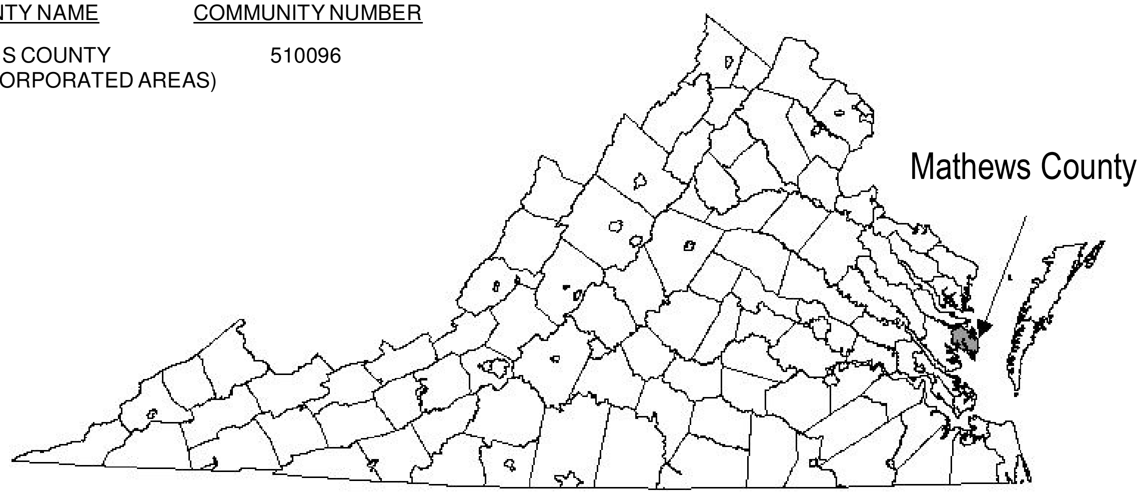
FLOOD INSURANCE STUDY

MATHEWS COUNTY, VIRGINIA

(ALL JURISDICTIONS)

COMMUNTY NAME	COMMUNITY NUMBER
MATHEWS COUNTY (UNINCORPORATED AREAS)	510096



REVISED:
DECEMBER 9, 2014

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
51115CV000B

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) report may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS report may be revised and republished at any time. In addition, part of this FIS report may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS report components.

Initial countywide FIS Effective Date: November 16, 2007

Revised countywide FIS Effective Date: December 9, 2014

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FLOOD INSURANCE STUDY
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1.0 INTRODUCTION

1.1 Purpose of Study

This countywide FIS revises and updates previous FISs/Flood Insurance Rate Maps (FIRMs) in the geographic area of Mathews County, Virginia.

This FIS aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This FIS has developed flood-risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Mathews County to update existing floodplain regulations as part of the Regular Phase of the NFIP and will also be used by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations (CFR) at 44 CFR, 60.3.

In some States or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgements

The sources of authority for this FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

Information on the authority and acknowledgments for each jurisdiction included in this countywide FIS, as compiled from their previously printed FIS reports, is shown below.

For the February 4, 1987 FIS, the hydrologic and hydraulic analyses were prepared by the Norfolk District of the U.S. Army Corps of Engineers (USACE) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement EMW-E-1153, Project Order No. 1, Amendment No. 15. That work was completed in June 1985.

An August 3, 1992 revision was issued that added undeveloped coastal barriers to the FIRMs.

For the November 16, 2007 countywide study, the original FIS was revised to show updated community description information, historical flood information, FEMA contact information, and bibliography and references. The hydrologic and hydraulic analyses were not revised or updated. The revised FIS also included information regarding survey bench marks and vertical datums. The FIRM was converted to a digital format, utilizing aerial photography as the base map.

For this countywide revision, the coastal analysis and mapping for Mathews County was conducted for FEMA by RAMPP under contract No. HSFEHQ-09-D-0369, Task Order HSFE03-10-J-0024. In addition, a storm surge study was conducted for FEMA by the USACE and its project partners under HSFE03-06-X-0023, "NFIP Coastal Storm Surge Model for Region III" and Project HSFE03-09-X-1108, Phase II Coastal Storm Surge Model for FEMA Region III". The work was performed by the Coastal Processes Branch (HF-C) of the Flood and Storm Protection Division (HF), U.S. Army Engineer Research and Development Center – Coastal & Hydraulics Laboratory (ERDC-CHL).

Base map information was provided in digital format by the Virginia Geographic Information Network. This information was photogrammetrically compiled at a scale of 1:2400 from aerial photography dated 2009. Additional information may have been derived from other sources. Users of this FIRM should be aware that minor adjustments may have been made to specific base map features.

The coordinate projection used for the preparation of this FIRM is the North American Datum of 1983 (NAD83) HARN Virginia State Plane south zone (FIPSZONE 4502). The horizontal datum is NAD 83 HARN, GRS 80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of information shown on this FIRM.

1.3 Coordination

For the pre-countywide study, an initial Consultation and Coordination Officer's (CCO) meeting was held on April 14, 1983 with representatives of FEMA, Mathews County, the Virginia State Water Control Board, and the USACE (the study contractor). At this meeting, the nature and purpose of the study and the scope and limits of the work were explained, and flood information currently available concerning the county was obtained. A final CCO meeting was held on March 11, 1986 attended by representatives of FEMA, Mathews County, the Virginia State Water Control Board, and the USACE.

Contacts with various state and federal agencies were made during the study in order to minimize possible hydrologic and hydraulic conflicts. A search for basic data was made at all levels of government.

For the 2007 countywide FIS, Mathews County was notified by FEMA that its FIS would be revised by the USACE, Norfolk District. No final CCO meeting was held for this study.

For this countywide FIS revision, an initial CCO meeting was held on March 31, 2011, with representatives of FEMA, the study contractor (RAMPP) and Mathews County.

The results of the study were reviewed at the final CCO meeting held on May 20, 2013, and attended by representatives of FEMA, the study contractor and

Mathews County. All problems raised at that meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Mathews County, Virginia.

For the November 11, 2007 countywide study, tidal flooding, including its wave action from the Piankatank River, the Chesapeake Bay, and Mobjack Bay, were studied by detailed methods. All areas within the county which are affected by tidal flooding were included in the detailed study. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

This countywide revision incorporates new detailed coastal flood hazard analyses for the Chesapeake Bay, the Mobjack Bay, and the Piankatank River.

The scope and methods of the study were proposed to, and agreed upon by FEMA and Mathews County.

2.2 Community Description

Mathews County is located in the southeastern portion of Virginia. It is bordered by Middlesex County and the Piankatank River to the north, the Chesapeake Bay to the east, Mobjack Bay to the south, and Gloucester County to the southwest and west. The population of Mathews County was 7,995 in 1980, 8,348 in 1990, 9,207 in 2000, 8,978 in 2010, and an estimated 8,884 in 2012 (USDOC: BOC, 2013). The county has 87 square miles of land area, which is almost surrounded by water. All parts of the county are within 2 miles of the more than 150 miles of shoreline within Mathews County.

