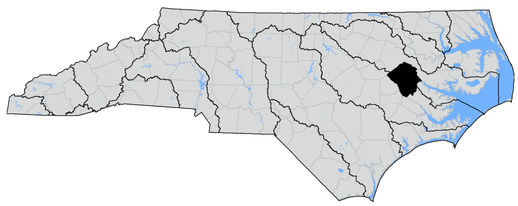
PRELIMINARY FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

A Report of Flood Hazards in

PITT COUNTY, NORTH CAROLINA AND INCORPORATED AREAS



Community Name	Community Number
CITY OF GREENVILLE	370191
PITT COUNTY	370372
TOWN OF AYDEN	370189
TOWN OF BETHEL	370546
TOWN OF FALKLAND	370666
TOWN OF FARMVILLE	370190
TOWN OF FOUNTAIN	370631
TOWN OF GRIFTON	370192
TOWN OF GRIMESLAND	370535
TOWN OF WINTERVILLE	370193
VILLAGE OF SIMPSON	370615

NORTH CAROLINA
Cooperating Technical State
FEMA'S COOPERATING TECHNICAL PARTNER

PRELIMINARY: 6/30/2016

REVISED: 6/30/2016

Federal Emergency Management Agency

State of North Carolina

Flood Insurance Study Number

37147CV000

www.fema.gov and www.ncfloodmaps.com

FOREWORD

This countywide Flood Insurance Study (FIS) Report was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long-term approach to floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the state level. As a part of this effort, the State of North Carolina has joined with FEMA in a Cooperating Technical State (CTS) agreement to produce and maintain this FIS Report and the accompanying digital Flood Insurance Rate Map (FIRM) for North Carolina.

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) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

The following is a list of the publication dates of this Countywide FIS Report starting with the initial Report accompanying the North Carolina Statewide FIRM:

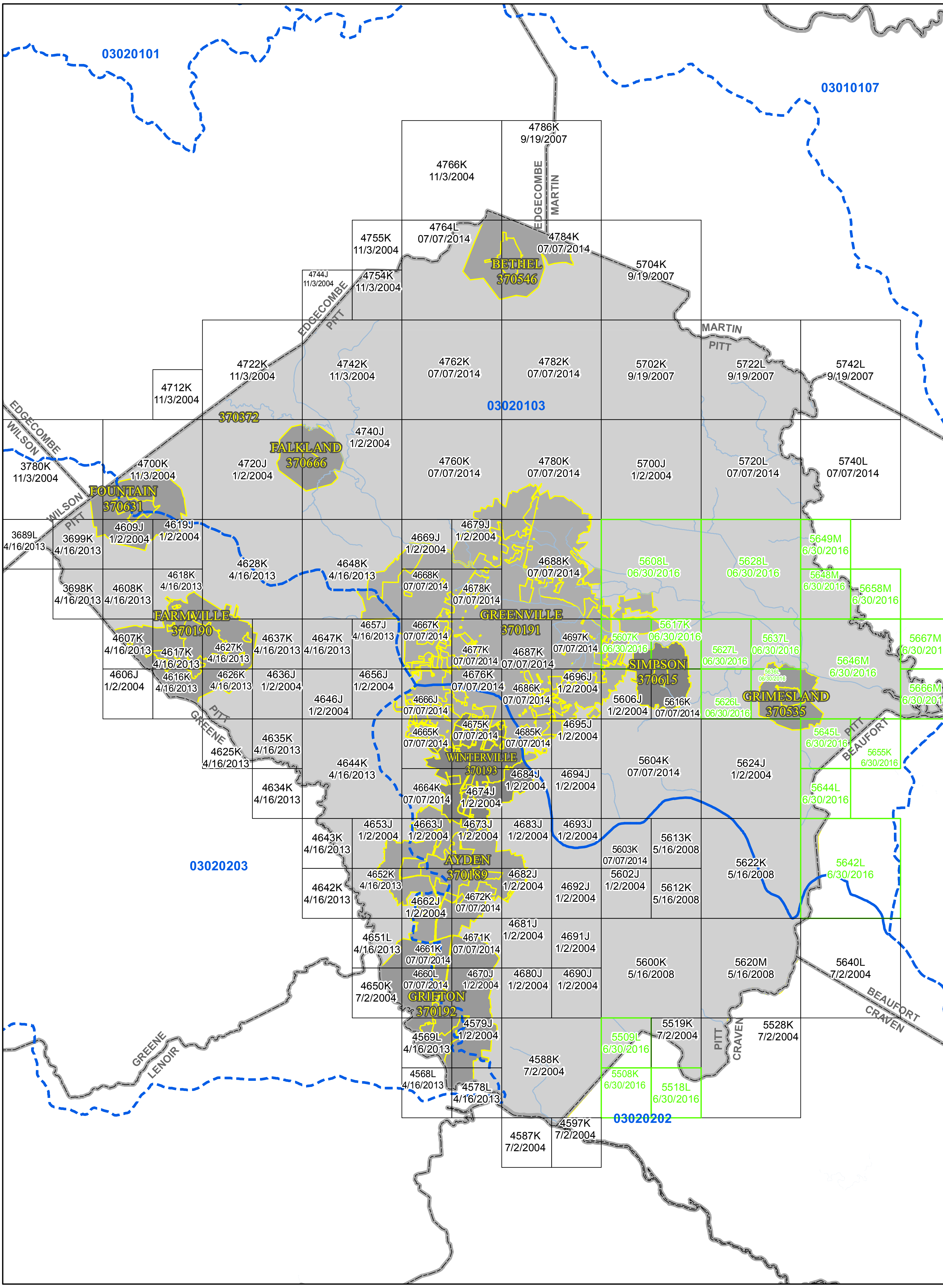
Date	Reason
1/2/2004	Initial Countywide FIS Report Effective Date

This FIS has been produced as part of the North Carolina Floodplain Mapping Program. Pitt County, North Carolina, falls under the administrative jurisdiction of Region IV of the Federal Emergency Management Agency (FEMA). Questions concerning this FIS may be directed to the North Carolina Floodplain Mapping Program at www.ncfloodmaps.com, the FEMA Map Assistance Center by calling the toll-free information line at 1-877-FEMA MAP (1-877-336-2627), or by contacting the FEMA Regional Office at the following address:

FEMA, Federal Insurance and Mitigation Administration
Koger Center - Rutgers Building
3003 Chamblee Tucker Road
Atlanta, Georgia 30341
(770) 220-5400

Table of Contents

Figures **Page**



N

1 in = 4 miles

0 0.5 1 2 3 Miles

Map Projection:
Lambert Conformal Conic
North American Datum 1983

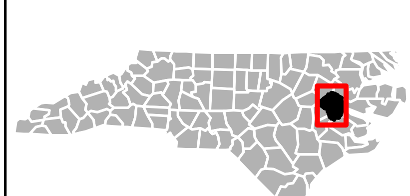
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://FRIS.NC.GOV/FRIS

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

PRELIMINARY
06/30/2016

COUNTY LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX

PITT COUNTY, NORTH CAROLINA And Incorporated Areas

PANELS PRINTED:
4616, 4626, 4625, 4635, 4644, 4634, 4643, 4642, 4652, 4651, 4569, 4568, 4578, 4650, 4660, 4670, 4680, 4690, 4764, 4784, 5704, 4744, 4754, 3780, 4700, 4720, 4740, 4760, 4780, 5700, 5720, 5740, 5628, 5649, 4687, 4697, 5607, 5617, 5627, 5637, 5646, 5667, 4606, 4636, 4646, 4656, 4666, 5624, 5645, 5655, 4662, 4661, 4671, 4681, 4691, 5600, 5620, 5508, 5518, 4587, 4597, 4653, 4663, 4673, 4683, 4693, 5603, 5613, 5622, 5642, 4755, 4766, 4786, 4722, 4742, 4762, 4782, 5702, 5722, 5742, 4712, 4609, 4619, 4669, 4679, 4688, 5608, 4668, 4678, 5648, 5658, 4667, 4677, 4676, 4686, 4696, 5606, 5616, 5626, 5636, 5666, 4665, 4675, 4685, 4695, 5604, 4664, 4674, 4684, 4694, 5644, 4672, 4682, 4692, 5602, 5612, 5640, 4579, 4588, 5509, 5519, 5528, 3689, 3699, 4628, 4648, 3698, 4608, 4618, 4607, 4617, 4627, 4637, 4647, 4657

FEMA

MAP NUMBER
37147CIND0H

1.0 Introduction

1.1 The National Flood Insurance Program

In 1968, Congress created the National Flood Insurance Program (NFIP) in response to the rising cost of taxpayer-funded disaster relief for flood victims and the increasing amount of damage caused by floods. The NFIP makes federally backed flood insurance available in communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage. Federally backed flood insurance is available in more than 19,000 communities across the United States and its territories.

The NFIP is managed by the Federal Insurance and Mitigation Administration of the Federal Emergency Management Agency (FEMA). The Federal Insurance and Mitigation Administration manages the insurance component of the NFIP and oversees the flood hazard mapping and the floodplain management aspects of the program.

The NFIP, through involvement with communities, the insurance industry, and the lending industry, helps reduce flood damage by nearly $800 million a year. Further, buildings constructed in compliance with NFIP building standards suffer approximately 80% less damage annually than those not built in compliance. In addition, every $3 paid in flood insurance claims saves $1 in disaster assistance payments. The NFIP is self-supporting for the average historical loss year, which means that operating expenses and flood insurance claims are not paid by the taxpayer, but through premiums collected for flood insurance policies.

Additional information of interest to homeowners, community officials, insurance companies, lenders, and study contractors is available in Section 9.0 of this FIS Report and on the NFIP Internet homepage at http://www.fema.gov/business/nfip/.

1.2 Purpose of this Flood Insurance Study

Flood Insurance Studies (FISs) are one of the primary means by which the NFIP administers the National Flood Insurance Act of 1968, the Flood Disaster Protection Act of 1973, and the National Flood Insurance Reform Act of 1994. FISs develop flood risk data that are used to establish actuarial flood insurance rates. The information in this FIS Report will also be used by Pitt County and the jurisdictions therein (hereinafter referred to collectively as Pitt County) to facilitate the adoption and maintenance of floodplain management ordinances, which form the basis of communities' continued participation in the NFIP. Minimum requirements for participation in the NFIP are set forth in Title 44, Part 60, Section 3 of the Code of Federal Regulations (44 CFR 60.3). In some States and/or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. In such cases, the more restrictive criteria will take precedence, and the State and/or community (or other jurisdictional agency) will be able to explain them.

This FIS investigates the existence and severity of flood hazards in, or revises and updates previous FISs for, the geographic area of Pitt County, North Carolina, including the jurisdictions listed in Table 1.

Table 1 - Jurisdictions in Pitt County

Community	Included in this FIS	If Not Included, Location of Flood Hazard/Flood Insurance Rate Data
CITY OF GREENVILLE	Yes	*
PITT COUNTY	Yes	*
TOWN OF AYDEN	Yes	*
TOWN OF BETHEL	Yes	*
TOWN OF FALKLAND	Yes	*
TOWN OF FARMVILLE	Yes	*
TOWN OF FOUNTAIN	Yes	*
TOWN OF GRIFTON	Yes	*
TOWN OF GRIMESLAND	Yes	*
TOWN OF WINTERVILLE	Yes	*

VILLAGE OF SIMPSON	Yes	*

1.3 FIS Components

A Flood Insurance Study (FIS) is an analysis of flood hazards, typically presented as a set of Flood Insurance Rate Map (FIRM) panels and the FIS Report, which includes a set of Flood Profiles and/or Water-surface elevation rasters.

Flood Insurance Study Report

The FIS Report provides a context for the information shown on the FIRM, as well as a summary of the data upon which the analyses are based. It also includes an index of sources of additional information on the NFIP.

1.4 Considerations for Using this Flood Insurance Study Report

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1% annual chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1% annual chance and 0.2% annual chance floodplains; and 1% annual chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal Stillwater Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data for floodplain management and flood insurance purposes. Community map repository addresses are provided in Table 27, “Map Repositories,” within this FIS Report.

New FIS Reports are frequently developed for multiple communities, such as entire counties. A countywide FIS Report incorporates previous FIS Reports for individual communities and the unincorporated area of the county (if not jurisdictional) into a single document and supersedes those documents for the purposes of the NFIP.

The Initial Countywide FIS Report for Pitt became Effective on 1/2/2004. Refer to Table XX for information about subsequent revisions to FIRMs.

Selected FIRM panels for the community may contain information (such as floodways and cross sections) that was previously shown separately on the corresponding Flood Boundary and Floodway Map panels. In addition, former flood hazard zone designations have been changed as follows:

Old Zone	New Zone
A1 through A30	AE
V1 through V30	VE
B	X (shaded)
C	X (unshaded)

FEMA does not impose floodplain management requirements or special insurance ratings based on Limit of Moderate Wave Action (LiMWA) delineations at this time. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. 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. Refer to Section 2.5.4 for additional information about the LiMWA.

The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Visit the FEMA Web site at http://www.fema.gov or contact your appropriate FEMA Regional Office for more information about this program.

Previous FIS Reports and FIRMs may have included levees that were accredited as reducing the risk associated with the 1% annual chance flood based on the information available and the mapping standards of the NFIP at that time. For FEMA to continue to accredit the identified levees, the levees must meet the criteria of the Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10), titled “Mapping of Areas Protected by Levee Systems.

Since the status of levees is subject to change at any time, the user should contact the appropriate agency for the latest information regarding levees presented in Table 9 of this FIS Report. For levees owned or operated by the U.S. Army Corps of Engineers (USACE), information may be obtained from the USACE national levee database. For all other levees, the user is encouraged to contact the appropriate local community.

FEMA has developed a Guide to Flood Maps (FEMA 258) and online tutorials to assist users in accessing the information contained on the FIRM. These include how to read panels and step-by-step instructions to obtain specific information. To obtain this guide and other assistance in using the FIRM, visit the FEMA Web site at http://www.fema.gov.

2.0 Floodplain Management Applications

Flood events of a magnitude expected to occur with a 10%, 2%, 1%, or 0.2% annual chance have been selected as having special significance for developing sound floodplain management programs. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10%, 2%, 1%, and 0.2% chance, respectively, of being equaled in any given year. Therefore, FIS Reports typically determine water-surface elevations for floods with these probabilities. The FIRM delineates 1% and 0.2% annual chance floodplains and 1% annual chance floodway boundaries, and depicts 1% annual chance flood elevations, rounded to the nearest foot, to assist in developing floodplain management measures.

2.1 Floodplains

To provide a national standard without regional discrimination, the 1% annual chance flood has been adopted by FEMA as the base flood for floodplain management purposes. A 1% annual chance flood, or base flood, is defined as that having a 1% chance of being equaled or exceeded in any given year. The 1% annual chance floodplains shown on the FIRM identify areas that are expected to be inundated by the 1% annual chance flood. This 1% annual chance floodplain is also called a Special Flood Hazard Area (SFHA), where the NFIP’s floodplain management regulations must be enforced by the community as a condition of participation in the NFIP. The 0.2% annual chance floodplain is employed to indicate additional areas of flood risk associated with exceptionally severe floods.

2.2 Floodways

Encroachment on floodplains such as that caused by placement of 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, floodways are provided as a tool to assist local communities in this aspect of floodplain management. Under this concept, the 1% annual chance riverine 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% annual chance flood can be carried without substantial increases in flood heights. Figure 1, “Floodway Schematic,” illustrates this principle. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this FIS are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional encroachment studies.

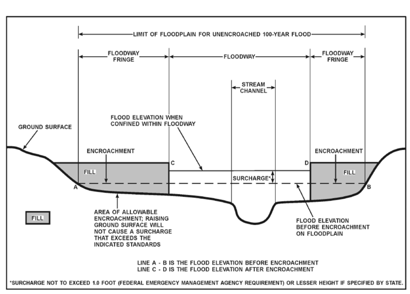


Figure 1- Floodway Schematic

2.3 Base Flood Elevations

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The Base Flood Elevation (BFE) is the elevation of the 1% annual chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM. Cross sections with BFEs shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. BFEs are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM.

Coastal flood elevations are provided in the Summary of Coastal Stillwater Elevations table 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.

2.4 Watershed Characteristics

Because a FIS is a probability analysis that may not account for some of the factors listed below, communities are strongly encouraged to consider adopting more restrictive or higher floodplain management criteria or ordinances than the minimum Federal requirements. Communities may also increase the validity of their flood hazard data by investing in continuous maintenance of river gages (see the Data Validity and Reliability paragraph below). If the U.S. Geological Survey (USGS) or other agencies do not maintain gages on the flooding sources of interest, partnerships with the USGS may be pursued, or local gages may be installed. For more information, see Section 9.0 of this report.

This flood hazard study represents an analysis of certain watershed characteristics, some of which are summarized as follows:

Drainage Area
In general, streams that drain larger areas have greater flood hazards. FISs, in North Carolina, do not typically analyze flood hazards in places with rural drainage areas of less than one square mile and within urban drainage areas of less than ½ square mile.

Soil Permeability and Infiltration
Differences in the types of soil and the amount of vegetation in a watershed have a significant effect on the amount of water that the soil can absorb; soils with a high sand content absorb much more water than soils with a high clay content. The presence of vegetation increases infiltration; the presence of pavement decreases infiltration and also speeds runoff to receiving waters. As soil permeability and infiltration decrease, the volume and rate of overland flow increases.

Soil Moisture Conditions
In addition to soil permeability and infiltration, the level of the water table helps determine the saturation point, beyond which no water is absorbed. As rainfall duration increases, the height of the water table increases.

Channel and Floodplain Geometry
The geometric contour of a streambed, termed channel geometry, and the geometric contour of a floodplain determine the volume of water that a channel can hold and partially determine the rate at which water flows through it.

Channel and Floodplain Roughness
The roughness of a surface affects the characteristics of runoff whether the water is on the surface of the watershed or in the channel.

FIS Reports include analyses of how these factors will combine to produce overland flow patterns during floods that have a certain probability of occurring in any given year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at shorter intervals or even within the same year. The risk of experiencing a rare flood increases when longer periods are considered. For example, the risk of having a flood which equals or exceeds the 1% annual chance flood (1% chance of annual exceedence) in any 50-year period is approximately 40% (4 in 10), but for any 90-year period, the risk increases to approximately 60% (6 in 10).

It is important to note that the 1% annual chance flood is used as the national standard to allow a consistent approach to floodplain management, flood hazard assessment, and flood hazard mapping. In any given community, a number of factors may result in flooding characteristics that do not conform to predicted conditions. Therefore, the determination that an area is not shown on the FIRM as being within a Special Flood Hazard Area is no guarantee that it will not flood during a 1% annual chance flood. Examples of these factors include Data Validity and Reliability; Developmental and Topographic Changes Over Time; Erosion, Deposition, and Debris Flow; and Meandering and Lateral Migration.

Data Validity and Reliability

Certain types of analysis methods yield more justifiable characterizations of flood hazards. For example, a gage analysis, to determine peak discharges, is based on actual measurements of watershed conditions over time and, therefore, is typically considered the most accurate method of hydrologic analysis. However, it is not feasible to install enough gages to gather data on every stream. In addition, for many of the gage sites that do exist, there are interruptions in the period of record. The usefulness of gage data for the purpose of predicting flooding behavior decreases with interruptions in the period of record; predicted flooding conditions over a 100-year period based on 20 years of measurements spread over a 35-year period are less valid than those based on 30 years of continuous measurements. A regression analysis is typically considered the best method in the absence of gage data, as it uses gage data from watersheds with similar characteristics to estimate flood frequency and magnitude in an ungaged watershed. Regression equations reflect average conditions for a region; therefore, the results will not exactly match the results of a gage analysis at a particular location. The standard errors of the North Carolina rural regression equations range from 44 to 51 percent for estimates of the 1% annual chance flood. That means the difference between the results of the regression equation and the gage analysis for approximately two-thirds of the locations that gage data exists are within 44 to 51 percent of the gage analysis results. A rainfall-runoff hydrologic analysis may be used for gaged or ungaged watersheds, and can estimate the effects of storage areas and flood control structures and measures. This method is most valid when calibrated against historical data.

Developmental and Topographic Changes Over Time

A FIRM is based on the best topographic and planimetric information available to FEMA and the State of North Carolina at the time the study is produced. In time, however, development and/or natural phenomena can alter the physical characteristics of a watershed and its drainage channels, resulting in changes in the flood hazards in those areas. For example, constructing a housing subdivision reduces the amount of soil that is available to absorb water; this in turn causes an increase in the volume of surface water that flows into the channel.

