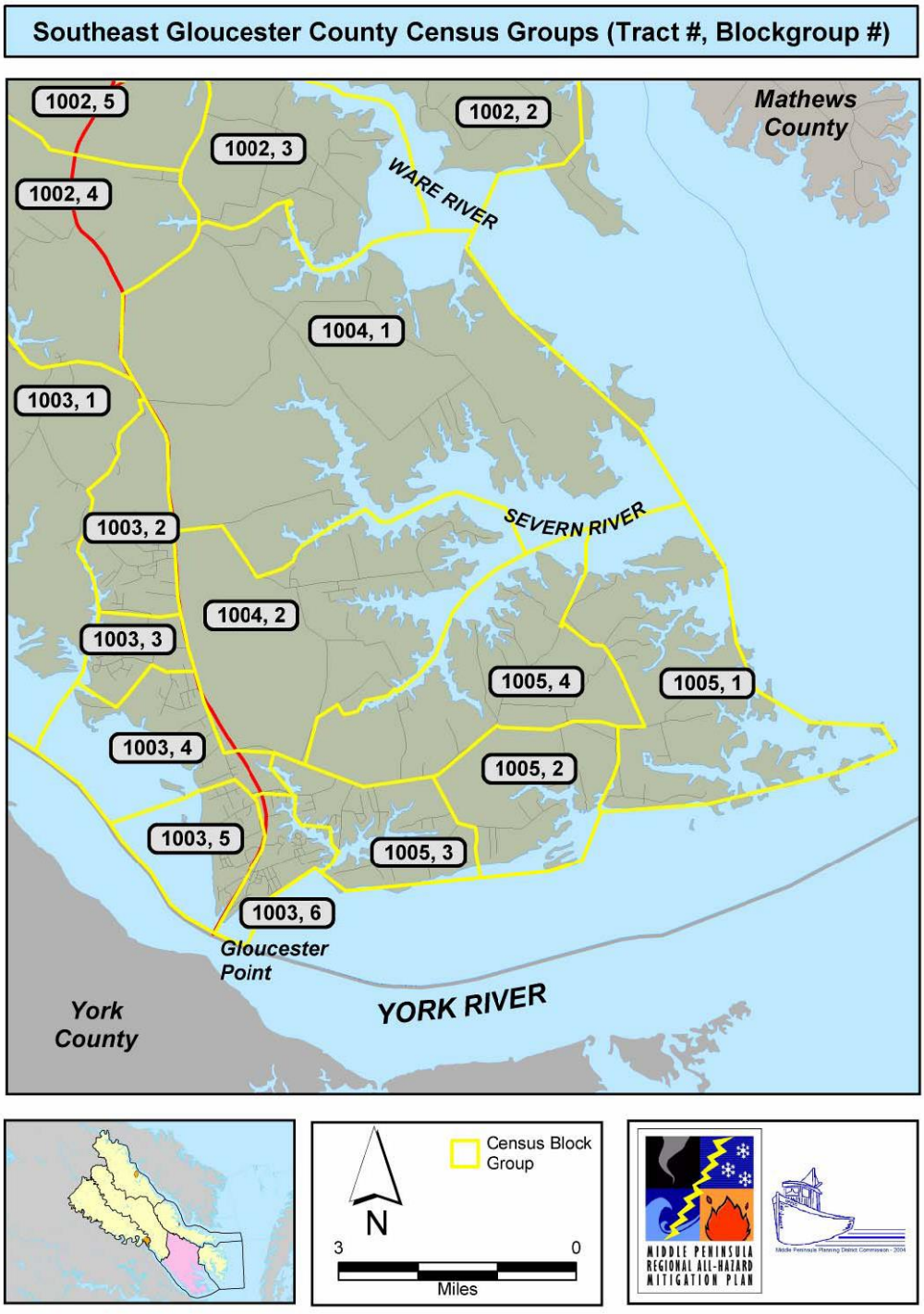
Gloucester County

An analysis of estimated total pre-firm structure value by SFHA zones: A, AE, and VE for census tract-block groups.

Flood Ordinance Adopted in Gloucester July 7, 1987

Geography	Block Group Code	Total population: Census 2000 (P001001)	Total number of structures (based on E911 GIS data)	Median value of owner-occupied housing (H085001)	% of Housing units 1989 or earlier	Housing Units 1989 or earlier	Total SFHA structures within the Special Flood Hazard Area	TotaL Pre-Firm Structures in SFHA	Total Value of Pre-Firm Strucutres in SFHA	Number of structures in Flood Zone A	Percent of Total	estimated pre-FIRM structures in Flood Zone A	estimated total value of pre-FIRM structures in Flood Zone A	Number of structures in Flood Zone AE	Percent of Total	estimated pre-FIRM structures in Flood Zone AE	estimated total value of pre-FIRM structures in Flood Zone AE	Number of structures in Flood Zone VE	Percent of Total	estimated pre-FIRM structures in Flood Zone VE	estimated total value of pre-FIRM structures in Flood Zone VE
Block Group 1, Census Tract 1001, Gloucester County, Virginia	1001, 1	2421	1171	$97,100	62.67%	734	48	31	$3,010,100	1	0.09%	1	$97,100	47	4.01%	30	$2,913,000	0	0.00%	0	$0
Block Group 2, Census Tract 1001, Gloucester County, Virginia	1001, 2	4216	1834	$85,700	72.03%	1321	97	71	$6,084,700	1	0.05%	1	$85,700	96	5.23%	70	$5,999,000	0	0.00%	0	$0
Block Group 1, Census Tract 1002, Gloucester County, Virginia	1002, 1	3133	1438	$113,500	58.97%	848	90	54	$6,129,000	5	0.35%	3	$340,500	85	5.91%	51	$5,788,500	0	0.00%	0	$0
Block Group 2, Census Tract 1002, Gloucester County, Virginia	1002, 2	1110	615	$142,200	93.64%	576	211	199	$28,297,800	0	0.00%	0	$0	196	31.87%	184	$26,164,800	15	2.44%	15	$2,133,000
Block Group 3, Census Tract 1002, Gloucester County, Virginia	1002, 3	1021	484	$120,300	83.54%	404	71	60	$7,218,000	0	0.00%	0	$0	67	13.84%	56	$6,736,800	4	0.83%	4	$481,200
Block Group 4, Census Tract 1002, Gloucester County, Virginia	1002, 4	1966	789	$117,400	81.51%	643	6	5	$587,000	6	0.76%	5	$587,000	0	0.00%	0	$0	0	0.00%	0	$0
Block Group 5, Census Tract 1002, Gloucester County, Virginia	1002, 5	1681	837	$100,600	84.59%	708	7	7	$704,200	6	0.72%	6	$603,600	1	0.12%	1	$100,600	0	0.00%	0	$0
Block Group 6, Census Tract 1002, Gloucester County, Virginia	1002, 6	2972	1103	$109,200	81.31%	897	10	9	$982,800	0	0.00%	0	$0	10	0.91%	9	$982,800	0	0.00%	0	$0
Block Group 1, Census Tract 1003, Gloucester County, Virginia	1003, 1	2777	1147	$114,100	77.54%	889	60	47	$5,362,700	0	0.00%	0	$0	60	5.23%	47	$5,362,700	0	0.00%	0	$0
Block Group 2, Census Tract 1003, Gloucester County, Virginia	1003, 2	1782	693	$91,200	76.84%	533	8	7	$638,400	0	0.00%	0	$0	8	1.15%	7	$638,400	0	0.00%	0	$0
Block Group 3, Census Tract 1003, Gloucester County, Virginia	1003, 3	1509	618	$89,200	75.97%	470	6	5	$446,000	0	0.00%	0	$0	6	0.97%	5	$446,000	0	0.00%	0	$0
Block Group 4, Census Tract 1003, Gloucester County, Virginia	1003, 4	1967	656	$111,400	90.22%	592	39	35	$3,899,000	0	0.00%	0	$0	38	5.79%	35	$3,899,000	0	0.00%	0	$0
Block Group 5, Census Tract 1003, Gloucester County, Virginia	1003, 5	1673	658	$118,700	92.70%	610	10	10	$1,187,000	0	0.00%	0	$0	6	0.91%	6	$712,200	4	0.61%	4	$474,800
Block Group 6, Census Tract 1003, Gloucester County, Virginia	1003, 6	1184	565	$123,700	85.99%	486	56	49	$6,061,300	0	0.00%	0	$0	52	9.20%	45	$5,566,500	4	0.71%	4	$494,800
Block Group 1, Census Tract 1004, Gloucester County, Virginia	1004, 1	795	467	$124,400	75.12%	351	237	179	$22,267,600	0	0.00%	0	$0	223	47.75%	168	$20,899,200	14	3.00%	11	$1,368,400
Block Group 2, Census Tract 1004, Gloucester County, Virginia	1004, 2	689	387	$109,800	96.41%	373	216	209	$22,948,200	0	0.00%	0	$0	180	46.51%	174	$19,105,200	36	9.30%	35	$3,843,000
Block Group 1, Census Tract 1005, Gloucester County, Virginia	1005, 1	623	336	$79,000	95.50%	321	335	321	$25,359,000	0	0.00%	0	$0	211	62.80%	202	$15,958,000	124	36.90%	119	$9,401,000
Block Group 2, Census Tract 1005, Gloucester County, Virginia	1005, 2	648	315	$117,400	89.39%	282	228	205	$24,067,000	0	0.00%	0	$0	204	64.76%	183	$21,484,200	24	7.62%	22	$2,582,800
Block Group 3, Census Tract 1005, Gloucester County, Virginia	1005, 3	1642	715	$123,700	90.21%	645	173	157	$19,420,900	0	0.00%	0	$0	173	24.20%	157	$19,420,900	0	0.00%	0	$0
Block Group 4, Census Tract 1005, Gloucester County, Virginia	1005, 4	971	432	$102,800	88.86%	384	326	290	$29,812,000	0	0.00%	0	$0	324	75.00%	288	$29,606,400	2	0.46%	2	$205,600
Gloucester totals:			15260		82.65%	12065	2233	1950	$214,482,700	19	0.12%	16	$1,713,900	1987	13.02%	1718	$191,784,200	227	1.49%	216	$20,984,600

Total Number of Structures	**15,260**
% of Housing Units Pre-1989	**82.65%**
# Housing Units Pre-1989	**12,065**
Total Pre-Firm Structures in SFHA	**1,950**
Total Value of Pre-Firm Structures in SFHA	**$ 214,482,700**



Source: Middle Peninsula Planning District Commission, 2005

Appendix C: VDOT Elevation Study on Select Roads in Gloucester County VA

TO: Christopher Perez
FROM: VDOT Central Office (Richmond VA) Engineering Staff
DATE: April 20, 2007

Anticipated Flood Tide Levels for the Roadways in Gloucester County's Southeastern Portion

This report is an investigation of the anticipated flood tide levels for the southeastern portion of the county's roadways (plus the Rte. 17, north approach to the Coleman Bridge). Everything was based on the FEMA Flood Insurance Study (FIS) for Gloucester County (dated August 4, 1987) and available Flood Insurance Rate Map (FIRM).

VDOT's usual criteria for protection of its roadway facilities against flooding is to have the lowest edge of shoulder elevation of the roadway prism 18" minimum above the prescribed level of flood protection. The prescribed level of protection usually would be as follows: 10-yr. for secondaries and 25-yr. for primaries and arterials.

The elevations cited in this report are based on the above. Tidal flooding in the southeastern portion of the county can take the form of either essentially stillwater or stillwater plus wave action, depending on how close the area in question is to open water. Inland areas are typically only subject to stillwater tidal action, whereas exposed areas (in this case those areas closer to the York River and/or the Bay) are also subject to wave action (in which case anticipated wave crests are added to the stillwater tide levels). FEMA, with their FIRM maps, identifies those areas of stillwater only (Zone AE designations) as well as those areas subject to wave action (Zone VE designations). Some of the roadways investigated had segments that fell in both zones and therefore different recommended elevations have been shown. The stillwater elevations for Gloucester County as shown in the FIS book were as follows:

FLOOD FREQUENCY (YRS.)	FLOOD ELEVATION (FT.)*
10	5.0
25**	5.8**
50	6.5
100	7.3

* Based on North American Vertical Datum of 1922 (NGVD '29 datum)
** Mathematical interpolations of these values, as the FIS book didn't show them.

The wave crests that can be experienced in open areas can raise the above values up to 3 additional ft. It should be noted that wave crest values were only provided for the 100-yr. flood event but, for the purposes of this report, the report assumed that the same wave crests would also apply to a 10 and 25-yr. event where applicable. This is probably conservative but should be satisfactory for estimating purposes.

Below is the report which deals with each individual roadway and is predicated on the above.

George Washington Memorial Highway (Rte. 17)
Because this is considered to be an emergency/ hurricane evacuation route, the roadway should be above a 100-yr. flood tide. If the roadway is not above a 100 yr flood tide, then in order to get the roadway above a 100-yr. flood tide level, the lowest approaches to the Coleman Bridge will need to be raised such that the lowest shoulder will be at or above elevation 12.5.

Maryus Road (Rte. 649)
To ensure the roadway is above a 10-yr. flood tide level the reach from the intersection with Rte. 648 eastwards to the end of state maintenance will need to be raised such that the lowest shoulder will be at or above elevation 9. For the intersection of Rte. 653 eastwards to the intersection of Rte. 648 to be above a 10 yr flood tide level the section will need to be raised such that the lowest shoulder will be at or above elevation 7.

Greate Road (Rte. 1208)
To get the roadway above a 10-yr. flood tide level that portion of the roadway in close proximity to the York River will need to be raised such that the lowest shoulder will be at or above elevation 9.

Guinea Road (Rte. 216)
To get the roadway above a 25-yr. flood tide level the entire roadway grade from its intersection with Rte. 17 eastwards to its intersection with Rte. 649 & 653 will need to be raised such that the lowest shoulder elevation will be at or above elevation 8.

Mark Pine Road (Rte. 643)
Nearly the entire length of the roadway will have to raised such that the lowest shoulder elevation is at or above elevation 7.

Little England Road (Rte. 642)
To get the roadway above a 10-yr. flood tide level that portion of the roadway nearest the York River (the western end) will need to be raised such that the lowest shoulder will be at or above elevation 7.

Cuba road (Rte. 643)
The Easternmost end of the roadway will have to be raised such that the lowest shoulder will be at or above elevation 7. Just to the west, where the roadway makes a sharp bend to the northeast, it will have to be raised such that the lowest shoulder will be at or above elevation 7. Further west at Cuba Road's intersection with Rte. 642 the roadway will have to be raised such that the lowest shoulder will be at or above elevation 7.

Kings Creek Road (Rte. 653)
To get the roadway above a 10-yr. flood tide level, the following will need to be done. The roadway from the intersection with Rte. 652 northeastwards to the end of state maintenance will need to have the entire grade raised such that the edge of the lowest shoulder elevation will be at or above elevation 9. From the intersection with Rte. 652 southwestwards to the intersection of Rte. 649, the entire grade will need to be raised such that the lowest shoulder elevation will be at or above elevation 7.

Appendix D: Saffir-Simpson Hurricane Damage Scale

The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, however, and require preventative measures. In the western North Pacific, the term "super typhoon" is used for tropical cyclones with sustained winds exceeding 150 mph.

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt 119-153 km/h	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph 83-95 kt 154-177 km/h	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph 96-112 kt 178-208 km/h	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph 113-136 kt 209-251 km/h	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher 137 kt or higher 252 km/h or higher	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: NOAA National Hurricane Center Website

Appendix E: Gloucester County Growth Rate

Gloucester County Growth Rate								
Population						Percent Change		Percent Change
1980	1990	2000	2010	2020	2030	1980-1990	1990-2000	Average
20,107	30,131	34,780	38,900	42,700	46,199	49.90%	15.40%	32.60%

Source: United States Census Bureau, 2000

Appendix F: VDOT Road Closure Data for Gloucester County (1999 – 2006)

TO: Christopher Perez
FROM: VDOT Staff
DATE: April 2, 2007

Road Closures in Gloucester, VA: Hurricane Floyd 9/18/1999

Route	From	To
36		
605		
606		
610		
612		
614 (at Mill Pond)		
614 (at Petsworth Church Rd)		
616		
629 (at Rt. 728)		
637 (end of state maintenance)		
1246 (end of state maintenance)		

Road Closures in Gloucester, VA: Severe Storm 10/7/2006

Route	From	To
662	at bridge	
1208	at boat landing	

Road Closures in Gloucester, VA: Hurricane Isabel 9/18/2003

Route	From	To
601		
602		
605		
606		
608		
609		
610		
611		
617		
621		
625		
628		
630		
631		
633		
635		
648		
678		

Road Closures in Gloucester, VA: Hurricane Ernesto 9/1/2006

Route	From	To
198	Rt. 17	Rt. 610
606		
614		
662		
666		
Great Rd		
Maryus Rd		

Road Closures in Gloucester, VA: Severe Storm 11/17/2006

Route	From	To
611		
614		
625	at Rt 623	
662		
701		
1208		

Appendix G: Documentation of the 2009 Planning Process

Planning Committee Members

1) Paul Koll: Gloucester County Building Official

2) Christopher Perez: Gloucester County Planner and then Graduate student in the Masters of Urban Regional Planning (MURP) Program at Virginia Commonwealth University (VCU)

3) Anne Ducey-Ortiz, Gloucester County Director of Planning

4) Jay Scudder: former Director of Planning

5) Mark Westfall: former Emergency Management Coordinator

6) Dr. Mort Gulak: Professor of Urban Studies and Planning, L. Douglas Wilder School of Government and Public Affairs at Virginia Commonwealth University (VCU)

7) Dr. Avrum J. Shriar: Professor of Urban Studies and Planning, L. Douglas Wilder School of Government and Public Affairs at Virginia Commonwealth University (VCU)

Time Table of Events during the Planning Process

While these meetings are not the entire sum of planning efforts during the development of the Floodplain Management Plan, they represent a comprehensive outline of the steps throughout the process.

