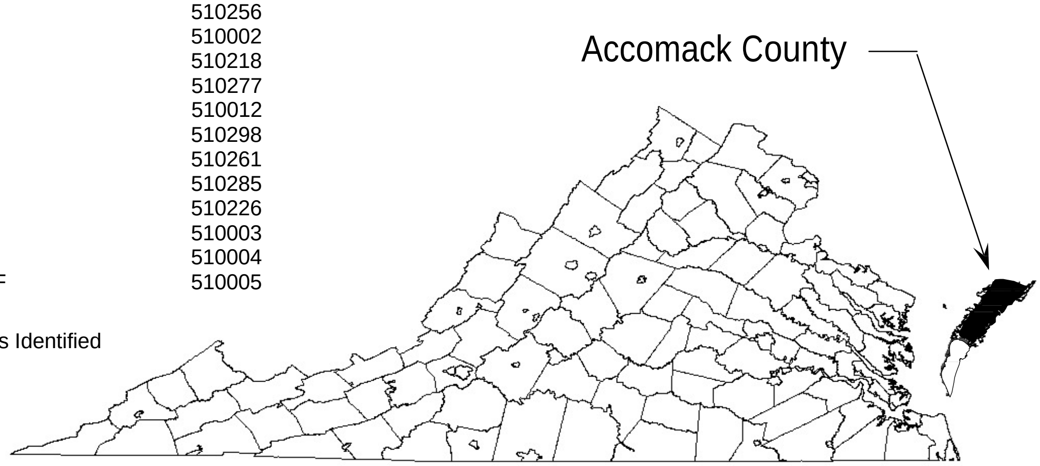
FLOOD INSURANCE STUDY

ACCOMACK COUNTY, VIRGINIA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
ACCOMACK COUNTY, (UNINCORPORATED AREAS)	510001
*ACCOMAC, TOWN OF	510050
BELLE HAVEN, TOWN OF	510242
*BLOXOM, TOWN OF	510256
CHINCOTEAGUE, TOWN OF	510002
*HALLWOOD, TOWN OF	510218
*KELLER, TOWN OF	510277
*MELFA, TOWN OF	510012
ONANCOCK, TOWN OF	510298
*ONLEY, TOWN OF	510261
*PAINTER, TOWN OF	510285
*PARKSLEY, TOWN OF	510226
SAXIS, TOWN OF	510003
TANGIER, TOWN OF	510004
WACHAPREAGUE, TOWN OF	510005

*No Special Flood Hazard Areas Identified



Revised:
May 18, 2015

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
51001CV000B

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) 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 may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current Flood Insurance Study components.

Initial countywide FIS Effective Date: March 16, 2009

Revised countywide FIS Date: May 18, 2015

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FLOOD INSURANCE STUDY
ACCOMACK COUNTY, VIRGINIA AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the previous FIS report and/or Flood Insurance Rate Map (FIRM) in the geographic area of Accomack County, Virginia, including the Towns of Accomac, Belle Haven, Bloxom, Chincoteague, Hallwood, Keller, Melfa, Onancock, Onley, Painter, Parksley, Saxis, Tangier, and Wachapreague and the unincorporated areas of Accomack County (hereinafter referred to collectively as Accomack County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study 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 Accomack County to update existing floodplain regulations as part of the regular phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain management. Minimum flood plain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

Please note that on the effective date of this study, the Towns of Accomac, Bloxom, Hallwood, Keller, Melfa, Onley, Painter, and Parksley have no identified Special Flood Hazard Areas (SFHAs). This does not preclude future determinations of SFHAs that could be necessitated by changed conditions affecting the community (i.e. annexation of new lands) or the availability of new scientific or technical data about flood hazards.

Please note that the Town of Belle Haven is geographically located in Accomack and Northampton Counties. The Town of Belle Haven is included in its entirety in this FIS report.

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 Acknowledgments

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 with a pre-countywide printed FIS report included in this countywide FIS is shown below:

Accomack County: The December 1, 1983, FIS (FIRM effective June 1, 1984) was 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 (IAA) No. IAA-H-9-79, Project No. 35 (Reference 1). The hydrologic analyses were prepared by the National Oceanic and Atmospheric Administration (NOAA) and the Virginia Institute of Marine Science (VIMS). The wave height analysis was prepared by Dewberry & Davis, for

FEMA, under Contract No. EMW-C-0543. That work was completed in January 1981. Individual FIRM panels were revised on May 1, 1985, April 2, 1992, October 16, 1996, and July 20, 1998.

Town of Belle Haven: The hydrologic and hydraulic analyses for the Town of Belle Haven June 15, 1981, FIS (FIRM effective December 15, 1981) were prepared by the USACE, for FEMA, under IAA No. IAA-H-9-79, Project No. 35. That work was completed in July 1980 (Reference 2).

Town of Chincoteague: In the original study the hydrologic and hydraulic analyses for the Town of Chincoteague FIS effective March 1, 1977 were prepared by the USACE, for the U.S. Department of Housing and Urban Development, under IAA No. H-16-75, Project Order No. 16. That work was completed in September 1976. A FIS revision was prepared by Dewberry & Davis, for FEMA, under Contract No. EMW-C-0543. That work was completed in June 1982. The FIS and FIRM for that revision became effective on May 16, 1983. Another revision was also prepared by Dewberry & Davis, at the request of the community, in September 1983. The FIS and FIRM for that revision became effective on June 1, 1984 (Reference 3).

Town of Hallwood: In the original FIS effective November 3, 1981 (FIRM effective May 3, 1982), the hydrologic and hydraulic analyses for Messongo Creek were prepared by the USACE, for FEMA, under IAA No. H-9-79, Project Order No. 35. That work was completed in October 1980 (Reference 4). Under the Limited Map Maintenance Program (LMMP), it was determined from a restudy by the USACE that no SFHAs exist within the community. By letter, effective September 28, 2001, the effective FIRM was rescinded.

Town of Onancock: The hydrologic and hydraulic analyses for the Town of Onancock June 15, 1981, FIS (FIRM effective December 15, 1981) were prepared by the USACE, for FEMA, under IAA No. IAA-H-9-79, Project No. 35. That work was completed in August 1980 (Reference 5).

Town of Saxis: The hydrologic and hydraulic analyses for the Town of Saxis May 17, 1982, FIS (FIRM effective November 17, 1982) were prepared by the USACE, for FEMA, under IAA No. IAA-H-9-79, Project No. 35. That work was completed in February 1981. The wave height analysis was prepared by Dewberry & Davis, for FEMA, under Contract No. EMW-C-0543. That work was completed in July 1981 (Reference 6).

Town of Tangier: The hydrologic and hydraulic analyses for the Town of Tangier April 15, 1982, FIS (FIRM effective October 15,

1982) were prepared by the USACE, for FEMA, under IAA No. IAA-H-9-79, Project No. 35. That work was completed in April 1981. The wave height analysis was prepared by Dewberry & Davis, for FEMA, under Contract No. EMW-C-0543. That work was completed in July 1981. A revision to the FIRM, effective on August 3, 1992, was performed to add undeveloped coastal barriers (Reference 7).

Town of Wachapreague: The hydrologic and hydraulic analyses for the Town of Wachapreague March 2, 1982, FIS (FIRM effective September 2, 1982) FIS were prepared by the USACE, for FEMA, under IAA No. IAA- H-9-79, Project No. 35. That work was completed in March 1981. The wave height analysis was prepared by Dewberry & Davis, for FEMA, under Contract No. EMW-C-0543. That work was completed in July 1981 (Reference 8).