Erosion, Deposition, and Debris Flow

The flood hazards shown on a FIRM are based on the assumption of unobstructed flow. The FIRM does not reflect an analysis of areas that are subject to erosion caused by the increased water-surface elevations and velocities that occur during flooding. In addition to the risks of landslides or a weakening of the ground underneath roads or structures, any sediment that is removed from one location will be deposited in another; accumulated deposits may have a pronounced effect on flood hazards in those areas. Similarly, debris such as fallen trees or branches, litter, or other items may obstruct stream channels or hydraulic structures, increasing water-surface elevations, velocities, and floodplain width.

Meandering and Lateral Migration

FISs are based on the assumption that channel geometry will remain stable during normal drainage and during flood events. This assumption is valid for most streams, which flow over bedrock or between bedrock outcroppings that form non-alluvial channels. However, alluvial streams change the channel geometry with time, significantly so during flood events. Alluvial streams are subject to erosion and deposition, which may result in braided or meandering channels. Streams of this type may be characterized by lateral migration, or channel shifting, in which the stream may change course entirely during a flood. Whenever clear evidence is available, a FIRM will identify the alluvial nature of a studied flooding source and designate wider floodways to allow for potential migration. However, these floodways are based on qualitative assessments and not on quantitative geomorphic and engineering analyses.

2.5 Coastal Flood Hazard Areas

For most areas along rivers, streams, and small lakes, BFEs and floodplain boundaries are based on the amount of water expected to enter the area during a 1% annual chance flood and the geometry of the floodplain. Floods in these areas are typically caused by storm events. However, for areas on or near ocean coasts, large rivers, or large bodies of water, BFE and floodplain boundaries may need to be based on additional components, including storm surges and waves. Communities on or near ocean coasts face flood hazards caused by offshore seismic events as well as storm events.

Coastal flooding sources that are included in this Flood Risk Project are shown in Table XX.

2.5.1 Water Elevations and the Effects of Waves

Specific terminology is used in coastal analyses to indicate which components have been included in evaluating flood hazards.

The stillwater elevation (SWEL or still water level) is the surface of the water resulting from astronomical tides, storm surge, and freshwater inputs, but excluding wave setup contribution or the effects of waves.

- *Astronomical tides* are periodic rises and falls in large bodies of water caused by the rotation of the earth and by the gravitational forces exerted by the earth, moon and sun.
- *Storm surge* is the additional water depth that occurs during large storm events. These events can bring air pressure changes and strong winds that force water up against the shore.
- *Freshwater inputs* include rainfall that falls directly on the body of water, runoff from surfaces and overland flow, and inputs from rivers.

The 1% annual chance stillwater elevation is the stillwater elevation that has been calculated for a storm surge from a 1% annual chance storm. The 1% annual chance storm surge can be determined from analyses of tidal gage records, statistical study of regional historical storms, or other modeling approaches. Stillwater elevations for storms of other frequencies can be developed using similar approaches.

The total stillwater elevation (also referred to as the mean water level) is the stillwater elevation plus wave setup contribution but excluding the effects of waves.

- *Wave setup* is the increase in stillwater elevation at the shoreline caused by the reduction of waves in shallow water. It occurs as breaking wave momentum is transferred to the water column.

Like the stillwater elevation, the total stillwater elevation is based on a storm of a particular frequency, such as the 1% annual chance storm. Wave setup is typically estimated using standard engineering practices or calculated using models, since tidal gages are often sited in areas sheltered from wave action and do not capture this information.

Coastal analyses may examine the effects of overland waves by analyzing storm-induced erosion, overland wave propagation, wave runup, and/or wave overtopping.

- *Storm-induced erosion* is the modification of existing topography by erosion caused by a specific storm event, as opposed to general erosion that occurs at a more constant rate.
- *Overland wave propagation* describes the combined effects of variation in ground elevation, vegetation, and physical features on wave characteristics as waves move onshore.
- *Wave runup* is the uprush of water from wave action on a shore barrier. It is a function of the roughness and geometry of the shoreline at the point where the stillwater elevation intersects the land.
- *Wave overtopping* refers to wave runup that occurs when waves pass over the crest of a barrier.

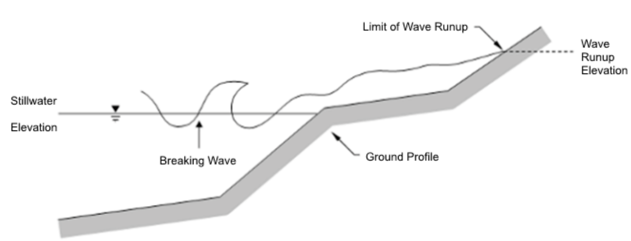


Figure 5: Wave Runup Transect Schematic

2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

For coastal communities along the Atlantic and Pacific Oceans, the Gulf of Mexico, the Great Lakes, and the Caribbean Sea, flood hazards must take into account how storm surges, waves, and extreme tides interact with factors such as topography and vegetation. Storm surge and waves must also be considered in assessing flood risk for certain communities on rivers or large inland bodies of water.

Beyond areas that are affected by waves and tides, coastal communities can also have riverine floodplains with designated floodways, as described in previous sections.

Floodplain Boundaries

In many coastal areas, storm surge is the principle component of flooding. The extent of the 1% annual chance floodplain in these areas is derived from the total stillwater elevation (stillwater elevation including storm surge plus wave setup) for the 1% annual chance storm. The methods that were used for calculation of total stillwater elevations for coastal areas are described in Section 5.3 of this FIS Report. Location of total stillwater elevations for coastal areas are shown in Figure 8, "1% Annual Chance Total Stillwater Levels for Coastal Areas.

In some areas, the 1% annual chance floodplain is determined based on the limit of wave runup or wave overtopping for the 1% annual chance storm surge. The methods that were used for calculation of wave hazards are described in Section 5.3 of this FIS Report.

Table 18 and 18P presents the types of coastal analyses that were used in mapping the 1% annual chance floodplain in coastal areas.

Coastal BFEs

CWhere they apply, coastal BFEs are calculated along transects extending from offshore to the limit of coastal flooding onshore. Results of these analyses are accurate until local topography, vegetation, or development type and density within the community undergoes major changes.

Parameters that were included in calculating coastal BFEs for each transect included in this FIS Report are presented in Table 20, "Coastal Transect Parameters." The locations of transects are shown in Figure 9, "Transect Location Map." More detailed information about the methods used in coastal analyses and the results of intermediate steps in the coastal analyses are presented in Section 5.3 of this FIS Report. Additional information on specific mapping methods is provided in Section 6.4 of this FIS Report.

2.5.3 Coastal High Hazard Areas

Certain areas along the open coast and other areas may have higher risk of experiencing structural damage caused by wave action and/or high-velocity water during the 1% annual chance flood. These areas will be identified on the FIRM as Coastal High Hazard Areas.

- *Coastal High Hazard Area (CHHA)* is a SFHA extending from offshore to the inland limit of the primary frontal dune (PFD) or any other area subject to damages caused by wave action and/or high-velocity water during the 1% annual chance flood.
- *Primary Frontal Dune (PFD)* is a continuous or nearly continuous mound or ridge of sand with relatively steep slopes immediately landward and adjacent to the beach. The PFD is subject to erosion and overtopping from high tides and waves during major coastal storms.

CHHAs are designated as "V" zones (for "velocity wave zones") and are subject to more stringent regulatory requirements and a different flood insurance rate structure. The areas of greatest risk are shown as VE on the FIRM. Zone VE is further subdivided into elevation zones and shown with BFEs on the FIRM.

The landward limit of the PFD occurs at a point where there is a distinct change from a relatively steep slope to a relatively mild slope; this point represents the landward extension of Zone VE. Areas of lower risk in the CHHA are designated with Zone V on the FIRM. More detailed information about the identification and designation of Zone VE is presented in Section 6.4 of this FIS Report.

Areas that are not within the CHHA but are SFHAs may still be impacted by coastal flooding and damaging waves; these areas are shown as "A" zones on the FIRM.

Figure 6, "Coastal Transect Schematic," illustrates the relationship between the base flood elevation, the 1% annual chance stillwater elevation, and the ground profile as well as the location of the Zone VE and Zone AE areas in an area without a PFD subject to overland wave propagation. This figure also illustrates energy dissipation and regeneration of a wave as it moves inland.

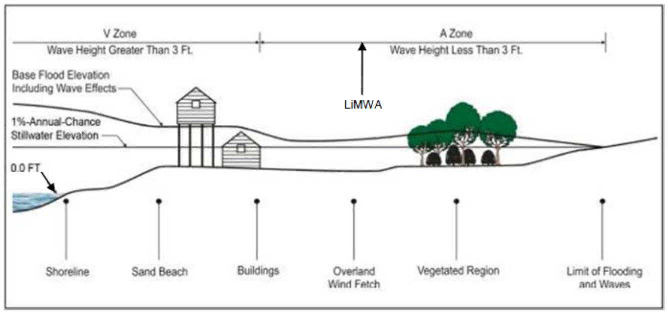


Figure 6: Coastal Transect Schematic

Methods used in coastal analyses in this Flood Risk Project are presented in Section 5.3 and mapping methods are provided in Section 6.4 of this FIS Report.

Coastal floodplains are shown on the FIRM using the symbology described in Figure 3, "Map Legend for FIRM." In many cases, the BFE on the FIRM is higher than the stillwater elevations shown in Table 17 due to the presence of wave effects. The higher elevation should be used for construction and/or floodplain management purposes.

2.5.4 Limit of Moderate Wave Action

Laboratory tests and field investigations have shown that wave heights as little as 1.5 feet can cause damage to and failure of typical Zone AE building construction. Wood-frame, light gage steel, or masonry walls on shallow footings or slabs are subject to damage when exposed to waves less than 3 feet in height. Other flood hazards associated with coastal waves (floating debris, high velocity flow, erosion, and scour) can also damage Zone AE construction.

Therefore, a LiMWA boundary may be shown on the FIRM as an informational layer to assist coastal communities in safe rebuilding practices. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. The location of the LiMWA relative to Zone VE and Zone AE is shown in Figure 6.

The effects of wave hazards in Zone AE between Zone VE (or the shoreline where Zone VE is not identified) and the limit of the LiMWA boundary are similar to, but less severe than, those in Zone VE where 3-foot or greater breaking waves are projected to occur during the 1% annual chance flooding event. Communities are therefore encouraged to adopt and enforce more stringent floodplain management requirements than the minimum NFIP requirements in the LiMWA. The NFIP Community Rating System provides credits for these actions.

Where wave runup elevations dominate over wave heights, there is no evidence to date of significant damage to residential structures by runup depths less than 3 feet. Examples of these areas include areas with steeply sloped beaches, bluffs, or flood protection structures that lie parallel to the shore. In these areas, the FIRM shows the LiMWA immediately landward of the VE/AE boundary. Similarly, in areas where the zone VE designation is based on the presence of a primary frontal dune or wave overtopping, the LiMWA is delineated immediately landward of the Zone VE/AE boundary.

3.0 Insurance Applications

3.1 National Flood Insurance Program Insurance Zones

For flood insurance applications, the FIRM designates flood insurance rate zones and, in 1% 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. Table 2, "Flood Zone Designations," includes a description of each type of flood hazard zone.

Table 2 - Flood Designations

Zone	Description
A	Zone A is the flood insurance rate zone that corresponds to the 1% 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 Flood Elevations or depths are shown within this zone.
AE	Zone AE is the flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined in the FIS Report by detailed methods. In most instances, whole-foot Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.
AH	Zone AH is the flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.
AO	Zone AO is the flood insurance rate zone that corresponds to the areas of 1% 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.
AR	Zone AR is the flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood 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% annual chance or greater flood.
A99	Zone A99 is the flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No Base Flood Elevations or depths are shown within this zone.
V	Zone V is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no Base Flood Elevations are shown within this zone.
VE	Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.
X	Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2% annual chance floodplain, areas within the 0.2% annual chance floodplain, and to areas of 1% annual chance flooding where average depths are less than 1 foot, areas of 1% annual chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1% annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone.
X (Future)	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.
D	Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

3.2 Coastal Barrier Resources System

3.2 Coastal Barrier Resources System

The Coastal Barrier Resources Act (CBRA) of 1982 was established by Congress to create areas along the Atlantic and Gulf coasts and the Great Lakes, where restrictions for Federal financial assistance including flood insurance are prohibited. In 1990, Congress passed the Coastal Barrier Improvement Act (CBIA), which increased the extent of areas established by the CBRA and added “Otherwise Protected Areas” (OPA) to the system. These areas are collectively referred to as the John. H Chafee Coastal Barrier Resources System (CBRS). The CBRS boundaries that have been identified in the project area are in Table 4: Coastal Barrier Resource System Information.

Table 4: “Coastal Barrier Resources System Information” is not applicable in Pitt County.

4.0 Area Studied

Pitt County is found in the Coastal Plain region of North Carolina. It is surrounded by Wilson and Edgecombe Counties to the northwest, Martin County to the northeast, Beaufort County to the east, Craven County to the southeast, Lenoir County to the southwest, and Greene County to the west.

4.1 Basin Description

Table 3, “Basin Description” contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its area.

Table 3 - Basin Description

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description	HUC Area (square miles)
Contentnea	03020203	Contentnea Creek	The Contentnea Creek Basin begins in southern Franklin County and drains southeast through significant portions of Greene, Nash, Pitt, Wayne, and Wilson Counties. The basin ends at the confluence with Neuse River in Craven County.	1,008
Lower Tar	03020103	Tar River	The Lower Tar River Basin begins in Edgecombe County near Tarboro, North Carolina. The basin drains significant portions of Martin, Pitt, and Wilson Counties before emptying into the Pamlico River in Beaufort County.	960
Middle Neuse	03020202	Neuse River	The Middle Neuse River Basin headwaters are in Wayne and Pitt Counties. The basin also drains significant portions of Beaufort, Greene, Jones, and Lenoir Counties and ends near New Bern, North Carolina in Craven County.	1,065

4.2 Principal Flood Problems

Table 4, “Principal Flood Problems” contains a list of principal flooding problems in Pitt County.

Table 4 - Principal Flood Problems

Flooding Source	Problem
All Sources	Flooding is an important cause of many of the social and economic problems confronting Pitt County. Although stream flooding within the county may occur during any season of the year, the most severe flooding is usually the result of accumulations of abn
All Sources	Flooding is an important cause of many of the social and economic problems confronting Pitt County. Although stream flooding within the county may occur during any season of the year, the most severe flooding is usually the result of accumulations of abnormally high direct precipitation, pocosin overflow, or stream channel overflow, following tropical storms and local thunderstorms during the spring and summer months. The terrain of the county is relatively flat, and inadequate main channels prevent timely removal of accumulated surface water. Relatively large areas remain inundated for periods of up to 3 or 4 days following major rainstorms. Historical records from 1966-1986 show that an average of three flood-producing storms per year have occurred in the floodplains of the major watersheds in the county. Approximately 75 percent of these storms occurred during the growing season. Low-lying areas of Greenville are subject to periodic flooding from the Tar River, Green Mill Run, and their tributaries. The most severe flooding on the Tar River is usually the result of heavy rains from tropical storms, while creek flooding usually result primarily from local thunderstorms. River stage records from the national weather service gage at Greenville show that a stage of 15.85 feet NAVD has been equaled or exceeded eight times between 1905 and 1986. Flooding on the streams within the Towns of Grifton and Farmville may occur during any season of the year. The most severe flooding is normally the result of heavy rains from tropical storms and local thunderstorms during the spring, late summer, and early fall. It is estimated that thousands of acres of croplands and pastureland within the Towns of Grifton and Farmville suffer flood damage annually. Contentnea Creek and its tributaries, as well as areas adjacent to Little Contentnea Creek and its tributaries, suffer flood damage annually from stream channel overflow or accumulation of surface water caused by abnormally heavy rainfall. Their floodplains are relatively flat, and their main channel capacities are inadequate for the timely removal of accumulated surface water. The frequency of flooding has noticeably increased during the past few years as the main channels have become more clogged, and practically none of the tributaries function properly or adequately to drain productive agricultural lands. Low areas in the floodplains remain inundated at shallow depth for 3 to 5 days following torrential rains.

4.3 Historic Flood Elevations

Hurricane Floyd

(9/16/1999)

Hurricane Floyd made landfall near Wilmington with category two winds of 105 to 110 mph. Rainfall totals from Floyd were as high as 15 to 20 inches over portions of eastern North Carolina; with a record of 23.45 inches of rain falling in the month of September at Wilmington, NC. This breaks the previous record of 21.12 inches set in July 1886. These rains combined with saturated ground from previous rain events, including Hurricane Dennis, to produce an inland flood disaster. There were 74 deaths in the United States, including 52 in North Carolina, due to drowning from flood waters. This makes Floyd the deadliest U.S. hurricane since Agnes in 1972. Data from the USGS indicate that eleven of their stream gage monitoring sites in North Carolina (Ahoskie, Rocky Mount, Hilliardston, White Oak, Enfield, Tarboro, Lucama, Hookerton, Trenton, Chinquapin, and Freeland) exceeded 0.2% annual chance flood levels due to Floyd. Total losses in North Carolina approach $5 billion with an estimated $3.5 billion in damages to North Carolina homes, businesses, roads, and infrastructure. Floyd passed relatively close to the entire U.S. east coast, justifying hurricane warnings from Florida to Massachusetts and requiring an estimated two million people to evacuate. The last hurricane to require warnings for as large a stretch of coastline was Hurricane Donna in 1960.

Hurricane Bonnie
(8/26/1998)
The landfall location of Bonnie was in southern North Carolina near Cape Fear very close to landfall of both Hurricanes Bertha and Fran in 1996. Even though a powerful storm, damage from Bonnie was much less than Fran, which was also Category 3. Winds gusted up to 100 knots and storm tides of 5 to 8 feet above normal were reported mainly in eastern beaches of Brunswick County, while a storm surge of 6 feet was reported at Pasquotank and Camden Counties in the Albemarle Sound.

Hurricane Fran
(9/5/1996)
The landfall location of Fran near the city of Wilmington and its progression into the Raleigh-Durham area caused an estimated $1.275 billion in damage in North Carolina alone. Fran hit with gusts up to 105 mph and a storm surge of approximately 16 feet. Over $1 billion in damage was reported in North Topsail Beach and Surf City and 23 people were killed.

Hurricane Bertha
(7/12/1996)
1996 was a damaging year in the hurricane history of North Carolina. Tropical Storm Arthur, Hurricane Bertha, and Hurricane Fran all made direct landfall on the North Carolina coastline. It was the most active tropical cyclone season in the state since 1955, when Hurricanes Connie, Diane, and Ione all hit the coast. Bertha entered North Carolina in North Topsail Beach with 105 mph gust and a storm surge of approximately 5 feet.

Hurricane Gloria
(9/26/1985)
The landfall location of Gloria was Cape Hatteras, with 90 knot winds and a storm surge of approximately 6-8 feet.

Hurricane Diana
(9/13/1984)
The landfall location of Diana was 38 miles south of Wilmington with 90 mph winds at its closest approach to Wilmington. Diana had 115 mph sustained winds before landfall. Storm surge was approximately 5-6 feet.

Hurricane Donna
(8/29/1960)
Hurricane Donna crossed the North Carolina coast between Wilmington and Morehead City of September 11, 1960. The center of the storm passed a few miles east of Wrightsville Beach, although Wilmington and Wrightsville Beach were each in the eye for about an hour. The lowest barometric pressure recorded during this storm was 962 mb at Wilmington. High tides, 6 to 8 feet above normal, together with high winds, caused severe damage at many points. Winds of hurricane force, up to 97 mph, were reported from Wilmington. During the night of September 11, the storm center moved northward, parallel, and slightly east of a line drawn between Wilmington and Norfolk. Wind gusts were in excess of 97 mph and tides were 4 to 8 feet above normal. High tides of 10.3 and 8.3 feet NGVD were reported at Atlantic Beach and Wrightsville Beach, respectively. Coastal communities from Wilmington to Nags Head suffered heavy structural damage and considerable beach erosion. Eight deaths and approximately 100 injuries were attributed to the storm. Damages were estimated at millions of dollars.

Hurricane Helene
(9/21/1958)
Hurricane Helene was one of the most powerful storms of recent history. Fortunately for the people of North Carolina, the storm center was well out at sea as it moved north on September 26 and 27. Nevertheless, high winds were recorded at Wilmington, with the highest winds measured at 85 mph and peak gusts recorded at 135 mph. The lowest reported central pressure of the storm was 932 mb; this measurement was recorded south-southeast of Cape Fear early on the morning of September 27. There was some beach erosion due to seas and tides, but this erosion was minimized by the fact that the storm occurred at the time of low astronomical tides. High tides were estimated at 3 to 5 feet above normal; a high tide of 5.1 feet NGVD was reported at Wrightsville Beach. Tides were higher on the southern edge of Pamlico Sound, when the wind shift as the storm center passed brought the tides 7 to 8 feet above normal.