January 25, 2007 @ 3:30pm
Held an initial meeting between all Floodplain Management Plan planning committee members to discuss the role of the committee in the formation of the plan, follow up committee meetings to discuss the plans' progress, the perimeters of the plan, the various agencies that needed to be involved, the necessity for public involvement, various resources to aid in the risk assessment of the area, as well as the time frame for the plans completion and projected adoption date.

May 10, 2007 @ 7pm
Community meeting at Achilles Elementary School to gain citizen involvement and community awareness (Below is a cutout of the meeting advertisement).

THURSDAY MAY 10, 2007 Gloucester-Mathews Gazette Journal

Facing flooding

Session tonight at Achilles School

BY BILL NACHMAN

Gloucester County will sponsor a public information meeting at 7 tonight at Achilles Elementary School to discuss various community concerns related to coastal flooding problems in the county, specifically the Guinea area.

The purpose of the meeting will be to engage with the public and field any questions or concerns that residents might have relating to Gloucester's flooding problem, said planning director Jay Scudder.

The meeting will assist Gloucester's planning staff as it formulates future coastal flooding mitigation strategies, Scudder said.

The meeting is not being

SEE ACHILLES, PAGE 21A

ACHILLES: *Meeting tonight on flood problems*

(CONTINUED FROM PAGE 1A)

held to apply for a grant, is not related to several unrelated meetings held earlier that concerned specific grant projects linked to hazard mitigation and elevation programs.

A brochure that will be distributed notes that "the floodplain contains Gloucester County's valuable natural resources including wetlands, beaches, forests, rivers, streams and the plant and animal communities that inhabits them." Also, the brochure said that "highlights of the county are vast salt marshes and expansive rivers and creeks. These natural resources are unique to the Chesapeake Bay region and are important to Gloucester County's environment and economic welfare."

Codes compliance director Ron Peaks said the county has adopted a number of programs to help preserve and protect these valuable resource areas, including Chesapeake Bay Preservation, Erosion and Sediment Control, Wetlands Protection, and Floodplain Management. Holding the meeting will "help get the public involved" in the county's floodplain management efforts, he said.

Building official Paul Koll said Gloucester is under a Community Rating System program for flood insurance purposes. If the county improves its floodplain management program, residents might qualify for additional flood insurance discounts under the National Flood Insurance Program, he said.

Chris Perez, a student at Virginia Commonwealth University, is examining the local floodplain as part of a collegiate program. He is scheduled to hear comments from residents about how they are impacted by present flood control measures and suggestions for improvements at tonight's meeting. For more information, call 693-1224.

Source: Gloucester-Mathews Gazette Journal

4A GLOUCESTER-MATHEWS GAZETTE-JOURNAL

POINT PANORAMA

Coastal flooding topic of sparsely attended info meet at Achilles

BY BILL NACHMAN

Gloucester County sponsored a public information meeting May 10 to discuss various community concerns related to coastal flooding problems in the county, specifically the Guinea area.

The purpose of the meeting, held at Achilles Elementary School, was to engage with the public and field questions that residents might have relating to the county's flooding problem, said planning director Jay Scudder. Also, Scudder said the meeting will assist Gloucester's planning staff in formulating possible future coastal flooding mitigation strategies in the county.

Scudder said that the staff picked up some good ideas from residents about steps to take before flooding occurs. Only about a dozen persons attended the meeting.

For example, one person suggested the county install alarms in the Guinea area, possibly on low-lying Guinea Circle, to alert citizens that they are in danger of flooding or other severe weather and should quickly leave the area before the roadway out becomes impassable.

Another suggestion was to ask the Virginia Department of Transportation for better cleaning of ditches in that area. One woman said that her husband has tried to dig out some of their ditch, but she believes that VDOT should be doing that job.

County officials said they are trying to establish better communications with residents. But one man said putting out e-mails won't be effective since many people in the lower county don't have computers.

Emergency services director Mark Westfall said that county officials usually have ample time to alert residents about impending storms—but that's not always the case. "Ernesto was one of those anomalies," Westfall said of the Sept. 1, 2006 tropical storm that caused more extensive damage than had been predicted.

Building official Paul Koll said that many county roads are low and officials need to address ways these might be improved to allow residents safer evacuation

Chris Perez, a alumni of Gloucester High School who is now a graduate planning student at Virginia Commonwealth University, is studying the local floodplain management as part of his graduate research. "We're in a pretty weather-prone area," Perez said of Gloucester.

In too many cases local properties suffer "repetitive losses," with insurance and grants being used to repair damaged properties, Perez said. Elevation grants are being offered to elevate some flood-prone properties above the flood stage.

Koll said subsequent public meetings might be held as the county studies its flood management options. Also, he said that Gloucester is under a Community Rating System program for flood insurance purposes. If the county improves its floodplain management program, he said, residents here might qualify for additional flood insurance discounts under the National Flood Insurance Program.

For more information about floodplain management in Gloucester, call the Gloucester Planning office at 693-1224.

BILL NACHMAN / GAZETTE-JOURNAL

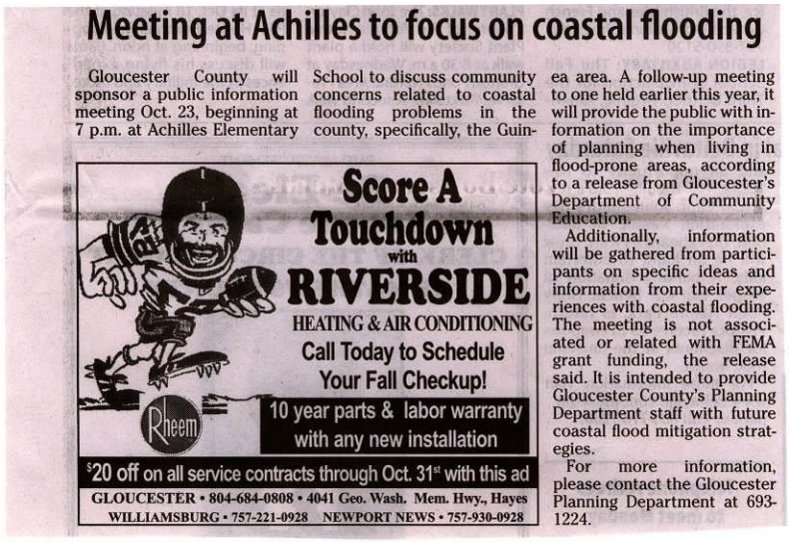
Only about 10 people attended a public meeting about floodplain management Thursday night at Achilles Elementary School. Suggestions aired included placing alarms in the lower county to notify residents of threatening storms, cleaning ditches, and improving low-lying roads.

Source: Gloucester-Mathews Gazette Journal

May 2007
Formulated Draft Goals and Objectives for Floodplain Management Plan

August 2007
Provided a working draft of the Floodplain Management Plan, which Committee Members edited and strengthened through numerous meetings and editing sessions.

Oct 23, 2007 @ 7pm
Follow up Community Meeting at Achilles Elementary School to gain citizen involvement and community awareness (Below is a cutout of the meeting advertisement).



Meeting at Achilles to focus on coastal flooding

Gloucester County will sponsor a public information meeting Oct. 23, beginning at 7 p.m. at Achilles Elementary School to discuss community concerns related to coastal flooding problems in the county, specifically, the Guinea area. A follow-up meeting to one held earlier this year, it will provide the public with information on the importance of planning when living in flood-prone areas, according to a release from Gloucester's Department of Community Education.

Additionally, information will be gathered from participants on specific ideas and information from their experiences with coastal flooding. The meeting is not associated or related with FEMA grant funding, the release said. It is intended to provide Gloucester County's Planning Department staff with future coastal flood mitigation strategies.

For more information, please contact the Gloucester Planning Department at 693-1224.

Source: Gloucester-Mathews Gazette Journal

November 19, 2007
Planner, Christopher Perez met individually with each committee member to discuss the current draft of the plan and provide any comments or suggestions.

December 13, 2007
Dissertation meeting at VCU to formally present the Plan to the VCU Master of Urban and Regional Planning Program.

February 22, 2008
Floodplain Management Plan sent to the ISO review board.

April 18, 2008
ISO 510 review received.

April 3, 2008 @ 7:30pm
Floodplain Management Plan Presentation to the Planning Commission (below is the minutes from the meeting).

AT A MEETING OF THE GLOUCESTER COUNTY PLANNING COMMISSION HELD THURSDAY, APRIL 3, 2008 IN THE COLONIAL COURTHOUSE, 6504 MAIN STREET, GLOUCESTER, VIRGINIA

THERE WERE PRESENT:
Thomas Arnold
Kenneth Richardson
William Rodgers
Michelle Ressler
Michael Winebarger
Natalie Johnson
Hal McVey III
Keith Belvin, Vice Chairman
Wyvonnia Carter

THERE BEING ABSENT:
Eric Weisel
Phillip Bazzani, Chairman
Laurence Wilkinson
Mark Strawn

ALSO IN ATTENDANCE:
Jay Scudder, Director of Planning
Anne Ducey-Ortiz, Planner III
Christopher Perez, Planner I

IN RE: MEETING CONVENED

Keith Belvin, Vice Chairman, called the April 3, 2008 meeting of the Gloucester County Planning Commission to order at 7:30 P.M. Roll call established a quorum was present.

IN RE: CONSENT AGENDA

The Consent Agenda consists of 1) Minutes of February 19, 2008 Meeting; 2) Minutes of March 6, 2008 Meeting; 3) Application(s) before the BZA in April; 4) Housing Report – February 2008

Mr. Winebarger stated that he had a correction for the March 6, 2008 meeting minutes. He noted that a statement made by Mr. Rodgers right before adjournment was not put in the minutes and he would like it added, verbatim. The statement is as follows:

"Actually what Eric said, and all, is right, in fact, we've written into our rules of procedures, we did not follow it tonight with the first subdivision, we did do it the last meeting before we started on Bedford Falls and that is to make the statement that we are strictly looking, to look at it, to be sure it passes, everything in the ordinance. If we can

make recommendations, and we've gotten some things by having these reviews, we've gotten some things fixed in developments that although they met the ordinance completely, but a little extras, by having it in here and I think that's good, I think we need to have it in there, also gives us an opportunity to see what's going on and see where we need to change the ordinance."

A motion to accept the Consent Agenda with changes was made by Mr. Rodgers, seconded by Ms. Ressler and carried by a unanimous voice vote.

IN RE: PUBLIC COMMENT

There being no concerns or comments expressed by the public, the Vice Chairman closed the floor to public comment.

IN RE: NEW BUSINESS

A. Floodplain Management Plan

Mr. Perez gave a power point presentation:

Gloucester County Floodplain Management Plan

Background –

- In 1987, Gloucester County became a participating community in FEMA's National Flood Insurance Program (NFIP) which enables property owners to obtain federally backed flood insurance.
- Shortly after the County joined the Community Rating System (CRS) program.
- The program modifies annual premiums based on the participating community's efforts to reduce future flood damage in the area.
- In 1994, Gloucester County earned a Class 9 status in the Community Rating System (CRS) program.
  5% off annual premiums.

- There are approximately 1,415 flood insurance policy holder's within the County.
- To gain further reductions in flood insurance policy premiums (up to 15%) the county must gain credits that will qualify the locality at a lower CRS rating.

One method of acquiring CRS credit is through the development of a floodplain management plan for the county.

What is a Floodplain Management Plan?

A Floodplain Management Plan analyzes the causes of coastal flooding in the County and identifies the vulnerabilities within the community.

The plan also documents and analyzes the County's existing coastal flood management practices and provides feasible solutions to strengthen the overall coastal flood management system, intending to lessen the amount of damage caused by coastal flooding.

Note: It is not the purpose or the intent of this plan to commit the county to large public expenditures.

Vulnerabilities within the Community

- Potential Property Damage from Storm Surge
- Repetitive Loss Areas
- Vulnerable Populations
  Age, Disability, and Income Levels
- Critical Facilities
  Police Station, Fire and Rescue, Government Buildings, Schools and Shelters, Hospitals, Utilities, and Roads,
- Safety and Health Hazards

Mitigation Strategies

1) **Structural Improvement Activities** – Road Improvements
   – Reservoir protection
2) **Preventative Measures** – Planning and Zoning
   – Building Regulations
   – Flood Development Regulations.
3) **Property Protection Measures** – Acquisition and elevation of property
   – Purchasing flood insurance
4) **Public Information Measures** – Community Educational Outreach Programs
   – Public Libraries and the County Website
   – Technical Assistance
5) **Emergency Services Measures** – Hazard Identification, Warning, Response, and Recovery Efforts.
6) **Natural Resource Protection Measures** – a special type of mitigation activity that aims at preserving or restoring natural areas.

Where are we?

The Initial Draft of the Floodplain Management Plan
ISO review board *
Comprehensive Plan Steering Committee
Planning Commission
Board of Supervisors

End of Presentation

Mr. Winebarger asked who the ISO review board was.

Mr. Richardson stated the Insurance Services Organization, the same group that rates fire departments.

Ms. Johnson asked what this really does once it is adopted, does it require the county or the citizens to do anything?

Mr. Perez stated that it does not officially require the county to do anything. He stated that the plan tells us what our weaknesses are in the county, why we are having flooding issues, who is vulnerable, and what we are currently doing and how we could make that stronger.

Mr. Scudder stated that with the FEMA programs the county has probably received within the range of 3.6 million dollars, through the Hazard Mitigation Program. He noted that there is a Pre-Hazard Mitigation Program that is an allocation of money each year, and jurisdictions that choose to participate can take advantage of those programs. He stated that Gloucester County has been participating in both of those programs for years. He stated that the direct benefit of the citizens from this Floodplain Management Plan is to get a higher rating from CRS with will reduce flood insurance premiums for the residents.

Mr. Rodgers asked if just having the plan in place actually improves our rating from a 9 to something like an 8 or a 7.

Mr. Scudder stated that just having to plan and meeting the objectives reduces the insurance premium.

Mr. Winebarger asked how far in the 1-10 scale will Gloucester County have to move to increase or savings from the current 5%.

Mr. Richardson stated that from what he as seen there is no real guidelines to determine what you get for different things you do.

Dr. Belvin suggested to Mr. Perez that after the ISO review board has approved this document, it be forwarded to the Planning Commission.

IN RE: ADJOURNMENT

July 2008 –May 2009
Collect, organize, and edit the draft Floodplain Management Plan, in preparation to have the Board of Supervisors review the plan and ultimately adopt it.

May 14, 2009 @ 7pm
The third follow up Community Meeting at Achilles Elementary School was held to review the draft floodplain management plan and gain citizen input (Below is a cutout of follow-up article of the meeting in the Gloucester-Mathews Gazette Journal).

ANORAMA
THURSDAY MAY 28, 2009

Perez said another electronic means of warning residents who might be affected by hurricanes, tornadoes and other storm events would be to set up a voluntary cell phone Reverse 911 alert system.

Several persons said they think the Virginia Department of Transportation should become much more involved in maintaining ditches in lower Gloucester, cleaning them on a more regular basis and especially removing debris and making needed culvert repairs prior to a hurricane hitting the area.

One person suggested using trusties from the Gloucester jail to clean ditches or to have local residents volunteer to clean them. However, codes compliance director Ron Peaks said that there might be a liability issue of using sheriff's trusties on private property and neither they nor well-meaning volunteers would have the necessary heavy equipment needed for proper cleaning.

Perez said that some of the high-priority roads in terms of readying them for storms include Maryus Road, Ditchley Road, Allmondsville Road, and Featherbed Lane.

Besides public comments, the draft plan will include comments from a variety of agencies such as Gloucester and Abingdon Volunteer Fire and Rescue squads, Gloucester Sheriff's Office, Virginia Department of Transportation, Middle Peninsula Planning District Commission, and others.