Mathews County formed when Kingston Parish of Gloucester County was made an independent county in 1791. The county was named for Major Thomas Mathews, who made the resolution for its formation in the Virginia House of Delegates. The community of Mathews is located in the central portion of the county and is the county seat (COV, DSPCA, 1972).

The county is situated in the Coastal Plain province and is underlain by clay, sand, shell, and gravel sediments. Except for the northwestern portion of the county, the topography is typical of a coastal region. The terrain of the area is generally flat with no unusual features. Elevations range from sea level to about 42 feet, with the average elevation being less than 10 feet (Clements, 1991). The eastern and southern portions of the county are characterized by numerous inlets, bays, and creeks.

The area enjoys a temperate climate with moderate seasonal changes. The climate is characterized by moderately warm summers with temperatures averaging approximately 79 degrees Fahrenheit (°F) during July, the warmest month. The winters are cool with temperatures averaging approximately 39°F in January, the coolest month. The annual precipitation over the area averages approximately 43 inches. There is some variation in the monthly averages; however, this rainfall is distributed evenly throughout the year (Clements, 1991). Snowfall is infrequent, generally occurring in light falls which normally melt within 24 hours.

The principal occupations in Mathews County are farming and fishing, including oystering and crabbing. The main crops are corn, soybeans, and hay. Mathews County is widely known for its daffodils and several farms raise strawberries. There is some manufacturing within the county, producing a variety of products such as processed seafood, boats, lumber, and fabricated textile products.

Land use within the floodplains of the county consists of scattered residential structures, summer cottages, small businesses, cropland, and forest. With the county's many miles of shoreline, there will be pressure for future development in these areas.

2.3 Principal Flood Problems

The coastal areas of Mathews County are vulnerable to tidal flooding from major storms such as hurricanes and northeasters. Both types of storms produce winds which push large volumes of water against the shore.

With their high winds and heavy rainfall, hurricanes are the most severe storms which can hit the study area. The term hurricane is applied to an intense cyclonic storm originating in tropical or subtropical latitudes in the Atlantic Ocean just north of the equator. A study of tracks of all tropical storms for which there is a record indicates that, on an average of once a year, a tropical storm of hurricane force passes within 250 miles of the area and poses a threat to Mathews County. While hurricanes may affect the area from May through November, nearly 80 percent occur in the months of August, September, and October with approximately 40 percent occurring in September. The most severe hurricanes on record to strike the study area occurred in August 1933 and in September 2003 (Isabel). Other notable hurricanes which caused significant flooding in Mathews County occurred in September 1936, October 1954 (Hazel), and August 1955 (Connie).

Another type of storm which could cause severe damage to the county is the northeaster. This is also a cyclonic type of storm and originates with little or no warning along the middle and northern Atlantic coast. These storms occur most frequently in the winter months but may occur at any time. Accompanying winds are not of hurricane force but are persistent, causing above-normal tides for long periods of time. The March 1962 northeaster was the worst ever recorded in the county.

The amount and extent of damage caused by any tidal flood will depend upon the topography of the area flooded, rate of rise of floodwaters, the depth and duration of flooding, the exposure to wave action, and the extent to which structures have been placed in the floodplain. The depth of flooding during these storms depends upon the velocity, direction, and duration of the wind; the size and depth of the body of water over which the wind is acting; and the astronomical tide. The duration of flooding depends upon the duration of the tide-producing forces. Floods caused by hurricanes are usually of much shorter duration than those caused by northeasters. Flooding from hurricanes rarely lasts more than one tidal cycle, while flooding from northeasters may last several days, during which the most severe flooding takes place at the time of the peak astronomical tide.

The timing or coincidence of the maximum storm surge with the normal high tide is an important factor in the consideration of flooding from tidal sources. Tidal waters in the study area normally fluctuate twice daily with a mean tide range of approximately 2.4 feet in the Chesapeake Bay (USDOC: NOAA: NOC: COOPS, 2005). The range is somewhat less in most of the connecting bays and inlets.

All development in the floodplain is subject to water damage. Some areas, depending on exposure, are subject to high velocity wave action which can cause structural damage and severe erosion along beaches. Waves are generated by the action of wind on the surface of the water. The entire eastern shoreline and portions of the southern shoreline of Mathews County are vulnerable to wave damage due to the vast exposure afforded by the Chesapeake Bay, Mobjack Bay, and Piankatank River.

Mathews County has experienced major storms since the early settlement of the area. Historical accounts of severe storms in the area date back several hundred years. The following paragraphs discuss some of the larger known storms which have occurred in recent history. This information is based on newspaper accounts, historical records, field investigations, and routine data collection programs normally conducted by the USACE.

Effects of the July 23-24, 1788 hurricane were described in a contemporary letter from Green Plains on the North River in Mathews County. "The tide which was 6 feet deep in some of their houses, has swept all before and drowned several of the inhabitants" (USACE: Norfolk District, 1960).

The August 1933 hurricane was one of the most severe storms ever to occur in the Middle Atlantic region. The storm passed inland near Cape Hatteras on August 22 and was accompanied by extreme winds and tides. Norfolk reported the greatest 24-hour rainfall in its history, a fall of 6.64 inches. At Norfolk, gusts of wind reached measured velocities of 88 miles per hour (mph), although the maximum sustained velocity was only 56 mph. In Mathews County, widespread damage to homes, cropland, and livestock resulted from tidal flooding which reached an elevation of approximately 5.6 feet, referenced to the North American Vertical Datum of 1988 (NAVD 88). Due to the drainage characteristics of the area, the tidal waters and the coincident heavy rainfall were trapped and added to the misfortune of the local inhabitants. 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. Families were isolated and all productive activities ceased for a 10-day period. In addition to damage from tidal flooding, much damage was caused to roofs, communication lines, and other structures by the high wind.

Damage of this nature is characteristic of that caused by hurricanes (USACE: Norfolk District, 1960).

The eye of the September 18, 1936, hurricane passed approximately 20 miles east of Cape Henry. High tides and gale force winds caused much damage throughout the lower Chesapeake Bay area as the storm moved off to the northeast. In Mathews County, local inhabitants estimated the elevation of flooding to have been approximately 1 foot less than the storm of August 1933. Damage was severe, and by occurring during the Depression period, became a double hardship on the populace (USACE: Norfolk District, 1960).

On October 15, 1954, Hurricane Hazel passed approximately 60 miles inland through Virginia, causing high winds and moderately high tides. The center of the hurricane moved inland in the vicinity of the South Carolina-North Carolina border between 9 a.m. and 10 a.m., and rapid northward movement carried the center through Virginia between 2 p.m. and 6 p.m. Hurricane force winds with gusts of 80 to 100 mph were experienced near the path of the storm center and eastward to the coast. The tidal flooding during this hurricane caused considerable salt damage due to dry antecedent soil conditions. There was also severe damage from the wind and salt spray (USACE: Norfolk District, 1960).

On August 13, 1955, Hurricane Connie followed a path similar to the August 1933 hurricane and generated a fairly high storm surge. The surge occurred at the time of the astronomical low tide in this area, and the resultant tide was approximately 2.9 feet, NAVD 88. The extremely heavy rainfall of approximately 9 inches in 24 hours with this hurricane added to the damage inflicted by the tidal flooding (USACE: Norfolk District, 1960).