There are no previous FIS reports published for the Towns of Accomac, Bloxom, Keller, Melfa, Onley, Painter, and Parksley; therefore, the previous authority and acknowledgments for these communities are not included in this FIS. SFHAs were previously identified in the Town of Keller on April 1, 1977 as Zone A; however during the initial countywide study and after further review by FEMA, the effective Flood Hazard Boundary Map (FHBM) for the community was rescinded.

For the March 16, 2009, initial countywide FIS, revisions and updates were prepared by the USACE, for FEMA, under IAA No. EMW-2002-IA-0283. New hydrologic and hydraulic analyses were not conducted for that countywide FIS, and minor revisions were made to bring previous studies into agreement. All previous FISs were in agreement with the hydrologic and hydraulic analyses except the FISs for the Towns of Belle Haven, Hallwood, and Onancock. Through that countywide FIS, the original FIRMs for the Towns of Belle Haven and Onancock were revised to reflect the flood elevations shown in the previous Accomack County FIS. The FIRM rescission for the Town of Hallwood, by letter effective September 28, 2001, was also included in that countywide FIS. As a result, the FISs and FIRMs for all previously studied communities are now in agreement. Other revisions and updates include updated community description information, historical flood information, FEMA contact information, and bibliography and references. That countywide FIS also included information regarding survey bench marks and vertical datums. The original FIRMs were converted to a digital format, utilizing aerial photography as the base map. The original FIRM panels for the previous FISs were shown at scales of 1:2,400, 1:4,800, 1: 6,000, or 1:12,000; the revised and updated FIRM panels were shown at scales of 1:12,000 and 1:24,000. This work was completed in March 2006.

For the May 18, 2015, countywide FIS revision, the coastal analysis and mapping for Accomack County was conducted for FEMA by the USACE and its project partners under Project 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). The coastal analysis involved transect layout, field reconnaissance, erosion analysis, and overland wave modeling including wave setup, wave height analysis and wave runup.

The FIRM was prepared using the Virginia State Plane South zone. The horizontal datum used is North American Datum of 1983 (NAD83)/HARN, GRS80 spheroid. Differences in datum, spheroid, projection, or State Planes zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdictional boundaries. The base map information shown on the revised FIRM was provided by the Commonwealth of Virginia through the Virginia Base Mapping Program (VBMP). The orthophotos were flown in 2009 at a scale of 1:100 and 1:200.

1.3 Coordination

The purpose of the initial Consultation Coordination Officer (CCO) meeting is to discuss the scope of the FIS. A final CCO meeting is held to review the results of the study.

The dates of the pre-countywide initial and final CCO meetings held for the incorporated communities within the boundaries of Accomack County are shown in Table 1, "CCO Meeting Dates for Pre-countywide FISs".

TABLE 1 - CCO MEETING DATES FOR PRE-COUNTYWIDE FISs

Community Name	Initial CCO Date	Final CCO Date
Accomack County	January 22, 1979	June 24, 1982
Town of Accomac	N/A	N/A
Town of Belle Haven	January 22, 1979	January 28, 1981
Town of Bloxom	N/A	N/A
Town of Chincoteague[1]	June 19, 1975	February 2, 1976
Town of Hallwood[1]	January 23, 1979	May 4, 1981
Town of Keller	N/A	N/A
Town of Melfa	N/A	N/A
Town of Onancock	January 22, 1979	January 28, 1981
Town of Olney	N/A	N/A
Town of Painter	N/A	N/A
Town of Parksley	N/A	N/A
Town of Saxis	January 23, 1979	December 7, 1981
Town of Tangier	Not Available	December 1, 1981
Town of Wachapreague	January 22, 1979	October 20, 1981

[1]Coordination and review for revisions occurred during the restudy.
N/A – Not applicable, no FIS previously prepared.

For the March 16, 2009, initial countywide FIS, the initial CCO meeting was held on July 14, 2003, and attended by representatives from FEMA, Accomack County, the Virginia Department of Conservation and Recreation, and the USACE. The results of the study were reviewed at the final CCO meeting held on July 18, 2006, and attended by representatives of FEMA, Accomack County, and the USACE.

For the May 18, 2015, countywide FIS revision, the FEMA Region III office initiated a coastal storm surge study in 2008 for the Atlantic Ocean, the Chesapeake Bay and its tributaries, and the Delaware Bay. Therefore, no initial CCO meeting for the coastal storm surge study was held. A final CCO meeting was held on July 31, 2013, with representatives from FEMA, the Virginia Department of Conservation and Recreation, the USACE, the study contractor, and Accomack County.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Accomack County including the Towns of Accomac, Belle Haven, Bloxom, Chincoteague, Hallwood, Keller, Melfa, Onancock, Onley, Painter, Parksley, Saxis, Tangier, and Wachapreague, and the unincorporated areas of Accomack County, Virginia.

In the March 16, 2009, initial countywide FIS, coastal flooding, including wave action from the Atlantic Ocean, Chincoteague Bay, and the Chesapeake Bay, was studied by detailed methods. 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. The scope and methods of the study were proposed to, and agreed upon, by FEMA and Accomack County.

For the May 18, 2015, countywide FIS revision, the FEMA Region III office initiated a study to update the coastal storm surge elevations within the states of Virginia, Maryland, and Delaware, and the District of Columbia including the Atlantic Ocean, Chincoteague Bay, Metompkin Bay, Wachapreague Channel, Major Hole Bay, the Chesapeake Bay, Pocomoke Sound, Onancock Creek, Pungoteague Creek, Nandua Creek, Occohannock Creek, and Outlet Bay. This effort is one of the most extensive coastal storm surge analyses to date, encompassing coastal floodplains in three states and including the largest estuary in the world. The study will replace outdated coastal storm surge stillwater elevations for all FISs in the study area, and serve as the basis for new coastal hazard analysis and ultimately updated FIRMs. Study efforts were initiated in 2008 and concluded in 2012.

No Letters of Map Revision (LOMRs) have been issued for Accomack County.

2.2 Community Description

Accomack County is located in the eastern portion of Virginia, on a peninsula of land known as the Eastern Shore. It is bordered by the State of Maryland to the north, the Atlantic Ocean to the east, the Chesapeake Bay to the west, and Northampton County to the south. The county has a total land area of 476 square miles. The population of Accomack County was 31,147 in 1980, 31,703 in 1990, 38,305 in 2000, and 33,164 in 2010 (Reference 9). Of the fourteen incorporated towns within Accomack County, the Town of Chincoteague had the largest population of 2,941 in 2010 (Reference 9). The Town of Tangier is unique, such that it is part of Tangier Island located in the Chesapeake Bay, approximately 11 miles from the Virginia Eastern Shore and 14 miles from Crisfield, Maryland. Access to the town is by airplane or vessels that run from the Towns of Onancock and Reedville, Virginia and the Town of Crisfield, Maryland. The population of Tangier was 727 in 2010 (Reference 9).

Prior to European settlement, numerous Indian tribes inhabited the Eastern Shore. They named the land “Accawmache”, meaning “land beyond the waters”. In 1524, Giovanni da Verrazzano was the first European to visit the area. Captain Bartholomew Gilbert of England visited in 1603, and Captain John Smith explored the land in 1608. The entire Eastern Shore peninsula was originally founded as Accomack County in 1663. The first permanent English settlement on the Eastern Shore was settled in 1620. In

1673, the peninsula was divided into two counties, Accomack and Northampton. The first settlement on Tangier Island was in 1670 (Reference 10).

