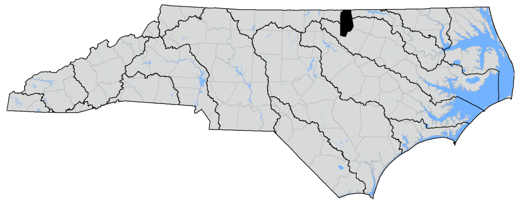
PRELIMINARY FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

A Report of Flood Hazards in

VANCE COUNTY, NORTH CAROLINA AND INCORPORATED AREAS



Community Name	Community Number
CITY OF HENDERSON	370367
TOWN OF KITTRELL	370578
TOWN OF MIDDLEBURG	370589
VANCE COUNTY	370366

NORTH CAROLINA
Cooperating Technical State
FEMA'S COOPERATING TECHNICAL PARTNER

PRELIMINARY: 3/31/2015

REVISED: 3/31/2015

Federal Emergency Management Agency

State of North Carolina

Flood Insurance Study Number

37181CV000

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
4/16/2007	Initial Countywide FIS Report Effective Date

This FIS has been produced as part of the North Carolina Floodplain Mapping Program. Vance 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

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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 Vance County and the jurisdictions therein (hereinafter referred to collectively as Vance 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 Vance County, North Carolina, including the jurisdictions listed in Table 1.

Table 1 - Jurisdictions in Vance County

Community	Included in this FIS	If Not Included, Location of Flood Hazard/Flood Insurance Rate Data
CITY OF HENDERSON	Yes	*
TOWN OF KITTRELL	Yes	*
TOWN OF MIDDLEBURG	Yes	*
VANCE COUNTY	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 Vance became Effective on 4/16/2007. 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.

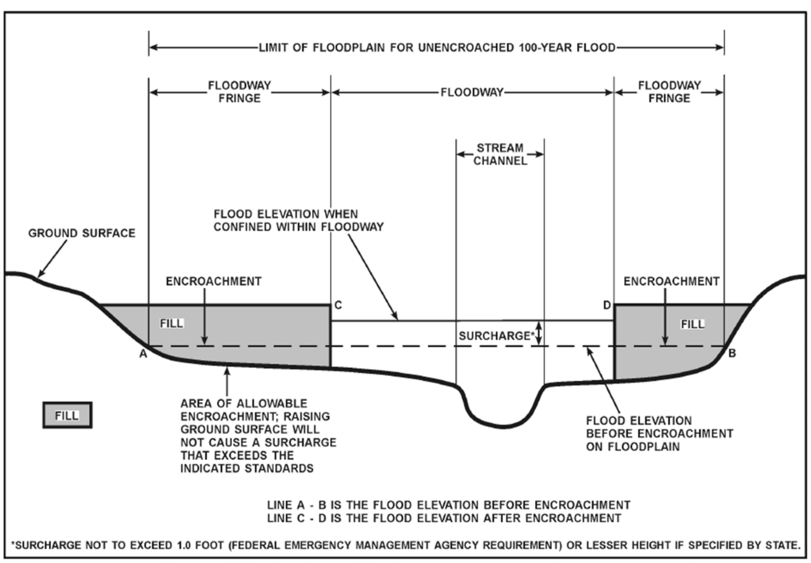

Figure 1- Floodway Schematic

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.

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.

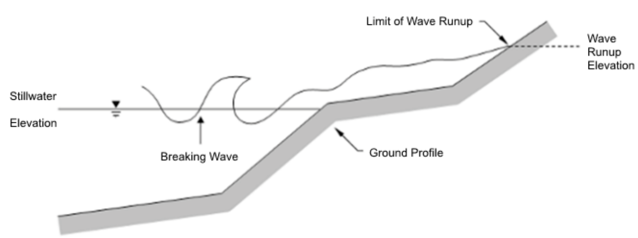

Figure 5: Wave Runup Transect Schematic

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.

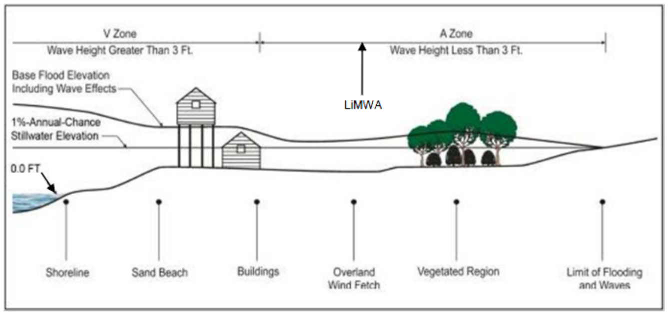

Figure 6: Coastal Transect Schematic

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

This section is not applicable to this FIS project.

4.0 Area Studied

Vance County is found in the Piedmont region of North Carolina. It is surrounded by Virginia to the north, Warren County to the east, Franklin County to the south, and Granville 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)
Fishing	03020102	Fishing River	The Fishing River Basin begins in eastern Vance County and drains southeast through Warren and Halifax Counties. The basin ends in Edgecombe County where Fishing River confluences with Tar River.	894
Middle Roanoke	03010102	Roanoke River	The Middle Roanoke River Basin begins in Virginia and drains portions of Pittsylvania and Campbell Counties. The basin then drains southeast to the end of the John H. Kerr Reservoir, and includes drainage from Granville, Warren, and Vance Counties.	1,739
Roanoke Rapids	03010106	Roanoke River	The Roanoke Rapids Basin begins in Mecklenburg County Virginia and covers the portion of the Roanoke River downstream of John H. Kerr Reservoir. This basin drains Halifax, Northampton, and Warren Counties and ends in Roanoke Rapids, North Carolina.	592
Upper Tar	03020101	Tar River	The Upper Tar River Basin begin in east Person County and drains significant portions of Edgecombe, Franklin, Granville, Nash, and Vance Counties along the Tar River.	1,305

4.2 Principal Flood Problems

Table 4, "Principal Flood Problems" contains a list of principal flooding problems in Vance County.

Table 4 - Principal Flood Problems

Flooding Source	Problem
All Sources	Flooding has occurred in the Tar River study area during all seasons of the year, with the major floods occurring in the fall and winter. According to highwater marks, the largest flood on the Tar River occurred on December 3, 1934. The Tar River reaches flood stage in about 30 hours after intense rainfall begins and remains out of its banks for 2 to 4 days (FEMA, 1991).

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.

Table 5, "Historic Flood Elevations", lists selected flooding sources in Vance 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)
Fishing Creek / Floyd	Cross Section 104	211606	93.5	9/24/1999	500
Fishing Creek / Floyd	Draughan Road Station	114857	66.7	9/27/1999	500
Fishing Creek / Floyd	Etheridge Farm Road	162138	78.6	9/28/1999	500
Red Bud Creek / Unknown storm	Vance Academy Road station	692	312.8	9/1/1999	100
Tar River / Unknown storm	Princeville	*	33.0	7/1/1919	100
Tar River / Unknown storm	Tarboro - U.S. Weather Bureau Stream Gage	*	43.4	7/1/1919	100
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	182350	39.4	9/1/1999	500

* 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" is not applicable in Vance County.

Table 7, "Levees" is not applicable in Vance County.

4.5 Scope of Study

For this map maintenance revision, a scoping meeting was held in Vance 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 Vance 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 Vance 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	
Martin Creek	The confluence with Sandy Creek	Approximately 1,920 feet upstream of NC Highway 39	City Of Henderson Vance County
Nutbush Creek	The confluence with John H. Kerr Reservoir	Approximately 470 feet upstream of Beckford Drive	City Of Henderson Vance County
Nutbush Creek Tributary 3	The confluence with Nutbush Creek	Approximately 620 feet upstream of Parham Street	City Of Henderson
Nutbush Creek Tributary 3A	The confluence with Nutbush Creek Tributary 3	Approximately 220 feet downstream of Young Avenue	City Of Henderson
Nutbush Creek Tributary 3B	The confluence with Nutbush Creek Tributary 3	Approximately 730 feet upstream of Parkway Drive	City Of Henderson
Poplar Creek	The confluence with Tabbs Creek	Approximately 0.7 mile upstream of Interstate 85	Vance County
Red Bud Creek	The confluence with Ruin Creek	Approximately 1,420 feet upstream of Cameron Drive	City Of Henderson
Tabbs Creek	The confluence with Tar River	Approximately 0.6 mile upstream of Egypt Mountain Road	Vance County
Tabbs Creek	The Granville/Vance County boundary	Approximately 0.6 mile upstream of West Tom Parham Road	Vance County

Table 9P, “Scope of Revisions: Redelineated - Preliminary” is not applicable in Vance 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	
Anderson Creek	Approximately 0.5 mile downstream of Mabry Mill Road	Approximately 0.4 mile upstream of Mabry Mill Road	Vance County
Nutbush Creek Tributary 2[1]	The confluence with Nutbush Creek	Approximately 470 feet upstream of the confluence with Nutbush Creek	City Of Henderson
Red Bud Creek	Approximately 1,420 feet upstream of Cameron Drive	Approximately 0.5 mile upstream of Cameron Drive	City Of Henderson
Red Bud Creek Tributary[1]	The confluence with Red Bud Creek	Approximately 500 feet upstream of the onfluence with Red Bud Creek	City Of Henderson
Red Bud Creek Tributary 2	The confluence with Red Bud Creek	Approximately 970 feet upstream of Woodland Road	City Of Henderson
Sandy Creek	Approximately 900 feet upstream of U.S. Highway 1 Bypass	Approximately 0.7 mile upstream of U.S. Highway 1 Bypass	City Of Henderson
Sandy Creek Tributary 12	Approximately 240 feet upstream of U.S. Highway 1 Bypass	Approximately 130 feet upstream of Harriet Street	City Of Henderson
Sandy Creek Tributary 16	The confluence with Sandy Creek	Approximately 0.6 mile upstream of the confluence with Sandy Creek	City Of Henderson
Sandy Creek Tributary 17	The confluence with Sandy Creek	Approximately 100 feet upstream of Christopher-Tyler Drive	City Of Henderson

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

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	
Martin Creek	The confluence with Sandy Creek	Approximately 1,920 feet upstream of NC Highway 39	City Of Henderson Vance County
Nutbush Creek	The confluence with John H. Kerr Reservoir	Approximately 470 feet upstream of Beckford Drive	City Of Henderson Vance County
Nutbush Creek Tributary 3	The confluence with Nutbush Creek	Approximately 620 feet upstream of Parham Street	City Of Henderson
Nutbush Creek Tributary 3A	The confluence with Nutbush Creek Tributary 3	Approximately 220 feet downstream of Young Avenue	City Of Henderson
Nutbush Creek Tributary 3B	The confluence with Nutbush Creek Tributary 3	Approximately 730 feet upstream of Parkway Drive	City Of Henderson
Poplar Creek	The confluence with Tabbs Creek	Approximately 0.7 mile upstream of Interstate 85	Vance County
Red Bud Creek	The confluence with Ruin Creek	Approximately 1,420 feet upstream of Cameron Drive	City Of Henderson
Tabbs Creek	The confluence with Tar River	Approximately 0.6 mile upstream of Egypt Mountain Road	Vance County
Tabbs Creek	The Granville/Vance County boundary	Approximately 0.6 mile upstream of West Tom Parham Road	Vance County
Tar River	Approximately 0.5 mile downstream of the confluence of Sapony Creek	Approximately 80 feet upstream of the confluence of Fork Creek	Vance County
Tar River	The Franklin/Granville County boundary	Approximately 500 feet upstream of Cannadys Mill Road	Vance 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	
John H. Kerr Reservoir	The entire shoreline within Warren County	The entire shoreline within Vance County	Vance County

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	
Anderson Creek	Approximately 0.5 mile downstream of Mabry Mill Road	Approximately 0.4 mile upstream of Mabry Mill Road	Vance County
Anderson Creek	The confluence with John H. Kerr Reservoir	Approximately 1.7 miles upstream of Anderson Creek Road	Vance County
Buffalo Creek North	The confluence with Tar River	Approximately 3.2 miles upstream of confluence with Tar River	Vance County
Cattail Creek	The confluence with Sandy Creek	Approximately 1.1 miles upstream of confluence with Sandy Creek	Vance County
Crooked Run	The confluence with John H. Kerr Reservoir	Approximately 1.7 miles upstream of NC 39	Vance County
Crooked Run Tributary 1	The confluence with Crooked Run	Approximately 1.6 miles upstream of confluence with Crooked Run	Vance County
Dickies Creek	The confluence with Sandy Creek	Approximately 0.31 mile upstream of Weldon Mill Road	Vance County
Fishing Creek	Approximately 50 feet downstream of Ward Road (SR 1502)	Approximately 0.8 mile upstream of Vance/Warren County boundary	Vance County
Flat Creek	The confluence with John H. Kerr Reservoir	Approximately 1.5 miles upstream of Kelly Road	Vance County
Gilliams Branch	The Virginia State Line	Approximately 330 feet upstream of Private Road	Vance County
Indian Creek	Approximately 2.5 miles downstream of I-85	Approximately 0.5 mile upstream of I-85	City Of Henderson Vance County