Hurricane Ione

(9/10/1955)
Hurricane Ione moved up from the south and crossed the North Carolina coast near Salter Path, 10 miles west of Morehead City, at about 5 a.m. on September 19. It then slowly curved to the northeast and went out to sea near the Virginia border early on September 20. When Ione entered North Carolina, winds gusted to over 100 mph. Wind speeds of 75 mph with gusts to 107 mph were recorded at Cherry Point. The minimum barometric pressure recorded over North Carolina during this storm was 960 mb. Heavy rains also accompanied Ione. At the same time, prolonged easterly winds drove tidal water onto beaches and into sounds and estuaries to heights of 3 to 10 feet above normal. The result was the largest inundation of eastern North Carolina ever known to have occurred. At New Bern, the depth of the flood was the greatest ever recorded, about 10.5 feet above mean low water; forty city blocks were flooded, several hundred homes were washed away, and thousands more were flooded with up to 4 feet of water. A high tide of 6.9 feet NGVD was reported at Atlantic Beach, North Carolina, and an estimated 5.3 feet NGVD at Wrightsville Beach.

Hurricane Diane
(8/7/1955)
Five days after Hurricane Connie, and before the damage from that storm could be estimated, Hurricane Diane struck the coast near Carolina Beach about 6 a.m. on August 17. The highest wind speed reported during this storm was 74 mph at Wilmington Airport. Storm tides ranged from 5 to 9 feet above mean low water on the beaches (6.8 feet NGVD at Wrightsville Beach), and in some areas of sounds and rivers emptying into sounds, estimated water levels were 5 to 9 feet above normal. Water was 3 feet above flood level in the business district of Belhaven and “waist deep” in parts of Washington and New Bern. Diane caused severe beach erosion along the North Carolina coast. The total damage caused in North Carolina by both Connie and Diane was estimated to be in excess of $90 million. No deaths or injuries in North Carolina were attributed to either of the storms.

Hurricane Connie
(8/3/1955)
Hurricane Connie entered North Carolina close to Cape Lookout at about 8:30 a.m. on August 12. The prolonged pounding of high waves against the coast caused tremendous beach erosion, probably worse than that caused by Hazel in 1954. Storm tides along the coast from Southport to Nags Head were reported to be about 7 feet NGVD (6.9 feet NGVD at Wrightsville Beach and 7.5 feet NGVD at Kure Beach). Water in sounds and near the mouths of rivers was 5 to 8 feet above normal. At Wilmington, winds were reported at 72 mph, gusting to 83 mph. At Fort Macon, winds of 75 mph, gusts of 100 mph, and barometric pressure of 962 mb were reported. The storm also brought torrential rains with the maximum rainfall, around 12 inches in 48 hours, occurring near Morehead City. Total damage throughout the state was estimated at $50 million.

Hurricane Hazel
(10/5/1954)
Hurricane Hazel was the most destructive storm in the history of North Carolina. The storm crossed the coast just north of Myrtle Beach, South Carolina, as hurricane winds hit the Atlantic coast between Georgetown, South Carolina, and Cape Lookout, North Carolina. Storm tides (i.e., hurricane surge) devastated the immediate ocean front of this stretch of coast. Every fishing pier along 170 miles of coast, from Myrtle Beach to Cedar Island, North Carolina, was destroyed. The waterfront between the South Carolina/North Carolina state boundary and Cape Fear was destroyed. Beach homes, which had been built in a continuous line five miles long behind and along grass-covered dunes (some of which were 20 feet high), simply disappeared – dunes, houses, and all. From Cape Fear to Cape Lookout, the degree of devastation was not as great, but oceanfront property was damaged an average of 50 percent along this entire stretch. To the north of Cape Lookout, the damage was relatively light. Storm surges of 16.6 feet above NGVD were observed at Holden Beach Bridge and Calabash, North Carolina. The highest tide of record was observed during Hurricane Hazel, when ocean tide levels reached approximately 10 feet NGVD at Wrightsville Beach and 11 feet NGVD at Carolina Beach. The lowest recorded barometric pressure of the storm was 938 millibars (mb), reported at Little River Inlet on the North Carolina/South Carolina border. Maximum wind speeds were 83 miles per hour (mph), with gusts recorded at 98 mph at Wilmington, North Carolina, 106 mph at Myrtle Beach, South Carolina, and an estimated 150 mph at Cape Fear. The storm continued inland through North Carolina, causing widespread damage due to high winds and record rainfalls. Nineteen people were killed and 200 injured during this storm.

Table 5, “Historic Flood Elevations”, lists selected flooding sources in Pitt County with records of past stages. The table shows the historic peak, a location description, approximate stream station, the date of the historic peak, and approximate recurrence interval of the flood elevation. The approximate recurrence interval for a flood is often estimated based on an analysis of rainfall amounts from a storm and /or stream gage data.

Table 5 - Historic Flood Elevations

Flooding Source/Tropical Storm	Location Description	Approx. Stream Station	Historic Peak (Feet NAVD 88)	Date	Approximate Recurrence Interval (in years)
Chicod Creek / Unknown storm	Unknown	29910	19.6	9/1/1999	*
Chicod Creek / Unknown storm	Unknown	29827	20.4	9/1/1999	*
Grindle Creek / Unknown storm	Unknown	19977	15.3	9/1/1999	*
Grindle Creek / Unknown storm	Edge of Tree line	24004	15.6	9/1/1999	*
Grindle Creek / Unknown storm	Discoration line on 30" hardwood	23361	16.1	9/1/1999	*
Grindle Creek / Unknown storm	Shed	20460	16.3	9/1/1999	*
Grindle Creek / Unknown storm	Unknown	25248	19.1	9/1/1999	*
Juniper Branch / Unknown storm	Unknown	3349	21.6	9/1/1999	*
Juniper Branch / Unknown storm	Back Fence	12308	32.6	9/1/1999	*
Neuse River / Hurricane Floyd	Upstream face of Weyerhaeuser Road	57075	10.6	9/1/1999	100
Neuse River / Hurricane Floyd	Downstream face of West Craven Middle School Road	65300	11.7	9/1/1999	100
Neuse River / Hurricane Floyd	400 feet southwest of intersectioin of River Road and Cowpens Landing Road	76975	14.6	9/1/1999	100
Neuse River / Hurricane Floyd	Approximately 1.0 mile upstream of intersection of River Road and State Camp Road	94750	17.7	9/1/1999	100
Neuse River / Hurricane Floyd	Backwater up Core Creek (approximately 2.9 miles downstream of NC 55)	127000	18.7	9/1/1999	100
Neuse River / Hurricane Floyd	Backwater up Village Creek (downstream face of Biddle Road)	135000	22.2	9/1/1999	100
Neuse River / Hurricane Floyd	Upstream face of U.S. Highway 70/Queen St.	258355	37.6	9/1/1999	100
Neuse River / Hurricane Floyd	Downstream face of Main Street	591830	54.9	9/1/1999	50
Neuse River / Hurricane Floyd	Downstream face of NC 111	636585	61.7	9/1/1999	50
Neuse River / Hurricane Floyd	Upstream face of SR 1915	694195	71.1	9/1/1999	50
Neuse River / Hurricane Floyd	160 feet Southeast of Bryan Boulevard	710650	72.8	9/1/1999	50
Tar River / Unknown storm	Upstream face of Enon Road, Oxford	952391	392.2	9/1/1996	100
Tar River / Unknown storm	Upstream face of Goochs Mill Road	960799	402.5	9/1/1996	100
Tar River / Unknown storm	Upstream face of Tar River Dam, 5109 Goochs Mill Road, Oxford	961210	405.3	9/1/1996	100
Tar River / Unknown storm	Upstream face of Moriah Road	980814	427.3	9/1/1996	100
Tar River / Unknown storm	Unknown	31359	15.0	9/1/1999	*
Tar River / Unknown storm	Unknown	66300	20.2	9/1/1999	*

* Data Not Available

4.4 Flood Protection Measures

Flood protection measures may be structural (such as levees, dams, and reservoirs) or non-structural (such as land-use management ordinances, policies, or practices).

Table 6, “Non-Levee Flood Protection Measures”, lists the flood protection measures undertaken to mitigate flood damage in Pitt County.

Table 6 - Non-Levee Flood Protection Measures

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Tar River	NP	OTHER / MISC STRUCTURE	Tar River between Hardee Creek and Rocky Mount	Clearing and snagging project

N/A - Not Applicable

Table 7, “Levees” is not applicable in Pitt County.

4.5 Scope of Study

For this map maintenance revision, a scoping meeting was held in Pitt County to present the results of initial research to the county and communities within the county and to discuss their floodplain mapping needs. The county and communities were asked to provide input on proposed study priorities and analysis methods. These meetings resulted in the identification of flooding sources having a floodplain mapping need. Map Maintenance Plans were developed based on the results of the scoping meetings and were both mailed to each jurisdiction within Pitt County and posted to the State’s website at www.ncfloodmaps.com.

Draft basin plans were developed based on the results of the initial scoping meetings. Final scoping meetings were held by the State and FEMA to provide counties and communities an overview of the draft basin plans, including the proposed scope and schedule for the project, and to provide an opportunity for additional county and community input. After the final scoping meeting was held, the Final Basin Plans were produced.

This FIS covers the geographic area of Pitt County, North Carolina, and all jurisdictions therein. 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. Limits of detailed study are indicated on the Flood Profiles and/or Water-surface elevation rasters and/or the FIRM.

Table 8P, “Scope of Revisions: Revised or New Detailed Study -Preliminary”, lists flooding sources that were newly studied by detailed methods or were previously studied by detailed methods and had a change in backwater elevation due to flooding effects from a newly studied flooding source.

Table 8P - Scope of Revisions: Revised or New Detailed Study - Preliminary

Source	Riverine Sources		Affected Communties
	From	To	
Chicod Creek[1]	The confluence with Tar River	Approximately 525 feet downstream of Mobley's Bridge Road	Pitt County Town Of Grimesland
Grindle Creek[1]	The confluence with Tar River	Approximately 3 miles upstream of confluence with Tar River	Pitt County
Juniper Branch[1]	The confluence with Chicod Creek	Approximately 2,300 feet upstream of the confluence with Chicod Creek	Pitt County Village Of Simpson
Tar River	Approximately 4,000 feet downstream of the confluence with Chicod Creek	Approximately 1,000 feet upstream of the confluence with Mill Creek	City Of Greenville Pitt County Town Of Grimesland Village Of Simpson
Tranters Creek[1]	The confluence with the Tar River	Approximately 2.6 miles upstream of U.S. Highway 264	Pitt County

[1] **Revised to reflect backwater effects from new detailed study**

Table 9P, “Scope of Revisions: Redelineated - Preliminary” is not applicable in Pitt County.

Table 10P, “Scope of Revisions: Limited Detailed - Preliminary”, lists flooding sources that were newly studied by limited detailed methods or were previously studied by limited detailed methods and had a change in backwater elevation due to flooding effects from a newly studied flooding source.

Table 10P - Scope of Revisions: Limited Detailed - Preliminary

Source	Riverine Sources		Affected Communties
	From	To	
Tar River	Approximately 0.6 mile upstream of the confluence of Tranters Creek	Approximately 0.4 mile downstream of Grimesland Bridge	Pitt County

Table 8, “Flooding Sources Studied by Detailed Methods”, lists all flooding sources within the county that were studied by detailed methods for this FIS and previous FISs.

Table 8 - Flooding Sources Studied by Detailed Methods: Revised or Newly Studied

Source	Riverine Sources		Affected Communties
	From	To	
Baldwin Swamp	The confluence with Moyes Run-Cannon Swamp	Approximately 1.4 miles upstream of confluence with Baldwin Swamp North Tributary	City Of Greenville Pitt County
Baldwin Swamp - North Tributary	The confluence with Baldwin Swamp	Approximately 1.0 mile upstream of confluence with Baldwin Swamp	Pitt County
Bates Branch	The confluence with Juniper Branch	Approximately 1,000 feet upstream of Simpson Street (SR 1759)	Pitt County Village Of Simpson
Chicod Creek	Approximately 0.6 mile upstream of State Route 33	Approximately 1.5 miles upstream of Mobley’s Bridge Road	Pitt County
Chicod Creek	The confluence with Tar River	Approximately 0.4 mile upstream of Mobley’s Bridge Road (SR 1760)	Pitt County Town Of Grimesland
Contentnea Creek	Confluence with Neuse River	Approximately 1.5 miles downstream of confluence of Wheat Swamp	Pitt County Town Of Grifton

Table 8 - Flooding Sources Studied by Detailed Methods: Revised or Newly Studied

Source	Riverine Sources		Affected Communties
	From	To	
Green Mill Run	Confluence with Tar River	Approximately 270 feet upstream of Allen Road	City Of Greenville
Grindle Creek	The confluence with Tar River	Approximately 500 feet downstream of the confluence of Grindle Creek Tributary	Pitt County
Hardee Creek	Confluence with Tar River	Approximately 1.0 mile upstream of Herman Garris Road	City Of Greenville Pitt County
Indian Well Swamp	Approximately 0.4 mile upstream of Grover Hardee Road (SR 1749)	Approximately 0.7 mile upstream of Ivy Road (SR 2241)	Pitt County
Juniper Branch	The confluence with Chicod Creek	Approximately 0.46 mile upstream of Ivy Road	Pitt County Village Of Simpson
Lateral No. 1	The confluence with Parkers Creek	Approximately 440 feet upstream of North Memorial Drive/NC Highway 11	City Of Greenville
Lateral No. 2	The confluence with Parker Creek	Approximately 1.1 miles upstream of confluence with Parker Creek	City Of Greenville
Moyes Run - Cannon Swamp	Approximately 200 feet downstream of Old Pactolus Road (SR 1534)	Approximately 1.2 miles upstream of Whichard Road (SR 1523)	City Of Greenville Pitt County
Neuse River	Approximately 2.17 miles downstream of the confluence of Swift Creek	Craven/Lenoir/Pitt County boundary	Pitt County
Parkers Creek	The confluence with Tar River	Approximately 1,950 feet upstream of Industrial Boulevard (SR 1591)	City Of Greenville
Tar River	Approximately 0.4 mile downstream of Grimesland Bridge Road	Pitt/Edgecombe County Boundary	City Of Greenville Pitt County Town Of Falkland Town Of Grimesland Village Of Simpson
Tar River	Approximately 4,000 feet downstream of the confluence with Chicod Creek	Approximately 1,000 feet upstream of the confluence with Mill Creek	City Of Greenville Pitt County Town Of Grimesland Village Of Simpson
Tranters Creek	The confluence with the Tar River	Approximately 2.6 miles upstream of U.S. Highway 264	Pitt County

Table 9, “Flooding Sources Studied by Detailed Methods: Redelineated”, lists all flooding sources that were studied by detailed methods for the pre- statewide FIS and redelineated for previous FISs. These flooding sources were not part of this revision and their effective analyses remain valid.

Table 9 - Flooding Sources Studied by Detailed Methods: Redelineated

Source	Riverine Sources		Affected Communties
	From	To	
Lateral No. 1	Confluence with Parkers Creek	U.S. Highway 13	City Of Greenville
Lateral No. 2	Confluence with Parkers Creek	U.S. Highway 13	City Of Greenville
Parkers Creek	Confluence with Tar River	Approximately 800 feet upstream of confluence of Lateral No. 2	City Of Greenville

Table 10, “Flooding Sources Studied by Detailed Methods: Limited Detailed”, lists all flooding sources within the county that were studied by limited detailed methods for either this FIS or previous FISs.

Table 10 - Flooding Sources Studied by Detailed Methods: Limited Detailed

Source	Riverine Sources		Affected Communties
	From	To	
Briery Swamp	Confluence with Tranters Creek	Approximately 0.5 mile upstream of Staton Mill Rd	Pitt County
Briery Swamp Tributary	Confluence with Briery Swamp	Approximately 0.77 mile upstream of State Hwy 903	Pitt County
Buckleberry Canal	Confluence with Neuse River	Approximately 0.9 mile upstream of Rock Road	Pitt County
Chicod Creek	Approximately 0.9 mile upstream of Dixon Road	At confluence of Harding Swamp	Pitt County
Clayroot Swamp	Confluence with Swift Creek	Approximately 1,300 feet upstream of V.O.A. Site B Road	Pitt County
Cow Swamp	Confluence with Chicod Creek	Approximately 2.6 miles upstream of Black Jack Simpson Road	Pitt County
Creeping Swamp	Confluence with Clayroot Swamp	Approximately 0.9 mile upstream of Cayton Road	Pitt County

Table 10 - Flooding Sources Studied by Detailed Methods: Limited Detailed

Source	Riverine Sources		Affected Communties
	From	To	
Grindle Creek	Confluence of Grindle Creek Tributary	Approximately 0.24 mile upstream of State Road 1431	Pitt County
Grindle Creek Tributary	Confluence with Grindle Creek	Approximately 2.0 miles upstream of confluence with Grindle Creek	Pitt County
Hunting Run	Confluence with Grindle Creek	Approximately 1.5 miles upstream of Grindle Creek	Pitt County
Island Swamp	Confluence with Chicod Creek	Approximately 0.9 mile upstream of South Grimesland Bridge Road	Pitt County
Meadow Branch	Confluence with Briery Swamp	Approximately 0.7 mile upstream of Sheppard Mill Road	Pitt County
Pea Branch	The confluence with Tranters Creek	Approximately 0.1 mile upstream of Satterwaite Road	Pitt County
Poley Branch	The confluence with Tranters Creek	Approximately 0.4 mile upstream of Sheppard Mill Road	Pitt County
Swift Creek	1.1 miles upstream of Streets Ferry Road	Approximately 0.3 mile downstream of the confluence of Fork Swamp	Pitt County
Tar River	Approximately 0.6 mile upstream of the confluence of Tranters Creek	Approximately 0.4 mile downstream of Grimesland Bridge	Pitt County
Tranters Creek	Approximately 2.6 miles upstream of U.S. Highway 264	Approximately 790 feet downstream of Horse Pen Swamp Road	Pitt County
Tranters Creek	At the confluence of Maple Branch	Approximately 2,000 feet upstream of Sheppard Mill Road	Pitt County

Table 11, “Stream Name Changes” is not applicable in Pitt County.

Table 12, “Letters of Map Revision” is not applicable in Pitt County.

5.0 Engineering Methods

For the flooding sources 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 are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 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-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2% annual 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 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 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.

5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. For details on the county’s hydrologic analyses, the hydrologic report is available by request.

A summary of the drainage area-peak discharge relationships for the flooding sources studied by detailed methods is shown in Table 13, “Summary of Discharges”.