The topography of Accomack County is typical of a coastal region. The terrain is mostly flat with some hilly areas where elevations range from sea level to about 45 feet above sea level. It is fringed by islands and cut by countless creeks, bays, and inlets. The majority of the land is cropland and woodland. The soils are underlain by clay, sand, shell, and gravel sediments. The topography of the Town of Tangier is generally flat where elevations range from sea level to about 4 feet above sea level (Reference 10).

The area enjoys a temperate climate with moderate seasonal changes. The climate is characterized by moderately warm summers with temperatures averaging approximately 78 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. Average annual snowfall is 6 inches, generally occurring in light falls which normally melt within 24 hours (Reference 10).

The economy of Accomack County is based primarily on manufacturing, services, and wholesale/retail trade. Agriculture, poultry operations, production of wood products, tourism, and the federal government also provide economic assets. With all the available cropland, the county has long been known as a highly productive farming area for soybeans, potatoes, sweet potatoes, spinach, and other field crops. The county's large amount of timberland is important to the landowners and to those that work in the wood products industry. The close proximity to the waters of the Atlantic Ocean and Chesapeake Bay has long supported the local seafood industry. The National Aeronautics and Space Administration (NASA) Wallops Flight Facility and related contractors provide many jobs to the county (Reference 10).

U.S. Route 13 and the Eastern Shore Railroad provide important links to the State of Maryland and to southeastern Virginia. Both offer easy access to the many local communities and waterfront areas that are located within the county, providing opportunity for continued growth. With the county's many miles of shoreline, there will be pressure for future development within flood prone areas.

2.3 Principal Flood Problems

The coastal areas of Accomack 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 Accomack 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, September 2003 (Hurricane Isabel), August 2011 (Hurricane Irene), and October 2012 (Hurricane Sandy). Other notable hurricanes which caused significant flooding in

Accomack County occurred in September 1936, September 1954 (Hazel), and September 1960 (Donna).

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. This storm occurs 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. Northeasters which caused significant flooding in the county occurred in April 1956, October 1957, and March 1962.

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 3.5 - 4.0 feet along the Atlantic Ocean, 1.0 - 3.5 feet in Chincoteague Bay, and 1.5 - 2.0 feet in the Chesapeake Bay (Reference 11). 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 shoreline of Accomack County is vulnerable to wave damage due to the vast exposure afforded by the Atlantic Ocean, Chincoteague Bay, and the Chesapeake Bay.

Accomack 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.

The August 1933 hurricane passed directly over the lower Chesapeake Bay area, then moved north up the west side of the bay. In addition to damage from tidal flooding, high winds caused damage to roofs, communication lines, and other structures. An account of this hurricane, dated August 25, 1933, reads in part as follows (Reference 12):

"2 dead, many lost, as fierce storm hits shore…Property damage by high tide, 80 mile gale…Wharves swept away, towns flooded, Coast Guard Station deserted as havoc rages on eastern coast…"

"The Eastern Shore and the whole Atlantic coast north of the Carolinas, experienced one of the worst wind and rain storms in the past quarter of a century Tuesday and Wednesday of this week as high winds, gales ranging between 50 and 80 miles per hour intensity when a northeaster piled up against a gale from the Caribbean and drove the waters of the ocean over the beaches and marshes high into the mainland at points completely flooding towns. Ocean breakers easily rode over the marshes and islands into such towns as Willis Wharf, Cape Charles, Chincoteague, Wachapreague, and Kiptopeke. In many instances the angered breakers slashed up the towns, severely damaging property."

The hurricane of September 1936 passed approximately 20 miles east of Cape Henry on the morning of September 18, 1936. High tides and gale force winds caused mush damage along the lower Chesapeake Bay area and the Eastern Shore as the storm moved to the northeast. An account of this hurricane, dated September 18, 1936, reads in part as follows (Reference 13):

"…on the 18th…high tides in the lower section of Norfolk, and high winds demolishing windows, roofs, and buildings, entailed a damage of approximately $500,000 in that area."

"Farther north in Accomack and Northampton Counties, approximately 60,000 broiler chickens were lost, oyster beds were wrecked, and most late crops were lost, the loss in crops approximately $250,000, and other damage amounting to another $250,000."

Hurricane Hazel, which occurred on October 15, 1954, tore through Virginia causing the deaths of 13 persons and widespread property damage. The center of the hurricane moved inland in the vicinity of the South Carolina-North Carolina border between 9 and 10 a.m., and rapid northward movement carried the center through Virginia between 2 and 6 p.m. Hurricane force winds with gusts 80 to 100 miles per hour were experienced near the path of the storm center and eastward to the coast. Rainfall was relatively light in the coastal area but increased sharply west of the storm center (Reference 14).

The northeaster of April 11, 1956 produced a steady wind in the lower Chesapeake Bay area for about 30 hours. The tides ran about 4 feet above normal for about 12 hours and crested on April 11, 1956. Large areas of low-lying sections of the Eastern Shore were inundated during the storm.

The northeaster of October 6, 1957, with wind gusts of 60 - 70 miles per hour, moved north just east of Cape Hatteras during the evening of the 5th, then turned northwest to move through the lower portion of the Chesapeake Bay on the 6th. Heavy rains and gales extended west through central Virginia. The greatest property damage occurred in the coastal areas where heavy seas and high tides battered structures, grounded vessels, and disrupted transportation. An account of this storm, dated October 10, 1957, reads in part as follows (Reference 15):

“Near hurricane winds lashed shore Sunday, Wachapreague, other areas hit.”

“One of the severest struck areas was Wachapreague where tides were estimated four feet above normal…Several boats sunk and there were numerous reports of minor damage.”

Hurricane Donna, which occurred on September 12, 1960, skirted the Virginia coast on the morning of the 12th before moving to the northeast. Strong winds, heavy seas, and severe flooding occurred along the Chesapeake Bay shoreline of the Eastern Shore from Cape Charles north, causing extensive damage. An account of this hurricane, dated September 15, 1960, reads in part as follows (Reference 16):

“‘Devastating Donna’ with tree snapping winds and flooding rain smashed its way through the Eastern Shore Monday morning leaving behind a trail of destruction and tidal damage.”

“As Donna progressed up the coast it was labeled as the ‘most destructive’ storm since 1840 when accurate records began. Its total damage on the shore amounted in the millions of dollars.”

“Some of the highest bayside tides ever recorded were chalked up in Onancock, Bayford, and many other points. Winds up to and beyond 100 miles per hour were recorded at Chincoteague and Wallops Island. Rainfall was measured at 4.5 inches in the 24 hours between Sunday evening and Monday evening most of it falling at the height of the storm.”

“The Chesapeake lightship, anchored near the mouth of the Chesapeake Bay, recorded Donna’s winds at their height at 138 miles per hour. This was the highest recording made since the storm had left Florida where recordings of over 150 were made.”

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 past Hampton Roads and then reversed its course, moving again to the south and bringing with it huge volumes of water and high waves which battered the mid-Atlantic coastline for several days. During this storm, the bay side of the Eastern Shore received less damage from the winds and lower tides than the ocean side. Flooding was significant for low-lying areas like the Towns of Chincoteague, Tangier, and Wachapreague (Reference 17).

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 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 (Reference 18). Historical maximum water level records were exceeded at several locations within the Chesapeake Bay. In general, maximum water levels in the Chesapeake Bay resembled those of the August 1933 hurricane. Some communities along the Chesapeake Bay and its tributaries also experienced severe damage from wave action (Reference 19).

In August 2011, Hurricane Irene hit the eastern coast of the United States and caused substantial damage. In November 2011, President Barack Obama declared a Major Disaster Declaration for numerous counties, including Accomack County, which allowed residents affected by the hurricane to apply for federal aid. This declaration followed the August 2011 Emergency Declaration.