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

Source	Riverine Sources		Affected Communties
	From	To	
Island Creek	The North Carolina/ Virginia State boundary	Approximately 0.5 mile upstream of Rockwell Road	Vance County
Joes Branch	The confluence with Ruin Creek	Approximately 1.58 miles upstream of Old County Road	City Of Henderson Vance County
Kerr Reservoir Tributary 3D	The confluence with John H. Kerr Reservoir	Approximately 0.6 mile upstream of Kerr Reservoir Tributary 3D-2	Vance County
Kerr Reservoir Tributary 3D-1	The confluence with John H. Kerr Reservoir	Approximately 0.7 mile upstream of confluence with John H. Kerr Reservoir	Vance County
Kerr Reservoir Tributary 3D-2	The confluence with Kerr Reservoir Tributary 3D	Approximately 0.5 mile upstream of confluence with Kerr Reservoir Tributary 3D	Vance County
Kerr Reservoir Tributary 4	The confluence with John H. Kerr Reservoir	Approximately 0.8 mile upstream of confluence with Kerr Reservoir	Vance County
Little Island Creek	The confluence with Island Creek	Approximately 2.0 miles upstream of Rice Road	Vance County
Little Island Creek Tributary 1	The confluence with Little Island Creek	Approximately 0.8 mile upstream of confluence with Little Island Creek	Vance County
Long Creek	The confluence with Tabbs Creek	Approximately 1.7 miles upstream of Kittrell College Road	Vance County
Long Grass Branch	The Virginia State Line	Approximately 1,400 feet upstream of Virginia State Line	Vance County
Lynch Creek	Confluence with the Tar River	Approximately 0.69 mile upstream of Gillburg Road	Vance County
Michael Creek	The confluence with Island Creek	Approximately 1.7 miles upstream of Rockwell Road	Vance County
Nutbush Creek Tributary 2	The confluence with Nutbush Creek	Approximately 1,700 feet upstream of Interstate 85	City Of Henderson
Nutbush Creek Tributary 2A	The confluence with Nutbush Creek Tributary 2	Approximately 0.6 mile upstream of confluence with Nutbush Creek Tributary 2	City Of Henderson
Nutbush Creek Tributary 2B	The confluence with Nutbush Creek Tributary 2	Approximately 0.4 mile upstream of I-85	City Of Henderson
Red Bud Creek	Approximately 1,420 feet upstream of Cameron Drive	Approximately 0.5 mile upstream of Cameron Drive	City Of Henderson
Red Bud Creek Tributary	The confluence with Red Bud Creek	Approximately 1.8 miles upstream of the confluence with Red Bud Creek	City Of Henderson
Red Bud Creek Tributary 2	The confluence with Red Bud Creek	Approximately 970 feet upstream of Woodland Road	City Of Henderson
Ruin Creek	The confluence with Tabbs Creek	Approximately 1.2 miles upstream of US Hwy 158 Business	City Of Henderson Vance County
Sandy Creek	Approximately 900 feet upstream of U.S. Highway 1 Bypass	Approximately 0.7 mile upstream of U.S. Highway 1 Bypass	City Of Henderson
Sandy Creek	Confluence with Swift Creek	Approximately 0.25 mile upstream of US Highway 1 Bypass	City Of Henderson Vance County
Sandy Creek Tributary 11	The confluence with Sandy Creek	Approximately 0.21 mile upstream of US Highway 1	City Of Henderson
Sandy Creek Tributary 12	Approximately 240 feet upstream of U.S. Highway 1 Bypass	Approximately 130 feet upstream of Harriet Street	City Of Henderson
Sandy Creek Tributary 12	The confluence with Sandy Creek Tributary 11	Approximately 0.05 mile upstream of US Highway 1	City Of Henderson
Sandy Creek Tributary 16	The confluence with Sandy Creek	Approximately 0.6 mile upstream of the confluence with Sandy Creek	City Of Henderson
Sandy Creek Tributary 17	The confluence with Sandy Creek	Approximately 100 feet upstream of Christopher-Tyler Drive	City Of Henderson
Tabbs Creek	Approximately 500 feet downstream of the confluence of Long Creek	Approximately 600 feet upstream of Old Watkins Road	Vance County
Weaver Creek	The confluence with Sandy Creek	Approximately 0.46 mile upstream of Vicksboro Road	Vance County

Additional Flooding Sources included in this FIS Report studied by Other Methods

Source	Riverine Sources		Affected Communties	Study Type
	From	To		
Sandy Creek Tributary 11	Approximately 0.21 mile upstream of U.S. Highway 1	Approximately 0.5 mile upstream of U.S. Highway 1	City Of Henderson	DIGITAL CONVERSION
Unnamed Stream	Approximately 1,620 feet upstream of the confluence with Sandy Creek	Approximately 0.7 mile upstream of the confluence with Sandy Creek	City Of Henderson	DIGITAL CONVERSION

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

Table 12, “Letters of Map Revision” is not applicable in Vance 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
Anderson Creek					
Approximately 0.5 mile downstream of Mabrey Hill Road	4.42	997	1613	1878	2550
Approximately 675 feet downstream of Mabrey Hill Road	3.92	924	1499	1747	2375
Buffalo Creek North					
Approximately 0.3 mile upstream of the Tar River confluence	7.65	*	*	2660	*
Approximately 0.2 mile upstream of the Dick Smith Road crossing	7.24	*	*	2570	*
Approximately 0.8 mile upstream of the Dick Smith Road crossing	6.70	*	*	2450	*
Approximately 1.5 miles upstream of the Dick Smith Road crossing	5.92	*	*	2260	*
Approximately 2.2 miles upstream of the Dick Smith Road crossing	1.70	*	*	1020	*
Cattail Creek					
At the confluence of Sandy Creek	2.28	*	*	1250	*
Approximately 0.5 mile upstream of the confluence of Sandy Creek	1.96	*	*	1140	*
Crooked Run					
Approximately 275 feet downstream of State Highway 39	9.58	*	*	3058	*
Approximately 170 feet upstream of State Highway 39	4.79	*	*	1983	*
Approximately 1.3 miles upstream of State Highway 39	4.03	*	*	1780	*
Crooked Run Tributary 1					
At the confluence with Crooked Run	4.70	*	*	1960	*
Approximately 1.4 miles upstream of the confluence with Crooked Run	4.08	*	*	1794	*

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
Dickies Creek					
Just upstream of confluence with Sandy Creek	5.00	*	*	2040	*
At the confluence of Sandy Creek	3.01	*	*	1480	*
Fishing Creek					
Approximately 0.71 mile upstream of the Vance/Warren County Line	6.80	*	*	2470	*
Approximately 0.9 miles upstream of Vance / Warren County boundary	1.20	*	*	853	*
Flat Creek					
At the confluence with John H. Kerr Reservoir	14.78	*	*	4011	*
Approximately 0.8 mile downstream of Kelly Road	13.92	*	*	3863	*
Approximately 2150 feet downstream of Kelly Road	13.05	*	*	3710	*
Approximately 1650 feet upstream of Kelly Road	12.67	*	*	3643	*
Approximately 0.6 mile upstream of Kelly Road	10.47	*	*	3233	*
Gilliams Branch					
Approximately 1.7 miles downstream of Private Road	4.83	*	*	1994	*
Approximately 1.0 mile downstream of Private Road	4.55	*	*	1920	*
Approximately 0.5 mile downstream of Private Road	2.92	*	*	1456	*
Just downstream of Private Road	2.60	*	*	1354	*
Indian Creek					
Approximately 2.6 miles downstream of Interstate 85	2.40	*	*	1289	*
Approximately 0.7 mile downstream of Interstate 85	0.68	*	*	587	*
Approximately 2475 feet downstream of Interstate 85	0.53	*	*	500	*
Approximately 2200 feet downstream of Interstate 85	0.30	*	*	351	*
Approximately 130 feet upstream of Interstate 85	0.14	*	*	271	*
Approximately 950 feet upstream of Interstate 85	0.06	*	*	159	*
Island Creek					
Confluence of Little Island Creek	39.27	*	*	7387	*
Approximately 0.3 mile upstream of the confluence of Little Island Creek	38.93	*	*	7346	*
Approximately 1.4 miles upstream of the confluence of Little Island Creek	38.56	*	*	7303	*
Approximately 1.9 miles upstream of the confluence of Little Island Creek	38.08	*	*	7246	*
Approximately 0.6 mile downstream of the confluence of Island Creek Tributary 1	37.61	*	*	7190	*
At the confluence of Island Creek Tributary 1	36.96	*	*	7112	*
Approximately 550 feet upstream of the confluence of Island Creek Tributary 1	36.53	*	*	7060	*
Approximately 0.3 mile upstream of the confluence of Island Creek Tributary 1	36.39	*	*	7043	*
Approximately 0.7 mile upstream of the confluence of Island Creek Tributary 1	35.89	*	*	6983	*
Approximately 1.1 miles upstream of the confluence of Island Creek Tributary 1	35.01	*	*	6875	*
Approximately 0.9 mile downstream of State Route 1445	33.46	*	*	6684	*
At the confluence of Island Creek Tributary 2	30.20	*	*	6268	*
At the confluence of Michael Creek	19.22	*	*	4726	*
Joes Branch					
Confluence of Ruin Creek	3.57	*	*	1650	*
Approximately 0.3 mile upstream from the confluence of Ruin Creek	3.46	*	*	1620	*
Approximately 0.7 mile upstream from the confluence of Ruin Creek	3.18	*	*	1530	*
Approximately 0.9 mile downstream of the County Home Road crossing	2.98	*	*	1470	*
Approximately 0.5 mile downstream of the County Home Road crossing	2.59	*	*	1350	*

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 0.1 mile upstream of the County Home Road crossing	2.14	*	*	1200	*
Approximately 0.5 mile upstream of the County Home Road crossing	1.63	*	*	1010	*
Kerr Reservoir Tributary 3D					
At the confluence of Kerr Reservoir Tributary 3D-2	1.09	*	*	787	*
Approximately 0.27 mile upstream of the confluence of Kerr Reservoir 3D-2	1.02	*	*	755	*
Approximately 0.42 mile upstream of the confluence of Kerr Reservoir Tributary 3D-2	0.32	*	*	368	*
Kerr Reservoir Tributary 3D-1					
Approximately 40 feet upstream of the confluence with John H. Kerr Reservoir	0.36	*	*	396	*
Approximately 1,370 feet upstream of the confluence with John H. Kerr Reservoir	0.28	*	*	337	*
Kerr Reservoir Tributary 3D-2					
At the confluence with Kerr Reservoir Tributary 3D	0.60	*	*	542	*
Approximately 1,700 feet upstream of the confluence with Kerr Reservoir Tributary 3D	0.44	*	*	444	*
Approximately 2,100 feet upstream of the confluence with Kerr Reservoir Tributary 3D	0.30	*	*	349	*
Kerr Reservoir Tributary 4					
At the confluence with John H. Kerr Reservoir	1.70	*	*	1039	*
Approximately 0.6 mile upstream of the confluence with John H. Kerr Reservoir	0.97	*	*	732	*
Little Island Creek					
Just upstream of the confluence with Island Creek	21.22	*	*	5027	*
Approximately 0.2 mile upstream of the confluence with Island Creek	21.19	*	*	5023	*
Approximately 1.1 miles upstream of the confluence with Island Creek	20.17	*	*	4872	*
At Tungsten Mine Road	18.98	*	*	4689	*
Approximately 0.7 mile upstream of Tungsten Mine Road	18.05	*	*	4544	*
Approximately 1.5 miles upstream of Tungsten Mine Road	14.86	*	*	4023	*
Approximately 1.6 miles upstream of Tungsten Mine Road	14.83	*	*	4020	*
Approximately 1.8 miles downstream of Morgan Road	14.34	*	*	3935	*
Approximately 0.6 mile downstream of Morgan Road	12.83	*	*	3672	*
Approximately 0.5 mile downstream of Morgan Road	12.10	*	*	3539	*
Approximately 0.3 mile upstream of Morgan Road	11.64	*	*	3455	*
Approximately 0.6 mile upstream of Morgan Road	11.27	*	*	3385	*
Approximately 0.6 mile downstream of Rice Road	9.26	*	*	2995	*
Approximately 0.5 mile downstream of Rice Road	8.94	*	*	2930	*
Approximately 467 feet upstream of Rice Road	7.94	*	*	2720	*
Approximately 0.3 mile upstream of Rice Road	5.88	*	*	2254	*
Approximately 1.2 miles upstream of Rice Road	4.81	*	*	1989	*
Approximately 1.5 miles upstream of Rice Road	4.01	*	*	1775	*
Little Island Creek Tributary 1					
Just downstream of the confluence with Island Creek	1.02	*	*	753	*
Approximately 0.7 mile upstream of the confluence with Island Creek	0.64	*	*	565	*
Long Creek					
At the confluence with Tabbs Creek	10.21	*	*	3180	*
Approximately 0.4 mile upstream of the confluence with Tabbs Creek	10.05	*	*	3150	*
Approximately 0.2 mile downstream of the Beachtree Trail crossing	9.58	*	*	3060	*
Approximately 0.4 mile upstream of the Beachtree Trail crossing	9.11	*	*	2960	*
Approximately 0.8 mile downstream of the Kittrell College Road crossing	8.27	*	*	2790	*