Perez and Koll said they expect the Gloucester Planning Commission to schedule a hearing on the draft plan this summer and the Gloucester Board of Supervisors may hold its own hearing on the matter in the fall.

For more information about the draft plan, call Perez at 693-1224 or Koll at 693-2744 or visit the Gloucester County website at www.gloucesterva.info/planning.

Comments taken on flood management

BY BILL NACHMAN

The Gloucester County Departments of Planning and Codes Compliance sponsored a public meeting May 14 at Achilles Elementary School to discuss the recommendations presented in the draft Floodplain Management Plan.

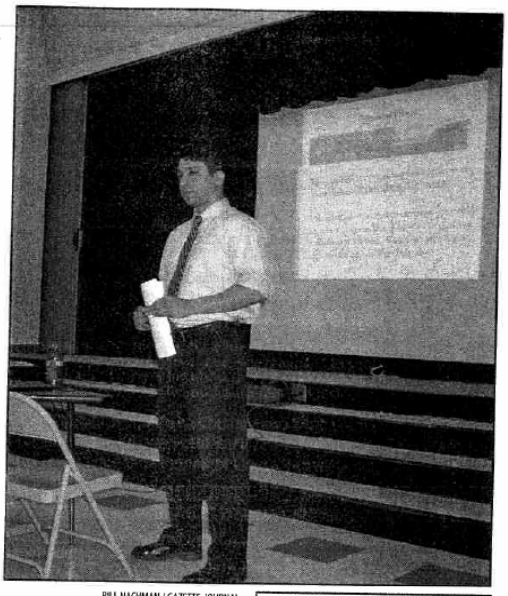
The meeting was a follow-up to two meetings held in 2007 during the development of the county's draft Floodplain Management Plan, planner Chris Perez said. At the 1½-hour meeting May 14, county staff provided information on the importance of planning for citizens living or working in flood prone areas.

Gloucester residents may benefit from the meeting in possible future savings on their flood insurance, building official Paul Koll said. Gloucester is presently rated "9"—or the starting level—on the scale, which qualifies homeowners in the floodplain here to receive a 5 percent discount on their flood insurance.

If Gloucester can identify and implement ways to better protect itself against floods in the future, homeowners might be eligible for higher discounts on their flood insurance, Koll said.

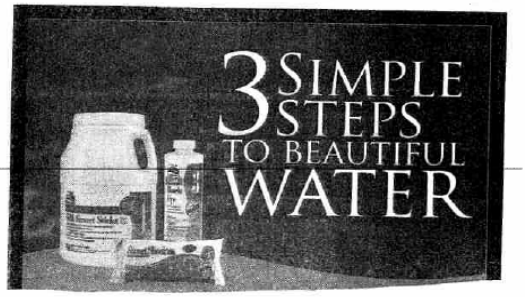
The meeting was a chance for staff and residents to talk about how Gloucester County addresses storm events. The dozen or so people who attended the meeting, including a handful of county employees and York district supervisor Teresa Altemus, were encouraged to make favorable comments as well as relate problems they have experienced during past storms, to come up with a better county assistance plans in times of floods.

Altemus said that federal stimulus money might be tapped for certain components of the draft plan, such as new emergency warning devices that might be placed in flood-prone areas to alert residents of impending danger.



BILL NACHMAN / GAZETTE-JOURNAL

Chris Perez, a planner in the Gloucester County Planning Department, was one of the speakers during a public information meeting May 14 at Achilles Elementary School about a floodplain management plan. A public hearing on the floodplain plan will be held by the Gloucester Board of Supervisors alter this year.



Source: Gloucester-Mathews Gazette Journal

June 2009 – September 2009
Formal Adoption Process

Appendix H: Board of Supervisor's Resolution Authorizing the Preparation of a Floodplain Management Plan and Establishing a Planning Committee

AT A REGULAR MEETING OF THE GLOUCESTER COUNTY BOARD OF SUPERVISORS, HELD ON TUESDAY, MAY 5, 2009, AT 7:00 P.M., IN THE BOARD ROOM IN THE COLONIAL COURTHOUSE, COURT CIRCLE, 6504 MAIN STREET, GLOUCESTER, VIRGINIA: ON A MOTION DULY MADE BY MR. ALLEN, AND SECONDED BY MS. ALTEMUS, THE FOLLOWING RESOLUTION WAS ADOPTED BY THE FOLLOWING VOTE:

Charles R. Allen, Jr., yes;
Teresa L. Altemus, yes;
Robert A. Crewe, yes;
Michelle R. Ressler, yes;
Christian D. Rilee, yes;
Louise D. Theberge, yes;
Gregory Woodard, yes;

RESOLUTION AUTHORIZING THE PLANNING DEPARTMENT AND THE DEPARTMENT OF CODES COMPLIANCE TO MOVE FORWARD WITH THE PREPARATION OF A FLOODPLAIN MANAGEMENT PLAN THAT MEETS FEMA CRS PROGRAM REQUIREMENTS AND AUTHORIZING THE ESTABLISHMENT OF A PLANNING COMMITTEE TO ANNUALLY EVALUATE AND REVIEW THE PLAN ONCE ADOPTED.

WHEREAS, Gloucester County is a participating community in FEMA's National Flood Insurance Program (NFIP), which allows the county to benefit from the Community Rating System (CRS) program. Under the program, flood insurance premiums are modified based on a point system which calculates the community's efforts to reduce future flood damage in the area beyond the minimal national standards; and

WHEREAS, in 1994, FEMA conducted an analysis of the county's floodplain management efforts, and in 1995 awarded the County a Class 9 rating in the CRS program. The rating directly affects the annual premiums of 1,528 flood insurance policy holders within Gloucester County decreasing premiums by 5 percent; and

WHEREAS, further reductions in flood insurance policy premiums are available to the county through this program; and

WHEREAS, in order to maintain its CRS rating, the county is required to prepare and adopt a flood plain management plan. The purpose of this plan is to document and analyze the county's existing coastal flood management practices and provides feasible solutions to strengthen the county's overall coastal flood management system, helping to lessen the amount of damage caused by coastal flooding; and

WHEREAS, additional CRS credits may be earned through the methods of preparation of the plan by the county including community support, public participation, and monitoring and implementation of the plan; and

WHEREAS, with activities currently being conducted by the county, the anticipated adoption of a flood plain plan and establishment of procedures for monitoring and implementation of the plan, staff anticipates being able to achieve a CRS rating that will reduce flood insurance rates up to 15 percent; and

WHEREAS, in 2007 a draft Floodplain Management Plan was prepared as part of a graduate student project with assistance from the departments of Planning, Codes Compliance, Emergency Services, and Information Technology; and

WHEREAS, two public meetings were held at Achilles Elementary School in order to engage the public on the county's flooding issues as well as gain citizen input as to what they would like to see done in the community to remedy the flood problems; and

WHEREAS, CRS officials (ISO Board) reviewed the draft plan and provided the county a list of requirements for approval including the adoption of the plan by the governing body and establishing a program for annual review of the plan's implementation and progress as well as recommendations for additional credits; and

WHEREAS, additional credits may be achieved for the CRS rating if the governing body formally endorses the planning process for the Floodplain Management Plan including establishing who is responsible for preparing the plan and specifying a completion deadline; and

WHEREAS, additional credits may also be achieved by the governing body authorizing the establishment of a planning committee that is charged with monitoring the implementation, reviewing progress and recommending revisions to the plan in an annual report submitted to the governing body, released to the media and made available to the public; and

WHEREAS, the Board of Supervisors finds that these actions will improve the quality of the planning process and its future implementation for the health, safety and welfare of the community, as well as provide additional benefits to its residents through the CRS program.

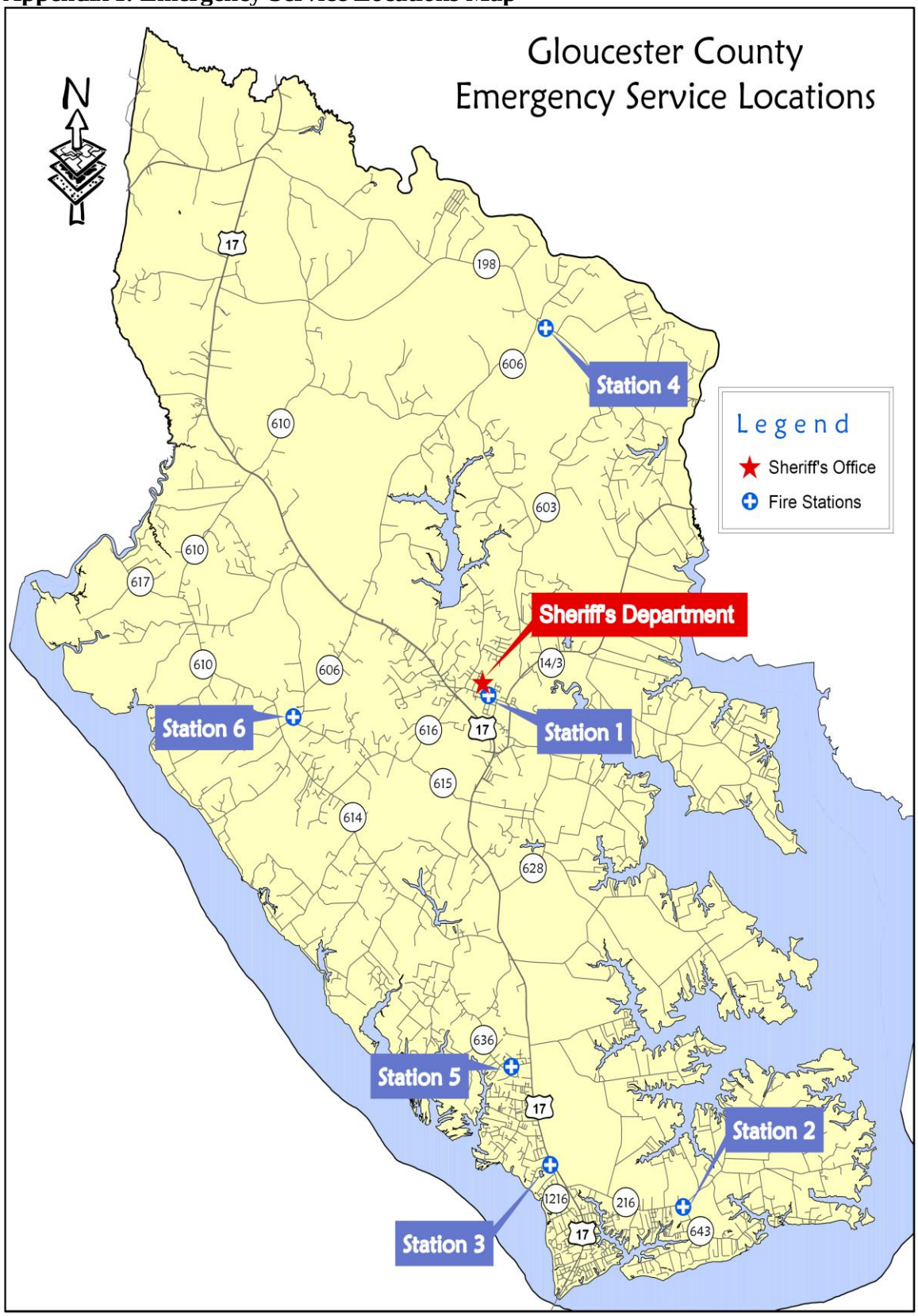
NOW, THEREFORE, BE IT RESOLVED that the Gloucester County Board of Supervisors authorizes the Department of Planning with assistance from the Department of Codes Compliance to move forward with the preparation of a Floodplain Management Plan to meet the CRS program requirements for adoption by November 2009.

BE IT FURTHER RESOLVED that the Board of Supervisors hereby authorizes the County Administrator to form a Flood Plain Management Planning Committee consisting of at least 16 members to facilitate and annually evaluate and review of the plan once adopted. At least half the committee members of this committee will be members of the public that are residents, business owners or property owners from the flood prone areas. Other members will include a member of the Board of Supervisors, the Building Official and representatives from the Planning Department, Environmental Programs Division of the Department of the Department of Codes Compliance, Department of Emergency Services, Fire and Rescue Departments, Department of Public Works, Parks, Recreation and Tourism and Community Education. Members of the Committee will be appointed upon approval of the plan.

A Copy Teste:

Brenda G. Garton, County Administrator

Appendix I: Emergency Service Locations Map



Source: Gloucester County Information Technology/ GIS Department.

Appendix J: Documentation of the Annual Review process and Update Processes

Contents:

- 2009 Board of Supervisors Resolution adopting Floodplain Management Plan
- 2010 Floodplain Management Committee report to Board of Supervisors (2006 CRS Manual Excerpt Withheld)
- 2011 Floodplain Management Committee report to Board of Supervisors (2006 CRS Manual Excerpt Withheld)
- 2012 Floodplain Management Committee report to Board of Supervisors
- 2013 Floodplain Management Committee report to Board of Supervisors
- 2014 Review and Update Information
- 2015 Floodplain Management Plan Update Board Agenda Item
- 2016 Floodplain Management Plan Update Board Agenda Item
- 2017 Floodplain Management Plan Update Board Agenda Item
- 2018 Floodplain Management Plan Update Board Agenda Item
- 2018 Floodplain Management Plan Update
- 2019 5-Year Update Letter from Floodplain Management Committee
- 2019 Board of Supervisors Resolution to Adopt 5-year Plan Update
- 2019 Board of Supervisors Agenda for adoption of 5-year Plan Update

AT A REGULAR MEETING OF THE GLOUCESTER COUNTY BOARD OF SUPERVISORS, HELD ON TUESDAY, SEPTEMBER 1, 2009, AT 7:00 P.M., IN THE BOARD ROOM IN THE COLONIAL COURTHOUSE, COURT CIRCLE, 6504 MAIN STREET, GLOUCESTER, VIRGINIA: ON A MOTION DULY MADE BY MS. THEBERGE, AND SECONDED BY MR. CREWE, THE FOLLOWING RESOLUTION WAS ADOPTED BY THE FOLLOWING VOTE:

Charles R. Allen, Jr., yes;
Teresa L. Altemus, yes;
Robert A. Crewe, yes;
Michelle R. Ressler, yes;
Christian D. Rilee, yes;
Louise D. Theberge, yes;
Gregory Woodard, yes;

RESOLUTION ADOPTING THE PROPOSED FLOODPLAIN MANAGEMENT PLAN AND AUTHORIZING THE ESTABLISHMENT OF A PLANNING COMMITTEE TO ANNUALLY EVALUATE AND REVIEW THE PLAN

WHEREAS, Gloucester County is a participating community in FEMA's National Flood Insurance Program (NFIP), which allows the County to benefit from the Community Rating System (CRS) program. Under the program, flood insurance premiums are modified based on a point system which calculates the community's efforts to reduce future damage in the area beyond the minimum national standards; and

WHEREAS, in 1994, FEMA conducted an analysis of the County's floodplain management efforts, and in 1995 awarded the County a Class 9 rating in the CRS program. The rating directly affects the annual premiums of approximately 1,528 flood insurance policy holders within Gloucester County decreasing premiums by 5 percent; and

WHEREAS, further reductions in flood insurance policy premiums are available to the County through this program; and

WHEREAS, in order to maintain its CRS rating, the County is required to prepare and adopt a floodplain management plan. The purpose of this plan is to document and analyze the County's existing coastal floodplain management practices and provide feasible solutions to strengthen the County's overall coastal flood management system, helping to lessen the amount of damage caused by coastal flooding; and

WHEREAS, additional CRS credits may be earned through the methods of preparation of the plan by the County including community support, public participation, and monitoring and implementation of the plan; and

WHEREAS, with activities currently being conducted by the County, the anticipated

adoption of a floodplain plan and establishment of procedures for monitoring and implementation of the plan, staff is striving to achieve a CRS rating that will reduce flood insurance rates up to 15 percent; and

WHEREAS, in 2007 a draft Floodplain Management Plan was prepared as part of a graduate student project with assistance from departments of Planning, Codes Compliance, Emergency Services, and Information Technology; and

WHEREAS, two public meetings were held at Achilles Elementary School in order to engage the public on the County's flooding issues as well as gain citizen input as to what they would like to see done in the community to remedy the flood problems; and

WHEREAS, CRS officials (ISO Board) reviewed the draft plan and provided the County a list of requirements for approval including the adoption of the plan by the governing body and establishing a program for annual review of the plan's implementation and progress as well as recommendations for additional credits; and

WHEREAS, on May 5, 2009 the Board of Supervisors passed a resolution authorizing the Department of Planning with assistance from the Department of Codes Compliance to move forward with the completion of a Floodplain Management Plan to meet the CRS program requirements for adoption by November 2009; and

WHEREAS, the Board of Supervisors also authorized the County Administrator to form a Floodplain Management Planning Committee consisting of at least 16 members to facilitate and annually evaluate and review of the plan once adopted. At least half the committee members of this committee will be members of the public who are residents, business owners or property owners from the flood prone areas. Other members will include a member of the Board of Supervisors, the Building Official and representatives from the Planning Department, Environmental Program Division of the Department of the Codes Compliance, Department of Emergency Services, Fire and Rescue Departments, Department of Public Works, Parks, Recreation and Tourism and Community Education. Members of the Committee will be appointed upon approval of the plan; and

WHEREAS, a third public meeting was held at Achilles Elementary School to receive citizen comments on the plan which had been drafted in response to citizen input at previous meetings as well as input from other County Departments, Fire and Rescue, Sherriff's Department and state and regional agencies; and

WHEREAS, the Gloucester County Planning Commission reviewed the proposed plan at their June meeting and scheduled a public hearing be set for their July meeting; and

WHEREAS, the Gloucester County Planning Commission held a public hearing on July 2, 2009, voting 11-0 (with two absent) to forward the Plan to the Board of Supervisors with a recommendation of approval.