In October 2012, Hurricane Sandy made landfall north of the Commonwealth of Virginia, but caused substantial damage in Virginia. President Obama declared a Major Disaster Declaration for numerous counties, including Accomack County, which allowed residents affected by the hurricane to apply for federal aid.

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 floodproofed to that level" (Reference 20). 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 detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood-hazard data required for this study. Flood events of a magnitude that is 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 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

FEMA adopted recommendations by the National Academy of Sciences (NAS) to include prediction of wave heights in FISs for coastal communities subject to storm surge flooding, and to report the estimated wave crest elevations as the Base Flood Elevations (BFEs) on the FIRM (Reference 21).

Previously, FIRMs for these communities were produced showing only the stillwater storm surge elevations due to the lack of a suitable and generally applicable methodology for estimating the wave crest elevations associated with storm surges. These stillwater elevations were subsequently stipulated in community floodplain management ordinances as the minimum elevation of the lowest floor, including basement, of new construction. Communities and individuals had to consider the additional hazards of velocity waters and wave action on an ad hoc basis. Because there has been a pronounced tendency for buildings to be constructed only to meet minimum standards, without consideration of the additional hazard due to wave height, increasing numbers of people could unknowingly be accepting a high degree of flood-related personal and property risk in coastal areas subject to wave action. Therefore, FEMA has pursued the development of a suitable methodology for estimating the wave crest elevations associated with storm surges. The recent development of such a methodology by the NAS has led to the adoption of wave crest elevations for use as the BFEs in coastal communities (Reference 21).

3.1 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 for the selected recurrence intervals along the shoreline. Users of the FIRM should be aware that coastal flood elevations are provided in Table 2, "Summary of Stillwater Elevations", in this report. 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.

Sporadic commercial and residential development, as well as open space areas, encompasses that part of the Chesapeake Bay shoreline and several embayments west of the Atlantic Ocean shoreline. The barrier islands along the Atlantic Ocean shoreline, with the exception of Chincoteague, Assateague and Wallops Islands, remain privately held and largely undeveloped. Shorelines behind the Atlantic Ocean barrier islands are primarily low marshes, with some low bluffs less than 5 feet in height, along Bogues, Bradford, Burtons, Chincoteague, Gargathy, Hog Island, Kegotank, Major Hole, Metompkin, Swash, Upshur, and Watts Bays. Behind the shoreline, the ground slopes gently upward into woodlands or open agricultural areas.

An analysis was performed to establish the frequency peak elevation relationships for coastal flooding in Accomack County. The 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 Accomack County, 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 (Reference 22). ADCIRC was dynamically coupled to the unstructured numerical wave model Simulating WAves Nearshore (unSWAN) to calculate the contribution of waves to total storm surge. The resulting model system is typically referred to as SWAN+ADCIRC (Reference 23). 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 for those estuarine areas affected by the Atlantic Ocean and Chesapeake Bay affect the entire shoreline within Accomack County. The entire open coastline, south of the Maryland state line to the Northampton County line, is more prone to damaging wave action during high wind events due to the significant fetch over which winds can operate. Across Bogues, Bradford, Burtons, Chincoteague, Gargathy, Hog Island, Kegotank, Major Hole, Metompkin, Swash, Upshur, and Watts Bays, western shorelines transition into marshes as depths diminish, eventually terminating into small tidal and non-tidal tributaries. In these areas, the fetch over which winds can operate for wave generation is significantly less.

The storm-surge elevations for the 10-, 2-, 1-, and 0.2-percent annual chance floods were determined for the flooding sources shown in Table 2, "Summary of Stillwater Elevations." The analyses reported herein reflect the stillwater elevations due to tidal and wind setup effects.

TABLE 2 - SUMMARY OF STILLWATER ELEVATIONS

	ELEVATION (feet NAVD*)			
FLOODING SOURCE AND LOCATION	10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
ATLANTIC OCEAN				
At Maryland State Line	5.4	6.3	7.0	9.9
At Chincoteague Inlet	4.7	5.5	6.3	8.5
At Assawoman Inlet	5.2	6.5	7.5	10.6
At Metompkin Inlet	5.7	6.9	7.9	10.6
At Quinby Inlet	5.3	6.4	7.0	8.8
CHINCOTEAGUE BAY				
At Cockle Point	2.8	3.4	4.0	5.5
At Blake Point	2.6	2.9	3.1	4.0
METOMPKIN BAY				
At Bundick Creek	5.0	6.3	7.8	11.1
At Folly Creek	5.8	7.1	8.1	10.9
WACHAPREAGUE CHANNEL				
At Wachapreague	5.1	6.0	6.9	10.4
MAJOR HOLE BAY				
At Quinby	4.7	6.0	6.8	10.3
CHESAPEAKE BAY				
Tangier Island at Mailboat Harbor	3.1	3.5	3.6	4.0
At Thicket Point	3.3	4.3	4.9	5.7
At Milby's Point	3.2	3.7	4.0	4.7
At Occohannock Creek	3.2	3.7	4.0	5.2

TABLE 2 - SUMMARY OF STILLWATER ELEVATIONS - continued

FLOODING SOURCE AND LOCATION	ELEVATION (feet NAVD*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
POCOMOKE SOUND				
At Pig Point	4.8	6.7	7.5	8.7
At Back Creek	3.4	4.6	5.2	6.2
ONANCOCK CREEK				
At East Point	3.3	4.7	5.4	6.6
At Onancock	3.6	5.5	6.3	7.6
PUNGOTEAGUE CREEK				
At Warehouse Point	3.3	4.6	5.2	6.2
At Harborton	3.3	4.8	5.4	6.5
NANDUA CREEK				
At Monadox Point	3.3	4.1	4.4	5.2
At Kusian Cove	3.5	4.5	4.9	5.7
OCCOHANNOCK CREEK				
At Pons Point	3.2	4.0	4.5	5.9
OUTLET BAY				
At Parchaby Tump	5.4	6.5	7.2	9.0
At Sunday Ditch	6.0	7.3	8.1	11.1

*North American Vertical Datum of 1988

The methodology for analyzing the effects of wave heights associated with coastal storm surge flooding is described in a report prepared by the NAS (Reference 21). 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.

Wave heights were computed across transects that were located along coastal areas of Accomack 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.

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% 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 due 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 Accomack 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 (Reference 24). 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 follow the methodologies described in the FEMA guidance for coastal mapping (Reference 24). 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 Accomack 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 (Reference 25). 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 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% wave runup level be computed for the coastal feature being evaluated (cliff, coastal bluff, dune, or structure) (Reference 24). The 2% 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.

Computed controlling wave heights at the shoreline range from 2.1 feet at embayments where the fetch is short to 5.9 feet along the open coast where the fetch is longer. The corresponding wave elevation at the shoreline varies from 4.4 feet at embayments end to 11.8 feet along the open coast.

Between transects, elevations were interpolated using topographic maps, 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 development within the community experience major changes. Table 3, "Transect Data", provides the 10%, 2%, 1% and 0.2% annual chance stillwater elevations and the starting wave conditions for each transect. Figure 1, "Transect Location Map", provides an illustration of the transect locations for Accomack County.