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 0.5 mile downstream of the Kittrell College Road crossing	7.78	*	*	2690	*
Approximately 0.2 mile upstream of the Kittrell College Road crossing	6.27	*	*	2350	*
Approximately 0.6 mile upstream of the Kittrell College Road crossing	5.84	*	*	2250	*
Approximately 1.0 mile upstream of the Kittrell College Road crossing	5.54	*	*	2170	*
Approximately 1.4 miles upstream of the Kittrell College Road crossing	4.85	*	*	2000	*
Long Grass Branch					
Just upstream of the Virginia State Line	0.13	*	*	211	*
Lynch Creek					
Approximately 0.2 mile downstream of the Vance and Franklin County lines	5.80	*	*	2272	*
Approximately 0.3 mile upstream of the Vance and Franklin County lines	5.20	*	*	2090	*
Approximately 0.1 mile upstream from the Gillburg Road crossing	4.37	*	*	1870	*
Approximately 0.4 mile upstream from the Gillburg Road crossing	3.72	*	*	1690	*
Martin Creek					
Just upstream of confluence with Sandy Creek	4.40	993	1700	1952	2683
Approximately 3,080 feet downstream of Rock Mill Road	3.73	956	1641	1876	2552
Approximately 1,530 feet downstream of Rock Mill Road	3.37	940	1603	1828	2471
Approximately 1,165 feet upstream of Rock Mill Road	2.93	918	1552	1763	2363
Approximately 2,245 feet downstream of N.C. Highway 39 South	2.44	866	1458	1651	2198
Just upstream of N.C. Highway 39 South	2.20	849	1422	1606	2125
Michael Creek					
Just downstream of the confluence with Island Creek	10.59	*	*	3256	*
Approximately 0.4 mile upstream of the confluence with Island Creek	10.38	*	*	3216	*
Approximately 0.6 mile upstream of the confluence with Island Creek	9.89	*	*	3120	*
Approximately 1.0 mile upstream of the confluence with Island Creek	9.69	*	*	3081	*
Approximately 1.1 miles upstream of the confluence with Island Creek	9.20	*	*	2981	*
Approximately 1.5 miles upstream of the confluence with Island Creek	9.03	*	*	2947	*
Approximately 1.9 miles upstream of the confluence with Island Creek	8.54	*	*	2847	*
Approximately 2.3 miles upstream of the confluence with Island Creek	8.24	*	*	2785	*
Approximately 2.8 miles upstream of the confluence with Island Creek	6.09	*	*	2304	*
Approximately 1.8 miles downstream of Rockwell Road	5.97	*	*	2276	*
Nutbush Creek					
At upstream end of John H. Kerr Reservoir	7.56	1512	2502	2843	3813
Approximately 0.45 mile downstream of Spring Valley Road	6.81	1488	2446	2772	3693
Approximately 500 feet upstream of Spring Valley Road	5.90	1457	2373	2677	3534
At confluence with Nutbush Creek Tributary 1	5.24	1429	2311	2599	3405
Just upstream of confluence with Nutbush Creek Tributary 2	3.82	1323	2112	2359	3044
Approximately 1,450 feet upstream of North Carolina Highway 39	2.41	1022	1655	1850	2392
Just upstream of confluence with Nutbush Creek Tributary 3	0.84	552	929	1043	1361
Approximately 440 feet downstream of Beckford Drive	0.61	470	795	892	1163
Approximately 830 feet downstream of Beckford Drive	0.36	377	639	714	921
Nutbush Creek Tributary 1					
At the confluence with Nutbush Creek	0.88	*	*	688	*
Approximately 0.5 mile upstream of the confluence with Nutbush Creek	0.70	*	*	596	*
Approximately 0.9 mile upstream of the confluence with Nutbush Creek	0.37	*	*	402	*

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
Nutbush Creek Tributary 2					
At the confluence with Nutbush Creek	1.14	*	*	1161	*
At the confluence of Nutbush Creek Tributary 2A	0.59	*	*	801	*
At the confluence of Nutbush Creek Tributary 2B	0.39	*	*	642	*
Approximately 150 feet downstream of Interstate 85	0.32	*	*	546	*
Approximately 830 feet upstream of Interstate 85	0.19	*	*	398	*
Nutbush Creek Tributary 2A					
At the confluence with Nutbush Creek Tributary 2	0.40	*	*	672	*
Approximately 0.5 mile upstream of the confluence with Nutbush Creek Tributary 2	0.26	*	*	487	*
Nutbush Creek Tributary 2B					
At the confluence with Nutbush Creek Tributary 2	0.17	*	*	386	*
Nutbush Creek Tributary 3					
Just upstream of confluence with Nutbush Creek	1.26	702	1163	1304	1694
Just upstream of confluence with Nutbush Creek Tributary 3A	1.10	673	1110	1241	1604
Approximately 50 feet upstream of confluence with Nutbush Creek Tributary 3B	0.61	424	735	832	1103
Approximately 300 feet downstream of West Young Avenue	0.29	249	454	518	704
Nutbush Creek Tributary 3A					
Approximately 100 fet upstream of confluence with Nutbush Creek Tributary 3	0.15	125	214	254	372
Approximately 1,750 feet upstream of Beckford Drive	0.09	89	178	210	306
Nutbush Creek Tributary 3B					
Approximately 50 feet upstream of confluence with Nutbush Creek Tributary 3	0.38	387	653	730	940
At Parkway Drive	0.20	285	485	540	692
Poplar Creek					
Approximately 0.9 mile downstream of U.S. Highway 158 Business	3.83	912	1479	1724	2345
Approximately 1,740 feet downstream of U.S. Highway 158 Business	3.28	828	1347	1571	2141
Approximately 1,330 feet upstream of U.S. Highway 158 Business	2.82	754	1229	1435	1959
Approximately 1,500 feet downstream of Interstate 85	2.32	668	1094	1278	1749
Approximately 600 feet upstream of Interstate 85	1.32	473	782	917	1262
Approximately 2,300 feet upstream of Interstate 85	1.16	437	723	849	1170
Red Bud Creek					
Approximately 85 feet upstream of confluence with Ruin Creek	5.97	1199	2017	2313	3169
Approximately 225 feet upstream of vance Academy Road	2.94	797	1393	1599	2195
Approximately 1,775 feet upstream of U.S. Highway 158 Business	2.59	776	1349	1543	2104
Approximately 2,500 feet downstream of Cameron Drive	2.08	739	1271	1447	1950
Approximately 270 feet downstream of Cameron Drive	1.81	702	1205	1370	1840
Approximately 85 feet downstream of confluence with Red Bud Creek Tributary 2	0.91	543	925	1043	1374
Approximately 650 feet upstream of confluence with Red Bud Creek Tributary 2	0.85	537	910	1024	1344
Red Bud Creek Tributary					
At the confluence with Red Bud Creek	2.97	*	*	1470	*
Approximately 0.6 mile upstream of the confluence with Red Bud Creek	2.69	*	*	1380	*
Approximately 1.0 mile upstream of the confluence with Red Bud Creek	2.41	*	*	1290	*
Approximately 1.2 miles upstream of the confluence with Red Bud Creek	2.09	*	*	1180	*
Approximately 1.6 miles upstream of the confluence with Red Bud Creek	1.75	*	*	1060	*

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
Red Bud Creek Tributary 2					
Just upstream of confluence with Red Bud Creek	0.71	324	578	673	958
Approximately 265 feet upstream of Woodland Road	0.57	286	538	625	879
Ruin Creek					
Just upstream of confluence with Tabbs Creek	30.29	3266	5114	5887	7827
Approximately 1.0 mile upstream of the confluence with Tabbs Creek	29.35	*	*	6160	*
Approximately 0.1 mile downstream of the Community House Road crossing	28.08	*	*	5990	*
Approximately 1.1 miles upstream of the Community House Road crossing	23.19	*	*	5320	*
Approximately 1.8 miles upstream of the Community House Road crossing	20.44	*	*	4910	*
Approximately 2.0 miles upstream of the Community House Road crossing	19.91	*	*	4830	*
At the confluence of Joes Branch	15.38	*	*	4110	*
Approximately 0.8 mile upstream of the confluence of Joes Branch	14.85	*	*	4020	*
Just upstream of confluence with Red Bud Creek	7.97	1432	2295	2663	3593
At the confluence of Red Bud Creek	7.93	*	*	2720	*
Approximately 0.5 mile upstream of the confluence of Red Bud Creek	7.73	*	*	2680	*
Approximately 1.0 mile upstream of the confluence of Red Bud Creek	7.22	*	*	2560	*
Sandy Creek					
Approximately 0.5 mile downstream of Warren/Vance County boundary	33.70	*	*	6710	*
At the confluence of Weaver Creek	23.59	*	*	5370	*
Approximately 1.4 miles upstream of the confluence of Weaver Creek	19.09	*	*	4710	*
At the confluence of Cattail Creek	16.30	*	*	4260	*
Approximately 0.8 mile downstream of confluence with Martin Creek	15.81	2313	3731	4229	5642
Just upstream of confluence with Martin Creek	11.26	1879	3076	3493	4682
At the confluence of Martin Creek	11.21	*	*	3370	*
Approximately 0.5 mile upstream of the confluence of Martin Creek	9.24	*	*	2990	*
Approximately 1.8 miles upstream of the confluence of Martin Creek	8.76	*	*	2890	*
Approximately 250 feet downstream of confluence with Sandy Creek Tributary 11	4.59	1019	1681	1936	2681
At the confluence of Sandy Creek Tributary 11	4.53	*	*	1910	*
Approximately 70 feet downstream of Fox Pond Road	3.48	869	1514	1738	2388
Approximately 2,000 feet downstream of U.S. Highway 1 Bypass	1.63	644	1116	1271	1716
Approximately 1.2 miles upstream of the confluence of Sandy Creek Tributary 11	1.45	*	*	942	*
Approximately 0.1 mile downstream of the Highway 1 crossing	0.95	*	*	724	*
Approximately 725 feet upstream of U.S. Highway 1 Bypass	0.90	398	727	839	1164
Approximately 2,700 feet upstream of U.S. Highway 1 Bypass	0.70	373	675	775	1063
Sandy Creek Tributary 11					
Just upstream of confluence with Sandy Creek	3.47	1248	1999	2234	2886
Approximately 0.4 mile upstream of the confluence with Sandy Creek	3.01	*	*	1480	*
Approximately 1,330 feet upstream of N.C. Highway 39 South	1.52	715	1201	1354	1784
At the confluence with Sandy Creek Tributary 12	1.51	*	*	964	*
Sandy Creek Tributary 12					
Just upstream of the confluence with Sandy Creek Tributary 11	1.22	741	1209	1347	1729
Approximately 0.2 mile upstream of the confluence with Sandy Creek Tributary 11	1.07	*	*	776	*
Approximately 325 feet upstream of U.S. Highway 1 Bypass	0.99	617	1029	1153	1499
Just downstream of North Pinkston Street	0.69	500	845	948	1236

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
Sandy Creek Tributary 16					
Just upstream of confluence with Sandy Creek	0.91	375	624	734	1014
Approximately 1,700 feet upstream of confluence with Sandy Creek	0.75	333	555	653	905
Sandy Creek Tributary 17					
Just upstream of confluence with Sandy Creek	1.60	532	875	1025	1408
At Newton Dairy Road	1.48	506	834	978	1344
Tabbs Creek					
Just upstream of Vance / Franklin County boundary	71.00	5524	8526	9765	12862
Approximately 2,000 feet upstream of the confluence with Tar River	69.50	*	*	10446	*
At SR 1100	68.90	*	*	10395	*
Approximately 2,800 feet upstream of SR 1100	68.40	*	*	10338	*
At the confluence of Long Creek	59.52	*	*	9580	*
Approximately 2.8 miles upstream of the confluence of Long Creek	57.59	*	*	9380	*
Approximately 2.2 miles downstream of the confluence of Ruin Creek	55.61	*	*	9180	*
Just upstream of confluence with Ruin Creek	23.90	2822	4437	5114	6818
Approximately 1.4 miles upstream of the confluence of Ruin Creek	22.59	*	*	5230	*
At the confluence of Sandy Creek Tributary 11	1.20	*	*	851	*
Tar River					
Approximately 810 feet upstream of U.S. Highway 1	265.40	12642	19863	23458	33143
Approximately 120 feet upstream of the confluence of Taylors Creek	255.79	12630	19789	23330	32822
Approximately 1.5 miles downstream of Green Hill Road (SR 1203)	244.74	12616	19702	23177	32440
At the confluence of Gibbs Creek	223.50	11993	18670	21900	30600
Weaver Creek					
Confluence with Sandy Creek	9.71	*	*	3080	*
Approximately 1.2 miles upstream of the confluence with Sandy Creek	8.93	*	*	2930	*
Approximately 0.7 mile downstream of the Vicksboro Road crossing	7.98	*	*	2730	*
Approximately 0.2 mile downstream of the Vicksboro Road crossing	7.06	*	*	2530	*
Approximately 0.2 mile upstream of the Vicksboro Road crossing	5.26	*	*	2100	*

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

Table 15, “Gage Information”, lists the stream gages located in Vance 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
02081710	Long Creek	LONG CREEK AT KITTREL, N.C.	3.26	1954	1976