On March 6-8, 1962, a northeaster caused disastrous flooding and high waves all along the Atlantic Seaboard from New York to Florida. This storm was unusual even for a northeaster since it was caused by a low pressure cell which moved from south to north and then reversed its course, moving again to the south and bringing with it huge volumes of water and high waves. In Mathews County, high tides 4 to 5 feet above normal flooded highways and property and isolated some residences in the low-lying areas. The abnormal tides were caused by strong northeast winds with gusts estimated to be as high as 40 mph (Richmond Times Dispatch, 1962). The most damage was to piers, jetties, and seawalls along the waterfront. A few homes on Gwynn Island suffered damage from the pounding water. A large number of homes along the Chesapeake Bay were also damaged from the rising tides and wave action cutting into the beaches in these areas (Newport News Daily Press, 1962).

The most recent tidal stage of major proportions occurred during Hurricane Isabel, making landfall on September 18, 2003 along the Outer Banks of North Carolina and tracking northward through Virginia and up to Pennsylvania. At landfall, maximum sustained winds were estimated at 104 mph. Isabel weakened to a tropical storm by the time it moved into Virginia and lost tropical storm characteristics as it moved into Pennsylvania. The storm caused high winds, storm surge flooding, and extensive property damage throughout the Chesapeake Bay region. Within Virginia, ninety-nine communities were directly affected by Isabel. There were thirty-three deaths, over a billion dollars in property damage, and over a million electrical customers without power for many days (Commonwealth of Virginia, 2003). Historical maximum water level records were exceeded at several locations within the Chesapeake Bay. In general, maximum water levels in the lower Chesapeake Bay resembled those of the August 1933 hurricane, with storm surge occurring around the time of the predicted high tide. Some communities along the Chesapeake Bay and its tributaries also experienced severe damage from wave action (USDOC; NOAA, 2004).

2.4 Flood Protection Measures

There are no existing flood control structures that would provide protection during major floods in the study area. There are a number of measures that have afforded some protection against flooding, including bulkheads and seawalls, jetties, sand dunes, and non-structural measures for floodplain management such as zoning codes. The "Uniform Statewide Building Code" which went into effect in September 1973 states, "where a structure is located in a 100-Year floodplain, the lowest floor of all future construction or substantial improvement to an existing structure…, must be built at or above that level, except for non residential structures which may be flood proofed to that level" (Commonwealth of Virginia, 1973). These requirements will no doubt be beneficial in reducing future flood damages in the county.

3.0 ENGINEERING METHODS

For the flooding sources studied by detail methods in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-Year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-Year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 1-percent annual chance flood in any 50-year period is approximately 40 percent (four in ten); for any 90-year period, the risk increases to approximately 60 percent (six in ten). The analyses reported herein reflect flooding potentials based on conditions existing in the county at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

The previous hydrologic analyses for Mathews County have been superseded by the coastal analyses in Section 3.3.

3.2 Hydraulic Analyses

The previous hydraulic analyses for Mathews County have been superseded by the coastal analyses in Section 3.3.

3.3 Coastal Analyses

Coastal analyses, considering storm characteristics and the shoreline and bathymetric characteristics of the flooding sources studied, were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along the shoreline. Users of the FIRM should be aware that coastal flood elevations are provided in Table 1, “Summary of Stillwater Elevations.” If the elevation on the FIRM is higher than the elevation shown in this table, a wave height, wave runup, and/or wave setup component likely exists, in which case, the higher elevation should be used for construction and/or floodplain management purposes.

Development along the coastline of Mathews County consists mainly of private residences and agricultural land. Extensive residential development exists along the Chesapeake Bay, Piankatank River, Mobjack Bay and its’ estuaries. Undeveloped areas are located throughout Mathews County, consisting mainly of woodlands and marsh. Portions of the central and southern shoreline of the Chesapeake Bay remain undeveloped. Much of the Chesapeake Bay coastline is comprised of a small dune whose elevation varies from four feet to more than nine feet NAVD 88. Behind the dune, the ground slopes down to largely undeveloped marshland areas.

An analysis was performed to establish the frequency peak elevation relationships for coastal flooding in Mathews County. FEMA Region III office initiated a study in 2008 to update the coastal storm surge elevations within the states of Virginia, Maryland, and Delaware, and the District of Columbia including the Atlantic Ocean, Chesapeake Bay including its tributaries, and the Delaware Bay. The study replaces outdated coastal storm surge stillwater elevations for all FISs in the study area, including Mathews County, VA, and serves as the basis for updated FIRMs. Study efforts were initiated in 2008 and concluded in 2012.

The end-to-end storm surge modeling system includes the Advanced Circulation Model for Oceanic, Coastal and Estuarine Waters (ADCIRC) for simulation of 2-dimensional hydrodynamics (Luettich and Westerink, 2008). ADCIRC was dynamically coupled to the unstructured numerical wave model Simulating WAves Nearshore (unSWAN) to calculate the contribution of waves to total storm surge (USACE, 2012). The resulting model system is typically referred to as SWAN+ADCIRC (USACE, 2012). A seamless modeling grid was developed to support the storm surge modeling efforts. The modeling system validation consisted of a comprehensive tidal calibration followed by a validation using carefully reconstructed wind and pressure fields from three major flood events for the Region III domain: Hurricane Isabel, Hurricane Ernesto, and extratropical storm Ida. Model skill was accessed by quantitative comparison of model output to wind, wave, water level and high water mark observations.

The tidal surge in the Chesapeake Bay affects the entire 217 miles of Mathews County coastline. The coastlines of the Piankatank River and Mobjack Bay are more prone to damaging wave action during high wind events due to the significant fetch over which winds can operate. The widths of several embayments, including North River, Cobbs Creek, Milford Haven, Stutts Creek, Horn Harbor, Dyer Creek, Pepper Creek, East River, and Blackwater Creek, narrow considerably. In these areas, the fetch over which winds can operate for wave generation is significantly less.

The storm-surge elevations for the 10-, 50-, 100-, and 500-year floods determined for the Chesapeake Bay, Mobjack Bay, and Piankatank River are shown in Table 1, "Summary of Stillwater Elevations." The analyses reported herein reflect the stillwater elevations due to tidal and wind setup effects.

TABLE 1 - SUMMARY OF STILLWATER ELEVATIONS

	ELEVATION (feet NAVD 1988)			
FLOODING SOURCE AND LOCATION	10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
CHESAPEAKE BAY				
At Kibble Pond	3.4	4.4	4.7	5.7
At Point Breeze	6.6	4.6	5.0	6.0
At Horn Harbor Avenue Landing	4.0	5.0	5.4	6.5
MOBJACK BAY				
At Minter Point	4.4	5.3	5.7	7.3
At Confluence of Harper Creek	4.1	4.9	5.3	6.2
PIANKATANK RIVER				
At Pond Point	3.6	4.6	5.0	6.5
At confluence of The Narrows	3.5	4.5	5.0	6.2

The coastal analysis involved transect layout, field reconnaissance, erosion analysis, and overland wave modeling including wave setup, wave height analysis and wave runup.

Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Hydraulic analyses, considering storm characteristics and the shoreline and bathymetric characteristics of the flooding sources studied, were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the shorelines.

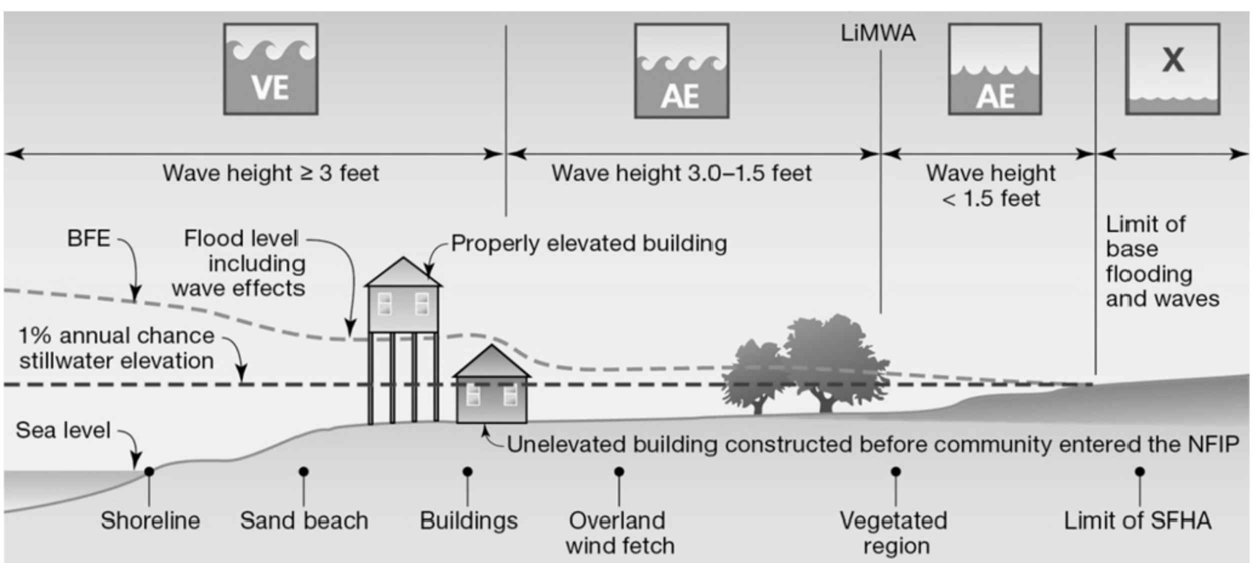
Special consideration was given to the vulnerability of Mathews County to wave attack. The inclusion of wave height, which is the distance from the trough to the crest of the wave, increases the water-surface elevation. The height of a wave is dependent upon wind speed and its duration, depth of water, and length of fetch.

The wave crest elevation is the sum of the stillwater elevation and the portion of the wave height above the stillwater elevation. Wave heights were computed across transects that were located along coastal and inland bay areas of Mathews County, as illustrated on the FIRM. The transects were located with consideration given to existing transect locations and to the physical and cultural characteristics of the land so that they would closely represent conditions in the locality.

Areas of coastline subject to significant wave attack are referred to as coastal high hazard zones. The USACE has established the 3-foot breaking wave as the criterion for identifying the limit of coastal high hazard zones (USACE: Galveston District, 1975). The 3-foot wave has been determined the minimum size wave capable of causing damage to conventional wood frame of brick veneer structures. The one exception to the 3-foot wave criteria is where a primary frontal dune exists. The limit of the high hazard coastal area then becomes the landward toe of the primary frontal dune or where a 3-foot or greater breaking wave exists, whichever is most landward. The coastal high hazard zone is depicted on the FIRM as Zone VE, where the delineated flood hazard includes wave heights equal to or greater than three feet. Zone AE is depicted on the FIRM where the delineated flood hazard includes wave heights less than three feet. A depiction of how the Zones VE and AE are mapped is shown in Figure 1, "Transect Schematic."

Figure 1, "Transect Schematic," is a profile for a typical transect illustrating the effects of energy dissipation and regeneration on a wave as it moves inland. This figure shows the wave crest elevations being decreased by obstructions, such as buildings, vegetation, and rising ground elevations, and being increased by open, unobstructed wind fetches. Actual wave conditions in Mathews County may not include all the situations illustrated in Figure 1.

FIGURE 1 - TRANSECT SCHEMATIC



It has been shown in laboratory tests and observed in field investigations that wave heights as little as 1.5 feet can cause damage to and failure of typical Zone AE construction. Therefore, for advisory purposes only, a Limit of Moderate Wave Action (LiMWA) boundary may be added to the FIRM in coastal areas subject to wave action. The LiMWA represents the approximate landward limit of the 1.5 foot breaking wave.

The effects of wave hazards in the Zone AE between the Zone VE (or shoreline in areas where VE Zones are not identified) and the limit of the LiMWA boundary are similar to, but less severe than, those in Zone VE where 3 foot breaking waves are projected during a 1-percent annual chance flooding event.

In areas where wave runup elevations dominate over wave heights, such as areas with steeply sloped beaches, bluffs, and/or shore-parallel flood protection structures, there is no evidence to date of significant damage to residential structures by runup depths less than 3 feet. However, to simplify representation, the LiMWA would be continued immediately landward of the VE/AE boundary in areas where wave runup elevations dominate. Similarly, in areas where the Zone VE designation is based on the presence of a primary frontal dune or wave overtopping, the LiMWA would also be delineated immediately landward of the Zone VE/AE boundary.

FEMA does not impose floodplain management requirements or special insurance ratings based on the LiMWA delineations at this time. If the LiMWA is shown on the FIRM, it is being provided by FEMA as information only. For communities that do adopt Zone VE building standards in the area defined by the LiMWA, additional Community Rating System (CRS) credits are available.

The methodology for analyzing the effects of wave heights associated with coastal storm surge flooding is described in a report prepared by the National Academy of Sciences (NAS) (NAS, 1977). This method is based on three major concepts. First, depth-limited waves in shallow water reach maximum breaking height that is equal to 0.78 times the stillwater depth. The wave crest is 70 percent of the total wave height above the stillwater level. The second major concept is that wave height may be diminished by dissipation of energy due to the presence of obstructions, such as sand dunes, dikes and seawalls, buildings and vegetation. The amount of energy dissipation is a function of the physical characteristics of the obstruction and is determined by procedures prescribed in the NAS Report. The third major concept is that wave height can be regenerated in open fetch areas due to the transfer of wind energy to the water. This added energy is related to fetch length and depth.

These concepts and equations were used to compute wave heights and wave crest elevations associated with the 1-percent annual chance storm surge. Accurate topographic, land-use, and land-cover data are required for the wave height analysis.

Wave heights were computed across transects that were located along coastal areas of Mathews County, as illustrated on the FIRM. Transects are located with consideration given to existing transect locations and to the physical and cultural characteristics of the land so that they would closely represent conditions in the locality. Mapped transect locations for this study are provided in Figure 2, "Transect Location Map."