TABLE 3 – TRANSECT DATA								
		Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (feet NAVD88)			
Flood Source	Transect	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
Chincoteague Bay	1	N 38.014367 W -75.378819	6.5	4.1	2.5	3.0	3.4	4.7
Chincoteague Bay	2	N 38.070070 W -75.388034	7.2	4.2	2.6	3.2	3.6	5.1
Chincoteague Bay	3	N 38.000506 W -75.403942	7.1	4.3	2.8	3.4	4.0	5.7
Chincoteague Bay	4	N 37.993744 W -75.406985	7.3	4.1	2.8	3.4	4.0	5.6
Chincoteague Bay	5	N 37.987017 W -75.411542	7.7	4.1	2.9	3.5	4.1	5.7
Chincoteague Bay	6	N 37.985475 W -75.422002	7.2	4.1	2.9	3.7	4.5	6.2
Chincoteague Bay	7	N 37.987962 W -75.427776	6.2	4.3	3.2	4.0	4.9	6.8
Chincoteague Bay	8	N 37.983987 W -75.429024	7.1	4.2	3.2	3.9	4.7	6.5
Chincoteague Bay	9	N 37.979822 W -75.430280	7.3	4.1	3.2	3.9	4.7	6.5
Chincoteague Bay	10	N 37.977890 W -75.430269	7.4	4.1	3.2	3.8	4.7	6.4
Chincoteague Bay	11	N 37.969201 W -75.430897	6.7	4.1	3.2	3.9	4.7	6.4
Chincoteague Bay	12	N 37.962733 W -75.436284	6.7	4.1	3.4	4.0	4.9	6.6
Chincoteague Bay	13	N 37.938988 W -75.371486	3.2	2.7	3.0	3.4	3.6	3.8
Chincoteague Bay	14	N 37.946147 W -75.360735	3.8	3.2	2.7	3.1	3.3	4.0

TABLE 3 – TRANSECT DATA (continued)								
		Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (feet NAVD88)			
Flood Source	Transect	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
Chincoteague Bay	15	N 37.952979 W -75.353038	3.1	3.9	2.6	2.9	3.1	4.1
Chincoteague Bay	16	N 37.965155 W -75.337252	3.8	3.0	2.4	2.7	3.0	4.9
Chincoteague Bay	17	N 38.006849 W -75.280982	3.6	2.6	2.3	3.0	3.1	3.7
Atlantic Ocean	18	N 38.021510 W -75.246431	27.1	13.9	5.3	6.3	7.0	9.9
Atlantic Ocean	19	N 38.008995 W -75.257195	25.9	13.5	5.1	6.1	6.8	9.6
Atlantic Ocean	20	N 37.994238 W -75.267993	24.5	14.5	5.2	6.2	6.9	9.8
Atlantic Ocean	21	N 37.980505 W -75.278700	25.0	14.5	5.1	6.1	6.9	9.7
Atlantic Ocean	22	N 37.970556 W -75.286541	25.4	14.4	5.1	6.1	7.0	9.8
Atlantic Ocean	23	N 37.957821 W -75.297210	28.0	13.7	5.2	6.2	7.1	9.9
Atlantic Ocean	24	N 37.945274 W -75.306061	30.0	13.5	5.3	6.3	7.2	9.9
Atlantic Ocean	25	N 37.931146 W -75.314674	28.7	13.5	5.4	6.3	7.2	9.9
Atlantic Ocean	26	N 37.917930 W -75.323487	27.6	13.5	5.3	6.3	7.2	10.0
Atlantic Ocean	27	N 37.911457 W -75.327615	26.6	13.3	5.3	6.4	7.2	9.9
Atlantic Ocean	28	N 37.898750 W -75.335920	25.3	13.3	5.2	6.3	7.1	9.8

TABLE 3 – TRANSECT DATA (continued)								
		Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (feet NAVD88)			
Flood Source	Transect	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
Atlantic Ocean	29	N 37.885691 W -75.343515	24.4	13.9	5.2	6.3	7.1	9.8
Atlantic Ocean	30	N 37.874114 W -75.353060	23.4	14.0	4.2	4.8	5.3	7.5
Atlantic Ocean	31	N 37.869233 W -75.427370	22.2	15.8	4.8	5.8	6.9	9.9
Atlantic Ocean	32	N 37.867025 W -75.443527	21.5	15.8	5.0	6.0	7.2	10.4
Atlantic Ocean	33	N 37.859357 W -75.458881	22.3	15.8	5.1	6.2	7.3	10.6
Atlantic Ocean	34	N 37.850653 W -75.469221	24.1	15.6	5.1	6.2	7.3	10.6
Atlantic Ocean	35	N 37.845166 W -75.474797	24.5	15.5	5.2	6.2	7.3	10.6
Atlantic Ocean	36	N 37.836528 W -75.484048	25.0	15.3	5.2	6.3	7.3	10.5
Atlantic Ocean	37	N 37.830363 W -75.491092	26.2	15.1	5.3	6.4	7.5	10.7
Atlantic Ocean	38	N 37.821061 W -75.686911	27.7	14.6	5.2	6.4	7.4	10.6
Atlantic Ocean	39	N 37.811846 W -75.507770	28.6	14.2	5.3	6.5	7.5	10.6
Atlantic Ocean	40	N 37.796957 W -75.520808	29.6	14.2	5.6	6.7	7.7	11.0
Atlantic Ocean	41	N 37.782204 W -75.529809	30.5	13.7	5.4	6.6	7.6	10.8
Atlantic Ocean	42	N 37.771426 W -75.537568	31.0	13.9	5.4	6.7	7.6	10.9

TABLE 3 – TRANSECT DATA (continued)								
		Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (feet NAVD88)			
Flood Source	Transect	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
Atlantic Ocean	43	N 37.766953 W -75.539908	30.8	13.8	5.4	6.6	7.6	10.7
Atlantic Ocean	44	N 37.756131 W -75.545923	29.9	13.9	5.4	6.6	7.5	10.6
Atlantic Ocean	45	N 37.739823 W -75.559601	29.9	13.9	5.1	6.3	7.4	10.5
Atlantic Ocean	46	N 37.733581 W -75.563749	29.7	13.8	5.4	6.7	7.6	10.7
Atlantic Ocean	47	N 37.719370 W -75.569711	29.4	13.7	5.6	6.8	7.8	10.7
Atlantic Ocean	48	N 37.704854 W -75.574901	28.3	13.9	5.6	6.8	7.8	10.6
Atlantic Ocean	49	N 37.697218 W -75.576700	29.4	13.6	5.6	6.8	7.7	10.5
Atlantic Ocean	50	N 37.684442 W -75.588662	29.6	13.5	5.6	6.9	7.8	10.6
Atlantic Ocean	51	N 37.670079 W -75.590419	29.8	13.4	5.7	6.9	7.8	10.3
Atlantic Ocean	52	N 37.654004 W -75.594343	29.6	13.3	5.5	6.7	7.5	10.0
Atlantic Ocean	53	N 37.636543 W -75.600117	29.7	12.7	5.6	6.8	7.8	10.0
Atlantic Ocean	54	N 37.624126 W -75.607314	30.3	12.3	5.5	6.8	7.5	9.9
Atlantic Ocean	55	N 37.613780 W -75.613409	29.9	12.3	5.5	6.7	7.4	9.6
Atlantic Ocean	56	N 37.604178 W -75.614798	29.5	12.2	5.6	6.8	7.6	9.8