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"
Anderson Creek	0.040 to 0.062	0.090 to 0.150
Buffalo Creek North	0.043 to 0.050	0.110 to 0.150
Cattail Creek	0.045	0.130
Crooked Run	0.035 to 0.050	0.130 to 0.150
Crooked Run Tributary 1	0.035 to 0.050	0.130 to 0.150
Dickies Creek	0.045	0.150
Fishing Creek	0.020 to 0.080	0.035 to 0.200
Flat Creek	0.040 to 0.050	0.150
Gilliams Branch	0.045	0.080 to 0.150
Indian Creek	0.035 to 0.055	0.120 to 0.150
Island Creek	0.035 to 0.045	0.130 to 0.150
Joes Branch	0.055 to 0.060	0.100 to 0.150
Kerr Reservoir Tributary 3D	0.035 to 0.050	0.060 to 0.180
Kerr Reservoir Tributary 3D-1	0.035 to 0.050	0.150
Kerr Reservoir Tributary 3D-2	0.050	0.150
Kerr Reservoir Tributary 4	0.050	0.150
Little Island Creek	0.040	0.080 to 0.150
Little Island Creek Tributary 1	0.040	0.100
Long Creek	0.055	0.130 to 0.140
Long Grass Branch	0.048	0.100 to 0.140
Lynch Creek	0.050 to 0.055	0.120 to 1.000
Martin Creek	0.040 to 0.055	0.070 to 0.150
Michael Creek	0.045	0.080 to 0.150
Nutbush Creek	0.040 to 0.055	0.080 to 0.150
Nutbush Creek Tributary 1	0.050	0.150
Nutbush Creek Tributary 2	0.050	0.080 to 0.150
Nutbush Creek Tributary 2A	0.048 to 0.050	0.110 to 0.130
Nutbush Creek Tributary 2B	0.035 to 0.065	0.070 to 0.150
Nutbush Creek Tributary 3	0.045 to 0.060	0.080 to 0.150
Nutbush Creek Tributary 3A	0.050	0.080 to 0.150
Nutbush Creek Tributary 3B	0.050 to 0.055	0.080 to 0.150
Poplar Creek	0.045 to 0.050	0.070 to 0.150

Table 16 - Roughness Coefficients

Stream	Channel "n"	Overbank "n"
Red Bud Creek	0.035 to 0.060	0.070 to 0.130
Red Bud Creek Tributary	0.050	0.130 to 0.150
Red Bud Creek Tributary 2	0.035 to 0.050	0.070 to 0.130
Ruin Creek	0.050 to 0.055	0.110 to 0.150
Sandy Creek	0.042 to 0.050	0.080 to 0.168
Sandy Creek Tributary 11	0.043	0.120
Sandy Creek Tributary 12	0.043 to 0.050	0.080 to 0.120
Sandy Creek Tributary 16	0.050	0.035 to 0.140
Sandy Creek Tributary 17	0.042 to 0.050	0.080 to 0.140
Tabbs Creek	0.035 to 0.060	0.045 to 0.150
Tar River	0.020 to 0.080	0.030 to 1.000
Weaver Creek	0.043 to 0.044	0.120 to 0.140

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
Anderson Creek				
001	51	2,502	320.1[1]	31 / 29
003	345	2,502	320.1[1]	28 / 28
007	717	2,502	320.1[1]	21 / 21
010	1,046	2,502	320.1[1]	50 / 16
018	1,788	2,502	320.1[1]	60 / 60

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
022	2,161	2,502	320.1[1]	80 / 120
025	2,534	2,502	320.1[1]	190 / 18
028	2,814	2,502	320.1[1]	220 / 35
033	3,315	2,100	320.1[1]	35 / 280
038	3,791	2,100	320.1[1]	70 / 100
041	4,051	2,100	320.1[1]	75 / 30
043	4,331	2,100	320.1[1]	80 / 75
049	4,932	2,100	320.1[1]	60 / 25
053	5,319	2,100	320.1[1]	38 / 109
056	5,616	2,100	320.1[1]	66 / 41
062	6,188	2,100	320.1[1]	70 / 17
065	6,463	2,100	320.1[1]	45 / 35
071	7,060	2,100	320.2	41 / 104
075	7,491	2,100	321.0	17 / 75
081	8,120	2,100	323.1	57 / 40
084	8,373	2,100	323.7	41 / 29
087	8,681	2,100	324.7	20 / 30
092	9,231	2,100	326.9	17 / 68
096	9,574	2,100	328.1	40 / 40
097	9,708	2,100	328.6	41 / 43
100	9,973	1,878	329.3	84 / 48
105	10,498	1,878	330.6	11 / 116
110	11,000	1,878	332.3	22 / 47
115	11,545	1,878	334.7	52 / 74
121	12,116	1,747	336.5	36 / 17
125	12,513	1,747	338.6	17 / 24
126	12,634	1,747	345.4	100 / 45
128	12,752	1,747	345.4	65 / 39
128	12,814	1,747	345.4	55 / 36
129	12,929	1,747	349.6	23 / 21
130	12,991	1,747	351.5	23 / 15
133	13,340	1,747	356.0	51 / 31
136	13,595	1,747	356.7	92 / 32
140	13,991	1,747	358.5	47 / 68
143	14,333	1,747	360.8	13 / 80
146	14,578	1,747	362.4	7 / 82
150	14,959	1,747	363.8	71 / 54
Buffalo Creek North				
016	1,587	2,696	229.2[1]	58 / 362
022	2,157	2,696	229.2[1]	75 / 419
026	2,616	2,696	229.2[1]	10 / 290
030	3,002	2,696	229.2[1]	138 / 188
035	3,502	2,696	229.2[1]	149 / 94
040	4,000	2,696	229.2[1]	145 / 26
045	4,500	2,696	229.2[1]	74 / 52

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
049	4,887	2,696	233.1	75 / 75
055	5,500	2,696	233.4	81 / 52
060	6,001	2,696	233.9	16 / 97
065	6,501	2,606	234.4	97 / 36
070	7,002	2,606	234.9	18 / 123
075	7,503	2,606	235.7	154 / 51
080	8,002	2,606	236.5	100 / 34
085	8,503	2,606	237.8	92 / 87
090	9,004	2,606	238.8	18 / 135
095	9,504	2,483	240.2	75 / 17
100	10,004	2,483	242.3	30 / 205
105	10,503	2,483	243.3	75 / 300
110	11,005	2,483	244.6	90 / 160
114	11,428	2,483	247.2	40 / 185
121	12,110	2,483	249.2	30 / 54
125	12,508	2,483	250.3	23 / 29
130	13,007	2,483	252.3	69 / 37
135	13,508	2,300	253.9	65 / 54
140	14,007	2,300	255.0	28 / 97
145	14,507	2,300	256.6	50 / 15
150	15,006	2,300	258.4	149 / 29
155	15,508	2,300	259.8	33 / 32
160	16,007	2,300	261.6	16 / 19
168	16,790	2,300	265.8	200 / 50
Cattail Creek				
006	551	1,250	329.2[1]	81 / 104
011	1,123	1,250	329.2[1]	191 / 31
017	1,709	1,250	329.2[1]	85 / 122
022	2,165	1,250	330.0	133 / 67
027	2,658	1,250	332.4	13 / 163
032	3,221	1,140	334.6	5 / 184
036	3,567	1,140	336.1	5 / 75
042	4,168	1,140	339.9	63 / 151
047	4,693	1,140	341.8	90 / 13
050	5,042	1,140	344.7	31 / 11
057	5,673	1,020	351.7	22 / 27
Crooked Run				
001	96	3,058	320.1[1]	416 / 156
003	294	3,058	320.1[1]	40 / 140
004	446	3,058	320.1[1]	91 / 90
009	908	1,983	320.1[1]	166 / 237
012	1,182	1,983	320.1[1]	234 / 181
017	1,673	1,983	320.1[1]	94 / 112
018	1,827	1,983	320.1[1]	138 / 101
020	2,003	1,983	320.1[1]	77 / 105

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
025	2,452	1,983	320.1[1]	59 / 74
030	3,036	1,983	320.1[1]	37 / 33
036	3,554	1,983	320.1[1]	58 / 23
038	3,778	1,983	320.1[1]	100 / 35
042	4,191	1,983	320.1[1]	100 / 15
045	4,526	1,983	320.1[1]	42 / 122
049	4,913	1,983	320.1[1]	155 / 128
057	5,663	1,983	320.1[1]	74 / 28
058	5,838	1,983	320.1[1]	60 / 12
062	6,157	1,983	320.1[1]	31 / 45
064	6,426	1,983	320.1	12 / 77
068	6,788	1,983	320.9	40 / 45
070	6,955	1,983	321.6	120 / 19
073	7,263	1,780	321.8	145 / 90
079	7,859	1,780	322.2	183 / 51
084	8,411	1,780	322.7	41 / 18
092	9,187	1,780	325.5	117 / 170
Crooked Run Tributary 1				
003	290	1,960	320.1[1]	146 / 257
005	527	1,960	320.1[1]	197 / 136
010	1,024	1,960	320.1[1]	193 / 235
013	1,306	1,960	320.1[1]	155 / 193
016	1,571	1,960	320.1[1]	99 / 97
017	1,702	1,960	320.1[1]	105 / 83
020	2,008	1,960	320.1[1]	83 / 38
021	2,147	1,960	320.1[1]	74 / 33
024	2,422	1,960	320.1[1]	35 / 30
027	2,712	1,960	320.1[1]	45 / 35
030	2,990	1,960	320.1[1]	45 / 62
033	3,250	1,960	320.1[1]	20 / 32
036	3,641	1,960	320.1[1]	23 / 40
039	3,876	1,960	320.1[1]	89 / 63
041	4,137	1,960	320.1[1]	9 / 128
045	4,460	1,960	320.1[1]	29 / 129
046	4,625	1,960	320.1[1]	10 / 144
051	5,091	1,960	320.1[1]	42 / 63
053	5,312	1,960	320.1[1]	57 / 30
056	5,563	1,960	320.6	19 / 171
058	5,817	1,960	320.9	30 / 119
060	5,993	1,960	321.4	70 / 53
063	6,265	1,960	322.0	48 / 26
065	6,524	1,960	323.1	77 / 64
067	6,722	1,960	323.4	107 / 158
070	6,954	1,960	323.6	86 / 28
074	7,391	1,794	324.6	50 / 86

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
076	7,577	1,794	325.1	35 / 93
079	7,875	1,794	325.8	45 / 39
083	8,264	1,794	326.9	84 / 53
Dickies Creek				
007	743	1,480	314.5[1]	14 / 147
008	829	1,480	316.0	44 / 104
016	1,566	1,480	317.1	232 / 74
022	2,166	1,480	320.2	97 / 24
Fishing Creek				
5790	579,006	2,469	344.8	75 / 75
5797	579,705	2,469	347.6	18 / 50
5803	580,330	2,469	350.1	33 / 38
5809	580,853	2,469	351.5	65 / 40
5814	581,435	2,469	352.3	79 / 57
5818	581,832	2,469	353.5	160 / 18
5826	582,616	2,036	355.2	54 / 110
5830	582,998	2,036	356.3	17 / 134
Flat Creek				
000	16	4,011	320.1[1]	116 / 121
008	760	4,011	320.1[1]	85 / 99
013	1,333	4,011	320.1[1]	138 / 129
018	1,817	4,011	320.1[1]	61 / 162
023	2,250	3,863	320.1[1]	231 / 182
027	2,694	3,863	320.1[1]	311 / 128
031	3,126	3,863	320.1[1]	136 / 170
035	3,530	3,863	320.1[1]	71 / 102
041	4,080	3,710	320.1[1]	156 / 185
044	4,377	3,710	320.1[1]	74 / 83
052	5,202	3,710	320.1[1]	185 / 140
058	5,799	3,710	320.1[1]	55 / 53
065	6,505	3,710	320.1[1]	154 / 154
070	7,016	3,710	320.1[1]	64 / 98
074	7,381	3,710	320.1[1]	48 / 162
079	7,869	3,643	320.1[1]	182 / 154
084	8,401	3,643	320.1[1]	450 / 35
092	9,166	3,643	320.1[1]	223 / 22
096	9,640	3,643	320.1[1]	135 / 239
100	10,009	3,233	320.1[1]	107 / 143
103	10,341	3,233	320.1[1]	30 / 230
107	10,733	3,233	320.3	30 / 400
112	11,230	3,233	321.2	35 / 450
118	11,785	3,233	322.0	20 / 329
126	12,596	3,233	325.7	180 / 25
129	12,939	3,233	326.5	100 / 25
133	13,275	3,233	327.9	55 / 75
135	13,493	3,233	328.2	25 / 75