Each transect was taken perpendicular to the shoreline and extended inland to a point where coastal flooding ceased. Along each transect, wave heights and elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. The stillwater elevations for a 1-percent annual chance event were used as the starting elevations for these computations. Wave heights were calculated to the nearest 0.1 foot, and wave elevations were determined at whole-foot increments along the transects. The location of the 3-foot breaking wave for determining the terminus of the Zone VE (area with velocity wave action) was computed at each transect. Along the open coast, the Zone VE designation applies to all areas seaward of the landward toe of the primary frontal dune system. The primary frontal dune is defined as the point where the ground profile changes from relatively steep to relatively mild.

Dune erosion was taken into account along the Chesapeake Bay. A review of the geology and shoreline type in Mathews County was made to determine the applicability of standard erosion methods, and FEMA's standard erosion methodology for coastal areas having primary frontal dunes, referred to as the "540 rule," was used (FEMA, 2007). This methodology first evaluates the dune's cross-sectional profile to determine whether the dune has a reservoir of material that is greater or less than 540 square feet. If the reservoir is greater than 540 square feet, the "retreat" erosion method is employed and approximately 540 square feet of the dune is eroded using a standardized eroded profile, as specified in FEMA guidelines. If the reservoir is less than 540 square feet, the "remove" erosion method is employed where the dune is removed for subsequent analysis, again using a standard eroded profile. The storm surge study provided the return period stillwater elevations required for erosion analyses. Each cross-shore transect was analyzed for erosion, when applicable.

Wave height calculations used in this study are based on methodologies described in the FEMA guidance for coastal mapping (FEMA, 2007). Wave setup results in an increased water level at the shoreline due to the breaking of waves and transfer of momentum to the water column during hurricanes and severe storms. For the Mathews County study, wave setup was determined directly from the coupled wave and storm surge model. The total stillwater elevation (SWEL) with wave setup was then used for simulations of inland wave propagation conducted using FEMA's Wave Height Analysis for Flood Insurance Studies (WHAFIS) model Version 4.0 (FEMA, 2007a). WHAFIS is a one-dimensional model that was applied to each transect in the study area. The model uses the specified SWEL, the computed wave setup, and the starting wave conditions as input. Simulations of wave transformations were then conducted with WHAFIS taking into account the storm-induced erosion and overland features of each transect. Output from the model includes the combined SWEL and wave height along each cross-shore transect allowing for the establishment of base flood elevations (BFEs) and flood zones from the shoreline to points inland within the study area.

Wave runup is defined as the maximum vertical extent of wave uprush on a beach or structure. FEMA's 2007 Guidelines and Specifications require the 2-percent wave runup level be computed for the coastal feature being evaluated (cliff, coastal bluff, dune, or structure) (FEMA, 2007). The 2-percent runup level is the highest 2-percent of wave runup affecting the shoreline during the 1-percent annual chance flood event. Each transect defined within the Region III study area was evaluated for the applicability of wave runup, and if necessary, the appropriate runup methodology was selected and applied to each transect. Runup elevations were then compared to WHAFIS results to determine the dominant process affecting BFEs and associated flood hazard levels. Based on wave runup rates, wave overtopping was computed following the FEMA 2007 Guidelines and Specifications.

Computed controlling wave heights at the shoreline range from 0.9 to 17.5 feet NAVD 88 along Chesapeake Bay, from 2.9 to 9.1 feet NAVD 88 along portions of the Piankatank River, and from 1.1 to 12.5 feet NAVD 88 along Mobjack Bay, where the fetch is long. The corresponding wave elevation at the shoreline ranges from 5.5 to 8.6 feet NAVD 88 along Chesapeake Bay, from 6.9 to 7.6 feet NAVD 88 along portions of the Piankatank River, and from 6.5 to 9.3 feet NAVD 88 along Mobjack Bay. The dune along the Chesapeake Bay coast serves to reduce wave height transmitted inland, but the large areas of low-lying marshes which are inundated by the tidal surge allow regeneration of the waves as they proceed inland. In general, the relatively shallow depth of water in the marshes along with the energy dissipating effects of vegetation allows only minor regeneration of the waves.

Between transects, elevations were interpolated using the best available topographic data provided, land-use and land cover data, and engineering judgment to determine the aerial extent of flooding. The results of the calculations are accurate until local topography, vegetation, or cultural developments within the community undergo major changes. A summary of the transect data for the coastal flooding sources is shown in Table 2, "Transect Data," which provides the 10-percent, 2-percent, 1-percent and 0.2-percent annual chance stillwater elevations and the starting wave conditions for each transect.