TABLE 3 – TRANSECT DATA (continued)								
		Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (feet NAVD88)			
Flood Source	Transect	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
Atlantic Ocean	57	N 37.592962 W -75.614569	29.5	12.0	5.6	6.8	7.6	9.7
Atlantic Ocean	58	N 37.563587 W -75.606459	25.6	11.3	5.3	6.3	7.1	9.3
Atlantic Ocean	59	N 37.552060 W -75.615661	26.2	13.8	5.2	6.4	7.1	9.4
Atlantic Ocean	60	N 37.539084 W -75.625444	27.6	13.2	5.4	6.6	7.3	9.4
Atlantic Ocean	61	N 37.522374 W -75.638660	27.1	13.9	5.5	7.0	7.3	9.5
Atlantic Ocean	62	N 37.511689 W -75.646127	26.6	13.9	5.3	6.6	7.3	9.5
Atlantic Ocean	63	N 37.500144 W -75.654475	27.1	14.0	5.4	6.6	7.3	9.4
Atlantic Ocean	64	N 37.489693 W -75.662234	25.0	13.8	5.4	6.5	7.2	9.1
Hog Island Bay	65	N 37.481622 W -75.683848	8.4	9.1	5.4	6.5	7.1	9.0
Hog Island Bay	66	N 37.507326 W -75.764978	4.3	3.1	5.7	7.1	7.7	10.6
Atlantic Ocean	67	N 37.443520 W -75.660385	27.2	13.0	5.1	6.3	7.0	9.0
Hog Island Bay	68	N 37.490201 W -75.779430	4.4	12.5	5.7	7.1	8.0	10.6
Atlantic Ocean	69	N 37.428347 W -75.678185	26.6	13.5	5.2	6.3	7.1	9.2
Hog Island Bay	70	N 37.473859 W -75.796958	5.2	3.8	5.8	7.1	7.9	10.6

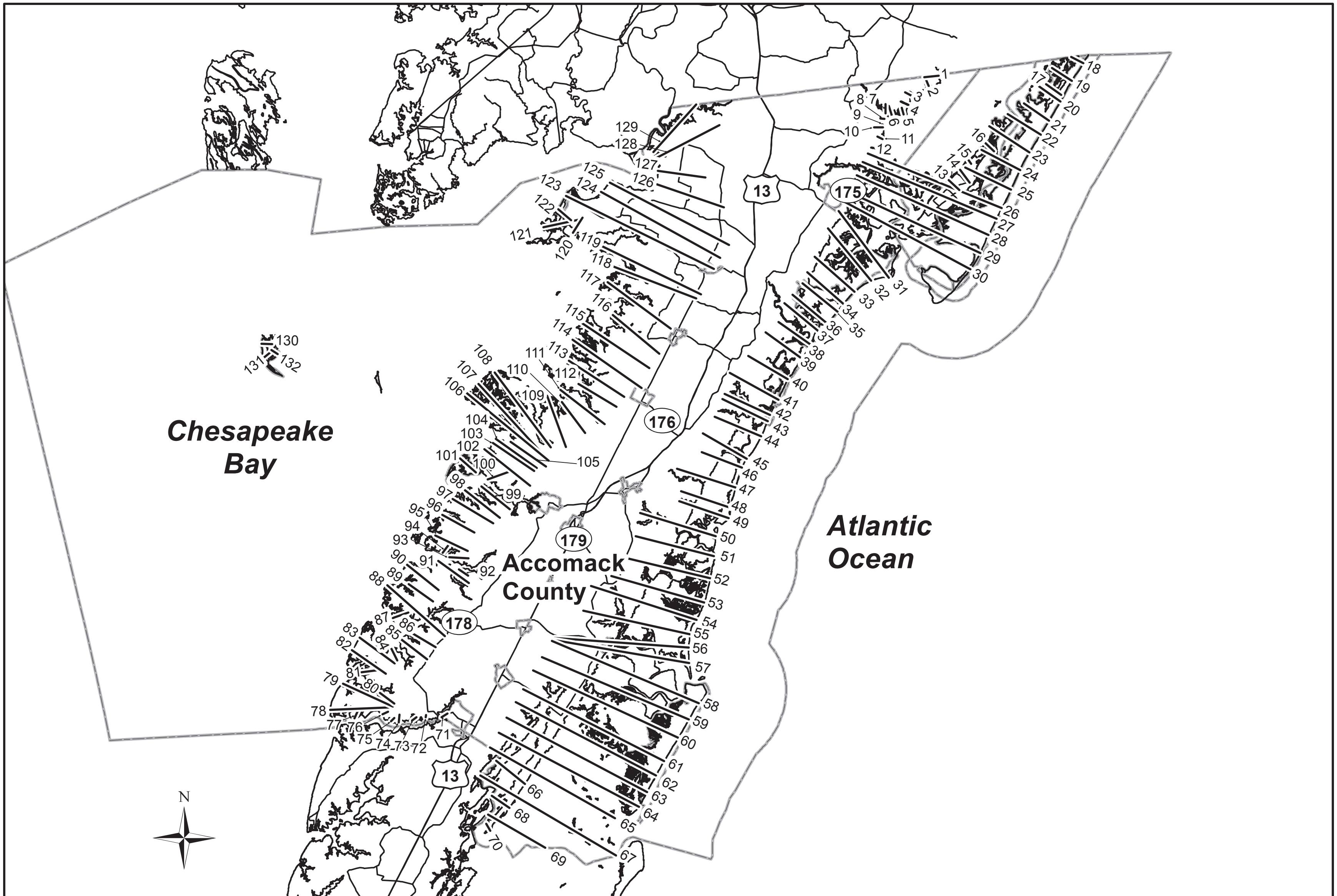
TABLE 3 – TRANSECT DATA (continued)								
		Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (ft NAVD88)			
Flood Source	Transect	Coordinates	Significant Wave Height H_s (ft)	Peak Wave Period T_p (sec)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Occohannock Creek	71	N 37.556361 W -75.839708	2.0	2.9	3.3	4.4	5.0	7.3
Occohannock Creek	72	N 37.556389 W -75.854311	1.9	2.3	3.3	4.4	5.0	7.3
Occohannock Creek	73	N 37.554337 W -75.866590	1.9	2.2	3.3	4.4	5.0	7.3
Occohannock Creek	74	N 37.552938 W -75.878772	1.9	2.3	3.3	4.3	4.9	6.5
Occohannock Creek	75	N 37.553869 W -75.885854	2.2	2.3	3.3	4.2	4.8	6.4
Occohannock Creek	76	N 37.558926 W -75.893467	2.5	2.3	3.2	4.1	4.7	6.3
Occohannock Creek	77	N 37.556441 W -75.918867	2.6	2.4	3.2	3.9	4.4	5.8
Chesapeake Bay	78	N 37.562586 W -75.941050	7.1	6.5	3.2	3.7	4.0	4.9
Chesapeake Bay	79	N 37.581521 W -75.928868	7.8	6.2	3.2	3.8	4.1	4.9
Craddock Creek	80	N 37.574532 W -75.895472	1.5	2.2	3.4	4.1	4.6	5.7
Chesapeake Bay	81	N 37.589682 W -75.912105	2.9	2.3	3.2	3.9	4.3	5.3
Chesapeake Bay	82	N 37.605485 W -75.920485	6.8	5.8	3.2	3.6	3.9	4.8