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
140	14,028	3,233	330.0	25 / 90
144	14,372	3,233	330.8	40 / 55
Gilliams Branch				
021	2,138	2,074	289.4[1]	54 / 96
026	2,601	2,074	289.4[1]	146 / 46
031	3,147	2,074	289.4[1]	52 / 39
037	3,723	2,074	289.4[1]	76 / 1
044	4,415	2,074	289.4[1]	20 / 73
051	5,098	2,074	289.4[1]	27 / 90
056	5,649	1,994	289.4[1]	50 / 173
061	6,130	1,994	289.4[1]	79 / 242
067	6,679	1,994	289.4[1]	56 / 118
073	7,262	1,994	289.4[1]	25 / 116
078	7,753	1,994	289.4[1]	77 / 72
083	8,261	1,920	289.4[1]	160 / 108
088	8,834	1,920	289.4[1]	38 / 40
093	9,307	1,920	289.4[1]	91 / 42
098	9,790	1,920	289.4[1]	25 / 165
103	10,306	1,920	289.4[1]	128 / 10
108	10,845	1,920	289.4[1]	155 / 10
114	11,430	1,456	289.4[1]	40 / 222
120	12,043	1,456	289.4[1]	104 / 20
125	12,497	1,456	289.4[1]	64 / 20
129	12,943	1,456	290.6	64 / 48
134	13,392	1,456	291.8	41 / 173
137	13,735	1,456	292.4	69 / 71
143	14,327	1,354	295.2	100 / 30
Indian Creek				
002	233	1,289	320.1[1]	75 / 102
005	481	1,289	320.1[1]	38 / 109
008	750	1,289	320.1[1]	127 / 43
010	962	1,289	320.1[1]	153 / 6
013	1,250	1,289	320.1[1]	171 / 6
015	1,500	1,289	320.1[1]	208 / 6
017	1,698	1,289	320.7	22 / 53
017	1,748	1,289	320.7	9 / 15
018	1,768	1,289	323.3	52 / 87
018	1,788	1,289	323.3	34 / 84
018	1,823	1,289	323.3	24 / 67
019	1,854	1,289	323.3	12 / 58
020	1,973	1,289	323.7	21 / 6
021	2,119	1,289	325.2	21 / 27
023	2,271	1,289	326.0	9 / 42
025	2,547	1,289	327.6	12 / 68
028	2,750	1,289	328.1	52 / 80

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
030	2,979	1,289	328.8	14 / 81
032	3,221	1,289	329.8	72 / 20
036	3,583	1,289	331.9	68 / 100
038	3,750	1,289	333.0	71 / 73
040	4,000	1,289	334.2	49 / 73
043	4,250	1,289	335.3	105 / 58
045	4,524	1,289	336.4	156 / 32
049	4,899	1,289	338.4	38 / 18
051	5,121	1,289	341.1	11 / 56
054	5,373	1,289	342.3	50 / 25
057	5,697	1,289	343.8	32 / 6
060	6,014	1,289	350.1	16 / 15
066	6,563	1,289	356.3	47 / 30
068	6,771	1,289	357.3	65 / 6
070	7,000	1,289	358.8	29 / 34
072	7,193	1,289	360.4	7 / 115
075	7,543	1,289	362.3	30 / 46
078	7,750	1,289	363.8	6 / 38
080	7,980	1,289	366.6	57 / 30
083	8,302	1,289	367.6	7 / 78
088	8,782	1,289	369.9	6 / 14
091	9,078	1,289	375.9	25 / 55
095	9,500	1,289	379.0	9 / 23
098	9,750	1,289	381.2	6 / 23
102	10,230	587	387.2	11 / 49
105	10,538	587	389.2	47 / 21
109	10,882	587	392.6	104 / 5
112	11,154	500	394.6	140 / 7
114	11,413	351	399.2	7 / 21
117	11,713	351	403.3	4 / 23
120	12,015	351	406.2	4 / 39
121	12,108	271	406.9	4 / 11
122	12,182	271	408.3	5 / 14
123	12,292	271	418.6	111 / 127
124	12,382	271	418.6	57 / 86
125	12,499	271	418.6	19 / 44
126	12,642	271	418.7	14 / 37
128	12,774	271	419.6	4 / 22
130	12,961	271	421.6	21 / 10
132	13,169	271	423.4	5 / 10
137	13,749	271	436.0	60 / 5
140	13,967	271	436.1	15 / 25
141	14,084	271	437.1	10 / 5
142	14,214	271	440.1	10 / 10
143	14,265	271	442.6	10 / 9

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
143	14,298	271	444.2	20 / 10
143	14,325	271	445.4	12 / 8
143	14,337	271	446.6	18 / 10
144	14,361	159	446.7	7 / 12
144	14,373	159	446.8	7 / 11
144	14,394	159	446.8	10 / 8
144	14,418	159	447.1	4 / 10
144	14,442	159	447.2	10 / 9
145	14,463	159	447.4	8 / 5
145	14,477	159	447.8	8 / 5
145	14,488	159	448.3	5 / 5
146	14,560	159	451.3	4 / 5
146	14,595	159	452.1	4 / 5
146	14,630	159	452.7	4 / 5
147	14,679	159	455.5	4 / 5
147	14,716	159	459.5	4 / 5
148	14,752	159	464.2	4 / 5
148	14,805	159	470.2	10 / 5
149	14,905	159	475.9	5 / 12
150	15,019	159	479.0	4 / 8
151	15,091	159	483.0	5 / 5
151	15,136	159	484.2	8 / 5
152	15,214	159	487.3	4 / 5
153	15,267	159	489.1	10 / 7
153	15,345	159	490.4	4 / 5
155	15,453	159	493.6	11 / 8
157	15,689	159	497.2	4 / 12
159	15,909	159	502.4	28 / 38
Island Creek				
008	805	9,729	289.4[1]	250 / 130
013	1,313	9,729	289.4[1]	125 / 165
018	1,806	9,729	289.4[1]	65 / 65
023	2,292	9,729	289.4[1]	205 / 255
025	2,507	9,729	289.4[1]	105 / 455
030	3,022	9,729	289.4[1]	35 / 753
036	3,597	9,729	289.4[1]	75 / 145
042	4,216	9,729	289.4[1]	100 / 55
047	4,740	9,729	289.4[1]	165 / 314
053	5,283	9,729	289.4[1]	290 / 55
060	6,029	9,729	289.4[1]	110 / 410
067	6,660	9,729	289.4[1]	98 / 107
078	7,760	7,387	289.4[1]	50 / 300
084	8,360	7,387	289.4[1]	682 / 31
088	8,771	7,346	289.4[1]	714 / 242
093	9,315	7,346	289.4[1]	30 / 653

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
097	9,669	7,346	289.4[1]	60 / 535
102	10,199	7,346	289.4[1]	30 / 79
108	10,799	7,346	289.4[1]	78 / 100
111	11,100	7,346	289.4[1]	73 / 30
117	11,695	7,346	289.4[1]	54 / 292
121	12,081	7,346	289.4[1]	65 / 610
124	12,448	7,346	289.4[1]	50 / 822
139	13,866	7,346	289.4[1]	1,024 / 30
144	14,413	7,303	289.4[1]	839 / 40
155	15,535	7,303	289.4[1]	300 / 50
162	16,211	7,303	289.4[1]	30 / 458
166	16,581	7,246	289.4[1]	30 / 337
172	17,176	7,246	289.4[1]	336 / 30
175	17,481	7,246	289.4[1]	232 / 182
179	17,949	7,246	289.4[1]	207 / 459
185	18,535	7,190	289.4[1]	550 / 224
190	19,028	7,190	289.4[1]	601 / 26
195	19,505	7,190	289.4[1]	622 / 15
200	20,003	7,190	289.4[1]	453 / 30
204	20,440	7,190	289.4[1]	299 / 34
210	20,992	7,190	289.4[1]	291 / 118
214	21,433	7,190	289.4[1]	283 / 30
221	22,066	7,190	289.4[1]	123 / 360
226	22,551	7,190	289.4[1]	42 / 711
231	23,138	7,060	289.4[1]	612 / 580
236	23,599	7,060	289.4[1]	567 / 31
241	24,138	7,043	289.4[1]	197 / 344
245	24,499	7,043	289.4[1]	32 / 551
250	25,002	7,043	289.4[1]	32 / 50
255	25,518	7,043	289.4[1]	107 / 40
255	25,541	7,043	289.4[1]	87 / 40
260	25,981	6,983	289.4[1]	35 / 255
265	26,480	6,983	289.4[1]	46 / 31
268	26,787	6,983	289.4[1]	32 / 31
270	27,033	6,983	289.4[1]	44 / 36
275	27,507	6,983	289.4[1]	71 / 10
280	28,021	6,983	289.4[1]	55 / 100
285	28,494	6,875	289.4[1]	41 / 85
291	29,092	6,875	289.4[1]	44 / 32
298	29,765	6,875	289.4[1]	43 / 34
303	30,271	6,875	289.4[1]	52 / 34
308	30,789	6,875	289.4[1]	33 / 37
310	31,001	6,875	289.4	35 / 123
312	31,246	6,875	289.4[1]	52 / 145
319	31,925	6,875	289.4[1]	153 / 267

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
326	32,591	6,875	289.4[1]	49 / 33
328	32,781	6,684	289.4[1]	89 / 33
331	33,087	6,684	289.5	122 / 35
336	33,631	6,684	289.8	66 / 28
342	34,167	6,684	290.4	40 / 63
345	34,536	6,684	290.8	24 / 82
351	35,085	6,684	291.4	35 / 81
356	35,562	6,684	291.8	45 / 70
360	36,005	6,684	292.2	48 / 46
365	36,495	6,684	292.7	53 / 80
370	36,959	6,684	293.4	133 / 339
373	37,335	6,684	293.4	93 / 53
378	37,788	6,684	294.1	72 / 67
387	38,713	6,268	296.8	50 / 27
390	39,019	6,268	297.2	34 / 30
396	39,556	6,268	298.0	27 / 229
402	40,192	6,268	298.4	180 / 27
406	40,639	6,268	298.6	27 / 202
412	41,248	6,268	299.1	70 / 609
418	41,840	6,268	299.3	33 / 636
428	42,781	6,268	299.8	245 / 345
435	43,497	6,268	299.9	36 / 85
441	44,089	6,268	300.6	17 / 55
445	44,498	4,726	301.1	50 / 50
450	44,998	4,726	303.2	39 / 144
455	45,477	4,726	304.2	48 / 35
456	45,632	4,726	304.5	55 / 17
Joes Branch				
010	1,020	1,680	299.8	20 / 44
015	1,503	1,680	302.0	18 / 24
020	2,004	1,648	305.0	17 / 16
025	2,521	1,648	307.5	25 / 56
030	3,003	1,648	309.1	15 / 26
035	3,503	1,648	311.7	10 / 29
040	4,000	1,648	314.1	42 / 25
046	4,605	1,563	317.1	13 / 63
051	5,123	1,563	320.6	37 / 12
055	5,499	1,563	324.3	43 / 12
060	6,036	1,563	328.0	71 / 10
065	6,470	1,563	329.8	26 / 31
070	7,024	1,501	332.6	10 / 32
076	7,558	1,501	336.3	25 / 20
080	8,000	1,501	339.1	17 / 53
084	8,377	1,501	343.6	24 / 97
090	8,998	1,501	345.3	37 / 21

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
095	9,500	1,377	348.9	35 / 24
100	9,999	1,377	351.1	23 / 53
105	10,525	1,377	353.6	34 / 161
110	10,998	1,377	357.3	23 / 16
116	11,572	1,377	364.2	120 / 30
121	12,085	1,377	366.7	35 / 134
123	12,277	1,377	372.0	70 / 27
127	12,744	1,223	372.2	125 / 52
131	13,054	1,223	372.6	30 / 82
136	13,556	1,223	374.3	42 / 109
139	13,933	1,223	375.5	26 / 131
145	14,496	1,223	377.6	29 / 133
150	14,994	1,032	379.4	40 / 119
155	15,494	1,032	381.3	150 / 66
160	16,028	1,032	383.2	72 / 59
165	16,495	1,032	385.1	104 / 93
170	16,991	1,032	387.1	41 / 36
174	17,448	1,032	389.6	46 / 54
179	17,859	1,032	392.3	22 / 42
184	18,377	853	396.3	33 / 27
Kerr Reservoir Tributary 3D				
024	2,397	786	320.1[1]	8 / 35
028	2,797	755	320.1[1]	76 / 8
030	3,046	755	320.1[1]	74 / 25
031	3,099	755	320.1[1]	111 / 8
032	3,222	755	320.1[1]	165 / 6
033	3,334	707	320.1[1]	111 / 6
036	3,561	707	321.5	15 / 16
037	3,682	707	322.6	55 / 11
040	3,950	367	323.7	46 / 40
041	4,101	367	324.4	6 / 28
Kerr Reservoir Tributary 3D-1				
001	78	396	320.1[1]	102 / 92
002	187	396	320.1[1]	138 / 10
003	310	396	320.1[1]	98 / 11
005	485	396	320.1[1]	102 / 76
007	710	396	320.1[1]	99 / 57
009	910	396	320.1[1]	61 / 30
010	1,021	396	320.1[1]	41 / 7
013	1,286	396	320.1[1]	95 / 14
015	1,493	337	320.1[1]	18 / 36
017	1,749	337	320.1[1]	14 / 9
019	1,949	337	320.1[1]	2 / 9
021	2,120	337	320.1[1]	40 / 5
023	2,270	337	320.1[1]	5 / 28