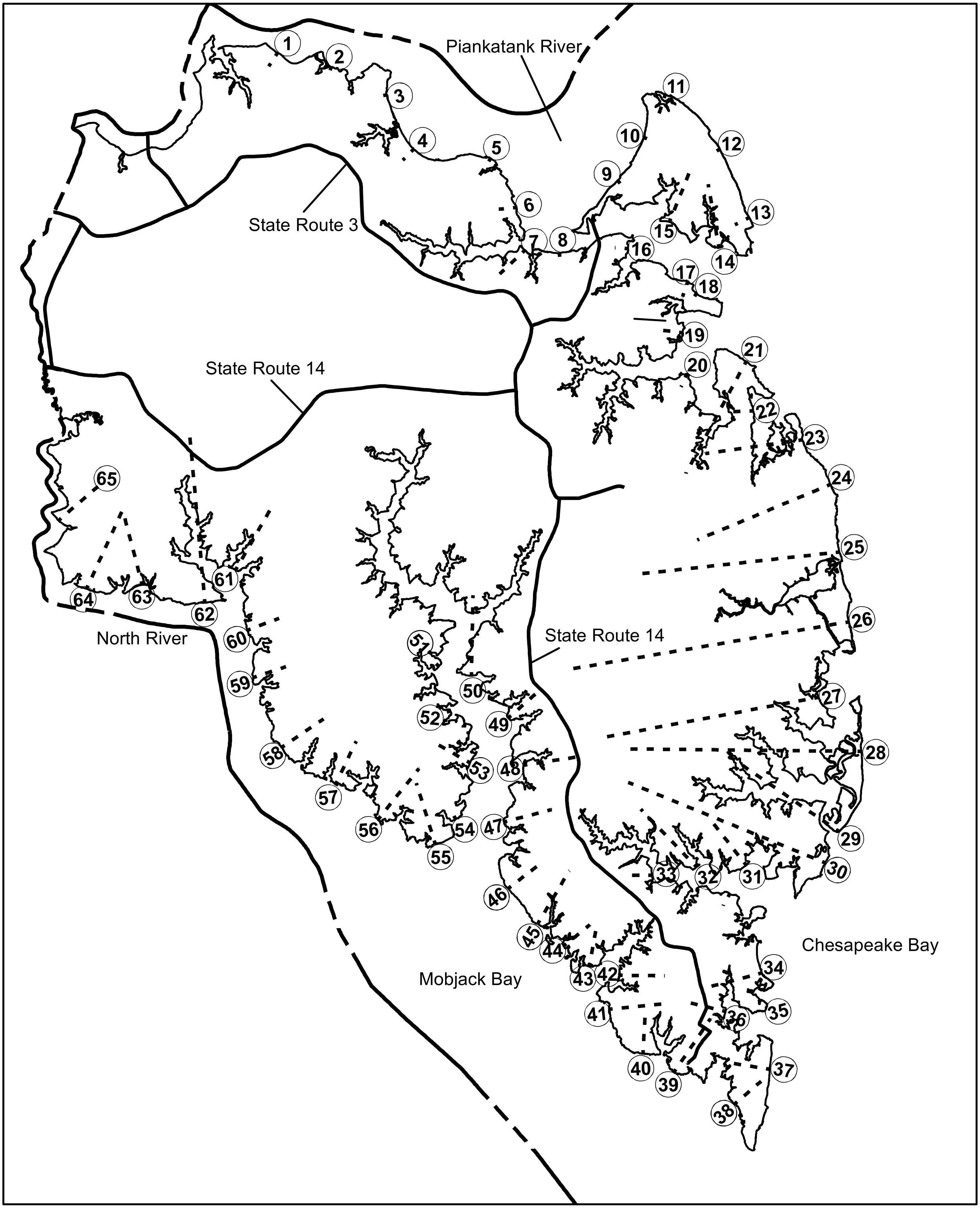


FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

MATHEWS COUNTY, VA
(ALL JURISDICTIONS)

0 1 2 3 4 5 Miles

TRANSECT LOCATION MAP

TABLE 2 - TRANSECT DATA

Flood Source	Transect	Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (ft NAVD88)			
		Coordinates	Significant Wave Height H_s (**ft**)	Peak Wave Period T_p (**sec**)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
PIANKATANK RIVER	1	N 37.52566 W -76.38744	3.6	3.5	3.6	4.6	5.0	6.5
PIANKATANK RIVER	2	N 37.52268 W -76.37429	3.8	3.6	3.6	4.6	5.0	6.4
PIANKATANK RIVER	3	N 37.51688 W -76.36084	4.5	3.6	3.6	4.5	4.9	6.2
PIANKATANK RIVER	4	N 37.50618 W -76.35445	4.7	3.8	3.6	4.6	4.9	6.3
PIANKATANK RIVER	5	N 37.50401 W -76.33552	4.7	6.2	3.6	4.6	4.9	6.2
PIANKATANK RIVER	6	N 37.49428 W -76.32947	5.1	4.0	3.5	4.5	5.0	6.2
PIANKATANK RIVER	7	N 37.48588 W -76.32765	3.6	3.8	3.6	4.6	5.0	6.3
PIANKATANK RIVER	8	N 37.48515 W -76.31919	4.1	3.8	3.5	4.5	5.0	6.2
PIANKATANK RIVER	9	N 37.49911 W -76.30441	4.8	3.6	3.5	4.3	4.8	5.9
PIANKATANK RIVER	10	N 37.50743 W -76.29770	3.5	2.9	3.4	4.4	4.7	5.8
CHESAPEAKE BAY	11	N 37.51581 W -76.29225	7.5	7.3	3.4	4.4	4.7	5.7
CHESAPEAKE BAY	12	N 37.50479 W -76.27906	10.5	7.2	3.4	4.3	4.7	5.5
CHESAPEAKE BAY	13	N 37.49125 W -76.27223	10.7	7.2	3.4	4.3	4.7	5.6
MILFORD HAVEN	14	N 37.48546 W -76.27999	2.5	2.6	3.6	4.5	4.9	5.9

TABLE 2 - TRANSECT DATA - continued

Flood Source	Transect	Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (ft NAVD88)			
		Coordinates	Significant Wave Height H_s (**ft**)	Peak Wave Period T_p (**sec**)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
MILFORD HAVEN	15	N 37.49080 W -76.29191	2.2	2.7	3.6	4.6	4.9	6.1
MILFORD HAVEN	16	N 37.48562 W -76.30220	2.2	2.7	3.6	4.6	5	6.2
MILFORD HAVEN	17	N 37.47902 W -76.28776	2.2	2.6	3.6	4.6	5	6
MILFORD HAVEN	18	N 37.47336 W -76.27958	2.9	7	3.6	4.6	5	6
MILFORD HAVEN	19	N 37.46896 W -76.28927	3.2	3.1	3.6	4.7	5.1	6.2
MILFORD HAVEN	20	N 37.46083 W -76.28848	2.8	3	3.6	4.7	5.1	6.2
MILFORD HAVEN	21	N 37.46302 W -76.27374	3	7	3.6	4.6	5	6
CHESAPEAKE BAY	22	N 37.45330 W -76.27246	2.5	5.6	3.6	4.7	5.1	6.1
CHESAPEAKE BAY	23	N 37.44739 W -76.26056	5.3	6.9	3.6	4.6	5	5.9
CHESAPEAKE BAY	24	N 37.43850 W -76.25387	5.6	6.9	3.6	4.6	5	5.8
CHESAPEAKE BAY	25	N 37.42523 W -76.25198	4.5	7.3	3.6	4.5	4.9	5.7
CHESAPEAKE BAY	26	N 37.41146 W -76.25006	5.4	7.5	3.6	4.5	4.9	5.8
CHESAPEAKE BAY	27	N 37.39676 W -76.25808	4.3	7.2	3.6	4.6	5	5.9
CHESAPEAKE BAY	28	N 37.38601 W -76.24777	5	7.3	3.7	4.6	5	5.8

TABLE 2 - TRANSECT DATA - continued

Flood Source	Transect	Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (ft NAVD88)			
		Coordinates	Significant Wave Height H_s (**ft**)	Peak Wave Period T_p (**sec**)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
CHESAPEAKE BAY	29	N 37.37035 W -76.25371	8.3	7.4	3.8	4.8	5.1	6
CHESAPEAKE BAY	30	N 37.36430 W -76.25730	8.4	7.4	3.8	4.7	5.1	6
CHESAPEAKE BAY	31	N 37.36413 W -76.27675	3	2.6	4	5	5.4	6.5
CHESAPEAKE BAY	32	N 37.36411 W -76.28899	2.6	3	4.1	5.1	5.5	6.7
CHESAPEAKE BAY	33	N 37.36267 W -73.29996	2.3	2.9	4.1	5.1	5.6	6.9
CHESAPEAKE BAY	34	N 37.35863 W -76.28090	2.9	2.9	4.1	5	5.4	6.5
CHESAPEAKE BAY	35	N 37.34300 W -76.27352	4	6.9	4	5	5.4	6.5
CHESAPEAKE BAY	36	N 37.33563 W -76.28265	3.3	6.8	4.2	5.2	5.6	6.7
CHESAPEAKE BAY	37	N 37.32409 W -76.27215	7	7.3	4.1	5.1	5.5	6.4
MOBJACK BAY	38	N 37.31739 W -76.28104	7.7	5.3	4.1	4.9	5.3	6.2
MOBJACK BAY	39	N 37.32403 W -76.29554	7.1	5.2	4.2	5	5.4	6.4
MOBJACK BAY	40	N 37.32771 W -76.30318	7.6	5.6	4.2	5	5.4	6.5
MOBJACK BAY	41	N 37.33655 W -76.31125	6	4.6	4.2	5.1	5.5	6.6
MOBJACK BAY	42	N 37.34323 W -76.30860	5.7	5.8	4.2	5	5.4	6.6