TABLE 3 – TRANSECT DATA (continued)								
		Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (ft NAVD88)			
Flood Source	Transect	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	83	N 37.614628 W -75.913194	5.8	5.7	3.2	3.8	4.1	4.9
Nandua Creek	84	N 37.606310 W -75.884627	3.0	2.7	3.4	4.0	4.3	5.2
Nandua Creek	85	N 37.613528 W -75.876656	3.3	2.7	3.4	4.1	4.4	5.3
Nandua Creek	86	N 37.617957 W -75.866682	2.7	2.3	3.3	4.2	4.6	5.4
Nandua Creek	87	N 37.628334 W -75.882961	3.9	2.9	3.3	4.0	4.4	5.1
Chesapeake Bay	88	N 37.652296 W -75.887878	6.8	5.1	3.2	3.9	4.2	4.9
Butcher Creek	89	N 37.652996 W -75.868281	2.2	3.8	3.2	4.4	4.8	5.7
Chesapeake Bay	90	N 37.666855 W -75.869520	4.8	3.5	3.2	4.2	4.6	5.6
Pungoteague Creek	91	N 37.669385 W -75.841229	3.6	2.7	3.3	4.7	5.2	6.3
Pungoteague Creek	92	N 37.663117 W -75.822326	2.4	2.3	3.4	4.9	5.5	6.6
Pungoteague Creek	93	N 37.671960 W -75.831087	2.4	2.4	3.3	4.8	5.4	6.5
Pungoteague Creek	94	N 37.675192 W -75.836973	2.6	2.3	3.3	4.7	5.3	6.4
Chesapeake Bay	95	N 37.687735 W -75.843280	2.3	2.9	3.3	4.7	5.3	6.3

TABLE 3 – TRANSECT DATA (continued)								
		Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (ft NAVD88)			
Flood Source	Transect	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	96	N 37.702667 W -75.836897	3.3	5.4	3.3	4.5	5.1	6.2
Chesapeake Bay	97	N 37.713971 W -75827415	4.4	5.3	3.3	4.6	5.2	6.2
Onancock Creek	98	N 37.720270 W -75.815931	3.5	2.5	3.3	4.8	5.4	6.6
Onancock Creek	99	N 37.722795 W -75.801054	3.2	2.4	3.4	5.0	5.8	7.0
Onancock Creek	100	N 37.727612 W -75.795251	2.4	2.7	3.5	5.1	5.9	7.2
Chesapeake Bay	101	N 37.743256 W -75.819988	5.7	4.0	3.3	4.5	5.0	5.9
Chesapeake Bay	102	N 37.749996 W -75.797990	4.2	2.7	3.4	4.8	5.4	6.5
Chesconessex Creek	103	N 37.754085 W -75.790090	3.8	3.0	3.5	4.9	5.7	6.8
Chesconessex Creek	104	N 37.757006 W -75.787431	3.7	3.1	3.5	5.0	5.8	6.9
Chesconessex Creek	105	N 37.754668 W -75.773849	2.6	2.6	3.6	5.2	6.1	7.4
Chesapeake Bay	106	N 37.814296 W -75.791063	6.4	4.1	3.4	4.6	5.2	6.2
Chesapeake Bay	107	N 37.802448 W -75.796698	6.9	4.1	3.5	4.7	5.4	6.4

TABLE 3 – TRANSECT DATA (continued)								
		Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (ft NAVD88)			
Flood Source	Transect	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	108	N 37.805123 W -75.787567	6.5	3.9	3.6	4.8	5.4	6.5
Chesapeake Bay	109	N 37.787699 W -75.740267	4.4	2.9	3.8	5.3	6.2	7.6
Chesapeake Bay	110	N 37.782857 W -75.726923	3.7	3.1	3.9	5.5	6.5	8.0
Chesapeake Bay	111	N 37.791765 W -75.727945	4.0	3.0	3.9	5.5	6.5	8.0
Chesapeake Bay	112	N 37.795854 W -75.711565	3.1	2.8	4.0	5.8	6.9	8.5
Chesapeake Bay	113	N 37.812741 W -75.719804	4.8	3.2	4.0	5.7	6.7	8.2
Chesapeake Bay	114	N 37.828038 W -75.716450	5.7	3.5	4.0	5.8	6.7	8.2
Chesapeake Bay	115	N 37.839452 W -75.707084	6.3	3.8	4.1	6.1	7.0	8.4
Chesapeake Bay	116	N 37.845478 W -75.679491	4.6	3.2	4.3	6.4	7.4	9.0
Chesapeake Bay	117	N 37.869068 W -75.683641	6.2	3.9	4.3	6.4	7.3	8.8
Chesapeake Bay	118	N 37.881215 W -75.680475	5.5	4.2	4.4	6.6	7.5	8.9
Chesapeake Bay	119	N 37.895490 W -75.689116	4.9	4.2	4.5	6.7	7.4	8.7

TABLE 3 – TRANSECT DATA (continued)								
		Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (ft NAVD88)			
Flood Source	Transect	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	120	N 37.905033 W -75.714642	4.7	4.7	4.4	6.4	7.1	8.2
Chesapeake Bay	121	N 37.909407 W -75.741118	7.9	4.4	4.3	6.0	6.7	7.8
Chesapeake Bay	122	N 37.922450 W -75.727766	6.6	4.3	4.4	6.3	6.9	8.0
Chesapeake Bay	123	N 37.932002 W -75.720637	6.7	4.3	4.5	6.4	7.0	8.1
Chesapeake Bay	124	N 37.934348 W -75.688483	4.4	2.9	4.7	6.8	7.5	8.7
Chesapeake Bay	125	N 37.941132 W -75.680398	5.3	3.5	4.7	6.8	7.5	8.7
Chesapeake Bay	126	N 37.939986 W -75.639789	4.0	3.0	4.9	7.2	8.0	9.3
Chesapeake Bay	127	N 37.949081 W -75.636203	4.6	3.4	5.0	7.3	8.0	9.3
Chesapeake Bay	128	N 37.958473 W -75.637500	4.6	3.5	5.0	7.3	8.0	9.3
Chesapeake Bay	129	N 37.962590 W -75.640128	4.6	3.5	5.0	7.3	8.0	9.3
Chesapeake Bay	130	N 37.827737 W -75.999634	8.0	5.9	2.9	3.4	3.7	4.3
Chesapeake Bay	131	N 37.817558 W -75.997539	8.6	6.3	3.1	3.5	3.7	4.3
Chesapeake Bay	132	N 37.820223 W -75.984854	7.2	4.9	3.1	3.4	3.6	4.0



0 2.75 5.5 11 16.5 22 Miles

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

ACCOMACK COUNTY, VA
AND INCORPORATED AREAS

TRANSECT LOCATION MAP

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 telephone number (301) 713-3242 or via Internet address 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.

3.2 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 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 FIRMs are referenced to NAVD 88. Structure and ground elevations in the community must, therefore, be referenced to NAVD 88. It is important to note that adjacent communities may be referenced to NGVD 29. This may result in differences in BFEs across the corporate limits between the communities. The vertical datum conversion factor from NGVD 29 to NAVD 88 for Accomack County is –0.81 feet. The BFEs shown on the FIRM represent whole-foot rounded values. For example, a BFE of 12.4 feet will appear as ‘12’ on the FIRM and a BFE of 12.6 feet will appear as ‘13’ on the FIRM. Therefore, users that wish to convert the elevations in this FIS to NGVD 29 should apply the stated conversion factor to elevations shown in this FIS report, which are shown at a minimum to the nearest 0.1 foot.

For more information on NAVD 88, see FEMA publication entitled, Converting the National Flood Insurance Program to the North American Vertical Datum of 1988, FEMA Publication FIA-20/June 1992, or contact the NGS on their website (http://www.ngs.noaa.gov) or 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
http://www.ngs.noaa.gov

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 report 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 and delineations of the 1- and 0.2-percent-annual-chance floodplains. This information is presented on the FIRM and in the Summary of Stillwater Elevations table in the FIS report. Users should reference the data presented in this FIS report 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 community.

In the March 16, 2009, initial countywide FIS, for the flooding sources studied in detail, the boundaries of the 1- and 0.2-percent-annual-chance floods have been delineated using the flood elevations determined at each transect; between transects, the boundaries were interpolated using topographic maps at scales of 1:2,400 and 1:24,000 with contour intervals of 2 and 5 feet, respectively (References 26 and 27).