Table 13 - Summary of Discharges

Flooding Source		Discharges (cfs)			
Location	Drainage Area (square miles)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Aggie Run					

Table 13 - Summary of Discharges

Flooding Source		Discharges (cfs)			
Location	Drainage Area (square miles)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
At confluence with Tranters Creek	45.99	2298	4012	4886	7295
Baldwin Swamp					
The confluence with Moyes Run-Cannon Swamp	2.31	314	595	751	1213
Approximately 0.6 mile downstream of Sunny Side Road (SR 1535)	2.04	292	555	701	1136
Approximately 212 feet upstream of Sunny Side Road (SR 1535)	0.60	137	272	350	585
Baldwin Swamp - North Tributary					
The confluence with Baldwin Swamp	1.14	204	396	504	829
Approximately 37 feet downstream of U.S. Highway 264 East	0.86	172	337	430	713
Bates Branch					
The confluence with Juniper Branch	2.37	828	1423	1637	2261
Approximately 675 feet upstream of Black Jack-Simpson Road (SR 9999)	1.53	511	949	1114	1611
Approximately 294 feet upstream of Simpson Street (SR 1759)	0.27	171	358	429	648
Briery Swamp					
At the confluence with Tranters Creek	23.37	*	*	2790	*
At the confluence with Briery Swamp Tributary	9.32	*	*	1660	*
Briery Swamp Tributary					
At the confluence with Briery Swamp	2.84	*	*	846	*
Buckleberry Canal					
Approximately 1.0 mile upstream of Pitt/Craven County boundary	13.28	*	*	2020	*
Approximately 0.26 mile downstream of Cletus Hart Road	12.10	*	*	1920	*
Approximately 0.35 mile downstream of Cletus Hart Road	5.17	*	*	1190	*
Approximately 0.5 mile upstream of Rock Road	4.24	*	*	1061	*
Chicod Creek					
The confluence with Tar River	56.31	3981	5682	6369	7885
Approximately 0.4 mile upstream of the confluence with Tar River	55.74	3957	5650	6334	7844
Approximately 0.5 mile downstream of NC Highway 33	53.39	3858	5517	6188	7671
Approximately 0.2 mile upstream of NC Highway 33	52.70	3829	5477	6144	7620
Approximately 1.2 miles downstream of Mobleys Bridge Road (SR 1760)	50.16	3719	5329	5982	7428
Approximately 0.8 mile downstream of Mobleys Bridge Road (SR 1760)	43.67	3320	4789	5389	6725
Approximately 115 feet downstream of Mobleys Bridge Road (SR 1760)	43.27	3301	4763	5360	6691
Boyds Road	15.73	*	*	2230	*
At the confluence with Island Swamp	7.93	*	*	1510	*
Clayroot Swamp					
Just upstream of confluence with Swift Creek	80.17	*	*	5600	*
Approximately 0.2 mile downstream of confluence of Creeping Swamp	78.17	*	*	5520	*
Just upstream of confluence of Creeping Swamp	45.58	*	*	4070	*
Creeping Swamp					
Just upstream of confluence with Clayroot Swamp	31.99	*	*	3590	*
Just downstream of Highway 43	29.61	*	*	3490	*
Approximately 0.9 mile upstream of Highway 43	28.88	*	*	3430	*
Approximately 1.3 miles upstream of Highway 43	24.51	*	*	3040	*
Approximately 0.2 mile downstream of confluence of Polland Swamp	19.90	*	*	2630	*
Just upstream of confluence of Polland Swamp	15.06	*	*	2180	*

Table 13 - Summary of Discharges

Flooding Source		Discharges (cfs)			
Location	Drainage Area (square miles)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Approximately 0.7 mile downstream of Highway 102	12.60	*	*	1960	*
Just upstream of confluence of Creeping Swamp Tributary	10.05	*	*	1730	*
Approximately 0.7 mile upstream of confluence of Creeping Swamp Tributary	4.21	*	*	1060	*
Approximately 1.8 miles upstream of confluence of Creeping Swamp Tributary	2.36	*	*	760	*
Grindle Creek					
At the confluence with Tar River	78.55	2752	4591	5532	8122
Approximately 10 feet upstream of US Highway 264	73.59	2644	4421	5332	7842
At the confluence of Grindle Creek Tributary	65.67	*	*	5000	*
At the confluence with Hunting Run	64.70	2443	4104	4957	7315
Approximately 1,600 feet upstream of Wichard-Cherry Lane Road	56.57	2249	3797	4594	6805
Grindle Creek Tributary					
At the confluence with Grindle Creek	1.71	*	*	634	*
Hardee Creek					
At the confluence with Tar River	9.23	*	*	3541	*
Hunting Run					
At the confluence with Grindle Creek	8.01	*	*	1519	*
Indian Well Swamp					
Approximately 0.5 mile upstream of NC Highway 43	4.30	461	854	1068	1696
Approximately 0.4 mile downstream of Joe Stocks Road (SR 1743)	3.25	388	726	911	1458
Approximately 0.2 mile upstream of Joe Stocks Road (SR 1743)	2.33	316	598	755	1218
Approximately 830 feet upstream of Ivy Road (SR 2241)	1.19	209	406	517	850
Approximately 1,940 feet upstream of Ivy Road (SR 2241)	0.65	144	285	366	612
Island Swamp					
At the confluence with Chicod Creek	1.30	*	*	543	*
Juniper Branch					
At the confluence with Chicod Creek	8.52	*	*	3560	*
Approximately 0.2 mile upstream of confluence of Bates Branch	7.36	1880	2930	3300	4331
Just upstream of confluence of Bates Branch	3.79	1270	2060	2329	3100
Approximately 0.6 mile upstream of Black Jack-Simpson Road	2.89	1081	1780	2019	2700
Approximately 0.3 mile upstream of Ivy Road	1.13	624	1090	1240	1690
Maple Branch					
At confluence with Tranters Creek	2.68	345	649	818	1315
Meadow Branch					
At the confluence with Briery Swamp	6.02	*	*	1290	*
Approximately 0.3 mile upstream of Beargrass Road	3.23	*	*	908	1450
Mitchell Branch					
At confluence with Tranters Creek	3.37	508	1004	1213	1873
Moyes Run - Cannon Swamp					
Approximately 1.2 miles upstream of the confluence with Tar River	12.47	887	1582	1952	3011
Approximately 311 feet downstream of Old Pactolus Road (SR 1534)	10.68	807	1446	1788	2771
Approximately 219 feet upstream of the confluence of Baldwin Swamp	8.27	689	1247	1547	2413
Approximately 498 feet upstream of U.S. Highway 264	5.83	556	1018	1269	1999
Approximately 0.7 mile upstream of U.S. Highway 264	4.24	457	847	1060	1683

Table 13 - Summary of Discharges

Flooding Source		Discharges (cfs)			
Location	Drainage Area (square miles)	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Approximately 0.8 mile downstream of Whichard Road (SR 1523)	3.32	394	736	924	1477
Neuse River					
Approximately 0.55 mile downstream of Pitt/Craven County line	3911.80	*	*	49000	*
Pea Branch					
At the confluence with Tranters Creek	3.78	*	*	993	*
At Sheppard Mill Road	1.49	*	*	587	*
Poley Branch					
At the confluence with Tranters Creek	1.75	*	*	643	*
At Sheppard Mill Road	1.10	*	*	493	*
Swift Creek					
Approximately 0.4 mile downstream of confluence of Clayroot Swamp	178.32	*	*	7690	*
Just upstream of confluence of Clayroot Swamp	97.83	*	*	6210	*
Approximately 0.7 mile downstream of Beaver Dam Road	94.51	*	*	6120	*
Just downstream of Clark Ford Road	91.41	*	*	6030	*
Approximately 0.7 mile upstream of Gardnerville Road	86.34	*	*	5840	*
Tar River					
At confluence with Tranters Creek	2917.54	30400	46700	55000	77900
Approximately 1.3 miles downstream of confluence with Chicod Creek	2899.34	30300	46500	54800	77600
At the confluence of Grindle Creek	2756.83	29500	45200	53100	74900
Tranters Creek					
Approximately 1.1 miles upstream of Clarks Neck Road (SR 1567)	237.00	5380	8631	10253	14616
Approximately 4.6 miles downstream of U.S. Highway 264	228.08	5301	8511	10114	14427
Approximately 0.9 mile downstream of U.S. Highway 264	225.19	5260	8449	10041	14329
Approximately 0.7 mile upstream of U.S. Highway 264	171.73	4452	7222	8613	12381
Approximately 1.8 miles upstream of U.S. Highway 264	169.90	4423	7177	8561	12310
At the confluence of Poley Branch	157.47	*	*	8200	*
At the confluence of Briery Swamp	116.74	*	*	6920	*
At the confluence of Bear Grass Swamp	89.19	*	*	5940	*
At the confluence of Collie Swamp	31.01	*	*	3269	*

Table 14, “Summary of Stillwater Elevations” is not applicable in Pitt County.

Table 15, “Gage Information”, lists the stream gages located in Pitt County, including the drainage area of the flooding source at the gage and the period of record available at the time of the publication of this FIS Report.

Table 15 - Gage Information

Gage Number	Flooding Source	Site Name	Drainage Area (square miles)	Period of Record	
				From	To
02084160	Chicod Creek	CHICOD CREEK AT SR 1760 NEAR SIMPSON, NC	43.30	1976	2010
02084164	Juniper Branch	JUNIPER BRANCH AT SR 1766 NR SIMPSON, NC	7.50	1976	1985

5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the flood elevations for the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the

Flood Profiles and/or Water-surface elevation rasters. For stream segments for which BFEs were computed, selected cross-section locations are also shown on the FIRM. Flood Profiles and/or Water-surface elevation rasters were developed showing computed water-surface elevations for floods of the selected recurrence intervals.

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 and/or Water-surface elevation rasters 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 the FIS in conjunction with the data shown on the FIRM.

The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the Flood Profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

For details on the county's hydraulic analyses, the hydraulic report is available by request.

For the streams studied by detailed methods, water surface elevations of floods of the selected recurrence intervals were computed through use of the Army Corps of Engineers' HEC RAS step backwater computer program . The hydraulic analyses were based on unobstructed flow. The flood elevations shown on the Profiles and/or Water-surface elevation rasters are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail. The computer models were calibrated using historic high water data collected during field investigations.

The cross section geometries were obtained from a combination of digital elevation data obtained by Light Detection and Ranging (LIDAR) and field surveys. All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry. Natural floodplain cross sections were surveyed approximately every 4000 feet along the detail study reaches to obtain the channel geometry between bridges and culverts. Overbank cross section data for the backwater analyses were obtained from recently flown LIDAR data.

Channel roughness factors (Manning's "n") used in the hydraulic computations were made in the field by an engineer where stream access was possible, with orthophotos used to supplement areas that could not be accessed. The channel and overbank "n" values for all of the streams studied by detailed methods are shown in Table 16, "Roughness Coefficients".

Table 16 - Roughness Coefficients

Stream	Channel "n"	Overbank "n"
Baldwin Swamp	0.040	0.050 to 0.150
Baldwin Swamp - North Tributary	0.050	0.060 to 0.120
Bates Branch	0.054 to 0.055	0.060 to 0.120
Briery Swamp	0.045	0.130
Briery Swamp Tributary	0.050 to 0.052	0.130 to 0.150
Buckleberry Canal	0.045	0.130
Chicod Creek	0.045 to 0.055	0.100 to 0.165
Clayroot Swamp	0.042 to 0.045	0.120 to 0.140
Contentnea Creek	0.030 to 0.080	0.032 to 0.200
Cow Swamp	0.050	0.120 to 0.150
Creeping Swamp	0.047	0.130 to 0.150
Green Mill Run	0.011 to 0.059	0.013 to 0.200
Grindle Creek	0.035 to 0.100	0.060 to 0.150
Grindle Creek Tributary	0.050	0.135 to 0.200
Hardee Creek	0.050 to 0.055	0.110 to 0.140
Hunting Run	0.040	0.120 to 0.130
Indian Well Swamp	0.040 to 0.050	0.060 to 0.160
Island Swamp	0.045 to 0.050	0.105 to 0.135
Juniper Branch	0.045	0.080 to 0.150
Lateral No. 1	0.048	0.060 to 0.140
Lateral No. 2	0.045	0.060 to 0.120
Meadow Branch	0.045 to 0.055	0.130 to 0.150
Moyes Run - Cannon Swamp	0.045 to 0.052	0.035 to 0.120
Neuse River	0.035 to 0.060	0.055 to 0.250
Parkers Creek	0.011 to 0.080	0.060 to 0.200
Pea Branch	0.048	0.140
Poley Branch	0.045	0.130

Table 16 - Roughness Coefficients

Stream	Channel "n"	Overbank "n"
Swift Creek	0.025 to 0.060	0.035 to 0.220
Tar River	0.020 to 0.080	0.030 to 1.000
Tranters Creek	0.020 to 0.060	0.035 to 0.450

For flooding sources studied by limited detailed methods in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this report and the FIRM panels. This method entails developing a HEC-RAS hydraulic model, resulting in the calculation of BFEs and the delineation of the 1% annual chance floodplain (designated as Zone AE). Cross sections for the flooding sources studied by limited detailed methods were obtained using digital elevation data obtained with LIDAR technology developed as part of the North Carolina Statewide Floodplain Mapping Program. The hydraulic model is prepared using this digital elevation data, without surveying bathymetric or structural data. Where bridge or culvert data are readily available, such as from the North Carolina Department of Transportation, these data have been reflected in the hydraulic model. If these structural data are not readily available, field measurements of these structures were made to approximate their geometry in the hydraulic models. In addition, this method does not include field surveys that determine specifics on channel and floodplain characteristics. A limited detailed study is a "buildable" product that can be upgraded to a fully detailed study at a later date by verifying stream channel characteristics, bridge and culvert opening geometry, and by analyzing multiple recurrence intervals.

The results of the HEC-RAS computations are tabulated for all cross sections (Table 17, "Limited Detailed Flood Hazard Data"). Flood Profiles have not been developed for streams studied by limited detailed methods. Water-surface elevation rasters were developed for steams studied by limited detailed methods. In addition, floodways for streams studied by limited detailed methods are not delineated on the FIRM. However, the 1% annual chance water-surface elevations, flood discharges, and non-encroachment widths from the limited detailed studies for every modeled cross section are given in Table 17. The non-encroachment widths given at modeled cross sections can be used by communities to enforce floodplain management ordinances that meet the requirement defined in 44 CFR 60.3(c)(10).

Between cross sections for streams studied by limited detailed methods, 1% annual chance water-surface elevations can be calculated by mathematical interpolation using the distance along the stream centerline. Non-encroachment widths and, therefore, the location of a non-encroachment area boundary between cross sections should be determined based on either 1) mathematical interpolation, or 2) the non-encroachment width at the upstream or downstream cross section, whichever is larger. If the width determined by this second method is wider than the Special Flood Hazard Area (SFHA) or the 1% annual chance floodplain delineated on the FIRM for this location along the stream, the non-encroachment area shall be considered to be coincident with the SFHA. A full detailed study incorporating field survey data in the HEC-RAS hydraulic model may be submitted for a Letter of Map Revision (LOMR) request to map a regulatory floodway along a section of a stream in lieu of applying the non-encroachment widths listed in Table 17.

Table 17 - Limited Detailed Flood Hazard Data

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
Briery Swamp				
015	1,475	2,352	22.0[1]	79 / 232
020	1,970	2,352	22.0[1]	85 / 289
025	2,519	2,352	22.0[1]	64 / 240
031	3,112	2,352	22.4	101 / 303
037	3,717	2,352	22.6	151 / 306
040	4,014	2,352	22.9	113 / 126
048	4,831	2,352	23.4	61 / 415
056	5,627	2,352	24.4	28 / 54
062	6,245	2,269	26.8	275 / 14
071	7,130	2,269	28.0	101 / 569
077	7,690	2,269	28.2	510 / 185
084	8,415	2,269	28.6	590 / 43

Table 17 - Limited Detailed Flood Hazard Data

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
090	9,039	2,269	28.9	444 / 60
096	9,562	2,269	29.1	249 / 216
103	10,321	2,269	29.4	231 / 355
108	10,785	2,269	29.6	261 / 272
114	11,383	2,269	29.9	130 / 271
121	12,056	2,269	30.2	40 / 522
125	12,500	2,269	30.3	202 / 404
133	13,295	2,078	30.6	175 / 277
138	13,823	2,078	30.8	456 / 130
146	14,632	2,078	31.2	124 / 332
153	15,326	2,078	31.6	13 / 311
161	16,106	2,078	32.4	13 / 412
169	16,897	2,078	33.3	132 / 212
174	17,420	2,078	33.7	13 / 354
178	17,774	2,078	33.9	269 / 328
181	18,076	2,078	34.0	101 / 391
185	18,503	2,078	34.1	204 / 528
196	19,558	2,078	34.5	238 / 362
202	20,240	2,078	34.8	179 / 287
209	20,880	2,078	35.2	190 / 422
216	21,576	2,078	35.6	477 / 13
221	22,064	2,078	36.0	276 / 25
Briery Swamp Tributary				
019	1,944	846	38.1	45 / 84
031	3,095	846	39.0	230 / 15
038	3,820	846	39.5	161 / 37
043	4,345	846	40.0	282 / 75
048	4,815	846	40.3	114 / 121
057	5,676	846	41.1	222 / 96
067	6,657	749	42.1	46 / 216
073	7,263	749	43.0	56 / 182
078	7,787	749	44.2	114 / 63
Buckleberry Canal				
139	13,908	2,023	23.6[1]	116 / 120
169	16,884	1,919	23.6[1]	127 / 31
182	18,221	1,187	23.6[1]	14 / 72
188	18,824	1,187	23.6[1]	17 / 17
195	19,473	1,187	23.6[1]	17 / 41
212	21,189	1,187	23.7	17 / 17
222	22,186	1,187	25.0	17 / 158
239	23,863	1,187	26.0	67 / 291
247	24,685	1,187	26.2	345 / 296
256	25,561	1,061	26.4	462 / 304
265	26,500	1,061	26.5	501 / 307
280	28,000	1,061	26.9	302 / 286
Chicod Creek				

Table 17 - Limited Detailed Flood Hazard Data

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
377	37,659	3,962	18.5	454 / 579
510	50,988	2,603	26.1	89 / 86
516	51,612	2,603	26.4	255 / 204
525	52,527	2,603	26.9	137 / 338
531	53,063	2,603	27.2	228 / 139
535	53,548	2,603	27.6	111 / 238
538	53,793	2,603	27.7	51 / 236
544	54,431	2,226	28.4	236 / 345
551	55,054	2,018	28.7	157 / 405
559	55,920	2,018	29.0	55 / 368
567	56,737	2,018	29.6	176 / 96
575	57,537	2,018	30.4	132 / 188
586	58,560	1,816	30.9	226 / 446
592	59,206	1,816	31.1	227 / 112
602	60,163	1,816	31.6	169 / 140
615	61,475	1,816	32.3	38 / 528
621	62,099	1,816	32.5	204 / 291
627	62,659	1,816	32.9	156 / 83
634	63,422	1,816	33.4	262 / 118
639	63,909	1,816	33.6	164 / 163
646	64,590	1,816	34.1	265 / 93
655	65,456	1,816	34.8	396 / 103
673	67,280	1,510	36.3	134 / 278
682	68,242	1,510	37.2	79 / 150
692	69,174	1,510	39.1	405 / 185
697	69,707	1,510	39.2	243 / 57
704	70,396	1,253	39.4	324 / 175
Clayroot Swamp				
010	1,032	5,596	19.4[1]	60 / 595
019	1,857	5,596	19.4[1]	285 / 388
032	3,189	5,596	19.4[1]	445 / 177
042	4,239	5,596	19.4[1]	50 / 879
066	6,605	5,596	20.3	290 / 450
073	7,259	5,517	20.4	175 / 670
080	7,953	5,517	20.5	840 / 305
091	9,050	4,065	20.6	599 / 515
100	10,041	4,065	20.7	275 / 494
108	10,750	4,065	20.8	170 / 413
115	11,519	4,065	21.2	177 / 355
121	12,147	4,065	21.4	495 / 149
128	12,836	4,065	21.6	834 / 38
136	13,577	4,065	21.9	729 / 246
143	14,342	4,065	22.1	455 / 587
159	15,854	4,065	22.6	195 / 575
Cow Swamp				

Table 17 - Limited Detailed Flood Hazard Data

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
204	20,354	1,430	34.5	90 / 190
210	21,039	1,260	34.8	235 / 49
215	21,476	1,260	35.0	47 / 68
220	21,996	1,260	35.6	138 / 168
225	22,479	1,260	35.8	66 / 106
229	22,946	1,260	36.1	118 / 177
235	23,486	1,260	36.5	258 / 84
240	24,039	1,260	36.9	172 / 35
247	24,692	1,260	37.6	129 / 150
253	25,312	1,260	38.3	109 / 33
257	25,692	1,260	38.9	159 / 110
264	26,407	1,260	39.5	135 / 160
270	27,016	1,260	39.9	144 / 218
274	27,431	1,260	40.1	55 / 237
280	27,997	1,020	40.7	81 / 246
285	28,463	1,020	41.0	88 / 221
289	28,879	1,020	41.5	99 / 184
293	29,336	1,020	41.9	83 / 175
298	29,825	1,020	42.4	165 / 129
303	30,321	1,020	42.7	87 / 298
308	30,824	1,020	43.0	102 / 141
312	31,250	1,020	43.4	132 / 164
319	31,944	725	44.1	124 / 61
325	32,536	725	44.8	97 / 92
335	33,465	725	45.9	117 / 128
340	33,963	725	46.3	347 / 92
Creeping Swamp				
027	2,655	3,590	20.8	42 / 514
035	3,525	3,590	21.6	600 / 150
044	4,410	3,590	22.1	99 / 310
050	5,008	3,590	22.8	134 / 181
055	5,479	3,590	23.3	225 / 95
063	6,269	3,590	24.2	554 / 168
076	7,588	3,490	26.0	800 / 100
084	8,418	3,490	26.1	600 / 300
092	9,248	3,490	26.2	125 / 600
103	10,293	3,430	26.4	600 / 250
113	11,254	3,430	26.7	400 / 400
124	12,362	3,430	27.0	400 / 400
140	13,962	3,040	27.4	327 / 403
154	15,361	3,040	27.9	230 / 852
162	16,218	3,040	28.1	87 / 1,018
172	17,156	3,040	28.3	372 / 662
182	18,234	3,040	28.7	404 / 440
194	19,448	3,040	29.2	591 / 384