NOW, THEREFORE BE IT RESOLVED by the Gloucester County Board of Supervisors that the Floodplain Management Plan attached hereto dated July 2009, is hereby adopted.

A Copy Teste:

Brenda G. Garton, County Administrator

COUNTY OF GLOUCESTER
EMERGENCY MANAGEMENT
6504 MAIN STREET, PO BOX 329
GLOUCESTER, VA 23061
Office: (804) 693-1390
Fax: (804) 693-0559

September 7, 2010

TO: Board of Supervisors

FROM: Floodplain Management Committee

SUBJECT: COASTAL FLOODPLAIN MANAGEMENT PLAN ANNUAL REVIEW

As you are all aware the Coastal Floodplain Management Plan, adopted in September 2009, requires an annual review by the Board established Floodplain Management Committee. This past June a Committee composed of 6 staff members, 1 Board Member, 2 Fire Chiefs and 11 citizens who are all affected by flooding was established. This Committee, formed under the Community Rating System (CRS) Program, specifically Activity 510, followed the steps of the annual review carefully. To date this Committee has met three times to review the Plan's recommendations and beginning to outline future strategies and goals. By ensuring the steps of Activity 510, we will continue to receive the points necessary to save money on flood insurance policies for Gloucester County citizens.

As Activity 510 states "an annual report on evaluating progress towards implementing the action plan's objectives and/or the recommendations of the area analysis," therefore the Committee has completed this task with the attached report. The Committee felt it was most important to evaluate the status of each recommendation before prioritizing and creating action plans for future work. With approval of this annual review that is being presented, the Committee will begin to evaluate the plan more closely to gain a greater perspective on the Plan's issues as well as recommendations. Again, as CRS requires, this information will continue to be documented and incorporated into the five year plan "to ensure that there is a continuing and responsive planning process."

The importance of this approval is to continue to receive credit under the CRS program for floodplain management planning, the loss of this credit will cause Gloucester County to revert back to a class 10 and receive no discounts in flood insurance.

The next goal for the Committee is to begin going through the recommendations and prioritize them according to importance and cost benefit to the Community. The Committee is also aware that some of the recommendations may need to be revised or completely eliminated based on new data; however, these changes will be made after careful consideration and studying the best course of action.

If you have any questions on the status update of the recommendations please do not hesitate to contact either Emily Ashley at 693-1390 or eashley@gloucesterva.info or Paul Koll at 693-2744 or pkoll@gloucesterva.info.

Enclosures (2): Activity 510 Floodplain Management Plan
Floodplain Management Plan Recommendations

Floodplain Management Plan Recommendations	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Structural Improvement Activities						
County should utilize road improvement priority list to prioritize the allocation of scarce resources to projects that support the largest number of unmitigated pre-FIRM structures in the SFHA.		VDOT has been invited to the FMC August 10th meeting to discuss road prioritization.		Transportation funds, which are currently not available, will have to be prioritized to go towards road repair.	Ongoing	Planning/Emergency Management/Public Works.
County should continue to monitor State Route 649 (Maryus) for washouts from flooding. The County should improve the road to withstand coastal floodwaters by elevating damaged sections and installing more appropriate roadway drainage crossings.			Not accomplished, Road needs to be monitored during future storms, coordination with VDOT and a VDOT road elevation and drainage study to determine the specifics of needed improvements. Also would need	Transportation Budget and coordination with VDOT.	2010-2011	VDOT/Emergency Management/Planning/Public Works

			to study the pros and cons of marketability for the area.			
County should keep detailed records of which roads in the County flood, how often and to what extent.			Not accomplished, Develop a list of frequently flooded roads and a process for reporting.	Staff Time	2011; Continuous Project	Emergency Management
The County should develop a semiannual ditch maintenance program for the southeastern portion of the County.			Not accomplished, a program that adequately addresses VDOT standards and citizen concerns for the area has not been developed or studied.	Transportation Budget and coordination with VDOT.	2010-2011	VDOT/Emergency Management/Planning Public Works.
County should consider permanent road signage with gauges to mark high water on frequently flooded roads in the County.			Not accomplished, this could cause turmoil for real estate agents/developers and also give a false sense of security to those evacuating.	Transportation Budget	2010-2011	VDOT/Emergency Management
The County should			Not		3 Years	Codes Compliance,

develop a Stormwater Management Plan that will help regulate the storm water throughout the County.			accomplished; the County will have to evaluate the impacts to the Community and recommend policy.			Environmental Department
The County should continue to implement the annual dam inspection and regular maintenance programs, as well as continue participation in the National Dam Safety Program.		Ongoing, the Beaverdam Reservoir Plan was adopted in December of 2008 and is updated annually.		Various Departments time for exercises and updates.	Annually	Emergency Management, Public Works, Public Utilities, Sheriff's Department.
Preventative Activities						
County should continue to zone for low density and encourage residential clustering within flood prone areas.		Ongoing through the County's current zoning Subdivision Ordinance Section 15-13. The Comprehensive Plan update will consider the impacts from flooding and severe repetitive losses.			Ongoing	Planning, Codes Compliance, Planning Commission, Board of Supervisors
Gloucester County should continue to enforce building		Ongoing			Ongoing	Codes and Compliance

regulations throughout the County.						
County should continue to require and enforce the provisions of the Floodplain Management Ordinance.		Ongoing, County recently updated and adopted a new floodplain management ordinance August 2010.			Ongoing	Codes Compliance
Property Protection Activities						
County should seek to acquire properties through a voluntary program according to the priority list in order to increase the amount of land preserved as open space.		Ongoing through the Hazard Mitigation Grant Programs and the Severe Repetitive loss Program.		Federal/State funding with in-kind local matches	Ongoing	Hazard Mitigation Management Team
The County should adopt the Floodplain Management Plan.	The Plan was adopted in Sepetember 2009; the FMC was started in June 2010.			No funding required.	Annually	Staff and Citizens that make up the Floodplain Management Committee are tasked with keeping the plan current and updated.
Natural Resource Protection Activity						
Gloucester County should continue to		Ongoing		Staff Time	Ongoing	Planning, Codes Compliance, Environmental

require and enforce the Chesapeake Bay Preservation Ordinance, the Erosion and Sediment Control Ordinance and the Wetland Zoning Ordinance						Department, Wetlands Board, CBPO Board
The County should continue to utilize its hazard identification process.		Ongoing, the hazard identification process is used in multiple planning documents including the Floodplain Management Plan, Mitigation and Emergency Operations Plan.		Staff time is used to develop the HIRA.	Ongoing	Departments required to plan for disasters and public safety.
Safety and Health Hazards						
County should assist residents with existing fuel, oil and propane tanks that are not secured by providing tie-down assistance.			Staff has not identified how many people would benefit/need this assistance nor identified funding sources.	Funding sources have not been identified but would be necessary.	1 year	Codes Compliance, Emergency Management
The County should examine the public health, safety and economic impacts			Staff has not identified the impacts to the Community or	Not known	1-2 years	Board of Supervisors, Virginia Department of Healthy, Emergency Management

associated with the increased use of alternative septic systems in the flood prone areas.			considered advising what policy changes would be needed.			
Climate Change						
As more data becomes available the County should evaluate the potential impact of climate change on the community, particularly with respect to its wetlands, and consider potential management options.		Various departments and Committees continue to learn about climate change and potential impacts. This is also being addressed in the Comprehensive Plan Update.			3 years	Board of Supervisors, Emergency Management, Planning Commission.
Emergency Service Measure						
The County should adopt a voluntary cellular telephone directory, which will work in unison with the existing reverse 911 system.			Not accomplished, the County is pursuing a rapid notification system that will allow for cell phones and by voluntary, however, it will replace the existing reverse	Funding approved through the 2010-2011 Budget Process	6 months	Emergency Management, DIT, County Administration, Human Resources

			911 system.			
Gloucester County should install an outdoor emergency warning system within the flood prone southeastern section of the county.			Due to cost, ineffectiveness and warning systems tied to nuclear emergencies in the Region this is not a viable option.	$300-400,000	N/A	Emergency Management
Public Information Activities						
The County should send an annual mass mailing with specialized information relating to property protection, flood safety and flood insurance to every property owner in a flood zone.		Ongoing, through the CRS program annual mailings with flood information are sent out to those in the floodplain.		Postage, printing cost	Annually	Emergency Management, Codes Compliance, Planning, Community Education
The County should adopt a central location where general information on flood preparedness, flood insurance and floodplain management is easily accessible to		Ongoing, a website with all floodplain management materials-have been developed and posted on the County's website. Hard copies are also available at the County Library		Staff time, Cost to print/purchase additional materials and advertising.	Annual updates	Emergency Management, Planning, Codes Compliance, Community Education

the public in a hard copy format.		locations as well as at the Codes Compliance/Building Inspections Office.				
Gloucester County should advertise the technical assistance opportunities it provides in relation to flood mitigation and preparedness, preferably in the same central location as other flood hazard information.		Same as above		Staff time/resources	Annual updates	Emergency Management, Planning, Codes Compliance, Community Education

GLOUCESTER COUNTY | MEETING DATE: September 6, 2011

BOARD OF SUPERVISORS | AGENDA ITEM# VIII – D

BOARD AGENDA ITEM

TYPE OF AGENDA ITEM:
- ☐ MINUTES OR CONSENT
- ☐ PRESENTATIONS & REPORTS
- ☒ REGULAR
- ☐ PUBLIC HEARING
  - ☐ Duly Advertised

PURPOSE OF ITEM:
- ☐ INFORMATION ONLY
- ☐ DISCUSSION ONLY
- ☒ DISCUSSION AND DECISION
  - ☐Resolution ☐Bylaws
  - ☐Ordinance

PRESENTER: Paul Koll

TITLE: Building Official

AGENDA ITEM: Coastal Floodplain Management Plan Annual Review

BACKGROUND / SUMMARY: As required per our participation in the CRS Program, the County has conducted an annual review of the Coastal Floodplain Management Plan. Attached is a summary of the recommendations that are in the plan and the Floodplain Management Committee's suggestions from the annual review of the plan.

ATTACHMENTS:
- Cover memo
- CRS Activity 510 Floodplain Management Planning (FEMA Regulations)
- 2011 Annual Review of the Recommendations in the Coastal Floodplain Management Plan

REQUESTED ACTION:

Acceptance of the Coastal Floodplain Management Plan 2011 Annual Review

FOR MORE INFORMATION, CONTACT: Name: Paul Koll

Phone#: 804-693-2744 E-mail: pkoll@gloucesterva.info

FOR USE DURING MEETING:			VOTE:		☐APPROVAL	☐DENIAL		
Y	N		Y	N		Y	N	
☐	☐	Borden	☐	☐	Crewe	☐	☐	Northstein
☐	☐	Ressler	☐	☐	Rilee	☐	☐	Theberge
☐	☐	Woodard						

December 2009 **Note: Please confine summary to one page.**

MEMORANDUM

TO: Board of Supervisors
FROM: Floodplain Management Committee
DATE: September 6, 2011

SUBJECT: COASTAL FLOODPLAIN MANAGEMENT PLAN ANNUAL REVIEW

As you are all aware, the Coastal Floodplain Management Plan, adopted in September 2009, requires an annual review by the Board established Floodplain Management Committee. This is the Committee's second annual review. It is not a recommendation to amend the plan at this time, it is only a means of reporting to the Board the issues identified and discussed by the Committee during the past twelve month period. The Committee will continue to compile this annual information for a recommendation to amend the plan in year five.

The Committee is composed of 6 County staff members, 1 Board member, 2 Fire Chiefs, and 11 citizens who are affected by flooding in the County. This Committee formed under the Community Rating System (CRS) program's Activity 510, followed the steps of the required annual review carefully. The Committee meets quarterly and to date has met seven times to review the plan, meet with various experts, and began to outline future strategies and goals. By ensuring the steps of Activity 510, the County will continue to receive CRS program points and citizens will continue to receive a 15 % discount on flood insurance premiums.

As CRS Activity 510 states, "an annual report on evaluating progress towards implementing the action plan's objectives and/or the recommendations of the area analysis", the Committee has completed its annual task with the attached report (p. 510-30). The Committee felt it was most important to evaluate the status of each recommendation before prioritizing and creating action plans for future work. With the Board's acceptance of this annual review that is being presented, the Committee will continue to evaluate the plan and prepare future recommendations. Again, as the CRS program requires, this information will continue to be documented and incorporated into the five year plan "to ensure that there is a continuing and responsive planning process" (p.510-31).

The next goal for the Committee is to begin going through the recommendations and prioritizing them according to importance and cost benefit to the Community. The committee is also aware that some of the recommendations may need to be revised or completely eliminated based on new data. However, such changes will be made after careful consideration and studying the best course of action.

If you have any questions on the status, or recommendations, please do not hesitate to contact either Paul Koll, at 693-2744 or email pkoll@gloucesterva.info OR Christopher Perez at 693-1224 or email cperez@gloucesterva.info.

Enclosures (2):
- CRS Activity 510 Floodplain Management Planning (FEMA Regulations)
- 2011 Annual Review of the Recommendations in the Coastal Floodplain Management Plan

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Structural Improvement Activities	33 - 42, 62, 63, 65						
County should use road improvement priority list to prioritize the allocation of scarce resources to projects that support the largest number of unmitigated pre-FIRM structures in the SFHA.	iv, 42, 62		VDOT met w/ the FMC at the August 10, 2010 meeting to discuss road prioritization and funding issues. Table 6 needs updating based on flooding events since the adoption of the plan.		Transportation funds, which are currently not available, will have to be prioritized to go towards road repair.	Ongoing	Planning/Emergency Management/Public Works
County should continue to monitor State Route 649 (Maryus) for washouts from flooding. The County should improve the road to withstand coastal floodwaters by elevating damaged sections and installing more appropriate roadway drainage crossings.	iv, 42, 62			Not accomplished, Road needs to be monitored during future storms, County staff should coordinate with VDOT and a VDOT road elevation and drainage study to determine the specifics of needed improvements. Also would need to study the pros and cons of marketability for the area.	Transportation Budget and coordination with VDOT.	2011-2012	VDOT/Emergency Management/Planning/ Public Works
County should keep detailed records of which roads in the County flood, how often and to what extent.	iv, 42, 63			Not accomplished, staff should coordinate with VDOT and the Sherriff's Office to develop a list of	Staff time	2011; Continuous Project	Emergency Management

				frequently flooded roads in the county, and to what extent they flood.			
The County should develop a semiannual ditch maintenance program for the southeastern portion of the County.	iv, 42, 62, 63		FMC discussed this issue in depth during the October 12th and November 16th meetings.	Not accomplished, a program that adequately addresses VDOT standards and citizen concerns for the area has not been developed or studied.	Transportation Budget and coordination with VDOT.	2011-2012	VDOT/Emergency Management/Planning Public Works
County should consider permanent road signage with gauges to mark high water on frequently flooded roads in the County.	iv, 42, 63		The FMC discussed this item at the August 9, 2011 meeting and felt this was a valuable program and would like to see funding sources sought.	Not accomplished, this could cause turmoil for real estate agents/developers and also give a false sense of security to those evacuating.	Transportation Budget	2011-2012	VDOT/Emergency Management
The County should continue to implement the annual dam inspection and regular maintenance programs, as well as continue participation in the NDSP.	v, 34, 65		Ongoing, the Beaverdam Reservoir Plan was adopted in December of 2008 and is updated annually.		Staff time from various Departments for exercises and updates.	Annually	Emergency Management/ Public Works/ Public Utilities/ Sheriff's Department
Preventative Activities	42 - 48, 64						
County should continue to zone for low density and encourage residential clustering within flood prone areas.	v, 47, 64		Ongoing through the County's current zoning Subdivision Ordinance. The Comprehensive Plan update will consider the impacts from			Ongoing	Planning/ Codes Compliance/ Planning Commission/ BOS

			flooding and severe repetitive losses.				
Gloucester County should continue to enforce building regulations throughout the County.	v, 47, 64		Ongoing			Ongoing	Codes Compliance
County should continue to require and enforce the provisions of the Floodplain Management Ordinance.	v, 48, 64		Ongoing, County recently updated and adopted a new floodplain management ordinance August 2010.			Ongoing	Codes Compliance
Property Protection Activities	48 - 53, 64						
County should seek to acquire properties through a voluntary program according to the priority list in order to increase the amount of land preserved as open space.	iv, 52, 64		Ongoing through the Hazard Mitigation Grant Programs and the Severe Repetitive Loss Program.		Federal/State funding with in-kind local matches	Ongoing	Hazard Mitigation Management Team
The County should adopt the Floodplain Management Plan.	iv, 53, 64	The Plan was adopted in September 2009; the FMC was started in June 2010 and meets quarterly and is charged with annual review and the 5 year revision of the plan.			No funding required.	Annually reports to the BOS.	Staff and Citizens that make up the Floodplain Management Committee are tasked with keeping the plan current and updated.