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
024	2,350	337	320.1[1]	5 / 41
025	2,549	337	323.7	16 / 5
027	2,749	337	326.4	5 / 8
Kerr Reservoir Tributary 3D-2				
001	121	542	320.1[1]	50 / 50
004	351	542	320.1[1]	114 / 50
005	543	542	320.1[1]	50 / 50
007	723	542	320.1[1]	50 / 22
010	1,000	542	320.1[1]	76 / 15
012	1,200	542	320.1[1]	115 / 10
014	1,400	542	320.1[1]	85 / 10
016	1,558	542	320.1[1]	24 / 40
018	1,800	444	320.1[1]	10 / 45
020	2,000	444	320.1[1]	48 / 9
023	2,306	349	320.3	14 / 29
025	2,457	349	321.1	10 / 17
026	2,600	349	322.9	10 / 20
Kerr Reservoir Tributary 4				
002	204	632	320.1[1]	136 / 226
004	400	632	320.1[1]	198 / 158
006	600	632	320.1[1]	215 / 164
008	800	632	320.1[1]	191 / 166
010	1,003	632	320.1[1]	219 / 94
012	1,250	632	320.1[1]	168 / 103
014	1,400	632	320.1[1]	161 / 46
016	1,579	632	320.1[1]	173 / 25
018	1,769	632	320.1[1]	70 / 35
021	2,057	632	320.1[1]	89 / 32
024	2,376	632	320.1[1]	85 / 48
026	2,576	632	320.1[1]	48 / 85
028	2,776	632	320.1[1]	29 / 61
030	2,976	632	320.1[1]	130 / 7
031	3,104	632	320.1[1]	135 / 10
033	3,312	632	320.1[1]	95 / 15
035	3,540	461	320.1[1]	100 / 15
038	3,776	461	320.1[1]	80 / 40
039	3,912	461	320.1[1]	15 / 20
042	4,176	461	321.6	29 / 10
Little Island Creek				
015	1,491	5,023	289.4[1]	32 / 603
020	1,968	5,023	289.4[1]	30 / 421
027	2,653	5,023	289.4[1]	72 / 27
031	3,143	5,023	289.4[1]	127 / 125
040	3,963	5,023	289.4[1]	50 / 267
045	4,544	5,023	289.4[1]	67 / 90
052	5,182	5,023	289.4[1]	63 / 148

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
057	5,686	5,023	289.4[1]	37 / 70
061	6,080	4,872	289.4[1]	35 / 269
065	6,513	4,872	289.4[1]	26 / 123
070	7,014	4,872	289.4[1]	213 / 26
075	7,535	4,872	289.4[1]	26 / 55
079	7,925	4,872	289.4[1]	65 / 98
086	8,565	4,872	289.4[1]	223 / 26
090	9,032	4,872	289.4[1]	26 / 340
095	9,532	4,872	289.4[1]	354 / 26
106	10,576	4,689	289.4[1]	50 / 150
109	10,944	4,689	289.4[1]	110 / 70
117	11,683	4,689	289.4[1]	68 / 160
122	12,171	4,689	289.4[1]	36 / 113
126	12,624	4,689	289.4[1]	134 / 26
134	13,367	4,544	289.4[1]	209 / 170
139	13,894	4,544	289.4[1]	30 / 442
147	14,729	4,544	289.4[1]	200 / 86
153	15,322	4,544	289.4[1]	25 / 145
158	15,814	4,544	289.4[1]	208 / 148
164	16,416	4,544	289.4[1]	40 / 128
171	17,064	4,544	289.4[1]	232 / 125
175	17,463	4,544	289.4[1]	71 / 202
179	17,913	4,023	289.4[1]	123 / 122
185	18,461	4,020	289.4[1]	121 / 68
189	18,941	4,020	289.4[1]	188 / 23
193	19,310	4,020	289.8	43 / 69
198	19,842	4,020	291.4	78 / 54
203	20,261	4,020	292.1	65 / 24
208	20,839	4,020	293.7	90 / 63
215	21,483	3,935	294.6	109 / 19
220	21,988	3,935	295.3	23 / 322
225	22,518	3,935	295.8	318 / 14
229	22,886	3,935	296.0	211 / 23
235	23,498	3,935	296.3	32 / 39
238	23,829	3,935	297.5	60 / 60
245	24,465	3,935	298.5	50 / 100
250	24,966	3,935	299.3	162 / 30
255	25,499	3,935	299.6	50 / 50
260	25,954	3,935	300.6	274 / 126
266	26,643	3,935	300.6	50 / 60
274	27,446	3,672	302.6	22 / 133
280	27,995	3,539	303.3	21 / 108
284	28,428	3,539	303.9	200 / 75
289	28,885	3,539	304.1	250 / 7
295	29,492	3,539	304.6	60 / 90

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
306	30,640	3,539	306.7	110 / 130
314	31,439	3,539	307.9	28 / 250
319	31,896	3,539	308.2	89 / 75
325	32,477	3,455	309.2	21 / 198
332	33,152	3,455	309.8	158 / 30
336	33,579	3,385	310.2	227 / 21
341	34,115	3,385	310.4	61 / 21
349	34,902	3,385	311.8	53 / 150
356	35,566	3,385	312.4	69 / 40
360	36,031	3,385	313.2	39 / 119
366	36,593	2,995	314.0	22 / 118
370	37,000	2,930	314.6	26 / 123
375	37,507	2,930	315.3	106 / 173
380	38,004	2,930	315.7	255 / 133
385	38,472	2,930	316.0	198 / 102
390	38,965	2,930	316.5	28 / 529
398	39,806	2,930	318.8	205 / 22
404	40,430	2,720	320.0	294 / 123
409	40,867	2,720	320.7	234 / 79
417	41,750	2,254	322.4	151 / 50
423	42,268	2,254	323.4	308 / 62
429	42,862	2,254	324.5	255 / 18
434	43,362	2,254	325.6	321 / 49
439	43,924	2,254	326.4	344 / 31
444	44,423	2,254	327.2	173 / 186
450	44,954	2,254	328.1	146 / 184
455	45,490	2,254	329.3	17 / 353
461	46,146	1,989	330.6	265 / 58
467	46,679	1,989	331.7	319 / 17
473	47,254	1,989	333.2	148 / 86
480	47,953	1,775	335.1	97 / 170
488	48,757	1,775	336.9	161 / 16
492	49,208	1,775	338.2	154 / 93
498	49,760	1,775	339.4	72 / 151
Little Island Creek Tributary 1				
004	434	753	289.4[1]	12 / 58
010	1,007	753	289.4[1]	21 / 93
016	1,591	753	289.4[1]	89 / 12
023	2,343	753	289.4[1]	55 / 21
029	2,913	753	289.4[1]	12 / 56
035	3,493	565	291.5	11 / 63
039	3,896	565	294.5	27 / 12
044	4,421	565	300.2	12 / 55
Long Creek				
006	582	3,225	237.0[1]	26 / 222

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
010	1,003	3,225	237.0[1]	85 / 164
015	1,504	3,225	237.0[1]	131 / 102
020	2,005	3,225	237.0[1]	93 / 127
025	2,506	3,225	237.0[1]	46 / 254
030	3,005	3,193	237.0[1]	170 / 206
035	3,503	3,193	237.0[1]	287 / 40
040	4,003	3,193	237.0[1]	315 / 98
045	4,504	3,193	237.6	182 / 66
050	5,004	3,101	239.0	308 / 39
055	5,502	3,101	240.0	279 / 63
060	6,002	3,101	241.1	70 / 180
061	6,121	3,101	242.9	55 / 200
065	6,502	3,101	243.2	45 / 290
070	7,000	3,101	243.8	84 / 159
075	7,498	3,101	245.0	104 / 132
080	7,998	3,101	246.1	66 / 272
085	8,499	3,005	247.1	212 / 155
090	9,000	3,005	248.3	208 / 60
095	9,502	3,005	249.9	89 / 187
100	10,000	3,005	251.8	112 / 124
105	10,501	2,830	253.3	185 / 142
110	11,002	2,830	254.9	127 / 96
115	11,502	2,830	257.0	240 / 39
120	12,003	2,830	259.2	177 / 66
125	12,503	2,830	260.7	103 / 16
130	13,002	2,725	262.3	79 / 31
135	13,503	2,725	264.5	26 / 252
140	14,002	2,725	265.4	30 / 106
145	14,500	2,725	267.1	35 / 119
150	14,999	2,725	269.0	25 / 47
153	15,324	2,615	272.3	62 / 55
155	15,500	2,615	272.9	42 / 15
160	15,997	2,615	274.8	42 / 157
165	16,496	2,382	275.3	20 / 150
170	16,998	2,382	276.3	51 / 24
175	17,497	2,382	278.0	16 / 49
180	17,996	2,382	280.0	51 / 44
185	18,496	2,281	281.7	78 / 19
190	18,999	2,281	283.3	64 / 104
194	19,374	2,281	284.1	39 / 59
200	19,995	2,281	285.9	47 / 173
205	20,495	2,205	286.9	190 / 164
210	20,994	2,205	288.1	67 / 122
217	21,650	2,205	291.0	61 / 56
Long Grass Branch				

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
001	110	457	309.6	31 / 27
006	553	457	314.8	31 / 22
013	1,263	457	322.6	17 / 30
015	1,525	211	325.5	13 / 14
019	1,906	211	329.4	16 / 20
022	2,185	211	333.9	5 / 26
025	2,536	211	340.7	9 / 14
029	2,909	211	346.0	12 / 15
Lynch Creek				
510	50,978	2,119	332.4	41 / 229
515	51,478	2,119	334.0	283 / 240
520	51,978	2,119	335.4	70 / 170
525	52,478	1,904	337.7	52 / 162
530	52,979	1,904	339.1	93 / 211
534	53,390	1,904	339.9	178 / 70
537	53,692	1,904	342.4	25 / 25
544	54,365	1,722	343.9	143 / 158
550	54,979	1,722	344.9	122 / 33
555	55,479	1,722	346.6	347 / 43
Michael Creek				
005	501	3,256	301.1[1]	25 / 25
010	1,004	3,256	303.8	40 / 25
015	1,505	3,256	305.4	20 / 90
020	2,005	3,256	306.8	72 / 49
025	2,497	3,216	308.1	148 / 64
029	2,880	3,216	308.8	127 / 30
035	3,475	3,120	310.5	202 / 25
041	4,127	3,120	311.8	143 / 89
045	4,513	3,120	312.5	141 / 88
049	4,902	3,120	313.4	220 / 44
054	5,390	3,081	314.2	118 / 96
061	6,123	2,981	316.0	26 / 142
065	6,510	2,981	317.1	56 / 151
070	6,982	2,981	318.6	66 / 64
075	7,498	2,981	320.0	144 / 20
080	7,998	2,981	321.2	207 / 35
085	8,499	2,947	322.1	205 / 27
090	9,003	2,947	323.5	43 / 108
095	9,499	2,947	324.8	171 / 35
100	9,993	2,847	325.9	59 / 50
105	10,494	2,847	327.0	25 / 103
110	11,014	2,847	328.1	98 / 30
115	11,493	2,847	329.3	39 / 99
120	12,018	2,785	330.0	24 / 61
125	12,476	2,785	331.0	28 / 99

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
130	13,027	2,785	332.0	207 / 30
135	13,504	2,785	332.5	81 / 14
140	14,021	2,785	333.7	30 / 142
145	14,501	2,785	334.2	97 / 35
150	15,000	2,785	335.3	285 / 30
155	15,498	2,304	335.7	33 / 109
160	16,002	2,304	336.7	53 / 164
Nutbush Creek Tributary 1				
005	474	688	329.7	10 / 10
009	931	688	335.5	35 / 10
015	1,500	688	340.8	40 / 51
017	1,740	688	342.4	40 / 7
020	2,000	688	347.5	55 / 60
023	2,257	688	350.3	5 / 38
026	2,526	688	353.3	8 / 58
030	3,000	596	358.7	5 / 59
032	3,179	596	359.9	2 / 34
33	3,329	596	362.2	4 / 2
035	3,500	596	366.8	25 / 35
037	3,675	596	367.0	32 / 20
039	3,854	596	367.8	16 / 8
040	4,000	596	373.9	18 / 18
042	4,177	596	378.1	10 / 15
045	4,500	596	381.6	15 / 28
047	4,729	596	386.8	10 / 10
051	5,112	402	393.4	21 / 5
053	5,310	402	395.4	9 / 19
054	5,362	402	395.4	9 / 19
054	5,404	402	408.9	50 / 50
056	5,624	402	408.9	105 / 101
059	5,903	402	410.2	21 / 35
061	6,066	402	412.8	22 / 22
064	6,432	402	415.8	32 / 21
Nutbush Creek Tributary 2				
003	344	1,161	345.2[2]	9 / 13
006	601	1,161	348.8	11 / 11
008	792	1,161	349.5	11 / 11
010	1,012	1,161	349.9	8 / 9
013	1,275	1,161	355.1	9 / 56
016	1,619	1,161	356.6	15 / 50
020	1,997	801	360.1	17 / 9
023	2,304	801	362.4	9 / 8
027	2,678	801	366.3	9 / 22
031	3,145	642	369.6	9 / 9
034	3,423	642	373.0	8 / 8