Table 17 - Limited Detailed Flood Hazard Data

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
217	21,667	2,630	29.9	476 / 749
228	22,766	2,630	30.3	647 / 234
237	23,730	2,630	30.9	369 / 411
249	24,855	2,630	31.6	99 / 658
263	26,293	2,630	32.6	335 / 370
276	27,643	2,630	33.6	364 / 205
293	29,302	2,180	34.6	364 / 205
303	30,276	2,180	35.0	383 / 208
336	33,575	1,960	37.8	661 / 45
371	37,147	1,910	39.4	493 / 545
393	39,259	1,730	40.9	26 / 413
426	42,643	1,730	46.6	219 / 219
439	43,921	1,060	46.6	44 / 726
458	45,802	760	46.7	500 / 400
Grindle Creek				
399	39,896	4,999	20.5	300 / 300
410	41,003	4,999	20.7	300 / 300
425	42,499	4,634	21.0	300 / 300
440	43,999	4,634	21.3	300 / 300
450	44,999	4,634	21.6	31 / 408
455	45,500	4,634	21.7	34 / 435
458	45,792	4,634	21.8	225 / 225
460	46,005	4,634	22.6	75 / 140
461	46,131	4,634	22.7	31 / 351
465	46,501	4,634	22.8	31 / 288
475	47,501	4,634	23.0	142 / 120
485	48,500	4,558	23.2	375 / 58
496	49,551	4,558	23.6	545 / 121
505	50,501	4,558	23.7	47 / 944
515	51,501	4,558	23.9	405 / 620
523	52,322	4,558	24.1	700 / 700
526	52,592	4,558	25.8	600 / 600
527	52,681	4,558	26.4	600 / 600
530	53,002	4,558	26.4	200 / 200
550	55,004	4,558	26.8	500 / 500
560	56,005	4,558	27.0	600 / 600
570	57,006	4,558	27.1	600 / 600
Grindle Creek Tributary				
011	1,112	634	20.2[1]	14 / 15
017	1,676	634	20.2[1]	1,366 / 20
025	2,520	634	20.4	2 / 998
030	2,990	634	20.8	86 / 412
036	3,596	634	21.9	385 / 2
041	4,131	634	23.7	82 / 12
046	4,628	634	25.4	128 / 31

Table 17 - Limited Detailed Flood Hazard Data

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
052	5,155	634	26.5	64 / 83
056	5,625	634	27.2	2 / 561
061	6,131	634	27.7	333 / 85
067	6,726	483	28.2	289 / 21
070	7,033	483	29.3	20 / 18
076	7,614	483	29.5	250 / 250
081	8,130	483	29.5	250 / 250
087	8,667	483	29.5	250 / 250
092	9,204	483	29.5	628 / 513
095	9,548	483	29.5	812 / 242
100	10,035	483	29.6	757 / 382
Hunting Run				
010	998	1,519	20.9[1]	20 / 20
015	1,498	1,519	20.9[1]	20 / 20
020	1,996	1,519	21.0	59 / 83
025	2,495	1,519	21.5	131 / 13
Island Swamp				
003	278	506	35.6[1]	30 / 90
008	822	506	35.8	15 / 120
017	1,675	506	36.8	60 / 20
020	2,034	506	37.1	90 / 25
028	2,757	506	37.9	64 / 9
032	3,179	506	38.3	10 / 10
036	3,589	506	39.6	70 / 15
040	4,011	353	40.1	15 / 35
043	4,318	353	40.4	10 / 15
049	4,876	353	41.3	13 / 15
054	5,364	353	41.9	10 / 18
060	5,999	353	42.7	10 / 28
067	6,681	353	43.3	39 / 30
072	7,182	353	43.6	63 / 44
077	7,675	353	43.9	11 / 60
Meadow Branch				
006	553	1,293	22.0[1]	144 / 60
011	1,093	1,293	22.0[1]	90 / 51
017	1,733	1,293	22.2	89 / 114
022	2,195	1,293	22.6	80 / 111
029	2,931	1,293	23.1	74 / 127
036	3,618	1,293	23.4	74 / 219
042	4,162	1,293	24.0	131 / 116
058	5,786	1,293	24.7	169 / 83
068	6,818	1,293	25.5	8 / 191
075	7,450	1,207	25.8	87 / 525
083	8,280	1,207	26.1	213 / 7
091	9,075	1,207	26.6	154 / 12
097	9,680	1,207	27.0	664 / 7

Table 17 - Limited Detailed Flood Hazard Data

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
103	10,293	1,207	27.3	16 / 117
113	11,336	1,207	29.3	7 / 177
121	12,131	1,207	29.9	1,562 / 7
130	12,960	1,207	30.2	1,615 / 7
137	13,693	1,207	30.4	947 / 7
142	14,228	908	30.4	1,227 / 197
148	14,843	908	30.5	783 / 483
155	15,523	908	30.6	415 / 566
162	16,210	908	30.8	497 / 63
170	16,962	908	31.1	1,220 / 5
178	17,838	908	31.6	2,198 / 371
189	18,914	908	32.5	1,623 / 5
198	19,774	908	41.4	44 / 40
207	20,687	908	42.0	169 / 21
212	21,169	506	42.1	48 / 46
218	21,777	506	43.8	270 / 66
223	22,320	506	44.4	60 / 21
231	23,075	506	45.8	136 / 7
236	23,578	506	46.6	134 / 135
Pea Branch				
008	829	993	13.9[1]	254 / 5
012	1,247	993	13.9[1]	69 / 11
021	2,104	993	14.7	131 / 17
025	2,507	993	15.0	142 / 49
032	3,157	993	15.5	175 / 5
036	3,632	993	15.9	101 / 82
041	4,150	993	16.2	5 / 207
048	4,778	993	16.6	122 / 52
051	5,082	993	17.3	107 / 181
060	6,000	587	17.7	62 / 29
067	6,674	587	18.5	68 / 91
073	7,327	587	19.3	55 / 130
084	8,440	546	22.1	24 / 13
091	9,123	546	24.8	120 / 4
095	9,518	546	24.9	67 / 40
Poley Branch				
008	827	643	14.7[1]	854 / 191
015	1,466	643	14.7[1]	32 / 73
020	1,980	643	14.7[1]	24 / 81
025	2,474	643	14.7[1]	60 / 48
031	3,067	561	15.2	2 / 169
034	3,436	561	17.0	20 / 23
039	3,888	561	19.7	52 / 34
042	4,201	561	20.6	17 / 54
052	5,165	493	23.3	76 / 42

Table 17 - Limited Detailed Flood Hazard Data

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
058	5,769	493	24.1	19 / 60
064	6,379	427	24.7	53 / 66
069	6,861	427	24.9	150 / 307
Swift Creek				
1256	125,585	6,210	19.8	1,000 / 250
1266	126,560	6,210	20.0	833 / 404
1270	126,979	6,210	20.0	432 / 666
1282	128,194	6,210	20.3	412 / 249
1294	129,375	6,120	20.6	300 / 550
1303	130,298	6,120	20.9	375 / 590
1309	130,915	6,120	21.0	300 / 500
1320	131,990	6,120	21.3	250 / 450
1336	133,608	6,120	22.2	770 / 455
1341	134,059	6,120	22.3	800 / 320
1351	135,109	6,120	22.5	365 / 381
1361	136,082	6,120	22.9	304 / 612
1366	136,643	6,120	23.0	556 / 290
1381	138,058	6,120	23.4	135 / 505
1403	140,252	6,030	24.1	525 / 320
1417	141,737	6,030	24.4	500 / 500
1427	142,709	6,030	24.6	47 / 588
1434	143,370	6,030	24.8	100 / 500
1442	144,207	6,030	25.1	300 / 475
1454	145,398	6,030	25.4	450 / 500
1468	146,770	6,030	25.9	100 / 500
1482	148,181	6,030	26.4	90 / 320
1490	149,009	6,030	26.7	250 / 125
1505	150,519	6,030	27.5	700 / 300
1518	151,803	6,030	27.7	1,200 / 125
1541	154,076	5,840	28.0	200 / 1,200
1555	155,550	5,840	28.4	140 / 1,000
1570	157,047	5,840	28.7	1,400 / 80
1588	158,786	5,840	29.1	500 / 1,000
1604	160,412	5,840	29.4	380 / 1,000
1653	165,331	5,690	31.0	700 / 1,200
Tar River				
120	11,985	55,000	7.0	955 / 3,245
164	16,447	55,000	7.8	305 / 3,600
203	20,281	55,000	8.4	1,090 / 1,410
237	23,664	55,000	9.2	2,469 / 1,392
258	25,755	54,800	9.6	4,015 / 235
281	28,145	54,800	9.8	5,200 / 500
Tranters Creek				
804	80,448	8,573	12.1	890 / 90
811	81,150	8,573	12.2	357 / 425
817	81,650	8,573	12.3	285 / 595

Table 17 - Limited Detailed Flood Hazard Data

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
821	82,149	8,573	12.3	481 / 684
827	82,650	8,573	12.4	644 / 589
842	84,150	8,573	12.5	109 / 1,436
849	84,850	8,573	12.6	476 / 1,590
856	85,648	8,573	12.7	903 / 900
864	86,385	8,573	12.8	160 / 412
871	87,146	8,573	13.0	663 / 303
876	87,645	8,573	13.1	472 / 258
881	88,144	8,573	13.1	680 / 237
890	89,036	8,524	13.2	1,110 / 302
899	89,923	8,524	13.4	936 / 547
908	90,818	8,524	13.5	791 / 144
918	91,810	8,524	13.6	289 / 753
926	92,648	8,524	13.7	511 / 463
936	93,650	8,524	13.8	944 / 633
936	93,650	8,524	14.5	944 / 910
941	94,150	8,524	13.8	820 / 1,054
946	94,650	8,524	13.8	718 / 757
955	95,494	8,524	13.9	1,590 / 142
971	97,135	8,305	14.0	1,549 / 402
976	97,636	8,305	14.0	1,185 / 630
981	98,136	8,305	14.0	1,020 / 671
986	98,637	8,305	14.1	994 / 763
991	99,138	8,305	14.1	1,290 / 681
1001	100,139	8,305	14.2	1,312 / 420
1010	101,029	8,305	14.2	877 / 951
1018	101,796	8,305	14.3	241 / 864
1026	102,640	8,305	14.4	650 / 1,089
1032	103,235	8,305	14.5	890 / 514
1041	104,140	8,305	14.6	1,132 / 440
1046	104,640	8,305	14.6	711 / 656
1061	106,135	8,201	14.9	173 / 749
1071	107,134	8,201	15.1	167 / 886
1076	107,635	8,201	15.2	47 / 918
1081	108,135	8,201	15.4	47 / 1,112
1089	108,892	8,201	15.5	105 / 1,428
1101	110,087	8,201	15.7	724 / 1,454
1112	111,196	7,840	15.9	1,227 / 630
1121	112,135	7,840	16.2	1,014 / 260
1129	112,922	7,840	16.8	61 / 61
1131	113,136	7,840	17.3	168 / 86
1140	113,951	7,836	17.9	1,369 / 50
1150	114,998	7,836	18.2	226 / 1,371
1156	115,598	7,836	18.3	45 / 1,965
1165	116,476	7,836	18.5	226 / 2,365

Table 17 - Limited Detailed Flood Hazard Data

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
1171	117,059	7,836	18.6	45 / 2,269
1181	118,142	7,836	18.8	174 / 2,469
1191	119,066	7,836	19.0	45 / 1,366
1206	120,597	7,743	19.3	342 / 2,228
1227	122,661	7,743	19.6	1,935 / 635
1234	123,370	7,743	19.7	2,557 / 108
1242	124,155	7,743	19.8	1,632 / 248
1252	125,154	7,743	20.0	1,828 / 44
1260	126,039	7,743	20.3	872 / 44
1269	126,907	7,743	20.5	1,474 / 82
1277	127,652	7,743	20.7	1,754 / 44
1283	128,327	7,743	20.8	1,643 / 179
1298	129,828	7,743	21.2	44 / 2,152
1306	130,570	7,743	21.4	44 / 2,033
1313	131,336	7,743	21.6	125 / 1,444
1324	132,386	7,743	21.9	645 / 357
1329	132,915	7,743	22.0	643 / 104
1353	135,292	6,923	22.7	2,232 / 560
1361	136,136	6,923	22.8	1,554 / 703
1372	137,163	6,923	23.2	1,651 / 959
1379	137,889	6,923	23.4	1,961 / 517
1384	138,365	6,923	23.4	1,560 / 40
1392	139,231	6,923	23.7	3,628 / 40
1400	139,976	6,923	23.8	3,390 / 40
1411	141,134	6,880	24.2	3,150 / 96
1420	142,032	6,880	24.5	1,456 / 40
1431	143,134	6,880	25.2	1,646 / 40
1441	144,108	6,880	25.9	1,026 / 301
1450	144,968	6,880	26.4	1,794 / 40
1456	145,622	6,880	27.0	2,775 / 89
1466	146,636	6,880	27.3	2,118 / 1,002
1475	147,522	6,847	27.5	1,713 / 1,055
1486	148,635	6,847	27.7	429 / 1,897
1496	149,636	6,847	27.9	40 / 1,995
1504	150,431	6,847	28.2	99 / 3,488
1516	151,636	6,847	28.4	532 / 3,581
1546	154,634	6,703	28.9	227 / 245
1554	155,442	6,703	29.4	274 / 294
1560	155,978	6,703	29.9	1,537 / 139
1565	156,483	6,703	30.1	263 / 39
1571	157,134	6,703	30.7	1,639 / 138
1578	157,767	6,703	30.9	1,708 / 39
1596	159,635	5,944	31.2	1,830 / 36
1606	160,633	5,944	31.3	1,626 / 87
1611	161,131	5,944	31.4	1,397 / 340

Table 17 - Limited Detailed Flood Hazard Data

Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width (feet) Left/Right from Stream Centerline
1619	161,872	5,944	31.4	733 / 895
1626	162,631	5,859	31.5	339 / 835
1636	163,633	5,859	31.6	1,291 / 770
1641	164,132	5,859	31.7	1,616 / 214
1646	164,632	5,859	31.7	1,385 / 779
1651	165,133	5,859	31.8	823 / 348
1656	165,634	5,859	31.9	1,441 / 685
1661	166,134	5,859	31.9	2,024 / 789
1668	166,799	5,859	32.0	1,932 / 793
1676	167,633	5,859	32.0	1,128 / 1,325
1683	168,342	5,859	32.0	911 / 1,115
1691	169,132	5,806	32.1	1,450 / 851
1698	169,814	5,806	32.2	949 / 1,132
1706	170,632	5,806	32.4	1,724 / 278
1713	171,281	5,806	32.5	1,924 / 482
1721	172,131	5,806	32.7	1,296 / 36
1734	173,351	5,806	32.9	283 / 1,002
1743	174,286	5,806	33.1	314 / 615
1754	175,419	5,806	33.4	441 / 109
1765	176,539	5,806	33.7	1,305 / 631
1797	179,673	3,269	34.2	213 / 281
1806	180,634	3,269	34.4	488 / 354
1815	181,484	3,269	34.5	455 / 877
1826	182,633	3,269	34.6	962 / 193
1836	183,632	3,269	34.8	696 / 340
1841	184,133	3,269	35.0	451 / 325
1847	184,718	3,269	35.6	75 / 80
1850	185,015	3,269	35.8	422 / 275
1856	185,633	3,269	36.0	639 / 236
1861	186,133	3,192	36.0	945 / 459
1866	186,633	3,192	36.1	606 / 627
1871	187,133	3,192	36.1	290 / 939
1876	187,633	3,192	36.2	286 / 807
1881	188,133	3,192	36.2	629 / 502
1886	188,633	3,192	36.3	897 / 268
1891	189,133	3,192	36.4	871 / 121
1896	189,633	3,192	36.6	464 / 273

[1]Elevation includes backwater effects

5.3 Coastal Analyses

For the areas of Pitt County that are impacted by coastal flooding processes, coastal flood hazard analyses were performed to provide estimates of coastal BFEs. Coastal BFEs reflect the increase in water levels during a flood event due to extreme tides and storm surge as well as overland wave effects.

The following subsections provide summaries of how each coastal process was considered for the FIS Report. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation. Table 15 summarizes the methods and/or models used for each of the coastal analyses. Refer to Section 2.5.1 for descriptions of the terms used in this section.

Table 18P, “Summary of Coastal Analyses - Preliminary: Revised or Newly Studied”

Table 18P - Summary of Coastal Analyses - Preliminary: Revised or Newly Studied

Flooding Source	Study Limits From	Study Limits To	Hazard Evaluated	Model or Method Used	Date Analysis Was Completed	Study Type
Pamlico River	Pamlico/Hyde County Borders	Pamlico River	*	CHAMP 2.0	4/4/2014	DETAILED STUDY
Pamlico River	Pamlico/Hyde County Borders	Pamlico River	*	removal/ retreat	4/4/2014	DETAILED STUDY
Pamlico River	Pamlico/Hyde County Borders	Pamlico River	*	ADCIRC	1/22/2013	DETAILED STUDY
Pamlico River	Pamlico/Hyde County Borders	Pamlico River	*	CHAMP / RUNUP 2.0 (2007)	4/4/2014	DETAILED STUDY
Pamlico River	Pamlico/Hyde County Borders	Pamlico River	*	WHAFIS 4.0	4/4/2014	DETAILED STUDY

Table 18, “Summary of Coastal Analyses”

Table 18 - Summary of Coastal Analyses

Flooding Source	Study Limits From	Study Limits To	Hazard Evaluated	Model or Method Used	Date Analysis Was Completed
Pamlico River	Pamlico/Hyde County Borders	Pamlico River	*	CHAMP 2.0	4/4/2014
Pamlico River	Pamlico/Hyde County Borders	Pamlico River	*	removal/ retreat	4/4/2014
Pamlico River	Pamlico/Hyde County Borders	Pamlico River	*	ADCIRC	1/22/2013
Pamlico River	Pamlico/Hyde County Borders	Pamlico River	*	CHAMP / RUNUP 2.0 (2007)	4/4/2014
Pamlico River	Pamlico/Hyde County Borders	Pamlico River	*	WHAFIS 4.0	4/4/2014

5.3.1 Total Stillwater Elevations

The total stillwater elevations (stillwater including storm surge plus wave setup) for the 1% annual chance flood were determined for areas subject to coastal flooding. The models and methods that were used to determine storm surge and wave setup are listed in Table 15. The stillwater elevation that was used for each transect in coastal analyses is shown in Table 20, “Coastal Transect Parameters.”

Astronomical Tide
Astronomical tidal statistics were generated directly from local tidal constituents by sampling the predicted tide at random times throughout the tidal epoch.

Storm Surge Statistics
Storm surge is modeled based on characteristics of actual storms responsible for significant coastal flooding. The characteristics of these storms are typically determined by statistical study of the regional historical record of storms or by statistical study of tidal gages.

When historic records are used to calculate storm surge, characteristics such as the strength, size, track, etc., of storms are identified by site. Storm data was used in conjunction with numerical hydrodynamic models to determine the corresponding storm surge levels. An extreme value analysis was performed on the storm surge modeling results to determine a stillwater elevation for the 1% annual chance event.

Tidal gages can be used instead of historic records of storms when the available tidal gage record for the area represents both the astronomical tide component and the storm surge component. Table 16 provides the gage name, managing agency, gage type, gage identifier, start date, end date, and statistical methodology applied to each gage used to determine the stillwater elevations. For areas between gages, peak stillwater elevations for selected recurrence intervals were estimated by combining interpolation between gages and observed high water marks during major storms. A regionalized statistical approach was applied to the gage data so that stillwater elevations in areas between gages could be identified.

Table 19, “Tide Gage Analysis Specifics” is not applicable in Pitt County.

Combined Riverine and Tidal Effects
Riverine and surge rates for the lower reaches of the Inundation River were combined by developing curves for rate of occurrence vs. flood level for each flood source.

Wave Setup Analysis
Wave setup was computed during the storm surge modeling through the methods and models listed in Table 15 and included in the frequency analysis for the determination of the total stillwater elevations. The oscillating component of wave setup, dynamic wave setup, was calculated for areas subject to wave runup hazards.

5.3.2 Waves

A coastal wave model (Coastal State University 2007) was used to calculate the nearshore wave fields required for the addition of wave setup effects. Three nested grids were used to obtain sufficient nearshore resolution to represent the radiation stress gradients required as ADCIRC inputs. Radiation stress fields output from the inner grids are used by ADCIRC to estimate the contribution of breaking waves (wave setup effects) to the total stillwater elevation.

5.3.3 Coastal Erosion

A single storm episode can cause extensive erosion in coastal areas. Storm-induced erosion was evaluated to determine the modification to existing topography that is expected to be associated with flooding events. Erosion was evaluated using the methods listed in Table 15. The post-event eroded profile was used for the subsequent transect-based onshore wave hazard analyses.