Natural Resource Protection Activity	61, 64, 65						
Gloucester County should continue to require and enforce the CBPO, the Erosion and Sediment Control Ordinance and the Wetland Zoning Ordinance	v, 61, 64		Ongoing		Staff time	Ongoing	Planning/ Codes Compliance/ Environmental Department/ Wetlands Board/ CBPO Board
The County should develop a Stormwater Management Plan that will help regulate the storm water throughout the County.	v, 61, 65			Not accomplished; the County will have to evaluate the impacts to the Community and recommend policy.		This item may take some time to develop and implement. It truly is a long range item.	Codes Compliance/ Environmental Department
Safety and Health Hazards	28 - 31, 64, 65						
County should assist residents with existing fuel, oil and propane tanks that are not secured by providing tie-down assistance.	v, 30, 64, 65			Staff has not identified how many people would benefit/need this assistance nor identified funding sources. Once began contact local service providers to discuss the issues.	Funding sources have not been identified but would be necessary.	1 year	Codes Compliance/ Emergency Management
The County should examine the public health, safety and economic impacts associated with the increased use of alternative septic	v, 31, 65			Staff has not identified the impacts to the Community or considered advising what policy changes would be needed.	Not known	1-2 years	BOS/ Virginia Department of Healthy/ Emergency Management

systems in the flood prone areas.							
Climate Change	9, 65						
As more data becomes available the County should evaluate the potential impact of climate change on the community, particularly with respect to its wetlands, and consider potential management options.	v, 9, 65		Various departments and Committees continue to learn about climate change and potential impacts. This is also being addressed in the Comprehensive Plan Update. At nearly every meeting in 2011 the FMC has had speakers educate members of the committee on issues related to Climate Change.			3 years	BOS/ Emergency Management/ Planning Commission
Emergency Service Measure	56 - 60, 66						
The County should continue to utilize its hazard identification process.	v, 57, 66		Ongoing, the hazard identification process is used in multiple planning documents including the Floodplain Management Plan, Mitigation and Emergency Operations Plan. Update the hazard identification section (pg 57) of the plan with the newly installed "Alert Now" system rather than the previous "Reverse 911 system".		Staff time is used to develop the HIRA.	Ongoing	Departments required to plan for disasters and public safety.

The County should adopt a voluntary cellular telephone directory, which will work in unison with the existing reverse 911 system.	v, 58, 66	The County implemented a rapid notification system ("Alert Now") that has the potential for cell phone number inclusion by voluntary, however, it replaced the existing reverse 911 system.			Funding approved through the 2010-2011 Budget Process. A small annual fee to utilize the system applies.		Emergency Management/ DIT/ County Administration/ Human Resources
Gloucester County should install an outdoor emergency warning system within the flood prone southeastern section of the county.	v, 59, 66			Due to cost, ineffectiveness and warning systems tied to nuclear emergencies in the Region this is not a viable option and it is suggested it be removed from the plan.	$300-400,000	N/A	Emergency Management
Public Information Activities	53 - 56, 66,						
The County should send an annual mass mailing with specialized information relating to property protection, flood safety and flood insurance to every property owner in a flood zone.	v, 54, 66		Ongoing, through the CRS program annual mailings with flood information are sent out to those in the floodplain. On the County Homepage it is suggested to have a subscription like Community Connection or Emergency E-alerts.		Postage, printing cost	Annually	Emergency Management/ Codes Compliance/ Planning/ Community Education

The County should adopt a central location where general information on flood preparedness, flood insurance and floodplain management is easily accessible to the public in a hard copy format.	v, 56, 67		Ongoing, a website with all floodplain management materials has been developed and posted on the County's website. Hard copies are also available at the County Library locations as well as at the Codes Compliance Office.		Staff time, cost to print/purchase additional materials and advertising.	Annual updates	Emergency Management/ Planning/ Codes Compliance/ Community Education
Gloucester County should advertise the technical assistance opportunities it provides in relation to flood mitigation and preparedness, preferably in the same central location as other flood hazard information.	v, 56, 67		Same as above		Staff time/resources	Annual updates	Emergency Management/ Planning/ Codes Compliance/ Community Education

Acronyms Used:

Board of Supervisors (BOS)
Chesapeake Bay Preservation Ordinance (CBPO)
Community Rating System (CRS)
Department of Information Technology (DIT)
Flood Insurance Rate Map (FIRM)
Floodplain Management Committee (FMC)
Hazard Identification and Risk Assessment (HIRA)
National Dam Safety Program (NDSP)
Special Flood Hazard Area (SFHA)
"The Plan" - The Coastal Floodplain Management Plan for Gloucester County, Virginia
Virginia Department of Transportation (VDOT)

GLOUCESTER COUNTY MEETING DATE: September 4, 2012

BOARD OF SUPERVISORS AGENDA ITEM#: VIII – A

BOARD AGENDA ITEM

TYPE OF AGENDA ITEM:

- ☐ MINUTES OR CONSENT
- ☐ PRESENTATIONS & REPORTS
- X REGULAR
- ☐ ADMINISTRATOR/ATTORNEY ITEMS
- ☐ PUBLIC HEARING
  - ☐ Duly Advertised

PURPOSE OF ITEM:

- ☐ INFORMATION ONLY
- ☐ DISCUSSION ONLY
- X DISCUSSION AND/OR DECISION
  - ☐Resolution ☐Bylaws
  - ☐Ordinance ☐Grant/MOU
  - X By Motion

PRESENTER: Paul Koll
Cathy Estep

TITLE: Building Official
Chair of Floodplain Management Committee

AGENDA ITEM: Coastal Floodplain Management Plan Annual Review

BACKGROUND / SUMMARY: As required per our participation in the Community Rating System (CRS) Program, the County has appointed a Floodplain Management Committee to review the adopted Floodplain Management Plans annually and provide a progress report to the County with regard to the recommendations contained in the plan. Attached is the annual report that was approved by the Floodplain Management Committee at their meeting of July 10, 2012.

ATTACHMENTS:
Cover Memo
2012 FMC's Annual Review of the Recommendations in the Coastal Floodplain Management Plan

REQUESTED ACTION: ☐ NO ACTION REQUESTED
Acceptance of the 2012 Annual Review of the Coastal Floodplain Management Plan

FOR MORE INFORMATION, CONTACT:
Name: Paul Koll
E-mail: pkoll@gloucesterva.info
Phone: 804-693-2744

FOR USE DURING MEETING: **VOTE:** ☐APPROVAL ☐DENIAL

Y	N		Y	N		Y	N	
☐	☐	Borden	☐	☐	Chriscoe	☐	☐	Hutson
☐	☐	James	☐	☐	Northstein	☐	☐	Orth
☐	☐	Theberge						

MEMORANDUM

TO: Board of Supervisors

FROM Floodplain Management Committee

DATE: September 4, 2012

SUBJECT: COASTAL FLOODPLAIN MANAGEMENT PLAN ANNUAL REVIEW

The Coastal Floodplain Management Plan, adopted in September 2009, requires an annual review by the Board established Floodplain Management Committee (FMC). This is the Committee's third annual review. It is not a recommendation to amend the plan at this time, it is only a means of reporting to the Board the issues identified and discussed by the Committee during the past year. The Committee will continue to compile annual information in preparation of a review and update to the plan in year five.

The Committee is composed of six (6) County staff members from various departments, one Board member, and a representative from each of the Volunteer Fire and Rescue Departments, and up to eleven citizens or business owners that may be affected by flooding in the County. This Committee was formed by a Board resolution pursuant to the Community Rating System (CRS) program's Activity 510 and appointed by the County Administrator. Citizen volunteers were solicited from the Volunteer Board Bank. The Committee meets quarterly to review the plan, meet with various experts, and to outline future strategies, goals and activities to implement the plan. The Department of Emergency Management would typically be the lead Department in coordinating the activities of the FMC, however in the absence of a permanent Emergency Management Coordinator, other departments and staff members have stepped forward to make sure the FMC continues to fulfill its role in the CRS program. By ensuring the steps of Activity 510, the County will continue to receive CRS program points and citizens will continue to receive a 15 % discount on flood insurance premiums and the community will continue to be better prepared for future flooding events.

As CRS Activity 510 states, "an annual report on evaluating progress towards implementing the action plan's objectives and/or the recommendations of the area analysis", the Committee has completed its annual task with the attached report which was reviewed and approved at the July 10, 2012 meeting. With the Board's acceptance of this annual review that is being presented, the Committee will continue to evaluate the plan, prepare future recommendations, and work on implementation. Again, as the CRS program requires, this information will

continue to be documented and incorporated into the five year plan "to ensure that there is a continuing and responsive planning process".

The Committee is also aware that some of the recommendations may need to be revised or completely eliminated based on new data. However, such changes will be made after careful consideration, public input and studying the best course of action and the most up to date information available.

If you have any questions on the review, the plan or the committee, please do not hesitate to contact Paul Koll, Building Official at 693-2744 or email pkoll@gloucesterva.info or Anne Ducey-Ortiz, Planning Director, at 693-1224 or email aducey@gloucesterva.info.

2012 In Progress Review of the Recommendations in the Coastal Floodplain Management Plan

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Structural Improvement Activities	33 - 42, 62, 63, 65						
County should use road improvement priority list to prioritize the allocation of scarce resources to projects that support the largest number of unmitigated pre-FIRM structures in the SFHA.	iv, 42, 62		VDOT met w/ the FMC at the August 10, 2010 meeting to discuss road prioritization and funding issues. Table 6 needs updating based on flooding events since the adoption of the plan.	Not accomplished, flood gauges will help to prioritize. Need a staff person to coordinate w/VDOT on the updated list.[1]	Transportation funds, which are currently not available, will have to be prioritized to go towards road repair..	Ongoing	Planning/Emergency Management/Public Works

[1] **Five of five flood gauges are pending funding and approval for grant application and operation of gauges.*

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
County should continue to monitor State Route 649 (Maryus) for washouts from flooding. The County should improve the road to withstand coastal floodwaters by elevating damaged sections and installing more appropriate roadway drainage crossings.	iv, 42, 62			Not accomplished, Road needs to be monitored during future storms, placing a flood gauge here will help to monitor flooding and washouts, County staff should coordinate with VDOT and a VDOT road elevation and drainage study to determine the specifics of needed improvements. Also would need to study the pros and cons of marketability for the area.	Transportation Budget and coordination with VDOT.	2011-2012	VDOT/Emergency Management/Planning/ Public Works
County should keep detailed records of which roads in the County flood, how often and to what extent.	iv, 42, 63			Not accomplished, staff should coordinate with VDOT and the Sherriff's Office to develop a list of frequently flooded roads in the county, and to what extent they flood.	Staff time	2011; Continuous Project	Emergency Management
The County should develop a semiannual ditch maintenance program for the southeastern portion of the County.	iv, 42, 62, 63			Not accomplished, a program that adequately addresses VDOT standards and citizen concerns for the area has not been developed or studied.	Transportation Budget and coordination with VDOT. Currently, there is no County maintenance of roads	2011-2012	VDOT/Emergency Management

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
County should consider permanent road signage with gauges to mark high water on frequently flooded roads in the County.	iv, 42, 63	A grant application was submitted to VDEM/FEMA by the County's HMGP Coordinator for 5 flood level gauges to be installed in flood prone areas in the County. The Board authorized the grant application on July 3, 2012.	The FMC also discussed use of informational signage for purposes providing historic flood levels that could be installed inexpensively by using the County's sign shop to construct the signs and volunteers to install them at flood prone road segments.		Grant funding, contingency fund and ongoing cost of staffing and monitoring for the flood gauges. The total cost of the application will not exceed $3,000 and would be covered through the County Administrator's Contingency Fund. Static informational signage could be done in-house and be primarily for the materials used.	2012-2013	Emergency Management
The County should continue to implement the annual dam inspection and regular maintenance programs, as well as continue participation in the NDSP.	v, 34, 65		Ongoing, the Beaverdam Reservoir Plan was adopted in December of 2008 and is updated annually.		Staff time from various Departments for exercises and updates.	Annually	Emergency Management/ Public Works/ Public Utilities/ Sheriff's Department

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Preventative Activities	42 - 48, 64						
County should continue to zone for low density and encourage residential clustering within flood prone areas.	v, 47, 64		Ongoing through the County's current zoning Subdivision Ordinance. The Comprehensive Plan update will consider the impacts from flooding and severe repetitive losses.			Ongoing	Planning/ Codes Compliance/ Planning Commission/ BOS
Gloucester County should continue to enforce building regulations throughout the County.	v, 47, 64		Ongoing			Ongoing	Codes Compliance
County should continue to require and enforce the provisions of the Floodplain Management Ordinance.	v, 48, 64		Ongoing, County recently updated and adopted a new floodplain management ordinance August 2010.			Ongoing	Codes Compliance
Property Protection Activities	48 - 53, 64						
County should seek to acquire properties through a voluntary program according to a priority list in order to increase the amount of land preserved as open space.	iv, 52, 64	As of 6/14/12, sixteen acquisition reviews are pending through the HMGP	Ongoing through the Hazard Mitigation Grant Programs and the Severe Repetitive Loss Program.	Acquisitions not acquired by a priority list – totally voluntary and by owners' choice	Federal/State funding with in-kind local matches	Ongoing	Hazard Mitigation Management Team Planning Long Term Maintenance: Parks & Rec, Building & Grounds Maintenance

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
The County should adopt the Floodplain Management Plan.	iv, 53, 64	The Plan was adopted in September 2009; the FMC was started in June 2010 and meets quarterly and is charged with annual review and the 5 year revision of the plan.			Staff time and resources. As part of the five year update additional costs will be incurred for public meetings and outreach to update the plan.	Annually reports to the BOS.	Emergency Management and other departmental staff and citizens that make up the Floodplain Management Committee are tasked with keeping the plan current and updated.
Natural Resource Protection Activity	61, 64, 65						
Gloucester County should continue to require and enforce the CBPO, the Erosion and Sediment Control Ordinance and the Wetland Zoning Ordinance	v, 61, 64		Ongoing		Staff time	Ongoing	Planning/ Codes Compliance/ Environmental Department/ Wetlands Board/ CBPO Board
The County should develop a Stormwater Management Plan that will help regulate the storm water throughout the County.	v, 61, 65			Not accomplished; the County will have to evaluate the impacts to the Community and recommend policy.		This item may take some time to develop and implement. It truly is a long range item.	Codes Compliance/ Environmental Programs Division

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Safety and Health Hazards	28 - 31, 64, 65						
County should assist residents with existing fuel, oil and propane tanks that are not secured by providing tie-down assistance.	v, 30, 64, 65			Staff has not identified how many people would benefit/need this assistance nor identified funding sources. Once began contact local service providers to discuss the issues.	Funding sources have not been identified but would be necessary for outreach and implementation.	1 year	Codes Compliance/ Emergency Management
The County should examine the public health, safety and economic impacts associated with the increased use of alternative septic systems in the flood prone areas.	v, 31, 65			Staff has not identified the impacts to the Community or considered advising what policy changes would be needed. Prohibiting the use of alternative septic systems is not enabled by the code of Virginia.	Not known	1-2 years	BOS/ Virginia Department of Healthy/ Emergency Management
Climate Change	9, 65						

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
As more data becomes available the County should evaluate the potential impact of climate change on the community, particularly with respect to its wetlands, and consider potential management options.	v, 9, 65	At nearly every meeting in 2011 the FMC has had speakers educate members of the committee on issues related to Climate Change. MPPDC produced the "Start Adaption and Response Today" report which addresses local government tools for addressing sea level rise in Virginia, as well as specific recommendations for the Middle Peninsula. At the request of UVA IEN, the County Administrator appointed a Sea Level Rise Focus Group which will meet in October 2012.	Various departments and Committees continue to learn about climate change and potential impacts. This is also being addressed in the Comprehensive Plan Update. HRPDC and MPPDC are both working on compiling data and recommending strategies for consideration by localities.			Ongoing	BOS/ Emergency Management/ Planning Commission/ Planning/ MPPDC /HRPDC