TABLE 2 - TRANSECT DATA - continued

Flood Source	Transect	Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (ft NAVD88)			
		Coordinates	Significant Wave Height H_s (**ft**)	Peak Wave Period T_p (**sec**)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
MOBJACK BAY	43	N 37.34512 W -73.31589	6.4	4.7	4.2	5.1	5.4	6.7
MOBJACK BAY	44	N 37.34917 W -76.32209	6	4.7	4.3	5.1	5.5	6.8
MOBJACK BAY	45	N 37.35364 W -76.32828	5.7	4.3	4.3	5.1	5.5	6.9
MOBJACK BAY	46	N 37.36071 W -76.33538	5.7	4.6	4.3	5.2	5.6	7
MOBJACK BAY	47	N 37.37378 W -76.33599	2.9	2.8	4.3	5.2	5.7	7.3
MOBJACK BAY	48	N 37.38485 W -76.33088	2.3	2.6	4.4	5.2	5.7	7.4
MOBJACK BAY	49	N 37.39418 W -76.33428	2.2	2.6	4.3	5.2	5.7	7.4
MOBJACK BAY	50	N 37.40260 W -76.34323	2.2	2.7	4.4	5.2	5.8	7.5
MOBJACK BAY	51	N 37.40464 W -76.35125	2.2	2.7	4.4	5.3	5.8	7.8
MOBJACK BAY	52	N 37.39576 W -76.34863	2.6	3.4	4.4	5.3	5.8	7.6
MOBJACK BAY	53	N 37.34403 W -73.38555	2.4	2.7	4.4	5.3	5.7	7.4
MOBJACK BAY	54	N 37.34789 W -76.37457	3.5	4.1	4.4	5.3	5.7	7.3
MOBJACK BAY	55	N 37.35313 W -76.36987	4.6	4.1	4.4	5.3	5.7	7.3
MOBJACK BAY	56	N 37.37477 W -76.36702	5.1	4.3	4.4	5.3	5.8	7.4

TABLE 2 - TRANSECT DATA - continued

Flood Source	Transect	Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (ft NAVD88)			
		Coordinates	Significant Wave Height H_s (**ft**)	Peak Wave Period T_p (**sec**)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
MOBJACK BAY	57	N 37.37722 W -76.38190	5.1	4.3	4.5	5.4	5.9	7.7
NORTH RIVER	58	N 37.39032 W -76.38939	4.3	3.9	4.5	5.5	6	7.8
NORTH RIVER	59	N 37.39687 W -76.40320	2.9	2.9	4.5	5.5	6.1	8.2
NORTH RIVER	60	N 37.39087 W -76.41256	3.1	3.1	4.6	5.6	6.1	8.3
NORTH RIVER	61	N 37.42438 W -76.40069	2	2.6	4.6	5.5	6.2	8.5
NORTH RIVER	62	N 37.40838 W -76.41813	3.4	3.2	4.6	5.6	6.2	8.4
NORTH RIVER	63	N 37.42371 W -73.42192	2.6	3.1	4.6	5.7	6.3	8.7
NORTH RIVER	64	N 37.42136 W -76.43740	2.6	3.2	4.7	5.7	6.4	8.9
NORTH RIVER	65	N 37.44398 W -76.43488	0.9	2.6	4.7	5.8	6.4	9.2

Qualifying bench marks (elevation reference marks) within a given jurisdiction that are cataloged by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical and have a vertical stability classification of A, B, or C are shown and labeled on the FIRM with their 6- character NSRS Permanent Identifier.

Bench marks cataloged by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

- Stability A: Monuments of the most reliable nature, expected to hold position/ elevation well (e.g., mounted in bedrock)

- Stability B: Monuments which generally hold their position/elevation well (e.g., concrete bridge abutment)

- Stability C: Monuments which may be affected by surface ground movement (e.g., concrete monument below frost line)

- Stability D: Mark of questionable or unknown stability (e.g., concrete monument above frost line, or steel witness post)

In addition to NSRS bench marks, the FIRM may also show vertical control monuments established by a local jurisdiction; these monuments will be shown on the FIRM with the appropriate designations. Local monuments will only be placed on the FIRM if the community has requested that they be included, and if the monuments meet the aforementioned NSRS inclusion criteria.

To obtain current elevation, description, and/or location information for bench marks shown on the FIRM for this jurisdiction, please contact the Information Services Branch of the NGS at (301) 713-3242 or visit their website at www.ngs.noaa.gov.

It is important to note that temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with this FIS and FIRM. Interested individuals may contact FEMA to access this data.

3.4 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the finalization of the North American Vertical Datum of 1988 (NAVD 88), many FIS reports and FIRMs are being prepared using NAVD 88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD 88. Structure and ground elevations in the county must, therefore, be referenced to NAVD 88. It is important to note that adjacent counties may be referenced to NGVD 29. This may result in differences in base flood elevations across the county boundaries between the counties.

The vertical datum conversion factor from NGVD 29 to NAVD 88 for Mathews County is -1.096 feet. Therefore, users that wish to convert elevations in this FIS to NGVD 29 should apply the conversion factor to elevations shown in this FIS report, which are shown at a minimum to the nearest 0.1 foot.

NGVD 29 - 1.096 = NAVD 88

For information regarding conversion between the NGVD 29 and NAVD 88, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS provides 1-percent annual chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent annual chance flood elevations; delineations of the 1- and 0.2-percent annual chance floodplains; and 1-percent annual chance floodway. This information is presented on the FIRM and in many components of the FIS, including Flood Profiles, Floodway Data tables, and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS as well as additional information that may be available at the local community map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual- chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance flood is employed to indicate additional areas of flood risk in the county.

Pre-countywide Analysis

For the flooding sources studied in detail, the 1- and 0.2-percent annual chance floodplain boundaries were delineated using topographic maps at a scale of 1:4,800 with a contour interval of 2 feet (Air Survey Corporation, 1983).

For the tidal areas with wave action, the flood boundaries were delineated using the elevations determined at each transect; between transects, the boundaries were interpolated using engineering judgment, land-cover data, and topographic maps (Air Survey Corporation, 1983 and 1984). The 1-percent annual chance floodplain was divided into whole-foot elevation zones based on the average wave crest envelope in that zone. Where the map scale did not permit these zones to be delineated at 1-foot intervals, larger increments were used.

For the flooding sources studied by approximate methods, the boundaries of the 1-percent annual chance floodplains were delineated using topographic maps taken from the previously printed FIS reports, FHBMs, and/or FIRMs for all of the incorporated and unincorporated jurisdictions within Mathews County.