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
036	3,626	642	377.0	8 / 8
039	3,860	642	381.4	8 / 8
044	4,410	546	410.0	15 / 50
047	4,680	546	410.0	20 / 30
049	4,915	546	410.0	28 / 28
051	5,069	398	410.1	10 / 32
052	5,171	398	411.2	8 / 6
053	5,344	398	415.4	6 / 7
055	5,491	398	417.1	7 / 7
056	5,600	398	421.7	7 / 13
057	5,703	398	427.0	16 / 7
058	5,813	398	429.1	20 / 7
Nutbush Creek Tributary 2A				
007	656	672	363.4	4 / 8
011	1,059	672	371.4	4 / 27
013	1,282	672	373.7	19 / 12
015	1,491	672	375.6	7 / 7
017	1,679	672	381.8	9 / 12
018	1,845	672	382.9	18 / 7
020	2,048	672	385.4	10 / 10
025	2,533	487	389.6	5 / 9
028	2,806	487	395.7	4 / 10
030	3,023	487	400.2	15 / 12
Nutbush Creek Tributary 2B				
000	33	386	368.4[1]	6 / 9
001	136	386	373.1	18 / 7
002	211	386	374.6	7 / 7
004	352	386	378.7	7 / 7
004	445	386	381.8	7 / 5
005	520	386	384.8	12 / 11
006	612	386	390.0	66 / 55
007	702	386	391.6	89 / 38
008	817	386	396.8	16 / 12
010	962	386	400.9	8 / 8
010	1,021	386	403.2	7 / 7
011	1,055	386	406.4	7 / 7
011	1,108	386	410.8	13 / 11
015	1,490	386	426.2	52 / 25
016	1,604	386	426.2	48 / 31
017	1,718	386	426.2	40 / 35
019	1,862	386	426.3	40 / 30
019	1,918	386	426.4	40 / 30
020	1,958	386	426.4	10 / 10
020	1,994	386	427.4	7 / 18
020	2,040	386	430.3	24 / 16

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
021	2,080	386	431.6	20 / 5
023	2,309	386	443.9	20 / 20
023	2,349	386	444.0	9 / 11
024	2,424	386	445.2	7 / 8
025	2,468	386	446.9	15 / 12
026	2,613	386	448.3	7 / 6
027	2,708	386	450.2	5 / 7
028	2,822	386	454.5	9 / 9
029	2,914	386	456.2	21 / 14
031	3,053	386	458.0	17 / 14
032	3,186	386	460.7	21 / 19
033	3,292	386	462.2	13 / 12
034	3,397	386	464.8	7 / 7
035	3,476	386	466.1	7 / 5
Red Bud Creek				
104	10,428	1,043	360.5	29 / 25
105	10,530	1,043	361.0	33 / 14
105	10,544	1,043	361.2	40 / 14
106	10,583	1,043	361.7	20 / 11
106	10,643	1,043	362.3	20 / 14
107	10,699	1,043	362.9	35 / 20
107	10,719	1,043	363.0	35 / 20
108	10,795	1,043	363.1	18 / 18
110	11,037	1,024	364.9	22 / 40
113	11,294	1,024	365.6	20 / 30
116	11,562	1,024	366.9	20 / 20
118	11,828	1,024	369.6	20 / 13
Red Bud Creek Tributary				
004	376	1,499	314.0	87 / 21
009	931	1,499	319.0	28 / 10
010	972	1,499	319.0	10 / 9
015	1,463	1,499	323.4	9 / 30
020	1,990	1,499	324.6	34 / 62
027	2,746	1,499	331.6	12 / 13
031	3,119	1,499	336.1	70 / 100
037	3,684	1,408	339.1	75 / 18
041	4,122	1,408	342.6	65 / 7
046	4,563	1,408	345.8	13 / 59
050	4,967	1,408	347.8	17 / 23
054	5,414	1,315	350.4	46 / 31
060	6,037	1,315	353.3	20 / 70
064	6,400	1,315	355.1	69 / 63
070	7,014	1,205	358.0	19 / 129
074	7,442	1,205	360.9	14 / 19
082	8,200	1,205	366.2	129 / 13

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
086	8,646	1,205	367.1	6 / 13
092	9,209	1,079	374.1	60 / 55
096	9,587	1,079	375.0	105 / 16
Red Bud Creek Tributary 2				
001	62	673	360.1[3]	13 / 24
001	120	673	360.1[1]	20 / 27
003	311	673	362.9	20 / 27
004	354	673	363.0	10 / 11
004	413	673	364.8	60 / 20
004	437	673	365.6	25 / 25
005	487	673	365.6	32 / 22
006	573	673	365.7	18 / 18
008	776	673	369.6	50 / 20
010	975	673	373.4	45 / 20
014	1,427	673	378.7	15 / 15
016	1,593	673	380.0	14 / 14
017	1,725	673	381.5	12 / 10
019	1,853	673	382.5	14 / 11
019	1,906	673	382.8	15 / 16
020	2,011	673	383.3	10 / 10
022	2,218	625	384.4	9 / 14
023	2,343	625	386.1	19 / 9
026	2,622	625	391.0	10 / 10
029	2,854	625	393.1	10 / 15
Ruin Creek				
005	501	6,331	261.0[1]	72 / 426
010	1,001	6,331	261.0[1]	372 / 409
015	1,500	6,331	261.0[1]	130 / 331
020	2,000	6,331	261.0[1]	208 / 411
025	2,500	6,331	261.0[1]	145 / 424
030	2,999	6,331	261.3	123 / 412
035	3,501	6,331	261.9	165 / 209
040	4,000	6,331	262.7	235 / 239
045	4,500	6,331	263.3	353 / 91
050	5,000	6,331	263.8	402 / 66
055	5,500	6,331	264.5	444 / 44
060	6,000	6,213	265.1	400 / 39
065	6,503	6,213	266.1	384 / 238
070	7,003	6,213	266.8	350 / 346
080	8,000	6,213	267.9	254 / 303
090	9,000	6,213	270.2	302 / 98
095	9,503	6,213	271.2	122 / 51
100	10,004	6,213	272.5	100 / 35
105	10,503	6,213	273.8	140 / 30
110	11,000	6,213	274.7	53 / 47

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
114	11,436	6,045	275.7	62 / 85
116	11,599	6,045	276.1	71 / 70
120	12,000	6,045	277.1	44 / 65
125	12,500	6,045	277.9	109 / 27
130	13,000	6,045	278.5	118 / 23
135	13,502	6,045	279.2	67 / 67
140	14,005	6,045	279.8	67 / 96
145	14,505	6,045	280.4	89 / 60
149	14,947	6,045	280.7	85 / 31
155	15,497	6,045	281.4	61 / 222
160	16,007	6,045	281.7	22 / 184
165	16,505	6,045	282.1	284 / 75
170	17,004	6,045	282.3	157 / 88
180	18,007	5,369	283.0	110 / 180
185	18,509	5,369	283.4	43 / 253
190	19,008	5,369	283.7	27 / 281
195	19,510	5,369	284.1	119 / 204
200	20,011	5,369	284.5	210 / 164
205	20,509	5,369	285.0	198 / 194
210	21,010	5,369	285.3	316 / 188
215	21,510	4,964	285.6	206 / 205
220	22,011	4,964	285.9	464 / 162
225	22,510	4,883	286.1	468 / 145
230	22,955	4,883	286.4	488 / 73
235	23,510	4,883	287.0	554 / 95
240	24,010	4,883	287.7	535 / 88
246	24,566	4,883	288.7	436 / 100
250	25,021	4,883	289.8	430 / 120
255	25,506	4,883	291.0	330 / 68
260	26,003	4,883	292.4	200 / 50
265	26,504	4,883	293.8	183 / 71
270	27,002	4,883	294.8	165 / 270
275	27,452	4,883	295.1	568 / 460
280	28,000	4,883	295.4	314 / 353
285	28,500	4,883	296.0	257 / 276
290	28,998	4,159	297.0	346 / 326
295	29,493	4,159	297.7	409 / 177
300	29,994	4,159	299.0	451 / 85
305	30,457	4,159	300.1	431 / 209
310	30,990	4,159	301.1	467 / 112
315	31,491	4,159	302.4	480 / 73
321	32,082	4,159	303.7	404 / 189
325	32,487	4,159	304.5	336 / 317
330	32,987	4,071	305.5	127 / 274
333	33,349	4,071	306.7	131 / 110

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
340	33,982	4,071	308.2	115 / 333
345	34,482	4,071	308.8	180 / 318
348	34,825	4,071	309.2	125 / 380
352	35,250	4,071	309.9	52 / 348
356	35,576	4,071	310.6	20 / 117
356	35,580	4,071	310.6	19 / 118
362	36,189	2,756	312.4	294 / 108
365	36,497	2,756	312.7	182 / 57
369	36,924	2,756	313.4	90 / 25
375	37,494	2,756	316.0	190 / 22
379	37,940	2,756	317.0	31 / 145
382	38,228	2,756	319.0	24 / 27
385	38,512	2,714	319.2	20 / 30
392	39,155	2,714	321.6	71 / 24
395	39,540	2,714	322.4	12 / 38
400	40,006	2,714	324.3	18 / 35
405	40,531	2,714	326.9	28 / 58
409	40,937	2,714	327.9	23 / 27
415	41,466	2,600	331.6	22 / 124
419	41,905	2,600	333.2	25 / 35
423	42,316	2,600	334.9	38 / 19
429	42,930	2,600	337.7	129 / 19
434	43,351	2,600	339.1	83 / 13
439	43,917	2,600	341.0	21 / 52
447	44,747	2,600	344.0	89 / 32
Sandy Creek				
2096	209,611	6,710	297.9	56 / 50
2099	209,933	6,710	305.5	140 / 102
2111	211,110	6,710	305.5	41 / 36
2118	211,838	6,710	307.6	107 / 58
2128	212,790	5,370	308.9	82 / 93
2136	213,633	5,370	309.7	28 / 243
2150	214,993	5,370	310.5	80 / 85
2160	215,999	5,370	311.2	468 / 247
2171	217,118	5,370	311.2	54 / 36
2181	218,127	5,370	313.5	133 / 65
2188	218,838	5,370	314.1	153 / 109
2199	219,861	5,370	314.7	60 / 497
2204	220,390	5,370	314.9	105 / 309
2224	222,438	4,710	317.0	42 / 47
2226	222,623	4,710	324.8	41 / 75
2240	224,049	4,710	327.3	124 / 26
2258	225,751	4,260	329.4	387 / 24
2265	226,524	4,260	329.7	96 / 24
2272	227,163	4,260	331.1	29 / 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
2279	227,934	4,260	335.0	32 / 24
2287	228,743	4,260	337.7	126 / 24
2293	229,348	4,260	338.5	390 / 24
2301	230,083	4,260	339.4	299 / 18
2309	230,915	4,260	340.8	35 / 274
2325	232,509	4,260	342.6	126 / 152
2337	233,681	3,370	343.8	43 / 114
2348	234,821	3,370	345.8	118 / 14
2358	235,800	2,990	349.3	35 / 16
2369	236,922	2,990	353.3	125 / 10
2379	237,920	2,990	363.6	45 / 30
2389	238,923	2,990	369.8	183 / 66
2400	240,005	2,990	371.8	30 / 86
2412	241,177	2,990	373.1	130 / 155
2423	242,260	2,990	373.8	56 / 62
2434	243,411	2,990	376.2	20 / 72
2443	244,315	2,890	377.7	124 / 25
2455	245,472	2,890	378.5	19 / 19
2462	246,219	2,890	384.7	27 / 21
2467	246,667	2,890	401.8	85 / 89
2468	246,850	2,890	401.8	90 / 92
2475	247,527	2,890	401.8	90 / 92
2485	248,541	2,890	401.9	61 / 271
2500	250,004	1,910	404.3	118 / 70
2515	251,507	1,910	415.6	12 / 11
2517	251,726	1,910	416.0	100 / 84
2528	252,790	1,910	421.4	134 / 160
2537	253,694	1,910	421.4	128 / 158
2549	254,874	1,910	421.9	128 / 156
2561	256,121	942	428.2	16 / 107
2568	256,818	724	432.3	107 / 150
2575	257,508	724	446.9	19 / 19
2583	258,312	839	448.4	126 / 53
2586	258,648	839	448.4	80 / 55
2588	258,841	839	448.5	70 / 90
2589	258,892	839	448.5	100 / 90
2592	259,184	839	448.5	100 / 61
2595	259,470	839	448.7	80 / 28
2598	259,792	839	449.5	64 / 38
2601	260,087	839	451.0	55 / 50
2603	260,345	775	452.3	60 / 42
2606	260,564	775	453.7	60 / 30
2607	260,744	775	455.3	18 / 32
2610	260,961	775	458.3	40 / 40
2612	261,224	775	459.9	50 / 34

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
Sandy Creek Tributary 11				
006	625	1,590	402.7	153 / 51
013	1,327	1,590	403.8	81 / 27
021	2,078	1,590	405.4	112 / 38
029	2,879	1,590	406.8	59 / 141
034	3,351	1,480	407.7	37 / 14
040	3,951	1,480	411.0	14 / 18
041	4,103	1,480	412.9	19 / 22
046	4,587	1,480	413.3	37 / 56
051	5,064	1,480	414.1	84 / 14
061	6,055	964	416.4	26 / 75
068	6,751	964	419.2	19 / 17
075	7,543	964	421.1	39 / 60
Sandy Creek Tributary 12				
001	149	851	415.2[1]	102 / 12
007	654	851	417.2	44 / 12
011	1,132	851	420.4	20 / 68
014	1,439	776	421.1	14 / 14
018	1,788	776	424.0	17 / 18
020	1,966	1,347	424.3	49 / 14
021	2,145	1,153	426.5	60 / 61
024	2,364	1,153	427.3	40 / 100
027	2,705	1,153	428.7	55 / 90
030	2,965	1,153	431.3	66 / 40
033	3,280	1,153	432.7	74 / 100
035	3,522	1,153	432.9	70 / 42
036	3,615	1,153	435.7	80 / 40
038	3,809	1,153	436.0	40 / 80
041	4,072	948	436.8	14 / 70
042	4,182	948	440.9	14 / 70
044	4,361	948	441.0	39 / 41
046	4,604	948	441.7	70 / 46
048	4,829	948	442.6	12 / 54
050	5,014	948	443.5	70 / 14
052	5,175	948	444.0	36 / 20
055	5,541	948	446.9	25 / 50
057	5,668	948	447.1	24 / 40
057	5,736	948	447.6	24 / 40
058	5,827	948	448.2	22 / 52
Sandy Creek Tributary 16				
002	162	734	416.0[1]	50 / 110
002	243	734	416.0[1]	50 / 40
003	309	734	416.0[1]	50 / 35
004	426	734	416.0[1]	34 / 48
005	513	734	416.0[1]	14 / 60
006	621	734	416.0[1]	26 / 70