5.3.4 Wave Hazard Analyses

Overland wave hazards were evaluated to determine the combined effects of ground elevation, vegetation, and physical features on overland wave propagation and wave runup. These analyses were performed at representative transects along all shorelines for which waves were expected to be present during the floods of the selected recurrence intervals. The results of these analyses were used to determine elevations for the 1% annual chance flood.

Transect locations were chosen with consideration given to the physical land characteristics as well as development type and density so that they would closely represent conditions in their locality. Additional consideration was given to changes in the total stillwater elevation. Transects were spaced close together in areas of complex topography and dense development or where total stillwater elevations varied. In areas having more uniform characteristics, transects were spaced at larger intervals. Transects shown in Figure 9, “Transect Location Map,” are also depicted on the FIRM. Table 17 provides the location, stillwater elevations, and starting wave conditions for each transect evaluated for overland wave hazards. In this table, “starting” indicates the parameter value at the beginning of the transect.

Wave Height Analysis
Wave height analyses were performed to determine wave heights and corresponding wave crest elevations for the areas inundated by coastal flooding and subject to overland wave propagation hazards. Refer to Figure 6 for a schematic of a coastal transect evaluated for overland wave propagation hazards.

Wave heights and wave crest elevations were modeled using the methods and models listed in Table 18, “Summary of Coastal Analyses”.

Wave Runup Analysis
Wave runup analyses were performed to determine the height and extent of runup beyond the limit of stillwater inundation for the 1% annual chance flood. Wave runup elevations were modeled using the methods and models listed in Table 15.

Table 20, “Coastal Transect Parameters” is not applicable in Pitt County.

6.0 Mapping Methods

6.1 Vertical and Horizontal Control

Vertical Datum

All FISs 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. With the finalization of the North American Vertical Datum of 1988 (NAVD 88), all North Carolina FISs have been prepared using NAVD 88 as the referenced vertical datum.

All flood elevations shown on the FIRM for Pitt County 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 FISs for adjacent communities in neighboring states may be referenced to NGVD 29. This may result in BFE differences across political boundaries between the communities.

As noted above, the elevations shown in this FIS are referenced to NAVD 88. Ground, structure, and flood elevations may be compared and/or referenced to NGVD 29 by applying a standard conversion factor. The conversion factor for Pitt County is # feet. The locations used to establish the conversion factor were USGS quadrangle corners that fell within the county, as well as those that were within 2.5 miles outside the county. The benchmarks are referenced to NAVD 88. Table 21, “Datum Conversion Locations and Values,” is shown below.

Table 21, “Datum Conversion Locations and Values.”

Table 21 - Datum Conversion Locations and Values

Latitude	Longitude	Conversion from NGVD29 to NAVD88 (feet)
35.75	-77.50	-1.12
35.63	-77.63	-1.11
35.50	-77.50	-1.15
35.37	-77.25	-1.15
35.75	-77.38	-1.18
35.75	-77.25	-1.13
35.62	-77.50	-1.14
35.62	-77.38	-1.18
35.62	-77.25	-1.15
35.50	-77.37	-1.15
35.50	-77.25	-1.12
35.38	-77.38	-1.21
Average conversion in Pitt County from NGVD 29 to NAVD 88 = -1.15 feet		

The vertical datum conversion factor for all flooding sources which run along a county boundary are in accordance with the conversion factor used in those contiguous counties.

BFEs shown on the FIRM represent whole-foot rounded values. For example, a 1% annual chance water-surface elevation of 102.4 feet will appear as 102 on the FIRM and 102.6 feet will appear as 103. Therefore, users who wish to convert the elevations in this FIS to NGVD 29 should apply the stated conversion factor(s) to elevations shown on the Flood Profiles and/or Water-surface elevation rasters and supporting data tables in the FIS Report, which are shown, at a minimum, to the nearest 0.1 foot.

For more information on NAVD 88, see Converting the National Flood Insurance Program to the North American Vertical Datum of 1988, or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (http://www.ngs.noaa.gov).

Vertical Control Monuments

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

The National Geodetic Survey establishes precisely located monuments on the North Carolina Grid System and Bench Marks referenced to a vertical datum (NGVD 1929 and NAVD 1988).

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 movements (e.g., concrete monument below frost line)

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

Monuments with a Stability D classification may be used as Elevation Reference Marks (ERMs) when a Stability C or better monument is not an option. These ERMs must be approved by NCGS and can be set and used as elevation bench marks to establish vertical control and produce NC DFIRMs. Including such ERMs will greatly augment North Carolina's useable vertical control network.

In addition, when local jurisdictions have established their own vertical monument network, these monuments may also be shown on the FIRM with the appropriate designations. Local monuments will be placed on the FIRM if the community has requested that they be included and if the monuments meet the aforementioned criteria.

North Carolina Geodetic Survey (NCGS) and contractor surveyed vertical control monuments will be shown on the FIRM panels. Those cataloged by NCGS meet similar requirements to the NGS monuments as described above. Most monuments that have been cataloged by NCGS have been established to NGS standards, but have not been submitted to NGS for inclusion into the NSRS. The qualifying criteria for depicting bench marks established by the State's contractors on the new digital FIRM panels include:

•GPS surveying of permanent 3-D survey monuments to 5-centimeter or better local network accuracy guidelines, in accordance with NOAA Technical Memorandum NOS NGS-58 "Guidelines for Establishing GPS-Derived Ellipsoid Heights (Standards: 2 cm and 5 cm)," and conversion to NAVD 88 orthometric heights using NGS' latest geoid mode;

•Requiring a stability classification of "C" or better; and

•Submitting GPS files and station descriptions to NCGS.

To obtain current information for cataloging local bench marks in the NSRS, please visit the Data Sheet page of the NGS website at http://www.ngs.noaa.gov/cgi-bin/datasheet.prl, or contact the NGS Information Services Branch at:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-32822
(301) 713-3242

Information regarding the NCGS or State contractor bench marks can be obtained through the NCGS website at www.ncgs.state.nc.us, or by phone at (919) 733-3836.

It is important to note that temporary vertical monuments, sometimes called Elevation Reference Marks, 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, interested individuals may contact FEMA to access this information.

Horizontal Datum and Control

The digital files that comprise the FIRM are georeferenced to an established coordinate system. The coordinate system used for the production of this FIRM is North Carolina State Plane (FIPSZONE 3200) referenced to the North American Datum of 1983 (NAD83), GRS80 ellipsoid.

6.2 Base Map

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA's FIRM database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features.

The projection used in the preparation of this map was the North Carolina State Plane Coordinate System. The horizontal datum was NAD83, GRS80 spheroid. Differences in datum, spheroid, or projection used in the production of FIRMs for adjacent states may result in slight positional differences in map features across the state boundary. These differences do not affect the accuracy of this FIRM.

As part of the North Carolina CTS Initiative, North Carolina digital FIRM panel numbers are consistent with the North Carolina Land Records Management Program (LRMP).

The 11-digit digital FIRM panel numbering system for North Carolina is: SS MM LLLL PP X, where SS = State Federal Information Processing Code (37); MM = Easting-Northing (EN) 1,000,000-foot coordinates; LLLL = LRMP map numbers to include the EN 100,000-foot coordinates, and the EN 10,000-foot coordinates; PP = place holders for additional EN 1,000-foot coordinates; and X = suffix ("J" for the initial edition). North Carolina's State Plane Coordinate System origin is outside the State boundary to the southwest (in Georgia), the eastings range from approximately 0,404,000 (Tennessee border) to 3,040,000 (Atlantic Ocean); and the northings range from approximately 0,045,000 (South Carolina border) to 1,043,000 (Virginia border). Digital FIRM panels were compiled at either 1"=1,000', covering an area of 20,000 feet x 20,000 feet (20" x 20" panels); or at 1"=500', covering an area of 10,000 feet x 10,000 feet (20" x 20" panels). An additional 2 digits (both zeros) are held in reserve as a "place holder" in the event that future FIRMs are printed at a larger scale; e.g., 1"=250', covering an area of 5,000 feet x 5,000 feet for which the 1,000-foot coordinates would either be 0 or 5.

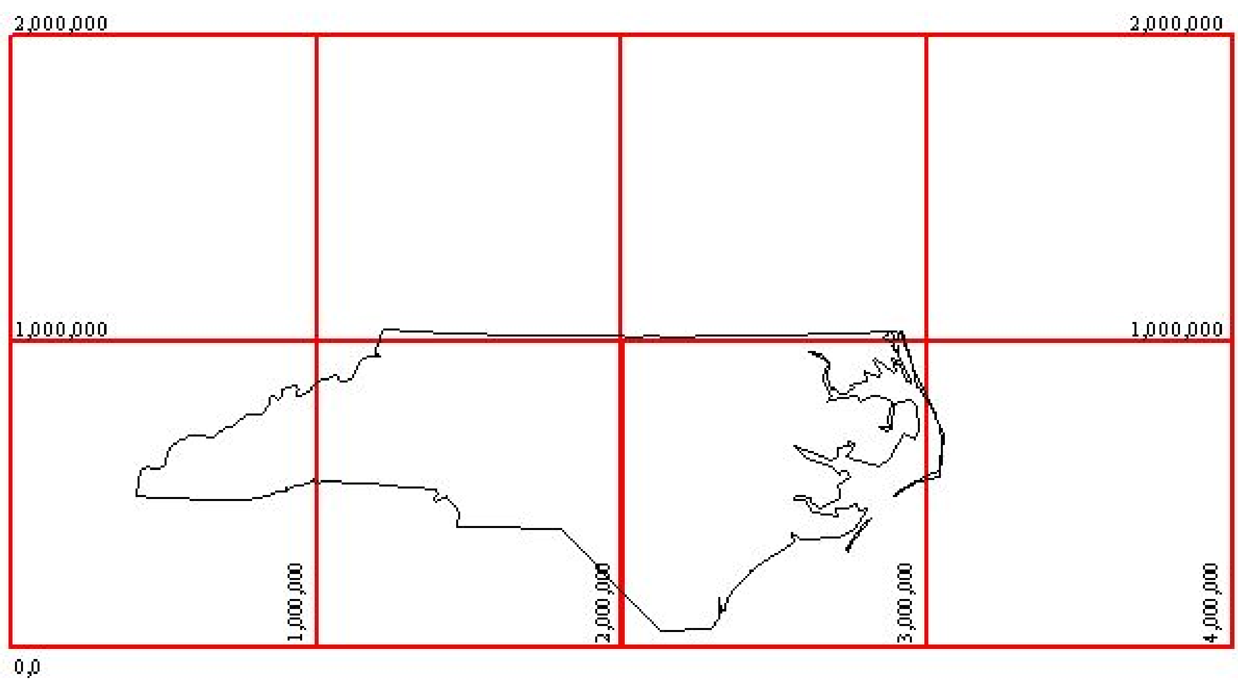


Figure 3 - North Carolina's State Plane Coordinate System

6.3 Floodplain and Floodway Delineation

Floodplain Boundaries

For streams restudied by detailed and limited detailed methods, the 1% and 0.2% annual chance floodplains were delineated using flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic data acquired using airborne Light Detection and Ranging (LIDAR). This LIDAR data was acquired during the (insert date from basin plan and update for map maintenance, if necessary) flying season.

The topographic data satisfies a vertical root-mean-square error (RMSE) accuracy standard of 20 cm (1.3 feet accuracy at the 95% confidence limit) for the Outer Banks and 25 cm (1.6 feet accuracy at the 95% confidence limit) for those portions of the basin lying west of the Outer Banks. These data could be contoured at roughly a 2-foot vertical contour interval. All elevations were referenced to the NAVD 88 and reflect orthometric heights. Variably spaced, bare-earth digital topographic data in ASCII point file format were combined with imagery (either flown concurrently with the LIDAR data or using existing digital orthophotos) to establish a Triangulated Irregular Network (TIN) of digital elevation points, which include selected breaklines to be used for hydraulic modeling. Furthermore, a uniformly spaced sampling of the TIN resulted in uniformly spaced Digital Elevation Models (DEMs), with 20 ft x 20 ft post spacing, which was generated in multiple file formats.

For coastal floodplains, after analyzing wave heights along each transect, wave elevations were interpolated between transects. Various source data were used in the interpolation, including topographic data described above. Controlling features affecting the elevations were identified and considered in relation to their positions at particular transect and their variation between transects. •

The 1% annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones VE, AO, AH, A99, AR, A, and AE), and the 0.2% annual chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundaries have been shown.

Floodway Delineation

The floodways presented in this FIS were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 22, "Floodway Data"). The computed floodway is shown on the FIRM. In cases where the floodway and 1% annual chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown. In areas where the top of the bridge or road is higher than the 1.0-percent annual chance (100-year) flood, the FIRM will show the flood discharge as contained within the structure for emergency management purposes. It is important to note that FEMA and community floodway regulations still apply in and around those areas.

Table 22 - Floodway Data

Floodway Source		Floodway			Water Surface Elevation			
Cross Section	Distance (Feet Above Mouth)	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet Per Second)	Regulatory	Without Floodway	With Floodway	Increase
Baldwin Swamp								
032	3,223	338	1,376	0.6	17.5[1]	14.3	14.4	0.1
044	4,428	450	825	0.8	18.1[1]	14.7	14.8	0.1
055	5,529	486	722	1.0	18.3[1]	15.2	15.4	0.1
066	6,649	460	567	1.2	18.5[1]	15.6	15.7	0.1
077	7,674	355	620	1.1	18.7[1]	16.3	16.4	0.1
090	9,001	460	807	0.4	19.0[1]	17.2	17.5	0.3
097	9,704	420	1,004	0.4	19.1[1]	17.2	17.6	0.4
109	10,888	230	625	0.6	19.4[1]	17.3	17.6	0.4
129	12,938	146	407	0.9	19.9[1]	18.9	19.4	0.5
134	13,392	210	673	0.5	20.0[1]	18.9	19.5	0.6
145	14,540	215	876	0.4	20.1[1]	19.0	19.6	0.6
158	15,834	150	472	0.7	20.2[1]	19.2	19.7	0.5
Baldwin Swamp - North Tributary								
017	1,715	90	551	0.8	20.2	20.2	21.1	0.9

Table 22 - Floodway Data

Floodway Source		Floodway			Water Surface Elevation			
Cross Section	Distance (Feet Above Mouth)	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet Per Second)	Regulatory	Without Floodway	With Floodway	Increase
025	2,531	260	1,265	0.3	20.2	20.2	21.2	0.9
038	3,788	488	2,063	0.2	20.2	20.2	21.2	1.0
045	4,517	720	2,849	0.2	20.2	20.2	21.2	1.0
053	5,264	640	2,843	0.2	20.3	20.3	21.2	1.0
Bates Branch								
004	420	372	2,150	0.8	27.9[2]	27.3	28.3	1.0
015	1,526	169	973	1.7	28.7	28.7	29.6	1.0
025	2,542	156	945	1.7	30.6	30.6	31.6	1.0
038	3,788	378	2,933	0.6	35.6	35.6	36.6	1.0
050	4,957	112	692	1.6	35.9	35.9	36.9	0.9
061	6,148	42	286	3.9	37.7	37.7	38.6	0.9
070	7,030	79	371	3.0	39.7	39.7	40.7	1.0
081	8,143	99	662	0.6	45.1	45.1	46.1	1.0
088	8,775	30	104	4.1	46.1	46.1	46.9	0.8
Chicod Creek								
118	11,781	2,173	14,011	0.4	13.1[3]	8.9	9.4	0.5
131	13,124	1,058	9,054	0.7	13.1[2]	9.1	9.7	0.6
143	14,306	478	2,980	2.1	13.1[2]	9.4	10.0	0.6
172	17,217	959	11,756	0.5	13.1[2]	12.4	13.1	0.7
183	18,302	735	9,375	0.7	13.1[2]	12.5	13.2	0.7
200	19,978	575	7,282	0.8	13.1[2]	12.7	13.4	0.8
223	22,261	675	7,984	0.8	13.1[2]	13.1	13.9	0.8
238	23,807	645	7,162	0.9	13.4	13.4	14.3	1.0
248	24,766	800	8,372	0.7	13.6	13.6	14.5	1.0
260	26,000	535	5,754	1.0	14.0	14.0	15.0	0.9
276	27,599	740	8,421	0.6	14.4	14.4	15.4	1.0
291	29,106	775	6,205	0.9	14.8	14.8	15.7	1.0
303	30,338	630	6,892	0.8	15.7	15.7	16.6	0.9
311	31,061	665	6,265	0.9	15.9	15.9	16.8	1.0
322	32,209	850	7,803	0.7	16.3	16.3	17.2	0.9
329	32,881	700	5,784	1.0	16.4	16.4	17.4	1.0
335	33,492	650	5,831	1.0	16.7	16.7	17.7	1.0
342	34,247	530	4,708	1.2	17.0	17.0	18.0	1.0
350	35,003	790	7,040	0.8	17.4	17.4	18.4	1.0
357	35,693	820	6,025	0.9	17.6	17.6	18.6	1.0
362	36,155	775	6,507	0.9	17.8	17.8	18.8	1.0
368	36,830	825	6,496	0.9	18.1	18.1	19.1	1.0
373	37,322	653	5,109	1.1	18.3	18.3	19.3	1.0
377	37,659	625	4,864	1.2	18.5	18.5	19.5	1.0
Contentnea Creek								
124	12,386	2,999	39,008	0.6	25.0[4]	21.9	22.9	1.0
191	19,051	2,503	24,781	0.9	25.2[2]	22.5	23.5	1.0
225	22,465	1,691	20,256	1.1	25.2[2]	23.4	24.4	1.0
Green Mill Run								
051	5,084	407	3,760	1.2	20.8[2]	16.9	17.4	0.6

Table 22 - Floodway Data

Floodway Source		Floodway			Water Surface Elevation			
Cross Section	Distance (Feet Above Mouth)	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet Per Second)	Regulatory	Without Floodway	With Floodway	Increase
055	5,498	352	2,877	1.5	20.8[2]	17.1	17.7	0.6
Grindle Creek								
061	6,110	1,759	11,214	0.5	12.5[3]	9.6	10.6	1.0
071	7,112	1,868	17,305	0.3	12.5[3]	9.6	10.6	1.0
084	8,353	1,081	8,888	0.6	12.5[3]	9.8	10.7	1.0
095	9,458	1,480	10,269	0.5	12.5[2]	10.2	11.1	1.0
115	11,496	364	2,659	2.1	12.5[2]	10.6	11.5	0.9
122	12,229	226	1,200	4.6	12.5[2]	10.6	11.5	0.9
139	13,881	576	5,859	1.0	13.0	13.0	14.0	1.0
147	14,722	635	5,815	1.0	13.2	13.2	14.2	1.0
159	15,942	1,215	10,870	0.5	13.4	13.4	14.4	1.0
170	16,988	1,218	10,972	0.5	13.5	13.5	14.4	1.0
181	18,110	1,358	11,715	0.5	13.6	13.6	14.5	1.0
190	19,009	1,171	8,369	0.7	13.6	13.6	14.6	1.0
200	19,977	970	7,040	0.8	13.7	13.7	14.7	1.0
210	20,964	1,255	8,358	0.7	13.9	13.9	14.8	1.0
223	22,258	494	2,866	1.9	14.0	14.0	15.0	0.9
234	23,361	830	4,726	1.2	14.5	14.5	15.5	1.0
261	26,071	765	3,085	1.7	17.0	17.0	17.6	0.7
266	26,599	1,205	2,225	2.4	17.2	17.2	17.9	0.6
277	27,672	736	4,269	1.2	17.5	17.5	18.4	0.8
285	28,474	1,038	2,005	2.6	17.7	17.7	18.4	0.7
292	29,248	850	5,842	0.9	18.1	18.1	18.9	0.8
305	30,490	739	5,930	0.9	18.3	18.3	19.2	0.9
316	31,560	1,112	6,133	0.9	18.4	18.4	19.4	0.9
326	32,585	724	4,772	1.1	18.6	18.6	19.5	0.9
337	33,672	875	5,652	0.9	18.9	18.9	19.8	1.0
348	34,754	1,091	7,649	0.7	19.0	19.0	20.0	1.0
360	35,961	1,015	6,093	0.9	19.2	19.2	20.2	1.0
385	38,481	397	2,372	2.2	19.9	19.9	20.9	1.0
Hardee Creek								
226	22,563	185	1,299	1.2	47.3	47.3	48.2	0.9
231	23,064	185	1,231	1.1	48.0	48.0	48.9	0.8
236	23,564	131	713	1.8	48.6	48.6	49.4	0.8
257	25,674	65	435	3.0	54.7	54.7	55.6	0.8
262	26,182	40	320	4.1	56.8	56.8	57.8	1.0
Indian Well Swamp								
231	23,132	375	1,598	0.7	44.0	44.0	44.5	0.6
250	24,991	341	1,146	0.8	44.6	44.6	45.4	0.8
263	26,306	320	1,231	0.7	45.2	45.2	46.1	0.9
273	27,273	305	1,101	0.8	46.0	46.0	46.4	0.4
289	28,888	239	585	1.3	46.9	46.9	47.8	0.9
304	30,386	230	397	1.9	48.6	48.6	49.3	0.8
316	31,605	79	300	2.5	51.4	51.4	52.0	0.6
325	32,507	84	226	2.3	51.8	51.8	52.4	0.6