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Emergency Service Measure	56 - 60, 66						
The County should continue to utilize its hazard identification process.	v, 57, 66		Ongoing, the hazard identification process is used in multiple planning documents including the Floodplain Management Plan, Mitigation and Emergency Operations Plan. Update the hazard identification section (pg 57) of the plan with the newly installed "Alert Now" system rather than the previous "Reverse 911 system".		Staff time is used to develop the HIRA.	Ongoing	Emergency Management and other Departments and agencies required to plan for disasters and public safety.
The County should adopt a voluntary cellular telephone directory, which will work in unison with the existing reverse 911 system.	v, 58, 66	The County implemented a rapid notification system ("Alert Now") that has the potential for cell phone number inclusion by voluntary, however, it replaced the existing reverse 911 system.			Funding approved through the 2010-2011 Budget Process. A small annual fee to utilize the system applies.		Emergency Management/ DIT/ County Administration/ Human Resources

2012 In Progress Review of the Recommendations in the Coastal Floodplain Management Plan
Gloucester County, Virginia
Presented to the BOS - September 4, 2012
page 8

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Gloucester County should install an outdoor emergency warning system within the flood prone southeastern section of the county.	v, 59, 66			Due to cost, ineffectiveness and warning systems tied to nuclear emergencies in the Region this is not a viable option and it is suggested it be removed from the plan.	$300-400,000	N/A	Emergency Management
Public Information Activities	53 - 56, 66,						
The County should send an annual mass mailing with specialized information relating to property protection, flood safety and flood insurance to every property owner in a flood zone.	v, 54, 66		Ongoing, through the CRS program annual mailings with flood information are sent out to those in the floodplain. On the County Homepage it is suggested to have a subscription like Community Connection or Emergency E-alerts.		Postage, printing cost	Annually	Emergency Management/ Codes Compliance/ Community Education (Beehive publication)
The County should adopt a central location where general information on flood preparedness, flood insurance and floodplain management is easily accessible to the public in a hard copy format.	v, 56, 67		Ongoing, a website with all floodplain management materials has been developed and posted on the County's website. Hard copies are also available at the County Library locations as well as at the Codes Compliance Office.		Staff time, cost to print/purchase additional materials and advertising.	Annual updates	Emergency Management/ Codes Compliance/ Community Education /Library

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Gloucester County should advertise the technical assistance opportunities it provides in relation to flood mitigation and preparedness, preferably in the same central location as other flood hazard information.	v, 56, 67		Same as above		Staff time/resources	Annual updates	Emergency Management/ Codes Compliance/ Community Education

Acronyms Used:

Board of Supervisors (BOS)
Chesapeake Bay Preservation Ordinance (CBPO)
Community Rating System (CRS)
Department of Information Technology (DIT)
Federal Emergency Management Agency (FEMA)
Flood Insurance Rate Map (FIRM)
Floodplain Management Committee (FMC)
Hazard Identification and Risk Assessment (HIRA)
Hazard Mitigation Grant Program (HMGP)
National Dam Safety Program (NDSP)
Special Flood Hazard Area (SFHA)
"The Plan" - The Coastal Floodplain Management Plan for
University of Virginia Institute for Environmental Negotiation (UVA IEN)
Virginia Department of Emergency Management (VDEM)
Virginia Department of Transportation (VDOT)

Recommendations for Future Update:

1. Perform an elevation study to make sure the ditches are draining in the correct direction
2. Acquisition and restoration of low lying lands
3. Protect and restore natural shoreline buffers
4. Reduce development in flood prone areas
5. Create a priority list for acquisition
6. Focus on win/win alternatives – for example protected open space and wetlands can benefit tourism, improve water quality which benefits seafood industry, recreation and quality of life as well as flood plan management and economic development;
7. Add Beach and Dune Ordinance to Plan v, 61, 64.

GLOUCESTER COUNTY MEETING DATE: October 1, 2013

BOARD OF SUPERVISORS AGENDA ITEM# : VIII - A

BOARD AGENDA ITEM

TYPE OF AGENDA ITEM:
- ☐ MINUTES OR CONSENT
- ☐ PRESENTATIONS & REPORTS
- X REGULAR
- ☐ ADMINISTRATOR/ATTORNEY ITEMS
- ☐ PUBLIC HEARING
  - ☐ Duly Advertised

PURPOSE OF ITEM:
- ☐ INFORMATION ONLY
- ☐ DISCUSSION ONLY
- X DISCUSSION AND/OR DECISION
  - ☐ Resolution ☐ Bylaws
  - ☐ Ordinance ☐ Grant/MOU
  - X By Motion

PRESENTER: Cathy Estep **TITLE**: Chair, Floodplain Management Committee

AGENDA ITEM: Coastal Floodplain Management Plan Annual Review

BACKGROUND / SUMMARY: In accordance with the County's participation in the Community Rating System (CRS), an appointed Floodplain Management Committee (FMC) reviews the Board adopted Floodplain Management Plan annually and provides progress reports to the County with regard to the recommendations contained in the plan. To this end, attached is the fourth annual report that was approved by the Floodplain Management Committee at their September 25, 2013 meeting.

ATTACHMENTS:

Memorandum from committee chair
Annual FMC review of Coastal Floodplain Management Plan Recommendations

REQUESTED ACTION: ☐ NO ACTION REQUESTED

Consider accepting the FMC review, by Board of Supervisor motion

FOR MORE INFORMATION, CONTACT: Name: Creig Moore

Phone#: (804) 693-1390 E-mail: cmoore@gloucesterva.info

FOR USE DURING MEETING:

Y	N		**VOTE:** Y	N		☐APPROVAL Y	N	☐DENIAL Y	N	
☐	☐	Borden	☐	☐	Hutson	☐	☐	☐	☐	Northstein
☐	☐	Chriscoe	☐	☐	Orth	☐	☐	☐	☐	Theberge
☐	☐	James								

January 2012 **Note: Please confine summary to one page.**

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MEMORANDUM

TO: Board of Supervisors - BOS

FROM Cathy Estep, Chair and Members of the Floodplain Management Committee

DATE: 20 September 2013

SUBJECT: Coastal Floodplain Management Plan's - BOS Annual Review

The Coastal Floodplain Management Plan, adopted in September 2009, requires an annual review by the Board established Floodplain Management Committee (FMC). This is the Committee's fourth annual review. It is not a recommendation to amend the plan at this time, it is only a means of reporting to the Board the issues identified and discussed by the Committee during the past year. The Committee will continue to compile annual information in preparation of a review and update to the plan in year five.

The Committee is composed of six (6) County staff members from various departments, one Board member, and a representative from each of the Volunteer Fire and Rescue Departments, and up to eleven citizens or business owners that may be affected by flooding in the County. This Committee was formed by a Board resolution pursuant to the Community Rating System (CRS) program's Activity 510 and appointed by the County Administrator. Citizen volunteers were solicited from the Volunteer Board Bank. The Committee meets quarterly to review the plan, meet with various experts, and to outline future strategies, goals and activities to implement the plan. The Department of Emergency Management is the lead Department in coordinating the activities of the FMC to make sure the FMC continues to fulfill its role in the CRS program. By ensuring the steps of Activity 510, the County will continue to receive CRS program points and citizens will continue to receive a 15 % discount on flood insurance premiums and the community will continue to be better prepared for future flooding events.

As CRS Activity 510 states, "an annual report on evaluating progress towards implementing the action plan's objectives and/or the recommendations of the area analysis", the Committee has completed its annual task with the attached report which was reviewed and approved at the September 25th, 2013 Special Meeting. With the Board's acceptance of this annual review that is being presented, the Committee will continue to evaluate the plan, prepare future recommendations, and work on implementation. Again, as the CRS program requires, this information will continue to be documented and incorporated into the five year plan "to ensure that there is a continuing and responsive planning process".

The Committee is also aware that some of the recommendations may need to be revised or completely eliminated based on new data. However, such changes will be made after careful consideration, public input and studying the best course of action and the most up to date information available.

If you have any questions on the review, the plan or the committee, please do not hesitate to contact C. Creig Moore, Emergency Management – Coordinator at 693-1390 or e-mail at cmoore@gloucesterva.info OR Paul Koll, Building Official at 693-2744 or email pkoll@gloucesterva.info .

2013 In Progress Review of the Recommendations in the Coastal Floodplain Management Plan

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Structural Improvement Activities	33 - 42, 62, 63, 65						
County should use road improvement priority list to prioritize the allocation of scarce resources to projects that support the largest number of unmitigated pre-FIRM structures in the SFHA.	iv, 42, 62		VDOT met w/ the FMC at the August 10, 2010 meeting to discuss road prioritization and funding issues. Table 6 needs updating based on flooding events since the adoption of the plan.	Not accomplished. Flood gauges will help to prioritize. Need a staff person to coordinate w/VDOT on the updated list.[1]	Transportation funds, which are currently not available, will have to be prioritized to go towards road repair.	Ongoing	County Admin (ACA/CD) / Emergency Management / Public Works / Planning & Zoning

[1] *Grant application was approved, funding five of five requested flood gauges.*

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
County should continue to monitor State Route 649 (Maryus) for washouts from flooding. The County should improve the road to withstand coastal floodwaters by elevating damaged sections and installing more appropriate roadway drainage crossings.	iv, 42, 62			Not accomplished. Road needs to be monitored during future storms, placing a flood gauge here will help to monitor flooding and washouts, County staff should coordinate with VDOT and a VDOT road elevation and drainage study to determine the specifics of needed improvements. Also would need to study the pros and cons of marketability for the area.	Transportation Budget and coordination with VDOT.	2014-2015	VDOT/ County Admin (ACA/CD)/ Emergency Management / Planning & Zoning / Public Works
County should keep detailed records of which roads in the County flood, how often and to what extent.	iv, 42, 63		The EOP revision and move to ICS structure will aid in capturing flood event information.	Not accomplished. Staff should coordinate with VDOT and the Sherriff's Office to develop a list of frequently flooded roads in the county, and to what extent they flood.	Staff time	Continuous Project; unassigned.	VDOT / Emergency Management
The County should develop a semiannual ditch maintenance program for the southeastern portion of the County.	iv, 42, 62, 63		The County is involved in a regional study to identify critical road receiving ditch ownership and investigate the potential existence of deeded easements; the study has not been finalized.	Not accomplished. A program that adequately addresses VDOT standards and citizen concerns for the area has not been developed.	Transportation Budget and coordination with VDOT. Currently, there is no County maintenance of roads.	No projected timeframe.	VDOT/ Emergency Management / BOS

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
County should consider permanent road signage with gauges to mark high water on frequently flooded roads in the County.	iv, 42, 63	After the BOS provided authorization in July 2012, a grant application for five (5) flood level gauges to be installed in flood prone areas of the County was submitted to VDEM/FEMA by the County's HMGP Coordinator. The County has been notified that the grant (and all twelve sites on the application) was approved. The grant will provide for the location of five (5) flood gauges as requested.	The FMC also discussed use of informational signage for purposes providing historic flood levels that could be installed inexpensively by using the County's sign shop to construct the signs and volunteers to install them at flood prone road segments.		Grant funding, contingency fund and ongoing cost of staffing and monitoring for the flood gauges. Static informational signage could be done in-house and be primarily for the materials used.	2013-2014	Emergency Management / Public Works
The County should continue to implement the annual dam inspection and regular maintenance programs, as well as continue participation in the NDSP.	v, 34, 65		Ongoing. The Emergency Action Plan (EAP) for the Beaverdam Reservoir Dam was adopted in December of 2008 and is updated annually.		Staff time from various Departments for exercises and updates.	Annually	Emergency Management / Public Works / Public Utilities / Sheriff's Department

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Preventative Activities	42 - 48, 64						
County should continue to zone for low density and encourage residential clustering within flood prone areas.	v, 47, 64		Ongoing through the County's current zoning Subdivision Ordinance. The Comprehensive Plan update will consider the impacts from flooding and severe repetitive losses.			Ongoing	Planning & Zoning / Planning Commission / BOS
Gloucester County should continue to enforce building regulations throughout the County.	v, 47, 64		Ongoing			Ongoing	Building Inspection
County should continue to require and enforce the provisions of the Floodplain Management Ordinance.	v, 48, 64		Ongoing. FEMA delivered new, preliminary FIRMs w/ anticipated County adoption in Fall 2014; Floodplain Ordinance due for rewrite in 2014.			Ongoing	Building Inspection / BOS
Property Protection Activities	48 - 53, 64						
County should seek to acquire properties through a voluntary program according to a priority list in order to increase the amount of land preserved as open space.	iv, 52, 64	As of 8/08/13, 16 acquisition reviews are pending through the HMGP	Ongoing through the Hazard Mitigation Grant Programs and the Severe Repetitive Loss Program.	Acquisitions not acquired by a priority list – totally voluntary and by owners' choice. New FEMA guidance removed the cost/benefit requirements, which will allow for more flexibility in targeting certain areas.	Federal/State funding with in-kind local matches	Ongoing	Hazard Mitigation Management Team / Planning & Zoning; Long Term Maintenance: Parks & Rec / Building & Grounds Maintenance

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
The County should adopt the Floodplain Management Plan.	iv, 53, 64	The Plan was adopted in September 2009. The FMC was created in June 2010; it meets quarterly, and is charged with annual review and the 5 year revision of the plan.			Staff time and resources. As part of the five year update, additional costs will be incurred for public meetings and outreach to update the plan.	Annually reports to the BOS.	Emergency Management and other departmental staff and citizens that make up the Floodplain Management Committee are tasked with keeping the plan current and updated.
Natural Resource Protection Activity	61, 64, 65						
Gloucester County should continue to require and enforce the CBPO, the Erosion and Sediment Control Ordinance and the Wetland Zoning Ordinance	v, 61, 64		Ongoing		Staff time	Ongoing	Environmental Programs / Planning & Zoning / Wetlands Board / CBPO Board
The County should develop a Stormwater Management Plan that will help regulate the storm water throughout the County.	v, 61, 65			Not accomplished; the County will have to evaluate the impacts to the Community and recommend policy.		This item may take some time to develop and implement. It truly is a long range item.	Environmental Programs / Planning & Zoning

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Safety and Health Hazards	28 - 31, 64, 65						
County should assist residents with existing fuel, oil and propane tanks that are not secured by providing tie-down assistance.	v, 30, 64, 65			Staff have neither identified how many people would benefit from / need this assistance, nor identified funding sources. Once begun, contact local service providers to discuss the issues – among them are liability concerns.	Funding sources have not been identified, but would be necessary for outreach and implementation.	1 year from assignment	Emergency Management / Building Inspection
The County should examine the public health, safety and economic impacts associated with the increased use of alternative septic systems in the flood prone areas.	v, 31, 65		County Code restricts installation of alternative systems where the distance between the soil surface and the water table is less than 12".	Staff have not quantified the impacts to the Community or considered advising what policy changes would be needed. Prohibiting the use of alternative septic systems is not enabled by the code of Virginia.	Not known	1-5 years from assignment	BOS / Virginia Department of Health / Emergency Management

Climate Change	9, 65						
As more data becomes available the County should evaluate the potential impact of climate change on the community, particularly with respect to its wetlands, and consider potential management options.	v, 9, 65	Since 2011, the FMC has had speakers at nearly every meeting to provide information on issues related to Climate Change. MPPDC produced the "Start Adaption and Response Today" report, which addresses local government tools for addressing sea level rise in Virginia - as well as some specific to the Middle Peninsula. (There are many more studies available) At the request of UVA's IEN, the County Administrator appointed a Sea Level Rise Focus Group - which met in October 2012 and had its final report published in January 2013.	Various departments and Committees continue to learn about climate change and potential impacts. This is also being addressed in the Comprehensive Plan Update. HRPDC and MPPDC are both working on compiling data and recommending strategies for consideration by localities.			Ongoing	BOS / Emergency Management / Planning & Zoning / Planning Commission / MPPDC / HRPDC / FPMC / VIMS

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Emergency Service Measure	56 - 60, 66						
The County should continue to utilize its hazard identification process.	v, 57, 66		Ongoing. The hazard identification process is used in multiple planning documents - including the Floodplain Management Plan, Mitigation and Emergency Operations Plan. Update the hazard identification section (pg 57) of the plan with the newly installed "Code Red" system rather than the previous "Reverse 911 system".		Staff time is used to develop the HIRA.	Ongoing	Emergency Management and other Departments and agencies required to plan for disasters and public safety.
The County should adopt a voluntary cellular telephone directory, which will work in unison with the existing reverse 911 system.	v, 58, 66	The County has implemented a rapid notification system ("Code Red") which has an "opt-in" cell phone database; this feature is now in use. "Code Red" replaced the reverse 911 system.			Funding approved through the 2010-2011 Budget Process. A small annual fee to utilize the system applies.		Emergency Management/ DIT/ County Administration/ Human Resources