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 topographic maps, aerial photographs, and engineering judgment (References 26, 27, and 28). 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 May 18, 2015, countywide FIS revision, the coastal boundaries were mapped using a Digital Elevation Model (DEM) derived from Light Detection and Ranging (LiDAR) data collected in March 2010 by Sanborn for the USGS. The coastal mapping was completed in April 2013. The coastal flood boundaries were delineated using the elevations determined at each transect; between transects, the boundaries were interpolated using engineering judgment, land cover, and topographic data.

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 (Reference 29). The 3-foot wave has been determined the minimum size wave capable of causing major damage to conventional wood frame or brick veneer structures. The one exception to the 3-foot wave criteria is where a primary frontal dune exists. The limit of the coastal high hazard 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 3 feet. Zone AE is depicted on the FIRM where the delineated flood hazard includes wave heights less than 3 feet. A depiction of a sample transect which illustrates the relationship between the stillwater elevation, the wave crest elevation, and the ground elevation profile, and how the Zones VE and AE are mapped is shown in Figure 2, “Typical Transect Schematic”.

Post-storm field visits and laboratory tests have confirmed that wave heights as small as 1.5 feet can cause significant damage to structures when constructed without consideration to the coastal hazards. Additional flood hazards associated with coastal waves include floating debris, high velocity flow, erosion, and scour which can cause damage to Zone AE-type construction in these coastal areas. To help community officials and property owners recognize this increased potential for damage due to wave action in the AE zone, FEMA issued guidance in December 2008 on identifying and mapping the 1.5-foot wave height line, referred to as the Limit of Moderate Wave Action (LiMWA). While FEMA does not impose floodplain management requirements based on the LiMWA, the LiMWA is provided to help communicate the higher risk that exists in that area. Consequently, it is important to be aware of the area between this inland limit and the Zone VE boundary as it still poses a high risk, though not as high of a risk as Zone VE (see Figure 2, “Typical Transect Schematic”).

The 1- and 0.2 -percent-annual-chance floodplain boundaries are shown on the FIRM. On this map, SFHAs inundated by the 1-percent-annual-chance flood which have additional hazards due to significant wave action have been designated as Zone VE. The 1-percent-annual-chance flood boundary corresponds to the boundary of the areas of special flood hazards (Zones AE and VE).

The AE and VE zones were divided into whole-foot elevation zones based on the average wave crest elevation in that zone. Where the map scale did not permit delineating zones at one foot intervals, larger increments were used. In cases where the 1- and 0.2-percent annual chance floodplain boundaries are close together, only the 1-percent annual chance 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 is shown.

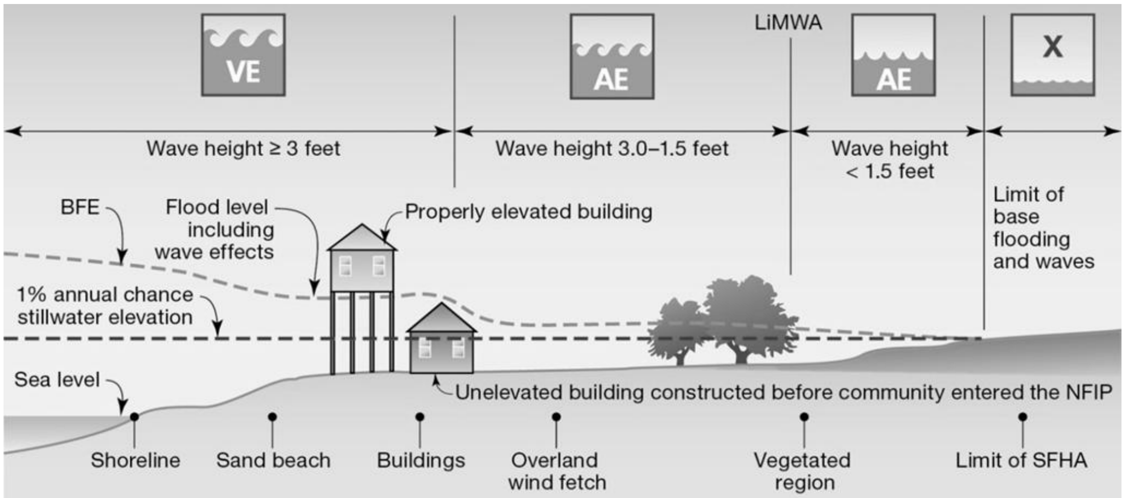


Figure 2 - Typical Transect Schematic

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 report by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base (1-percent-annual-chance) flood elevations (BFEs) or 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 report by detailed methods. 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 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 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 base 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 rate 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 (sq. mi.), and areas protected from the base 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 base flood elevations 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- percent-annual-chance floodplain, and the locations of selected transects sections used in the hydraulic analyses and floodway computations.

The current FIRM presents flooding information for the entire geographic area of Accomack County. Historical data relating to the pre-countywide maps prepared for each community are presented in Table 4, "Community Map History".

7.0 OTHER STUDIES

FISs are being conducted for Northampton County, Virginia, which borders Accomack County to the south, and for Somerset and Worcester Counties in Maryland, which border Accomack County to the north.

Being part of the same regional analysis, the results of this study are all in or will be in agreement with the adjacent studies. Information pertaining to revised and unrevised flood hazards for each jurisdiction within Accomack 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 Accomack County, and should be considered authoritative for the purposes of the NFIP.

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.

COMMUNITY NAME	INITIAL NFIP MAP DATE	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	INITIAL FIRM DATE	FIRM REVISIONS DATE
Accomack County (Unincorporated Areas)	December 13, 1974	October 1, 1983	June 1, 1984	May 1, 1985 April 2, 1992 October 16, 1996 July 20, 1998
Accomac, Town of[1,2]	N/A	N/A	N/A	N/A
Belle Haven, Town of	November 1, 1974	September 10, 1976	December 15, 1981	None
Bloxom, Town of[1,2]	N/A	N/A	N/A	N/A
Chincoteague, Town of	May 31, 1974	None	March 1, 1977	May 16, 1983 June 1, 1984
Hallwood, Town of[1]	May 28, 1976	None	May 3, 1982	N/A
Keller, Town of[1,2]	April 1, 1977	N/A	N/A	N/A
Melfa, Town of[1,2]	N/A	N/A	N/A	N/A
Onancock, Town of	January 31, 1975	None	December 15, 1981	None
Onley, Town of[1,2]	N/A	N/A	N/A	N/A
Painter, Town of[1,2]	N/A	N/A	N/A	N/A
Parksley, Town of[1,2]	N/A	N/A	N/A	N/A
Saxis, Town of	February 7, 1975	None	November 17, 1982	None
Tangier, Town of	May 31, 1974	None	October 15, 1982	August 3, 1992
Wachapreague, Town of	August 30, 1974	May 28, 1976	September 2, 1982	None

[1] No Special Flood Hazard Areas Identified

[2] This community did not have a map history prior to the first countywide mapping

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

ACCOMACK COUNTY, VA

AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

9.0 BIBLIOGRAPHY AND REFERENCES

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4. Federal Emergency Management Agency, Flood Insurance Study, Town of Hallwood, Accomack County, Virginia, Washington, D.C., November 3, 1981.

5. Federal Emergency Management Agency, Flood Insurance Study, Town of Onancock, Accomack County, Virginia, Washington, D.C., June 15, 1981.

6. Federal Emergency Management Agency, Flood Insurance Study, Town of Saxis, Accomack County, Virginia, Washington, D.C., May 17, 1982.

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