Table 22 - Floodway Data

Floodway Source		Floodway			Water Surface Elevation			
Cross Section	Distance (Feet Above Mouth)	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet Per Second)	Regulatory	Without Floodway	With Floodway	Increase
339	33,855	43	126	2.9	56.1	56.1	56.3	0.2
Juniper Branch								
003	290	346	1,961	1.8	14.4[2]	11.1	12.1	1.0
010	1,002	221	1,251	2.8	14.4[2]	12.8	13.6	0.8
013	1,345	394	2,836	1.3	14.4[2]	13.6	14.6	0.9
019	1,887	109	693	5.1	14.4[2]	14.0	14.8	0.7
024	2,405	248	1,800	2.0	16.3	16.3	17.2	0.9
028	2,828	117	880	4.0	17.0	17.0	17.8	0.8
037	3,681	315	2,585	1.4	18.8	18.8	19.7	0.9
043	4,257	272	2,044	1.6	19.3	19.3	20.2	0.9
048	4,847	403	2,878	1.2	21.0	21.0	21.8	0.7
057	5,661	180	1,027	3.2	21.4	21.4	22.1	0.7
063	6,332	255	1,270	2.6	22.6	22.6	23.2	0.6
072	7,167	223	1,413	2.3	24.3	24.3	24.7	0.4
077	7,657	280	2,086	1.6	25.2	25.2	25.6	0.4
083	8,274	315	2,191	1.5	25.9	25.9	26.2	0.3
096	9,579	370	1,984	1.7	27.3	27.3	27.4	0.1
103	10,253	615	3,428	1.0	27.9	27.9	28.2	0.3
116	11,569	247	1,386	1.7	28.5	28.5	29.2	0.7
123	12,309	206	1,610	1.4	31.7	31.7	32.7	1.0
130	13,006	240	1,585	1.5	32.4	32.4	33.4	0.9
140	14,023	251	1,754	1.3	33.4	33.4	34.3	0.9
148	14,758	182	1,214	1.9	34.2	34.2	35.1	0.8
153	15,301	257	1,897	1.2	34.9	34.9	35.8	0.9
159	15,928	221	1,452	1.4	35.4	35.4	36.3	0.8
165	16,481	186	1,251	1.6	36.0	36.0	36.8	0.8
172	17,230	150	846	2.4	37.2	37.2	38.0	0.8
176	17,643	237	1,421	1.4	38.1	38.1	39.0	0.8
185	18,453	183	1,016	2.0	39.3	39.3	40.1	0.8
194	19,354	99	607	3.3	40.7	40.7	41.5	0.8
199	19,943	324	2,181	0.9	43.4	43.4	44.2	0.8
206	20,593	218	1,346	1.5	43.8	43.8	44.6	0.8
213	21,253	118	668	3.0	44.9	44.9	45.6	0.7
221	22,127	124	712	1.7	47.4	47.4	48.3	1.0
Lateral No. 1								
003	254	89	361	2.4	22.3[1]	14.2	15.1	0.8
022	2,198	101	489	1.8	22.9[1]	16.8	17.7	1.0
044	4,388	47	322	2.0	22.8[1]	20.9	21.8	0.8
Lateral No. 2								
012	1,231	45	256	4.2	23.7[2]	23.0	23.6	0.6
023	2,279	45	345	3.1	24.6	24.6	25.1	0.5
032	3,238	95	589	1.8	25.3	25.3	26.2	0.8
041	4,066	180	569	1.9	25.8	25.8	26.8	0.9
064	6,360	145	1,122	0.7	29.1	29.1	30.1	1.0
Moyes Run - Cannon Swamp								

Table 22 - Floodway Data

Floodway Source		Floodway			Water Surface Elevation			
Cross Section	Distance (Feet Above Mouth)	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet Per Second)	Regulatory	Without Floodway	With Floodway	Increase
125	12,501	210	1,073	1.8	16.6[1]	11.5	12.4	0.9
136	13,617	140	681	2.6	16.8[1]	13.2	14.1	0.8
152	15,202	255	1,470	1.0	17.1[1]	14.4	15.4	1.0
164	16,371	170	981	1.3	17.3[1]	15.9	16.8	0.9
177	17,694	149	725	1.8	17.3[1]	16.2	17.1	0.9
186	18,624	118	626	2.0	17.3[1]	16.6	17.6	1.0
195	19,492	133	719	1.8	17.4	17.4	18.3	0.9
206	20,575	243	945	1.1	18.1	18.1	19.0	1.0
215	21,522	211	782	1.4	18.6	18.6	19.5	1.0
226	22,618	470	1,471	0.7	18.9	18.9	19.9	1.0
245	24,469	472	1,351	0.8	19.8	19.8	20.7	1.0
262	26,162	890	2,090	0.4	20.0	20.0	21.0	1.0
274	27,428	489	1,506	0.6	20.2	20.2	21.2	1.0
288	28,812	310	1,192	0.8	20.9	20.9	21.9	1.0
309	30,884	331	1,010	0.9	21.8	21.8	22.6	0.8
320	31,994	439	2,486	0.6	22.2	22.2	23.2	1.0
330	32,951	320	874	0.5	22.3	22.3	23.3	1.0
341	34,114	144	544	0.8	22.4	22.4	23.4	1.0
354	35,361	281	285	1.5	23.5	23.5	24.2	0.8
363	36,341	217	372	1.2	24.1	24.1	24.9	0.8
Neuse River								
1510	151,037	3,227	50,334	1.0	22.1	22.1	23.1	1.0
1530	152,990	2,821	47,966	1.0	22.4	22.4	23.4	1.0
1546	154,640	2,605	42,303	1.2	22.7	22.7	23.7	1.0
1564	156,388	2,804	45,979	1.1	23.0	23.0	24.0	1.0
1581	158,070	2,750	49,144	1.0	23.3	23.3	24.3	1.0
1598	159,831	3,760	67,696	0.7	23.5	23.5	24.5	1.0
1614	161,425	3,811	63,726	0.8	23.7	23.7	24.7	1.0
1626	162,580	3,890	65,823	0.7	23.9	23.9	24.9	1.0
1642	164,224	4,052	67,741	0.7	24.1	24.1	25.1	1.0
1658	165,767	4,104	69,932	0.7	24.3	24.3	25.3	1.0
1673	167,281	4,400	81,486	0.6	24.4	24.4	25.4	1.0
1762	176,237[5]	3,311	47,314	1.0	25.0	25.0	26.0	1.0
Parkers Creek								
032	3,160	326	1,873	1.4	22.4[2]	8.1	9.1	1.0
041	4,066	163	1,028	2.6	22.4[2]	9.1	10.0	0.9
046	4,572	352	2,231	1.2	22.4[2]	9.8	10.7	0.9
052	5,222	135	818	3.3	22.4[2]	10.2	11.0	0.9
060	5,967	227	1,450	1.9	22.4[2]	12.2	12.8	0.7
065	6,474	211	1,424	1.9	22.4[2]	12.5	13.3	0.8
070	6,964	178	1,157	2.4	22.4[2]	13.0	13.8	0.8
074	7,426	275	1,953	1.4	22.4[2]	13.5	14.4	0.9
079	7,890	236	1,531	1.8	22.4[2]	13.9	14.8	0.9
085	8,468	208	1,417	1.9	22.4[2]	14.5	15.4	0.9
090	8,960	103	692	3.9	22.4[2]	15.1	15.9	0.9

Table 22 - Floodway Data

Floodway Source		Floodway			Water Surface Elevation			
Cross Section	Distance (Feet Above Mouth)	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet Per Second)	Regulatory	Without Floodway	With Floodway	Increase
093	9,318	199	1,515	1.8	22.4[2]	15.7	16.7	1.0
105	10,481	185	1,147	2.1	22.4[2]	18.2	19.1	0.9
110	10,965	232	1,561	1.6	22.4[2]	18.4	19.3	1.0
118	11,771	190	1,230	2.0	22.4[2]	18.8	19.8	1.0
125	12,458	210	1,410	1.6	22.4[2]	19.3	20.2	1.0
130	12,957	154	852	2.7	22.4[2]	19.4	20.4	0.9
137	13,711	236	1,225	1.9	22.4[2]	20.4	21.4	1.0
145	14,456	315	1,546	1.5	22.4[2]	21.0	22.0	1.0
150	14,956	276	1,624	1.4	22.4[2]	21.4	22.4	1.0
159	15,939	529	2,509	0.9	22.4[2]	21.9	22.8	1.0
172	17,223	452	2,586	0.9	22.4[2]	22.3	23.3	1.0
180	18,049	234	1,186	1.9	23.3	23.3	24.0	0.8
186	18,604	254	1,205	1.8	23.7	23.7	24.5	0.8
188	18,843	253	1,295	1.4	23.8	23.8	24.7	0.9
195	19,494	327	1,512	1.2	24.1	24.1	25.0	0.9
Tar River								
281	28,145	5,700	60,708	0.9	9.8	9.8	10.7	0.9
293	29,287	5,550	60,466	0.9	9.9	9.9	10.8	0.9
303	30,339	5,342	41,921	1.3	10.1	10.1	10.9	0.8
304	30,383	5,342	42,906	1.3	10.7	10.7	11.6	0.9
314	31,359	5,248	58,776	0.9	11.4	11.4	12.2	0.8
347	34,698	5,835	61,357	0.9	12.0	12.0	12.7	0.7
393	39,341	4,423	59,578	0.9	12.8	12.8	13.5	0.7
433	43,347	4,562	61,895	0.9	13.3	13.3	14.0	0.7
470	46,977	4,278	53,865	1.0	13.9	13.9	14.5	0.6
502	50,247	5,099	63,318	0.9	14.4	14.4	15.0	0.6
531	53,127	5,549	59,918	0.9	14.8	14.8	15.4	0.6
557	55,678	5,098	56,612	1.0	15.2	15.2	15.8	0.6
579	57,866	4,907	59,181	0.9	15.5	15.5	16.1	0.6
616	61,617	4,530	62,042	0.9	16.1	16.1	16.7	0.6
646	64,572	4,762	69,990	0.8	16.6	16.6	17.1	0.5
681	68,086	5,244	75,623	0.7	17.0	17.0	17.5	0.5
738	73,798	5,547	79,110	0.7	17.7	17.7	18.2	0.5
914	91,433[6]	4,180	65,543	0.8	21.3	21.3	22.2	0.9
933	93,259[6]	3,735	43,879	1.2	21.5	21.5	22.4	0.9
973	97,288[6]	3,441	61,354	0.9	22.0	22.0	22.9	1.0
1106	110,600[6]	4,196	77,589	0.7	24.4	24.4	25.2	0.9
1165	116,460[6]	5,196	92,315	0.6	24.6	24.6	25.5	0.8
Tranters Creek								
118	11,841	562	10,253	1.8	6.1	6.1	6.4	0.3
127	12,718	390	10,253	2.2	6.1	6.1	6.5	0.4
136	13,636	227	10,253	2.5	6.2	6.2	6.6	0.4
142	14,207	210	10,253	2.7	6.3	6.3	6.7	0.4
149	14,919	290	10,253	2.3	6.3	6.3	6.8	0.5
155	15,492	265	10,253	2.4	6.3	6.3	6.8	0.5

Table 22 - Floodway Data

Floodway Source		Floodway			Water Surface Elevation			
Cross Section	Distance (Feet Above Mouth)	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet Per Second)	Regulatory	Without Floodway	With Floodway	Increase
161	16,110	279	10,253	2.3	6.4	6.4	6.9	0.5
168	16,762	370	10,253	2.2	6.4	6.4	6.9	0.5
182	18,207	720	10,253	1.6	6.5	6.5	7.1	0.6
189	18,904	508	10,253	1.7	6.6	6.6	7.2	0.6
195	19,476	363	10,253	2.3	6.6	6.6	7.2	0.6
200	20,010	437	10,253	2.1	6.6	6.6	7.3	0.7
208	20,772	517	10,253	1.9	6.7	6.7	7.4	0.7
221	22,078	686	10,253	1.5	6.8	6.8	7.6	0.8
234	23,378	918	10,213	1.3	7.0	7.0	7.7	0.7
243	24,292	910	10,213	1.3	7.1	7.1	7.9	0.8
268	26,813	1,064	10,213	1.1	7.3	7.3	8.2	0.9
276	27,646	1,168	10,213	1.0	7.4	7.4	8.3	0.9
307	30,718	2,069	10,213	0.6	7.7	7.7	8.6	0.9
341	34,138	1,325	10,213	0.9	7.8	7.8	8.8	1.0
352	35,182	1,479	10,213	1.2	7.9	7.9	8.8	0.9
362	36,152	1,913	10,213	0.8	8.0	8.0	9.0	1.0
378	37,839	1,450	10,213	1.1	8.1	8.1	9.1	1.0
386	38,649	800	10,213	1.3	8.2	8.2	9.2	1.0
394	39,443	890	10,213	1.3	8.3	8.3	9.2	0.9
407	40,676	1,424	10,213	0.8	8.4	8.4	9.4	1.0
415	41,477	1,265	10,213	1.2	8.4	8.4	9.4	1.0
424	42,425	1,627	10,114	1.1	8.5	8.5	9.5	1.0
445	44,468	1,981	10,114	0.9	8.6	8.6	9.6	1.0
476	47,645	1,270	10,114	0.8	8.9	8.9	9.9	1.0
491	49,111	994	10,114	1.2	8.9	8.9	9.9	1.0
497	49,663	750	10,114	1.6	9.0	9.0	10.0	1.0
505	50,537	740	10,114	1.5	9.1	9.1	10.1	1.0
515	51,455	560	10,114	1.5	9.1	9.1	10.1	1.0
522	52,188	452	10,114	1.7	9.2	9.2	10.2	1.0
533	53,332	394	10,114	2.0	9.3	9.3	10.3	1.0
540	53,954	540	10,114	1.6	9.5	9.5	10.5	1.0
545	54,474	619	10,114	1.4	9.6	9.6	10.6	1.0
551	55,052	660	10,114	1.3	9.7	9.7	10.7	1.0
556	55,644	475	10,114	1.8	9.7	9.7	10.7	1.0
574	57,438	952	10,114	1.0	10.0	10.0	11.0	1.0
585	58,454	1,110	10,114	0.9	10.1	10.1	11.1	1.0
594	59,375	640	10,114	1.4	10.1	10.1	11.1	1.0
616	61,608	992	10,114	1.0	10.5	10.5	11.5	1.0
638	63,802	690	10,041	1.2	10.6	10.6	11.6	1.0
660	65,960	1,239	10,041	0.7	10.8	10.8	11.8	1.0
663	66,311	1,279	10,041	0.7	11.1	11.1	12.0	0.9
680	67,982	950	10,041	0.8	11.2	11.2	12.1	0.9
694	69,357	1,077	10,041	0.8	11.3	11.3	12.2	0.9
709	70,889	1,383	8,613	0.5	11.4	11.4	12.4	1.0

Table 22 - Floodway Data

Floodway Source		Floodway			Water Surface Elevation			
Cross Section	Distance (Feet Above Mouth)	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet Per Second)	Regulatory	Without Floodway	With Floodway	Increase
717	71,681	1,283	8,613	0.6	11.4	11.4	12.4	1.0
729	72,896	1,430	8,613	0.6	11.5	11.5	12.5	1.0
741	74,084	1,507	8,613	0.5	11.6	11.6	12.5	0.9
748	74,764	1,402	8,613	0.7	11.6	11.6	12.6	1.0
757	75,732	1,623	8,561	0.5	11.7	11.7	12.7	1.0
766	76,565	1,836	8,561	0.5	11.8	11.8	12.7	0.9
774	77,413	1,857	8,561	0.6	11.8	11.8	12.8	1.0
781	78,071	1,212	8,561	0.8	11.9	11.9	12.8	0.9
788	78,790	1,028	8,561	0.6	12.0	12.0	12.9	0.9
797	79,651	919	8,561	0.7	12.1	12.1	13.0	0.9

[1]ELEVATION INCLUDES FLOODING CONTROLLED BY TAR RIVER

[2]Elevation includes backwater effects

[3]Tar River

[4]ELEVATION INCLUDES FLOODING CONTROLLED BY NEUSE RIVER

[5]Feet above US Highway 17

[6]Feet above County boundary

6.4 Coastal Flood Hazard Mapping

Flood insurance zones and BFEs including the wave effects were identified on each transect based on the results from the onshore wave hazard analyses. Between transects, elevations were interpolated using topographic maps, land-use and land-cover data, and knowledge of coastal flood processes to determine the aerial extent of flooding. Sources for topographic data are shown in Table 23.

Zone VE is subdivided into elevation zones and BFEs are provided on the FIRM.

The limit of Zone VE shown on the FIRM is defined as the farthest inland extent of any of these criteria (determined for the 1% annual chance flood condition):

- *The primary frontal dune* zone is defined in 44 CFR Section 59.1 of the NFIP regulations. The primary frontal dune represents a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes that occur immediately landward and adjacent to the beach. The primary frontal dune zone is subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune zone occurs at the point where there is a distinct change from a relatively steep slope to a relatively mild slope.

- *The wave runup zone* occurs where the (eroded) ground profile is 3.0 feet or more below the 2-percent wave runup elevation.

- *The wave overtopping splash zone* is the area landward of the crest of an overtopped barrier, in cases where the potential 2-percent wave runup exceeds the barrier crest elevation by 3.0 feet or more.

- *The breaking wave height zone* occurs where 3-foot or greater wave heights could occur (this is the area where the wave crest profile is 2.1 feet or more above the total stillwater elevation).

- *The high-velocity flow zone* is landward of the overtopping splash zone (or area on a sloping beach or other shore type), where the product of depth of flow times the flow velocity squared (hv2) is greater than or equal to 200 ft3/sec2. This zone may only be used on the Pacific Coast.

The SFHA boundary indicates the limit of SFHAs shown on the FIRM as either “V” zones or “A” zones.

Table 23, “Summary of Coastal Transect Mapping Considerations” is not applicable in Pitt County.

A LiMWA boundary has also been added in coastal areas subject to wave action for use by local communities in safe rebuilding practices. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. In areas where the Zone VE designation is based on the presence of a primary frontal dune the LiMWA was not delineated.

7.0 Revising the FIS

7.1 Letters of Map Amendment and Letters of Map Revision - Based on Fill

LOMAs and LOMR-Fs are documents issued by FEMA that officially remove a property and/or a structure from a Special Flood Hazard Area (SFHA), if data supporting the removal are submitted. LOMAs and LOMR-Fs are generally determinations regarding areas that are too small to be shown on a FIRM panel; consequently, the changes they describe become official without revising the FIRM or the FIS Report.

NFIP regulations require that the lowest adjacent grade (the lowest ground touching the structure) be at or above the 1% annual chance flood elevation for a LOMA to be issued. Currently, there is no fee for FEMA’s review of a LOMA request, but the requester of a LOMA is responsible for providing all the information needed for the review, which may include structure and/or property elevations certified by a licensed land surveyor or professional engineer. Therefore, LOMA requesters may need to retain the services of a land surveyor or engineer.

A LOMA cannot be used for property on which fill has been placed. For those situations, a LOMR-F must be used. As a participant in the NFIP, a local government must adopt ordinances that meet the minimum Federal floodplain management standards, which are outlined in Section 60.3 of the NFIP regulations. For a number of reasons, these ordinances generally vary from community to community. Nonetheless, because the placement of fill within the floodplain can affect flood hazards in the surrounding area, additional information is needed before FEMA can process a LOMR-F request. Among the data required for a LOMR-F is the community acknowledgment form. This form is FEMA’s assurance that all appropriate Federal, State, and local floodplain management requirements have been met. Furthermore, NFIP regulations require that the lowest adjacent grade (the lowest ground touching the structure) be at or above the 1% annual chance flood elevation for a LOMR-F to be issued removing the structure from the floodplain. Because LOMR-F requests are the result of changed physical conditions rather than limitations of scale or topographic definition, FEMA charges a fee for the review of a LOMR-F request. As with the LOMA, the requester of a LOMR-F is responsible for providing all supporting information, including structure and/or property elevation data.

In cases where property owners plan to add fill in the SFHA, NFIP regulations require plans and technical information to be submitted for review by FEMA before construction takes place. FEMA will issue a conditional LOMR-F stating how flood hazards would change and what portions of the property, if any, would remain in the SFHA if the project were built according to the submitted plans.