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Gloucester County should install an outdoor emergency warning system within the flood-prone southeastern section of the county.	v, 59, 66			Due to cost, ineffectiveness, and warning systems tied to nuclear emergencies in the Region, this is not a viable option - and it is suggested it be removed from the plan.	$300-400,000	N/A	Emergency Management
Public Information Activities	53 - 56, 66,						
The County should send an annual mass mailing with specialized information relating to property protection, flood safety and flood insurance to every property owner in a flood zone.	v, 54, 66		Ongoing. Through the CRS program, annual mailings with flood information are sent out to those in the floodplain. It has been/is suggested to have a subscription (like Community Connection) on the County Homepage.		Postage, printing cost	Annually	Building Inspection / Emergency Management / Community Education (Beehive publication)
The County should adopt a central location where general information on flood preparedness, flood insurance and floodplain management is easily accessible to the public in a hard copy format.	v, 56, 67		Ongoing. A website with all floodplain management materials has been developed and posted on the County's website. Hard copies are also available at the County Library locations as well as in the Building Inspection Office.		Staff time, cost to print/purchase additional materials, and advertising.	Annual updates	Emergency Management / Building Inspection / Community Education / Library

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Gloucester County should advertise the technical assistance opportunities it provides in relation to flood mitigation and preparedness, preferably in the same central location as other flood hazard information.	v, 56, 67		Same as above		Staff time/resources	Annual updates	Emergency Management/ Building Inspection / Community Education

Acronyms Used:
Assistant County Administrator for Community Development (ACA/CD)
Board of Supervisors (BOS)
Chesapeake Bay Preservation Ordinance (CBPO)
Community Rating System (CRS)
Department of Information Technology (DIT)
Federal Emergency Management Agency (FEMA)
Flood Insurance Rate Map (FIRM)
Floodplain Management Committee (FMC)
Hazard Identification and Risk Assessment (HIRA)
Hazard Mitigation Grant Program (HMGP)
National Dam Safety Program (NDSP)
Special Flood Hazard Area (SFHA)
"The Plan" - The Coastal Floodplain Management Plan for
University of Virginia Institute for Environmental Negotiation (UVA IEN)
Virginia Department of Emergency Management (VDEM)
Virginia Department of Transportation (VDOT)

Recommendations for Future Update:

1. Perform an elevation study to make sure the ditches are draining in the correct direction;
2. Acquisition and restoration of low lying lands;
3. Protect and restore natural shoreline buffers;
4. Reduce development in flood prone areas;
5. Create a priority list for acquisition;
6. Focus on win/win alternatives – for example protected open space and wetlands can benefit tourism, improve water quality which benefits seafood industry, recreation and quality of life as well as flood plan management and economic development;
7. Add the use of comprehensive coastal resource management plans/tools to offset the impacts of recurrent flooding and tidal inundation; http://ccrm.vims.edu/ccrmp/index.html
8. Add Coastal Primary Sand Dune Zoning Ordinance of Gloucester County, Virginia, or "Dune and Beach" ordinance to Plan v, 61, 64.

GLOUCESTER COUNTY
BOARD OF SUPERVISORS

MEETING DATE: September 15, 2015
AGENDA ITEM#: V – A

BOARD AGENDA ITEM

TYPE OF AGENDA ITEM:

- [X] MINUTES OR CONSENT
- [ ] PRESENTATIONS & REPORTS
- [ ] REGULAR
- [ ] ADMINISTRATOR/ATTORNEY ITEMS
- [ ] PUBLIC HEARING
  - [ ] Duly Advertised

PURPOSE OF ITEM:

- [ ] INFORMATION ONLY
- [ ] DISCUSSION ONLY
- [X] DISCUSSION AND/OR DECISION
  - [ ] Resolution
  - [ ] Ordinance
  - [X] By Motion

PRESENTER: Cathy Estep

TITLE: Chair, Floodplain Management Committee

AGENDA ITEM: Coastal Floodplain Management Plan Annual Review

BACKGROUND / SUMMARY: In accordance with the County's participation in the Community Rating System (CRS), an appointed Floodplain Management Committee (FMC) reviews the Board adopted Floodplain Management Plan annually and provides progress reports to the County with regard to the recommendations contained in the plan. To this end, attached is the 2015 annual report that was approved by the Floodplain Management Committee at their August 12, 2015 meeting.

Ms. Estep will provide a presentation at a future meeting.

ATTACHMENTS:

Cover Memo
2015 Annual FMC review of the Coastal Floodplain Management Plan Recommendations

REQUESTED ACTION: [ ] NO ACTION REQUESTED

Consider accepting the FMC review, by Board of Supervisors motion

FOR MORE INFORMATION, CONTACT: Name: Paul Koll, Building Official

Phone#: (804) 693-1390 E-mail: pkoll@gloucesterva.info

January 2015 **Note: Please confine summary to one page** Page 3

GLOUCESTER COUNTY MEETING DATE: September 20, 2016

BOARD OF SUPERVISORS AGENDA ITEM#: V – A

BOARD AGENDA ITEM

TYPE OF AGENDA ITEM:

- [ ] MINUTES OR CONSENT
- [ ] PRESENTATIONS & REPORTS
- [X] REGULAR
- [ ] ADMINISTRATOR/ATTORNEY ITEMS
- [ ] PUBLIC HEARING
  - [ ] Duly Advertised

PURPOSE OF ITEM:

- [ ] INFORMATION ONLY
- [ ] DISCUSSION ONLY
- [X] DISCUSSION AND/OR DECISION
  - [X] Resolution
  - [ ] Ordinance
  - [ ] By Motion

PRESENTER: Paul F. Koll, CBO, MCP **TITLE:** Building Official

AGENDA ITEM: Floodplain Management Plan Annual Review

BACKGROUND / SUMMARY: The Coastal Floodplain Management Plan, adopted in September 2014, requires an annual review by the Board established Floodplain Management Committee (FMC). The CRS program requires that the FMC review progress toward the recommendations included in the plan each year and then revise the plan five years after adoption.

The attached table provides the necessary review (year 2) following re-adoption. FMC representatives plan to attend a Board meeting in the near future to discuss this review and provide further updates relative to the CRS program.

ATTACHMENTS:

2016 Progress review of coastal floodplain management plan recommendations

REQUESTED ACTION: [ ] NO ACTION REQUESTED

Accept the FMC annual review through approval of the consent agenda

FOR MORE INFORMATION, CONTACT: Name: Paul F. Koll

Phone#: (804) 693-2744 E-mail: pkoll@gloucesterva.info

Page 3

January 2014 **Note: Please confine summary to one page**

GLOUCESTER COUNTY MEETING DATE: September 5, 2017

BOARD OF SUPERVISORS AGENDA ITEM#: V – C

BOARD AGENDA ITEM

TYPE OF AGENDA ITEM:

- [X] MINUTES OR CONSENT
- [ ] PRESENTATIONS & REPORTS
- [ ] REGULAR
- [ ] ADMINISTRATOR/ATTORNEY ITEMS
- [ ] PUBLIC HEARING
  - [ ] Duly Advertised

PURPOSE OF ITEM:

- [ ] INFORMATION ONLY
- [ ] DISCUSSION ONLY
- [X] DISCUSSION AND/OR DECISION
  - [ ] Resolution
  - [ ] Ordinance
  - [ ] By Motion

PRESENTER: Paul F. Koll, CBO, MCP **TITLE:** Building Official

AGENDA ITEM: Floodplain Management Plan Annual Review

BACKGROUND / SUMMARY: The Coastal Floodplain Management Plan, adopted in September 2014, requires an annual review by the Board established Floodplain Management Committee (FMC). The CRS program requires that the FMC review progress toward the recommendations included in the plan each year and then revise the plan five years after adoption.

The attached table provides the necessary review (year 3) following re-adoption. FMC representatives plan to attend a Board meeting in the near future to discuss this review and provide further updates relative to our flood management/CRS program.

ATTACHMENTS:

2017 Progress review of coastal floodplain management plan recommendations

REQUESTED ACTION: [ ] NO ACTION REQUESTED

Accept the FMC annual review through approval of the consent agenda

FOR MORE INFORMATION, CONTACT: Name: Paul F. Koll

Phone#: (804) 693-2744 E-mail: pkoll@gloucesterva.info

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January 2014 **Note: Please confine summary to one page**

GLOUCESTER COUNTY **MEETING DATE:** December 4, 2018

BOARD OF SUPERVISORS **AGENDA ITEM #:** V - E

BOARD AGENDA ITEM

TYPE OF AGENDA ITEM:
- ☒ MINUTES OR CONSENT
- ☐ PRESENTATION
- ☐ REGULAR
- ☐ PUBLIC HEARING
  - ☐ Duly Advertised

PURPOSE OF ITEM:
- ☐ INFORMATION / DISCUSSION
- ☒ DISCUSSION AND / OR DECISION
  - ☐ Resolution
  - ☐ Ordinance
  - ☐ Motion

PRESENTER: Brenton E. Payne, P.E. **TITLE:** Interim Director of Engineering/Environ.

AGENDA TITLE: Floodplain Management Plan Annual Review

BACKGROUND / SUMMARY: The Coastal Floodplain Management Plan, adopted in September 2014, requires an annual review by the Board established Floodplain Management Committee (FMC). The Community Rating System (CRS) program requires that the FMC review progress toward the recommendations included in the plan each year and then revise the plan five years after adoption.

The attached table provides the necessary review (year 4) following re-adoption. FMC representatives plan to attend a Board meeting in the near future to discuss this review and provide further updates relative to our flood management/CRS program.

ATTACHMENTS:

2018 Progress review of coastal floodplain management plan recommendations

REQUESTED ACTION: ☐ NO ACTION REQUESTED

Accept the FMC annual review through approval of consent agenda.

FOR MORE INFORMATION: Name: Brenton E. Payne

Phone: (804) 693-1245 Email: bpayne@gloucesterva.info

January 2018 Note: Confine summary to one page Page 29

2018 In Progress Review of the Recommendations in the Coastal Floodplain Management Plan

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Structural Improvement Activities							
Together with VDOT, the County should utilize the road improvement priority list as input to prioritize the allocation of scarce resources to projects that support the largest number of unmitigated pre-FIRM structures in the SFHA.	42, 61		VDOT met w/ the FMC at the August 10, 2010 meeting to discuss road prioritization and funding issues. Table 6 needs updating based on flooding events since the adoption of the plan. Crisis management software (WebEOC) was updated to be better positioned to record road blockages due to flooding (and other reasons). This tool will be used during the next event.	Revised efforts underway to carefully record observed street flooding during high tide events and correlate them with recorded tide height at established gauges. Need a staff person to coordinate w/VDOT on the updated list. LiDAR based DTM Data is now available locally to enable more detailed GIS study.	Secondary transportation funds, which are currently in very limited supply are prioritized to go towards critical road repair. Additional state funding mechanisms are not apparent.	Ongoing	County Admin (DCA) / Emergency Management / Public Works / Planning & Zoning
The County should keep detailed records of which roads in the County flood, how often and to what extent.	43, 61		VDOT has a project in process to replace the culverts under Maryus Road just east of Jenkins Neck Road. This location is a choke point for receding floodwaters. The new culverts will provide additional capacity (elliptical).	Not accomplished, But pending. Additional monitoring will be necessary to identify extent of improvement.	Transportation Budget and coordination with VDOT.	Ongoing	VDOT/ County Admin (DCA)/ Emergency Management / Planning & Zoning /Public Works

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
The County should develop a drainage study identifying the current state of the linked system of roadside and outfall ditches as input to the development of a ditch maintenance program for the southeastern portion of the county.	43, 61		The RAFT (Resiliency Adaptation Feasibility Tool) process that the County participated in also identified this as a need and preliminary work to understand critical roadway areas is a first step via review of LiDAR based elevation data.	This large undertaking is currently unfunded and must be competed against other uses of local or potentially available state funding.	Transportation Budget and coordination with VDOT. Currently, there is no funding allocated by the County for maintenance of roads.	Original Timeframe 2016-2017 Updated Timeframe 2018-2019	Engineering, Environmental Programs, Emergency Management, and Planning & Zoning
The County should keep detailed records of which roads in the County flood, how often and to what extent.	43, 61	Updates in the EOC will allow GIS capture of flooded roads and retention of that data with comparison to tide gauge data.	The EOP revision and move to ICS structure will aid in capturing flood event information. This is bolstered by updates to WebEOC software.	Infrastructure is put in place to facilitate this recommendation and it will be put into action during next significant flooding event.	Staff time	Continuous Project; unassigned	VDOT / Emergency Management
The County should consider permanent road markers along frequently flooded roads marking the road's path in a submerged state and signage with gauges that indicate inundation extent that mark historical high water levels.	43, 61	Finalized locations and began installation. Coordinating future work with VDOT.	The FMC assigned a subcommittee with the task of selecting locations for "Road May Flood" signs that have measuring sign at base. The subcommittee finalized locations.	After "Road May Flood" signs are installed shift focus to installation of shoulder markers in areas that frequently flood but do not have natural/visual alignment cues.	VDOT funding committed.	2016-2017	Emergency Management / Public Works

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
The County should continue to regularly inspect the dam and perform regular maintenance, as well as continue to participate in the National Dam Safety Program.	35, 64		Ongoing. The Emergency Action Plan (EAP) for the Beaverdam Reservoir Dam was adopted in December of 2008, readopted in 2014 and is reviewed and updated annually. Reviewing alternatives for improved grounds maintenance (2018-2019). Staff will complete the next Dam EAP update in 2019.		Staff time from various Departments for exercises and updates.	Annually	Emergency Management / Public Works / Public Utilities / Sheriff's Department
Preventative Activities							
The County should continue to zone for low density residential development and encourage residential clustering within flood-prone areas.	47, 62		Ongoing through the County's current zoning Subdivision Ordinance. The Comprehensive Plan update completed in 2016 includes the impacts from flooding and severe repetitive losses. The County is developing updated ordinances.			Ongoing	Planning & Zoning / Planning Commission / BOS
Gloucester County should continue to enforce building regulations throughout the county.	47, 62		Ongoing			Ongoing	Building Inspection

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
The County should continue to require and enforce the provisions of the Floodplain Management Ordinance.	48, 62	Revised Floodplain Management Ord. adopted BOS 9-2-14 New FEMA FIRM's dated 11-14-14.	Ongoing			Ongoing	Building Inspection / BOS
Property Protection Activities							
The County should continue to acquire properties through a voluntary program according to the priority list in order to increase the amount of land preserved as open space, and to reduce the amount of flood damage to new and existing properties in the flood prone areas of the community.	52, 62	All acquisition properties that were approved for grant-funded purchase for which the owner followed through with a sale have been completed. A subcommittee was appointed to review and prepare information for consumption by the Board of Supervisors as to the value of property acquisition.	The County and Board of Supervisors discontinued the acquisition of new properties.		Federal/State funding with in-kind local matches if the Board of Supervisors elects to apply for the grant based funding.	Ongoing	Hazard Mitigation Management Team / Planning & Zoning; Long Term Maintenance: Parks & Rec / Building & Grounds Maintenance

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
The County should readopt the Floodplain Management Plan at least every five years to help strengthen the community's mitigation activities as well as lower insurance premiums for policy holders. The County should also consider requiring heightened construction standards in the Coastal A zone.	53, 62	The Plan was readopted in September 2014. The Board also adopted higher regulatory standards in the Coastal A zone which helped to improve our CRS score and reduce insurance premiums.	The plan's recommendations are reviewed annually and the overall plan is reviewed and updated every five years before being presented to the Board of Supervisors for re-adoption.		Routine costs to support the Floodplain Management Plan Committee.	Ongoing	Building Inspections and other departmental staff and citizens that make up the Floodplain Management Committee are tasked with keeping the plan current and updated.
Natural Resource Protection Activities							
The County should continue to enforce the Chesapeake Bay Preservation Act Ordinance, the Erosion and Sediment Control Ordinance, the Wetlands Zoning Ordinance, the Coastal Primary Sand Dune Zoning Ordinance, and the Storm Water Ordinance.	59, 63		Ongoing. The Board of Supervisors is considering potential changes to the extent of the Chesapeake Bay Preservation Area in the County. The Floodplain Management Committee recommended to the Board to not reduce the extent of the current "full county" RMA		Staff time	Ongoing	Environmental Programs / Planning & Zoning / Wetlands Board / CBPO Commission
Safety and Health Hazards							