November 17, 2007 Countywide Study

The 1- and 0.2-percent annual chance floodplain boundaries are shown on the FIRM (Exhibit 1). On this map, the 1-percent annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, and VE); and the 0.2-percent annual chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent- annual-chance floodplain boundaries are close together, only the 1-percent-annual- chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 1-percent annual chance floodplain boundary was shown on the FIRM.

In the original FIS, FIRM panels were shown at a scale of 1:7,200. For this revised study, FIRM panels were shown at a scale of 1:12,000 using aerial photographs as a base map.

December 9, 2014 Countywide Revision

The 1- and 0.2-percent annual chance floodplain boundaries are shown on the FIRM (Exhibit 1). On this map, the 1-percent annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, and VE); and the 0.2-percent annual chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent annual chance floodplain boundaries are close together, only the 1-percent annual chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data. Floodplain boundaries were delineated from 2011 LiDAR based mass points compiled to meet a 3.5 foot horizontal accuracy (USGS, 2011).

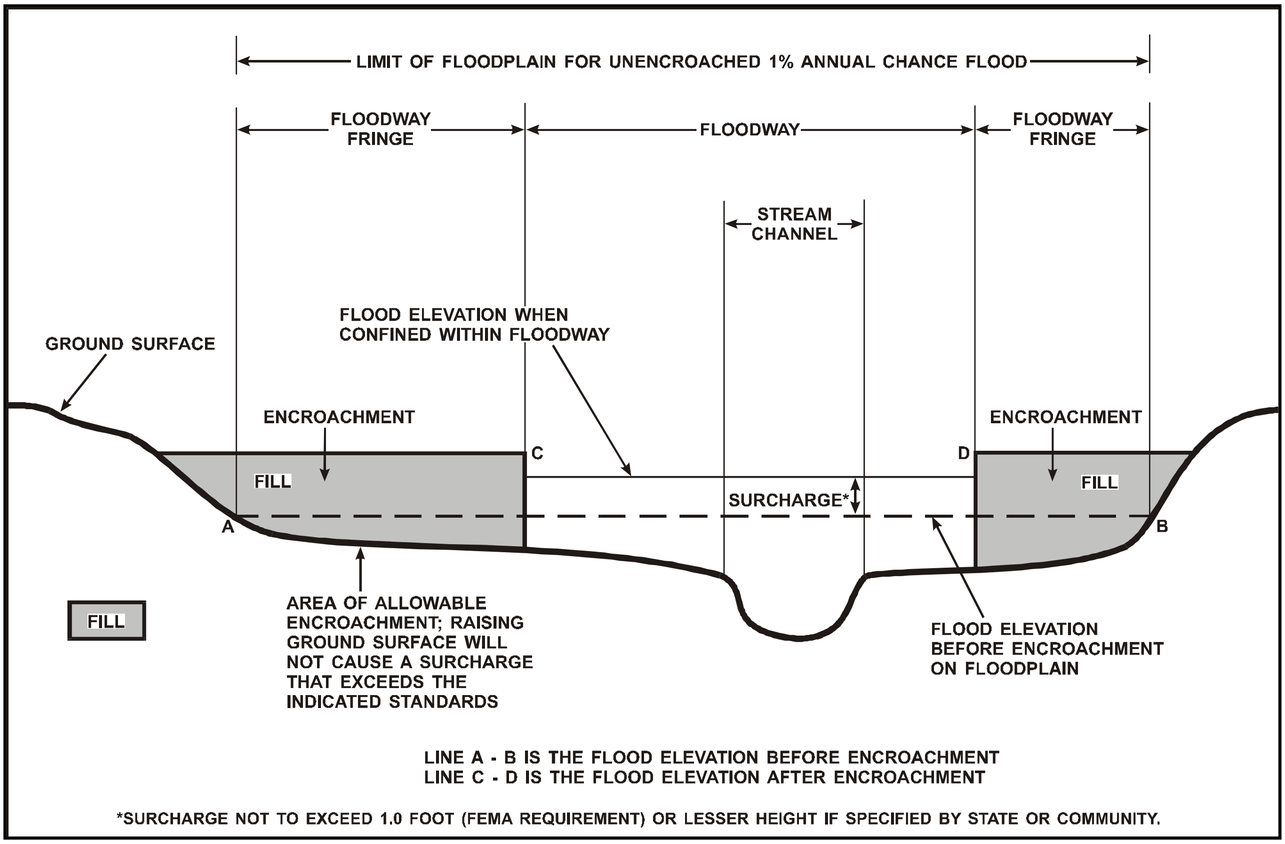
4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent annual chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent annual chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage, and heightens potential flood hazards by further increasing velocities. To reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development in areas outside the floodway.

The area between the floodway and 1-percent annual chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent annual chance flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 3, “Floodway Schematic.”

FIGURE 3 - FLOODWAY SCHEMATIC



No floodways were calculated as part of this FIS.

5.0 INSURANCE APPLICATION

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

Zone A

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

Zone AE

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

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 1-percent-annual- chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 1-percent-annual- chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone AR

Zone AR is the flood insurance risk zone that corresponds to an area of special flood hazard formerly protected from the 1-percent annual chance flood event by a flood-control system that was subsequently decertified. Zone AR indicates that the former flood-control system is being restored to provide protection from the 1-percent annual chance or greater flood event.

Zone A99

Zone A99 is the flood insurance zone that corresponds to areas of the 1-percent-annual- chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No BFEs or depths are shown within this zone.

Zone V

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

Zone VE

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

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent annual chance floodplain, areas of 1- percent annual chance flooding where average depths are less than 1 foot, areas of 1- percent annual chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent annual chance flood by levees. No BFEs or depths are shown within this zone.

Zone X (Future Base Flood)

Zone X (Future Base Flood) is the flood insurance risk zone that corresponds to the 1-percent annual chance floodplains that are determined based on future-conditions hydrology. No BFEs or base flood depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 1-percent annual chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent annual chance floodplains, floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The countywide FIRM presents flooding information for the entire geographic area of Mathews County. Previously, FIRMs were prepared for the unincorporated areas of the county identified as flood-prone. This countywide FIRM also includes flood-hazard information that was presented separately on Flood Boundary and Floodway Maps (FBFMs), where applicable. Historical data relating to the pre-countywide maps prepared for each community are presented in Table 3, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION DATE	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Mathews County (Unincorporated Areas)	November 8, 1974	September 17, 1976	February 4, 1987	August 3, 1992

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

MATHEWS COUNTY, VIRGINIA

(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

FISs are currently being prepared for Gloucester County and Middlesex County (FEMA, unpublished1; FEMA, unpublished2).

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Mathews County has been compiled into this FIS. Therefore, this FIS supersedes all previously printed FIS reports, and FIRMs for all of the incorporated and unincorporated jurisdictions within Mathews County.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this FIS can be obtained by contacting FEMA, Federal Insurance and Mitigation Division, FEMA Region III, One Independence Mall, Sixth Floor, 615 Chestnut Street, Philadelphia, Pennsylvania 19106-4404.

9.0 BIBLIOGRAPHY AND REFERENCES

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