The issuance of a LOMA or LOMR-F ends the property owner’s obligation to purchase flood insurance as a condition of Federal or federally backed financing. However, the property owner’s mortgage company maintains the prerogative to require flood insurance as a condition of providing financing. Before attempting to obtain a LOMA or LOMR-F, property owners are advised to consult their mortgage companies regarding this policy. Even if the mortgage company indicates that it will require flood insurance if a LOMA or LOMR-F is issued, it may be advantageous for property owners to request a LOMA or LOMR-F because flood insurance premiums are lower for properties removed from the SFHA than for properties that remain within the SFHA.

For additional information regarding LOMAs, LOMR-Fs, conditional LOMR-Fs, or current application fees, please call the FEMA Map Information eXchange (FMIX) toll-free information line at 1-877-FEMA MAP (1-877-336-2627).

7.2 Letters of Map Revision

A Letter of Map Revision (LOMR) is a document issued by FEMA and the NCFMP that revises an FIS Report and/or FIRM. A LOMR is used to change flood risk zones, floodplain and/or floodway delineations, flood elevations, or planimetric features such as road systems or corporate limits. A LOMR provides FEMA and the NCFMP with a cost-effective means of revising the FIS information without physically changing and reprinting the map or report itself. A portion of the FIRM panel or FIS Report showing the revised information is issued with the LOMR. The LOMR is sent to all affected communities and is archived in the communities' NFIP map repository for public reference.

In cases where a proposed project (such as construction in the 1% annual chance floodplain) would result in a significant rise in 1% annual chance water-surface elevations, NFIP regulations require the community to submit plans and technical information for review by FEMA and the NCFMP before construction takes place. This assures communities participating in the NFIP that proposed projects meet minimum NFIP requirements. The result of FEMA and the NCFMP reviews is documented in a conditional LOMR.

For additional information regarding LOMRs, conditional LOMRs, or current application fees, please call the FEMA Map Assistance Center toll-free information line at 1-877-FEMA MAP (1-877-336-2627) or the NCFMP at 919-715-5711.

7.3 Physical Map Revisions

Physical Map Revisions (PMRs) are processed to incorporate information concerning conditions present in the community that are not reflected in the FIS, and involve distributing republished FISs that supersede the most current NFIP data in the community repository. PMRs may be initiated by a request from a community resident or agency, or FEMA may initiate a PMR to incorporate one or more LOMRs, to reflect significant changes in corporate limits, to correct errors, or to update flood hazards to match new information from an adjacent community's FIS. Due to the costs associated with updating and distributing FISs, map revisions will be processed as LOMRs rather than PMRs whenever possible. For more information regarding PMRs, please contact the FEMA Map Information eXchange (FMIX) toll-free information line at 1-877-FEMA MAP (1-877-336-2627), the FEMA Regional Office at the address listed on the Notice to Flood Insurance Study Users page at the front of this report, or the NCFMP at 919-715-5711.

7.4 Contracted Restudies

The NFIP provides for a periodic review and restudy of flood hazards in a given community. FEMA accomplishes this through a national mapping needs assessment process that assigns priorities and allocates funds to sponsor or subsidize new flood hazard analyses used to update FIS Reports. For map maintenance restudies within the state of North Carolina, scoping will be performed by county approximately 2.5-3.5 years after the previous effective date. Scoping will focus on streams with restudy needs within those previously effective counties rather than on full countywide restudies. A restudy refers specifically to updating or reevaluating engineering analyses that were performed for a flood mapping project that directly impact BFEs and/or flood hazard boundary extents or analysis of previously unstudied flood prone areas. Restudy project evaluation triggers and prioritization values are an essential component of the map maintenance program. For more information regarding NCFMP-contracted restudies, please contact the NCFMP at 919-715-5711 or at www.ncfloodmaps.com. For more information regarding FEMA-contracted restudies, please contact the FEMA Map Information eXchange (FMIX) toll-free information line at 1-877-FEMA MAP(1-877-336-2627) or the FEMA Regional Office at the address listed on the Notice to Flood Insurance Study Users page at the front of this report.

7.5 Map Revision History

The current FIRM is a subset of the Statewide FIRM, showing flood hazard information for the entire geographic area of Pitt County. Previously, separate Flood Hazard Boundary Maps (FHBMs), Flood Boundary and Floodway Maps (FBFMs), and/or FIRMs were prepared for each identified flood prone jurisdiction within the county. Historical data relating to the NFIP maps prepared for each community prior to and including the 1/2/2004 North Carolina Statewide FIRM, which includes Pitt County, are presented in Table 24, "Map Revision History."

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

Table 24 - Map Revision History

Community	Initial Identification Date	Initial FIRM Effective Date	FIS Revision Date
CITY OF GREENVILLE	*	7/3/1978	07/07/2014
PITT COUNTY	*	1/6/1983	07/07/2014
TOWN OF AYDEN	*	8/4/1987	07/07/2014
TOWN OF BETHEL	*	1/2/2004	07/07/2014
TOWN OF FALKLAND	*	1/2/2004	04/16/2013
TOWN OF FARMVILLE	*	4/1/1982	04/16/2013
TOWN OF FOUNTAIN	*	1/2/2004	04/16/2013
TOWN OF GRIFTON	12/17/1973	2/17/1982	07/07/2014
TOWN OF GRIMESLAND	*	1/2/2004	07/07/2014
TOWN OF WINTERVILLE	*	2/24/1978	07/07/2014
VILLAGE OF SIMPSON	*	1/2/2004	07/07/2014

8.0 Study Contracting and Community Coordination

8.1 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.

This FIS revises and updates the previous countywide FIS for the geographic area of Pitt County and Incorporated Areas. Table 25, “Authority and Acknowledgments,” includes information for the previous countywide FIS and for this revision. This table also includes information for the single-jurisdiction FISs published for each community included in this countywide FIS (if available) as compiled from their previously printed FIS Reports

Table 25 — Authority and Acknowledgments

Community	FIS Dated	Study Contracted By	Data Source	Contract or IAA Number	Work Completed In
CITY OF GREENVILLE	1/2/2004	NCFMP	NCFMP	19-000017	10/29/2012
CITY OF GREENVILLE	1/2/2004	NCFMP	NCFMP	286-000022	12/1/2012
CITY OF GREENVILLE	1/2/2004	NCFMP	NCFMP	286-000022	10/2/2014
PITT COUNTY	1/2/2004	NCFMP	NCFMP	19-000017	10/29/2012
PITT COUNTY	1/2/2004	NCFMP	NCFMP	286-000022	12/1/2012
PITT COUNTY	1/2/2004	NCFMP	NCFMP	286-000022	10/2/2014
TOWN OF AYDEN	1/2/2004	NCFMP	NCFMP	19-000017	10/29/2012
TOWN OF AYDEN	1/2/2004	NCFMP	NCFMP	286-000022	12/1/2012
TOWN OF AYDEN	1/2/2004	NCFMP	NCFMP	286-000022	10/2/2014
TOWN OF BETHEL	1/2/2004	NCFMP	NCFMP	19-000017	10/29/2012
TOWN OF BETHEL	1/2/2004	NCFMP	NCFMP	286-000022	12/1/2012
TOWN OF BETHEL	1/2/2004	NCFMP	NCFMP	286-000022	10/2/2014
TOWN OF FALKLAND	1/2/2004	NCFMP	NCFMP	19-000017	10/29/2012
TOWN OF FALKLAND	1/2/2004	NCFMP	NCFMP	286-000022	12/1/2012
TOWN OF FALKLAND	1/2/2004	NCFMP	NCFMP	286-000022	10/2/2014
TOWN OF FARMVILLE	1/2/2004	NCFMP	NCFMP	19-000017	10/29/2012
TOWN OF FARMVILLE	1/2/2004	NCFMP	NCFMP	286-000022	12/1/2012
TOWN OF FARMVILLE	1/2/2004	NCFMP	NCFMP	286-000022	10/2/2014
TOWN OF FOUNTAIN	1/2/2004	NCFMP	NCFMP	19-000017	10/29/2012
TOWN OF FOUNTAIN	1/2/2004	NCFMP	NCFMP	286-000022	12/1/2012
TOWN OF FOUNTAIN	1/2/2004	NCFMP	NCFMP	286-000022	10/2/2014
TOWN OF GRIFTON	1/2/2004	NCFMP	NCFMP	19-000017	10/29/2012
TOWN OF GRIFTON	1/2/2004	NCFMP	NCFMP	286-000022	12/1/2012
TOWN OF GRIFTON	1/2/2004	NCFMP	NCFMP	286-000022	10/2/2014
TOWN OF GRIMESLAND	1/2/2004	NCFMP	NCFMP	19-000017	10/29/2012
TOWN OF GRIMESLAND	1/2/2004	NCFMP	NCFMP	286-000022	12/1/2012
TOWN OF GRIMESLAND	1/2/2004	NCFMP	NCFMP	286-000022	10/2/2014

Table 25 — Authority and Acknowledgments

Community	FIS Dated	Study Contracted By	Data Source	Contract or IAA Number	Work Completed In
TOWN OF WINTERVILLE	1/2/2004	NCFMP	NCFMP	19-000017	10/29/2012
TOWN OF WINTERVILLE	1/2/2004	NCFMP	NCFMP	286-000022	12/1/2012
TOWN OF WINTERVILLE	1/2/2004	NCFMP	NCFMP	286-000022	10/2/2014
VILLAGE OF SIMPSON	1/2/2004	NCFMP	NCFMP	19-000017	10/29/2012
VILLAGE OF SIMPSON	1/2/2004	NCFMP	NCFMP	286-000022	12/1/2012
VILLAGE OF SIMPSON	1/2/2004	NCFMP	NCFMP	286-000022	10/2/2014

This FIS Report was produced through a unique cooperative partnership between the State of North Carolina and FEMA. The State of North Carolina, through FEMA's Cooperating Technical Partner (CTP) Initiative, has become the first Cooperating Technical State (CTS) and will assume primary ownership of the NFIP FIRM panels for all North Carolina communities. This role has traditionally been fulfilled by FEMA. The North Carolina Floodplain Mapping Program is conducting flood hazard analyses and producing updated, digital FIRM panels. The hydrologic and hydraulic analyses and the FIRM panels for the initial statewide mapping for Pitt County were produced by NCFMP under contract with the State of North Carolina and issued on effective 6/30/2016. For this revision, the hydrologic and hydraulic analyses and the FIRM panels were produced by NCFMP, under contract with the State of North Carolina.

8.2 Consultation Coordination Officer's Meetings/Scoping Meetings

In general, for each FIS an initial Consultation Coordination Officer's (CCO) meeting is held with representatives from FEMA, the communities, and the study contractors to explain the nature and purpose of the FIS and to identify the streams to be studied by detailed methods. A final CCO meeting is held with representatives from FEMA, the communities, and the study contractors to review the results of the study

The dates of the initial and final CCO meetings held for Pitt County and Incorporated Areas were compiled from the previous countywide FIS Report and are shown in Table 26, "Consultation Coordination Officer's Meetings

Table 26 — Consultation Coordination Officer's Meetings

Community	For FIS Dated	Initial CCO Date	Attended By	Final CCO Date	Attended By
CITY OF GREENVILLE	4/30/1986	2/11/1975	FIA and local interests	9/28/1976	Representatives of FIA, community officials, and local residents
CITY OF GREENVILLE ETJ	4/30/1986	2/11/1975	FIA and local interests	9/28/1976	Representatives of FIA, community officials, and local residents
PITT COUNTY	9/14/1990	7/1/1977	Representatives of FEMA, the study contractor, and the County	2/3/1982	Representatives of FEMA, the study contractor, and the County
PITT COUNTY	9/14/1990	7/1/1977	Representatives of FEMA, the study contractor, and the County	9/13/1989	Representatives of FEMA, Person County, and the Study Contractor
TOWN OF FARMVILLE	4/17/1989	7/1/1977	Representatives of FEMA, the study contractor, and the community	2/27/1981	Representatives of FEMA, the study contractor, the town, and local residents
TOWN OF FARMVILLE ETJ	4/17/1989	7/1/1977	Representatives of FEMA, the study contractor, and the community	2/27/1981	Representatives of FEMA, the study contractor, the town, and local residents
TOWN OF GRIFTON	11/20/1998	7/22/1997	NP	8/8/8888	Notified by letter
TOWN OF GRIFTON	11/20/1998	7/22/1997	NP	8/8/8888	NP
TOWN OF GRIFTON ETJ	11/20/1998	7/22/1997	NP	8/8/8888	Notified by letter
TOWN OF GRIFTON ETJ	11/20/1998	7/22/1997	NP	8/8/8888	NP

For each FIS produced during the initial phase of statewide, an Initial Scoping Meeting was held with representatives from FEMA, the county, the incorporated communities, and the State of North Carolina. A Final Scoping meeting was held to review the Draft Basin Plan and finalize the streams to be studied by detailed methods. This information was then used to create the Final Basin Plan.

For map maintenance revisions, only one scoping meeting was held to identify the streams to be newly studied by detailed methods, redelineated, or to be studied by limited detailed methods. This information was then used to create the Map Maintenance Plan.

The historical dates of the Initial and Final Scoping Meetings held during the first round of statewide mapping for Pitt County are shown in Table 28, “Scoping Meetings.” Meetings held for the map maintenance revision are also included below for Pitt County.

Table 28 — Scoping Meetings

Community	Riverbasin	Initial Scoping Date	Attended By	Final Scoping Date	Attended By
CITY OF GREENVILLE	TAR-PAMLICO	11/14/2000	Representatives of the State, community, and FEMA-MCC/D&D	1/30/2001	Representatives of the State, community, and FEMA-MCC/D&D
CITY OF GREENVILLE ETJ	TAR-PAMLICO	11/14/2000	Representatives of the State, community, and FEMA-MCC/D&D	1/30/2001	Representatives of the State, community, and FEMA-MCC/D&D
PITT COUNTY	NEUSE	5/2/2006	Representatives of the State, FEMA, Dewberry & Davis, and Pitt County	8/8/8888	NP
PITT COUNTY	TAR-PAMLICO	11/14/2000	Representatives of the State, county, and FEMA-MCC/D&D	1/30/2001	Representatives of the State, county, and FEMA-MCC/D&D
PITT COUNTY	TAR-PAMLICO	5/2/2006	Representatives of the State, FEMA, Dewberry & Davis, and Pitt County	8/8/8888	NP
TOWN OF BETHEL	TAR-PAMLICO	11/14/2000	Representatives of the State, community, and FEMA-MCC/D&D	1/30/2001	Representatives of the State, community, and FEMA-MCC/D&D
TOWN OF BETHEL ETJ	TAR-PAMLICO	11/14/2000	Representatives of the State, community, and FEMA-MCC/D&D	1/30/2001	Representatives of the State, community, and FEMA-MCC/D&D
TOWN OF GRIMESLAND	TAR-PAMLICO	11/14/2000	Representatives of the State, community, and FEMA-MCC/D&D	1/30/2001	Representatives of the State, community, and FEMA-MCC/D&D
TOWN OF GRIMESLAND ETJ	TAR-PAMLICO	11/14/2000	Representatives of the State, community, and FEMA-MCC/D&D	1/30/2001	Representatives of the State, community, and FEMA-MCC/D&D

Preliminary Meetings are held in each county to disseminate and review the FIS Report and FIRM panels. This meeting is required by FEMA. Public Participation Meetings are not required by FEMA, but provide an opportunity to review and discuss the FIS Report and FIRM panels for each jurisdiction in a public setting. The dates for the preliminary and public participation meetings are shown in Table 30, “Preliminary and Public Participation Meetings.”

Table 30 — Preliminary and Public Participation Meetings

Community	For FIS Dated	Meeting Location	Preliminary Meeting Date	Attended By	Public Meeting Date	Attended By
PITT COUNTY	1/2/2004	Greenville	7/9/2002	Representatives of the county State, FEMA, Dewberry & Davis LLC, and Watershed Concepts	9/3/2002	NP
PITT COUNTY	1/2/2004	Greenville	7/9/2002	Representatives of the county State, FEMA, Dewberry & Davis LLC, and Watershed Concepts	10/17/2002	NP
PITT COUNTY	4/16/2013	Greenville	8/23/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas	8/10/2010	Representatives of the State, Franklin County and Incorporated Communities
PITT COUNTY	4/16/2013	Greenville	8/23/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas	8/10/2010	Representatives of the State, Granville County, and Dewberry
PITT COUNTY	4/16/2013	Greenville	8/23/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas	8/10/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry
PITT COUNTY	4/16/2013	Greenville	8/23/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas	8/10/2010	Representatives of the State, Wake County and Incorporated Communities, and Dewberry
PITT COUNTY	4/16/2013	Greenville	8/23/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas	11/15/2010	Representatives of the State, Nash County and Incorporated Communities, and Dewberry

Table 30 — Preliminary and Public Participation Meetings

Community	For FIS Dated	Meeting Location	Preliminary Meeting Date	Attended By	Public Meeting Date	Attended By
PITT COUNTY	4/16/2013	Greenville	8/23/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas	1/16/2011	Representatives of the State, Nash County and Incorporated Communities, and Dewberry
PITT COUNTY	4/16/2013	Greenville	8/23/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas	4/18/2011	Representatives of the State, FEMA, Dewberry, and Wilson County and Incorporated Areas
PITT COUNTY	4/16/2013	Greenville	8/23/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas	10/19/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas
PITT COUNTY	4/16/2013	Greenville	8/23/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas	10/20/2011	Representatives of the State, FEMA, Dewberry, and Lenoir County and Incorporated Areas
PITT COUNTY	4/16/2013	Greenville	8/23/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas	12/2/2011	Representatives of the State, FEMA, Dewberry, and Greene County and Incorporated Areas
PITT COUNTY	4/16/2013	Greenville	8/23/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas	12/2/2012	Representatives of the State, FEMA, Dewberry, and Greene County and Incorporated Areas

9.0 Guide to Additional Information

Information concerning the pertinent data used in the preparation of this FIS Report can be obtained by submitting an order with any required payment to the FEMA Engineering Library. For more information on this process, see http://www.fema.gov.

The Map Repositories table below lists locations where FIRMs for Pitt County can be viewed. Please note that the maps at these locations are for reference only and are not for distribution. Also, please note that only the maps for the community listed in the table are available at that particular repository. A user may need to visit another repository to view maps from an adjacent community.

Table 27 — Map Repositories

Community	Address	City	State	Zip Code
Town of Grifton	Grifton Town Hall, 528 Queen Street	Grifton	NC	28530
Town of Falkland	NP	Falkland	NC	27827
Town of Ayden	Planning Department, 4061 East Ave	Ayden	NC	28513
Town of Farmville	Town Hall, 200 North Main Street	Farmville	NC	27828
Pitt County	Pitt County Planning Dept, Development Service Building, 1717 West 5th Street	Greenville	NC	27834
Town of Fountain	Town Hall, 6777 West Wilson Street	Fountain	NC	27829
City of Greenville	Greenville City Hall, 200 West Fifth Street	Greenville	NC	27835
Town of Winterville	Planning Department, 2571 Railroad Street	Winterville	NC	28590
Town of Bethel	Town Hall, 201 Railroad Street	Bethel	NC	27812
Village of Simpson	Town Hall/Planning Dept, 2768 Thompson Street	Simpson	NC	27879
Town of Grimesland	Town Hall, 7592 Pitt Street	Grimesland	NC	27837

9.1 Additional Information

All FIRM panels created for the State of North Carolina are produced in a seamless statewide format; however, FIS Reports are produced for individual counties.

Copies of FIRM panels are available for a nominal fee. To obtain a copy of the current flood map for a specific community, contact the FEMA Map Service Center at 1-800-358-9616. To facilitate the processing of your request, please review the current flood map on file at your local community repository and obtain the panel number in which you are interested. If necessary, users may also order a FIRM Index from the Map Service Center to determine the appropriate panel numbers. The Map Service Center also accepts orders for the Community Status Book and the Flood Insurance Manual. The FIS Report, FIRM panels, and digital data used to produce the FIRM panels are available online at www.ncfloodmaps.com.

Information concerning the data used in the preparation of this FIS, contained in an Engineering Study Data Package, may be obtained by contacting the FEMA Regional Office at the address listed on the Notice to Flood Insurance Study Users page at the front of this report.

Table 29, “Additional Information” is not applicable in Pitt County.

10.0 Appendix

10.1 Bibliography

All bibliography and reference information associated within this Flood Insurance Study are maintained and accessible within the geodatabase structure and associated metadata. Users requiring more specific information should contact the North Carolina Floodplain Mapping Program (NCFMP) at www.ncfloodmaps.com under the Contacts menu