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
The County should alert residents as to the importance of securing existing fuel oil and propane tanks through the dissemination of tie-down information and methodologies.	31, 63			Staff have neither identified how many people would benefit from / need this assistance, nor identified funding sources. Once begun, contact local service providers to discuss the issues – among them are liability concerns.	Funding sources have not been identified, but would be necessary for outreach and implementation.	1 year from assignment	Emergency Management / Building Inspection
The County should request the Virginia Department of Health to examine the public health, safety and economic impacts associated with the increased use of alternative septic systems in flood prone areas.	31, 63		County Code restricts installation of alternative systems where the distance between the soil surface and the water table is less than 12".	Staff have not quantified the impacts to the Community or considered advising what policy changes would be needed. Prohibiting the use of alternative septic systems is not enabled by the code of Virginia.	Not known	1-5 years from assignment	BOS / Virginia Department of Health / Emergency Management
Sea Level Rise							

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
As more data become available the County should evaluate the potential impact of sea level rise on the community, particularly with respect to its wetlands, and consider potential management options.	9, 63	Since 2011, the FMC has had speakers at many meetings to provide information on issues related to SLR. MPPDC produced the "Start Adaption and Response Today" report, which addresses local government tools for addressing sea level rise in Virginia. The County Administrator appointed a Sea Level Rise Focus Group - which met in October 2012 and had its final report published in January 2013.	Various departments and Committees continue to learn about sea level rise and potential impacts. This was also included in the Comprehensive Plan Update. HRPDC and MPPDC are both working on compiling data and recommending strategies for consideration by localities. Staff is participating in burgeoning RAFT process (Resiliency Adaptation Feasibility Tool). By serving as one of three localities in the beta process the tool can be revised for broader value to all coastal localities.			Ongoing	BOS / DCA / Emergency Management / Planning & Zoning / Planning Commission / MPPDC / HRPDC / FPMC / VIMS

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
Emergency Service Measures							
The County should continue to utilize its hazard identification process.	57, 64		Ongoing. The hazard identification process is used in multiple planning documents - including the Floodplain Management Plan, Mitigation and Emergency Operations Plan. Enhanced Flood Warning and Response plan (CRS activity 610) led to additional CRS points.		Staff time is used to develop the HIRA and maintain CRS documentation.	Ongoing	Emergency Management and other Departments and agencies required to plan for disasters and public safety.
The County should increase awareness of the existing mobile phone mass notification system and the fact that citizens must opt-in to the program if they want to be contacted through this medium.	58, 64	The County has implemented a rapid notification system ("Code Red") which has an "opt-in" cell phone database; this feature is now in use.	Reach out to the public in all forms available to encourage them to self-register their mobile phones with the Code Red System.		Funding approved through the 2010-2011 Budget Process. A small annual fee to utilize the system applies.		Emergency Management/ DIT/ County Administration/ Human Resources
Public Information Activities							
The County should continue to send an annual mass mailing with specialized information relating to property protection, flood safety and flood insurance to every property owner in a flood zone.	55, 64	A Program for Public Information (PPI) was adopted by the BOS 7-7-2015. Outreach meetings with contractors and real estate agents conducted routinely.	Ongoing. Through the CRS program, annual mailings with flood information are sent out to those in the floodplain. A newspaper style "Disaster Guide" publication are mailed to every household.		Postage, printing cost	Annually	Building Inspection / Emergency Management / Community Education (Beehive publication)

Floodplain Management Plan Recommendations	Items Referenced in the Plan on Pages	Accomplished	On-Going	Not Accomplished	Funding Requirements	Time Frame	Responsible Office
The County should adopt a central location where general information on flood preparedness, and flood insurance is easily accessible to the public in a hard copy format.	56, 64		Ongoing. Updated "Flood Protection Information" posted on the County's website. Hard copies are also available at the County Library locations as well as in the Building Inspection Office.		Staff time, cost to print/purchase additional materials, and advertising.	Annual updates	Emergency Management / Building Inspection / Community Education / Library
Gloucester County should advertise the technical assistance opportunities it provides in relation to flood mitigation and preparedness, preferably in the same central location as other flood hazard information is available.	56, 65		Same as above		Staff time/resources	Annual updates	Emergency Management/ Building Inspection / Community Education

Acronyms Used:

Deputy County Administrator (DCA)
Board of Supervisors (BOS)
Chesapeake Bay Preservation Ordinance (CBPO)
Community Rating System (CRS)
Department of Information Technology (DIT)
Federal Emergency Management Agency (FEMA)
Flood Insurance Rate Map (FIRM)
Floodplain Management Committee (FMC)
Hazard Identification and Risk Assessment (HIRA)
Hazard Mitigation Grant Program (HMGP)
National Dam Safety Program (NDSP)
Special Flood Hazard Area (SFHA)
"The Plan" - The Coastal Floodplain Management Plan for Gloucester County
University of Virginia Institute for Environmental Negotiation (UVA IEN)
Virginia Department of Emergency Management (VDEM)
Virginia Department of Transportation (VDOT)

Recommendations for Future Plan Update:

1. Focus on win/win alternatives – for example protected open space and wetlands can benefit tourism, improve water quality which benefits seafood industry, recreation and quality of life as well as flood plan management and economic development;
2. Carefully follow CRS Checklist to maximize CRS points

NOTICE OF PUBLIC HEARING
GLOUCESTER COUNTY
PLANNING COMMISSION

The Gloucester County Planning Commission will hold a Public Hearing in the Colonial Courthouse, located at 6504 Main Street, Gloucester, Virginia, on August 7, 2014 beginning at 7:30 p.m. to consider the following:

Gloucester County Floodplain Management Plan - The Planning Commission will consider a recommendation for the re-adoption of the Gloucester County Floodplain Management Plan, originally adopted September 1, 2009 and now revised and dated **July 2014** (the Plan). The purpose of the Plan is to document and analyze the County's existing coastal flood management practices and recommend feasible solutions to strengthen the County's overall coastal flood management system, helping to lessen the amount of damage caused by coastal flooding. As a participating community in the Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program (NFIP), the County participates in the Community Rating System Program (CRS). n 1994, FEMA conducted an analysis of the County's floodplain management efforts, and in 1995 awarded the County a Class 9 rating in the CRS program; subsequent to the 2009 Plan's adoption, Gloucester received a Class 7 rating. The Plan is a requirement for the continued participation, maintenance, and potential improvement of our CRS rating. The rating directly affects the annual premiums of flood insurance policy holders; Gloucester's Class 7 rating is decreasing those premiums by 15 percent.

The preceding summary is not intended to be a complete explanation of the Plan. All interested parties are invited to study the proposed Plan and attend the hearing to express their views. Copies of the proposed Floodplain Management Plan update are available and may be reviewed in the Gloucester County Department of Planning & Zoning located at 6489 Main Street, Gloucester, Virginia, or on the department's website at www.gloucesterva.info/planning.

Persons requiring assistance to attend the hearing should contact the Planning & Zoning at (804) 693-1224 between the hours of 8:00 a.m. and 4:30 p.m. Monday through Friday.

Lawrence A. Dame, Chair
Gloucester County Planning Commission
30t2

GLOUCESTER GLEANINGS
THURSDAY AUGUST 14, 2014
GLOUCESTER-MATHEWS GAZETTE-JOURNAL

Gloucester planners re-adopt flood plan

BY BILL NACHMAN

The Gloucester Planning Commission re-adopted the county's Floodplain Management Plan Thursday night. Planners said the plan is a step toward residents saving money on their flood insurance.

Following a scheduled hearing during which no one from the public showed up to speak, the commission unanimously supported re-adoption of the plan.

Planning officials said the FMP was originally adopted in September 2009, and now has been revised. The purpose of the plan is to document and analyze the county's existing coastal flood management practices.

In addition, the plan recommends feasible solutions to strengthen the county's overall flood management system.

Gloucester is required to revise its Floodplain Management Plan every five years, said Anne Ducey-Ortiz, director of planning and zoning. In that way, she said the county can continue to participate in the Federal Emergency Management Agency's National Flood Insurance Program.

BILL NACHMAN / GAZETTE-JOURNAL

Kenny Richardson, left, was recognized at the Aug. 7 meeting of the Gloucester Planning Commission for his 22 years of service to the advisory board. Presenting the award is chairman Larry Dame.

In 1995, Gloucester received a Class 9 rating (1-10, with 1 the best), which qualified county residents for a 5 percent discount on the base rate for flood insurance, planner Tripp Little said. In 2009, a Class 7 was awarded to Gloucester so flood insurance policyholders could receive a 15 percent discount.

Little said that policyholders in Gloucester paid about $1.4 million total for their flood insurance last year, with the discount shaving off more than $250,000 from the original rate.

In areas prone to flooding, Little said, measures can be taken such as elevating homes, making road improvements and possibly conducting a drainage study.

AT A REGULAR MEETING OF THE GLOUCESTER COUNTY BOARD OF SUPERVISORS, HELD ON TUESDAY, SEPTEMBER 2, 2014 AT 7:00 P.M., IN THE COLONIAL COURTHOUSE, 6504 MAIN STREET, GLOUCESTER, VIRGINIA: ON A MOTION DULY MADE BY MR. WINEBARGER AND SECONDED BY MR. CHRISCOE THE FOLLOWING RESOLUTION WAS ADOPTED BY THE FOLLOWING VOTE:

Phillip N. Bazzani, no;
Ashley C. Chriscoe, yes;
Christopher A. Hutson, yes;
Andrew James, Jr., yes;
John C. Meyer, Jr., yes;
Robert J. Orth, yes;
Michael R. Winebarger, yes;

RESOLUTION ADOPTING AN UPDATED COASTAL FLOODPLAIN MANAGEMENT PLAN FOR GLOUCESTER COUNTY

WHEREAS, the Gloucester County Board of Supervisors adopted a Coastal Floodplain Management Plan in 2009; and

WHEREAS, to retain standing in the Community Rating System (CRS) the Federal Emergency Management Agency (FEMA) requires that localities update their Floodplain Management Plan at least once every five years; and

WHEREAS, Gloucester County currently enjoys a Class 7 rating in the CRS leading to a 15% discount for nearly all flood insurance policy holders in the county and retention of this benefit requires adoption of an updated plan; and

WHEREAS, the Gloucester County Planning Commission held a Public Hearing on August 7, 2014 to receive public input on the updated Plan, and at that meeting voted unanimously to forward the plan to the Board with a recommendation of adoption.

NOW, THEREFORE, BE IT RESOLVED by the Gloucester County Board of Supervisors that the updated Coastal Floodplain Management Plan dated August 2014 and included in the September 2, 2014 Board meeting agenda packet is hereby adopted as a planning tool for the community.

A Copy Teste:

Brenda G. Garton, County Administrator

Floodplain Management Committee

TO: Board of Supervisors – BOS

FROM: Ken Evans, Chair and Members of the Floodplain Management Planning Committee

DATE: August 14, 2019

SUBJECT: Coastal Floodplain Management Plan – 2019 5-year Update

The Coastal Floodplain Management Plan, adopted in September 2009, requires an update every 5 years to maintain compliance with CRS Activity 510. The first and most recent 5-year update occurred in 2014. The 5-year updates are the culmination of planning efforts by the Floodplain Management Committee.

The Committee is composed of six County staff members from various departments, one Board member, a representative from the Volunteer Fire and Rescue departments and up to eleven citizens or business owners that may be affected by flooding in the County. This Committee was formed by a Board resolution pursuant to the Community Rating System (CRS) program's Activity 510 and appointed by the County Administrator. Citizen volunteers were solicited from the Volunteer Board Bank. The Committee meets quarterly to review the plan, meet with various experts, and to outline future strategies, goals and activities to implement the plan. The Department of Engineering Services is the lead Department in coordinating the activities of the Committee to ensure the Committee continues to fulfill its role in the CRS Program. By ensuring the steps of Activity 510, the County will continue to receive CRS Program points and citizens will continue to receive a 20% discount on flood insurance premiums and the community will continue to be better prepared for future flooding events.

This update reflects and incorporates activities by the Committee that have been reviewed and approved by the Board of Supervisors annually. The most recent annual review occurred on August 6th, 2019. The 2019 plan includes the items outlined in the annual plans. In addition, this revision includes updates to figures and data to maintain an up-to-date document.

The Floodplain Management Committee has approved the 2019 Coastal Floodplain Management Plan for adoption. With the Board's acceptance of this 5-year update, the Committee will continue to evaluate the plan, prepare future recommendations and advise on implementation.

COPY

AT A REGULAR MEETING OF THE GLOUCESTER COUNTY BOARD OF SUPERVISORS, HELD ON TUESDAY, SEPTEMBER 3, 2019, AT 6:30 P.M., IN THE COLONIAL COURTHOUSE, 6504 MAIN STREET, GLOUCESTER, VIRGINIA: ON A MOTION DULY MADE BY DR. ORTH, AND SECONDED BY MR. SMITH, THE FOLLOWING RESOLUTION WAS ADOPTED BY THE FOLLOWING VOTE:

Phillip N. Bazzani, yes;
Ashley C. Chriscoe, yes;
Christopher A. Hutson, yes;
Andrew James, Jr., yes;
Robert J. Orth, yes;
Kevin M. Smith, yes;
Michael R. Winebarger, yes;

RESOLUTION ADOPTING AN UPDATED COASTAL FLOODPLAIN MANAGEMENT PLAN FOR GLOUCESTER COUNTY

WHEREAS, the Gloucester County Board of Supervisors adopted a Coastal Floodplain Management Plan in 2009; and

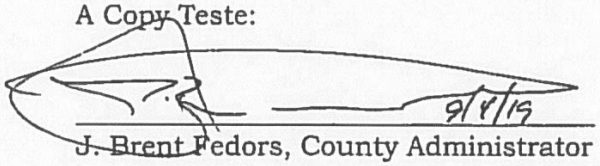
WHEREAS, to retain standing in the Community Rating System (CRS) the Federal Emergency Management Agency (FEMA) requires that localities update their Floodplain Management Plan at least once every five years; and

WHEREAS, Gloucester County currently enjoys a Class 6 rating in the CRS leading to a 20% discount for nearly all flood insurance policy holders in the county and retention of this benefit requires adoption of an updated plan; and

WHEREAS, the Gloucester County Floodplain Management Committee held a meeting on August 14, 2019 to receive public input on the updated Plan, and at that meeting voted unanimously to forward the plan to the Board with a recommendation of adoption.

NOW, THEREFORE, BE IT RESOLVED by the Gloucester County Board of Supervisors that the updated Coastal Floodplain Management Plan dated August 2019 and included in the September 3, 2019 Board meeting agenda packet is hereby adopted as a planning tool for the community.

A Copy Teste:



J. Brent Fedors, County Administrator

GLOUCESTER COUNTY BOARD OF SUPERVISORS
AGENDA
TUESDAY, SEPTEMBER 3, 2019
6:30 p.m.
COLONIAL COURTHOUSE
6504 MAIN STREET

I. Call To Order and Roll Call

II. Invocation and Pledge of Allegiance – Reverend Ronald Gayle – Union Zion Baptist Church

III. Approval of the Minutes – August 6 and August 13, 2019

IV. Adoption of the Agenda

V. Approval of the Consent Agenda

A. Open Board Directed Action Items – J. Brent Fedors – County Administrator
B. Resolution Supporting Private Beautification Improvements in Conjunction with Route 3/14 and Main Street Intersection Smart Scale Project – Anne Ducey-Ortiz – Planning, Zoning & Environmental Programs Director
C. FY2020 School Operating Fund to Capital Fund Transfer – Stephanie Tinsley – Chief Financial Officer

VI. Matters Presented by the Board

VII. County Administrator Items

VIII. Citizens' Comment Period – (Speakers should provide 10 copies of handouts if any)

IX. Scheduled Presentations

A. Quarterly Update from the Virginia Department of Transportation – Ron Peaks – Assistant Residency Administrator, Virginia Department of Transportation
B. Broadband VATI Grant Update – Carol Steele – Assistant County Administrator

X. Regular Agenda

A. 2019 Floodplain Management Plan 5- Year Adoption – Brent Payne – Director of Engineering and Ken Evans – Chair, Floodplain Management Committee
B. Revised Proffer Policy for Rezoning Applications - Anne Ducey-Ortiz – Planning, Zoning & Environmental Programs Director

C. FY2020 Additional Appropriation for Virginia Port Authority Grant (Non-Matching) for Aberdeen and Timberneck Creek Projects – Stephanie Tinsley – Chief Financial Officer and Reed Fowler – Deputy County Administrator

D. Board Appointments

XI. County Attorney Items

XII. Boards and Commissions Reports

XIII. Supervisors Discussion

XIV. Public Hearings - 7:00 p.m.

A. Public Hearing to Consider an Ordinance to Amend Chapter 6 "Stormwater Management" of the Gloucester County Code – Reed Fowler – Deputy County Administrator

XV. Closed Meeting

A. Personnel Matters

XVI. Adjournment