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
008	823	734	416.2	42 / 13
010	1,021	734	418.0	16 / 60
013	1,264	734	419.2	42 / 24
015	1,464	734	420.1	35 / 34
017	1,689	653	421.6	10 / 38
018	1,846	653	423.0	27 / 53
019	1,942	653	423.3	40 / 16
022	2,163	653	424.2	12 / 40
023	2,311	653	425.4	10 / 44
025	2,483	653	427.0	9 / 24
026	2,627	653	428.3	27 / 14
028	2,769	653	429.2	36 / 21
029	2,898	653	429.8	36 / 18
031	3,094	653	430.6	54 / 30
032	3,240	653	431.0	46 / 42
034	3,387	653	431.6	20 / 46
Sandy Creek Tributary 17				
002	210	1,025	426.1[4]	20 / 16
004	446	1,025	428.2	33 / 14
006	586	1,025	429.8	40 / 17
007	701	1,025	430.8	69 / 32
009	901	1,025	431.5	49 / 55
011	1,108	1,025	432.6	30 / 55
013	1,283	1,025	433.3	25 / 70
013	1,335	1,025	433.6	25 / 76
015	1,546	978	434.2	28 / 55
017	1,667	978	434.6	44 / 25
018	1,753	978	437.4	50 / 40
018	1,841	978	437.4	35 / 30
019	1,937	978	437.5	50 / 50
020	2,034	978	437.7	50 / 46
021	2,139	978	437.7	55 / 35
022	2,189	978	437.8	55 / 35
023	2,265	978	437.8	45 / 30
Tabbs Creek				
125	12,491	9,579	237.3	107 / 461
135	13,453	9,579	237.6	607 / 243
136	13,640	9,579	237.6	469 / 38
140	13,978	9,579	237.8	609 / 88
146	14,591	9,579	238.0	494 / 227
150	15,003	9,579	238.1	453 / 134
155	15,504	9,579	238.3	438 / 107
160	16,005	9,579	238.4	234 / 61
164	16,430	9,579	238.7	120 / 50
170	17,004	9,579	239.8	201 / 72

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
175	17,505	9,579	240.3	44 / 138
180	17,950	9,579	240.7	34 / 170
187	18,658	9,579	241.3	270 / 93
190	19,003	9,579	241.3	190 / 132
194	19,446	9,579	241.5	216 / 54
200	19,958	9,579	241.8	124 / 144
205	20,503	9,579	242.2	119 / 160
209	20,936	9,579	242.6	303 / 70
215	21,503	9,579	242.9	177 / 60
222	22,176	9,579	243.6	52 / 97
225	22,503	9,579	244.0	54 / 100
230	23,005	9,579	244.7	105 / 152
236	23,616	9,579	245.0	326 / 50
240	24,005	9,579	245.2	270 / 95
245	24,506	9,579	245.4	86 / 221
250	25,006	9,579	245.6	65 / 119
255	25,465	9,579	246.0	51 / 108
259	25,950	9,579	246.6	71 / 243
265	26,507	9,579	246.8	347 / 237
270	27,008	9,579	246.9	489 / 273
275	27,509	9,579	247.0	445 / 97
280	28,010	9,579	247.1	443 / 60
280	28,010	9,579	247.2	153 / 869
290	29,009	9,579	247.3	107 / 756
295	29,509	9,383	247.4	282 / 661
300	30,008	9,383	247.6	380 / 575
305	30,510	9,383	247.7	444 / 674
310	31,006	9,383	247.8	209 / 524
315	31,508	9,383	247.9	306 / 469
320	32,008	9,383	248.1	457 / 244
324	32,401	9,383	248.3	436 / 100
329	32,936	9,383	248.6	484 / 129
335	33,510	9,181	249.0	431 / 50
339	33,906	9,181	249.4	419 / 42
346	34,647	9,181	250.0	319 / 448
351	35,104	9,181	250.2	114 / 472
355	35,512	9,181	250.4	52 / 430
360	36,012	9,181	250.8	49 / 448
365	36,513	9,181	251.3	55 / 543
370	37,013	9,181	251.6	133 / 1,015
375	37,512	9,181	251.9	64 / 534
380	38,012	9,181	252.3	110 / 566
390	39,012	9,181	253.0	446 / 306
395	39,513	9,181	253.3	356 / 290
400	40,014	9,181	253.7	242 / 411

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
402	40,204	9,181	254.5	86 / 84
405	40,514	9,181	255.5	139 / 426
410	41,014	9,181	255.8	75 / 310
415	41,513	9,181	256.3	90 / 414
425	42,510	9,181	256.9	343 / 377
430	43,011	9,181	257.2	195 / 344
435	43,512	9,181	257.5	162 / 264
440	44,010	9,181	258.0	226 / 237
445	44,509	9,181	258.6	188 / 463
450	45,010	9,181	259.0	166 / 226
455	45,470	9,181	259.7	80 / 378
460	46,009	9,181	260.2	59 / 358
465	46,508	9,181	260.8	98 / 427
474	47,429	5,419	261.7	434 / 70
479	47,867	5,419	262.0	413 / 72
485	48,503	5,419	262.6	179 / 142
490	49,004	5,419	263.4	39 / 196
495	49,503	5,419	264.5	76 / 193
501	50,095	5,419	265.4	103 / 249
510	51,003	5,419	266.7	54 / 35
514	51,444	5,419	268.5	154 / 59
520	51,953	5,419	269.2	50 / 111
525	52,500	5,419	270.4	190 / 52
530	52,978	5,419	271.0	135 / 49
535	53,502	5,419	272.2	122 / 257
540	54,002	5,419	272.6	167 / 101
545	54,499	5,419	273.2	159 / 384
550	54,996	5,228	273.6	121 / 278
555	55,492	5,228	274.3	109 / 187
560	55,992	5,228	275.5	104 / 75
565	56,490	5,228	277.1	83 / 90
570	56,990	5,228	278.5	173 / 47
574	57,448	5,228	279.3	98 / 176
580	57,989	5,228	280.2	45 / 89
585	58,489	5,228	282.0	115 / 119
587	58,663	5,228	283.9	55 / 53
Weaver Creek				
005	500	3,080	308.9[1]	92 / 100
010	1,003	3,080	308.9[1]	91 / 84
015	1,503	3,080	309.6	87 / 20
021	2,107	3,080	312.1	20 / 77
028	2,812	3,080	313.8	80 / 77
037	3,656	3,080	315.0	109 / 52
041	4,104	3,080	315.5	136 / 115
047	4,715	3,080	316.0	267 / 66

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
051	5,088	3,080	316.5	147 / 91
056	5,592	3,080	317.4	105 / 45
060	6,003	3,080	318.4	138 / 72
067	6,673	3,080	319.5	61 / 98
074	7,390	2,930	321.1	92 / 119
081	8,135	2,930	322.6	120 / 68
087	8,671	2,930	323.7	137 / 131
094	9,419	2,930	325.7	88 / 12
102	10,166	2,930	329.4	200 / 60
109	10,935	2,930	330.4	236 / 65
116	11,586	2,730	331.7	221 / 19
119	11,949	2,730	332.6	86 / 24
129	12,892	2,730	336.6	127 / 19
136	13,562	2,730	338.0	130 / 19
141	14,099	2,730	339.0	118 / 111
148	14,821	2,530	339.9	36 / 42
151	15,085	2,530	342.6	17 / 18
159	15,927	2,530	345.0	50 / 88
165	16,481	2,100	345.8	86 / 124
174	17,420	2,100	349.1	17 / 77

[1]Elevation includes backwater effects

[2]Nutbush Creek

[3]Red Bud Creek

[4]Sandy Creek

5.3 Coastal Analyses

This section is not applicable to this FIS project. Table 18 “Summary of Coastal Analyses” does not apply to Vance 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 Vance 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 Vance 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)
36.50	-78.50	-0.91
36.37	-78.50	-0.91
36.25	-78.50	-0.94
36.25	-78.38	-0.95
36.50	-78.38	-0.94
36.38	-78.38	-0.92
Average conversion in Vance County from NGVD 29 to NAVD 88 = -0.93 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 Vance 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.

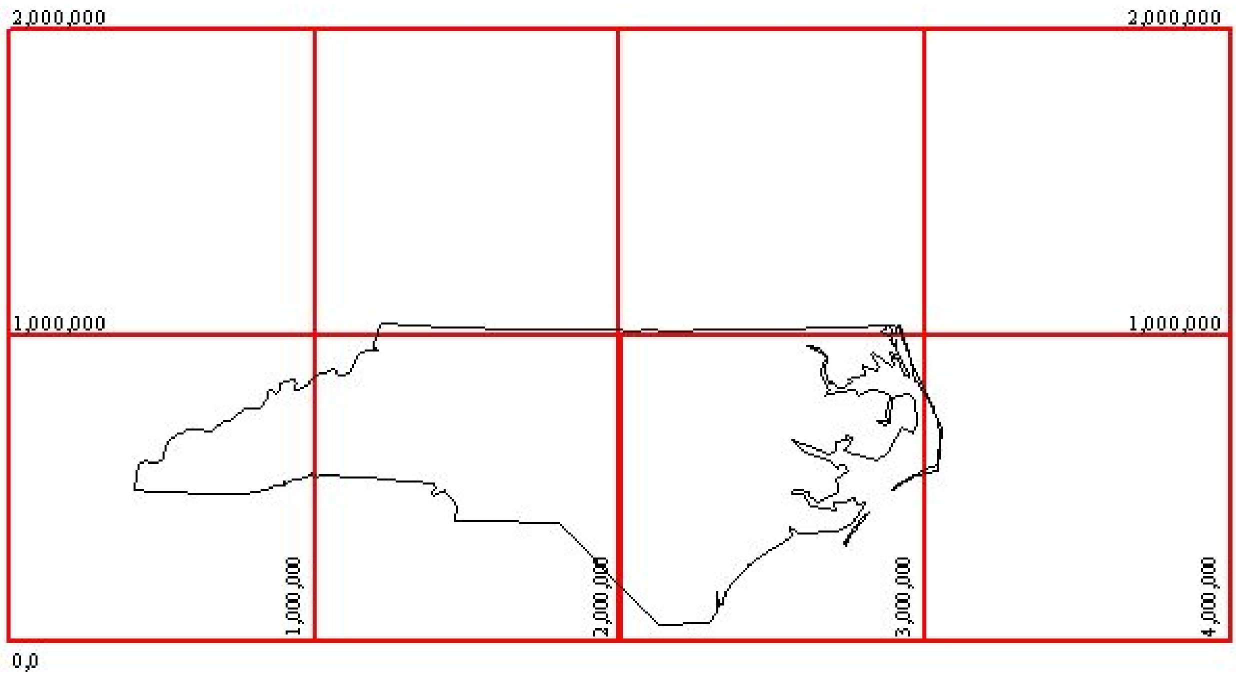

Figure 3 - North Carolina’s State Plane Coordinate System

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.

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
Martin Creek								
001	122	145	882	4.7	343.0[1]	342.2	343.2	1.0
003	254	110	422	9.8	343.0[2]	342.4	343.2	0.9
007	666	245	1,208	3.7	344.6	344.6	345.6	1.0
011	1,059	115	558	6.5	345.5	345.5	346.5	1.0
017	1,736	170	843	5.2	348.4	348.4	349.3	1.0
023	2,298	95	432	7.2	350.5	350.5	351.4	0.9
025	2,549	105	540	6.0	351.8	351.8	352.7	1.0
026	2,605	105	740	4.4	353.1	353.1	354.0	0.9
029	2,867	145	1,065	4.1	353.4	353.4	354.4	1.0
032	3,227	165	934	4.6	353.9	353.9	354.9	1.0
036	3,649	165	741	5.9	354.8	354.8	355.8	1.0
041	4,059	40	205	13.6	356.6	356.6	357.1	0.5
045	4,470	75	373	8.0	362.0	362.0	362.8	0.8
049	4,923	125	617	6.4	364.4	364.4	365.2	0.7
054	5,383	130	642	6.0	365.7	365.7	366.6	0.9
059	5,855	95	604	5.3	366.8	366.8	367.8	1.0
064	6,432	60	370	7.2	368.2	368.2	369.2	0.9
070	6,992	100	494	6.5	370.6	370.6	371.4	0.8
075	7,469	120	754	4.6	371.8	371.8	372.8	1.0
079	7,856	45	283	8.0	372.3	372.3	373.3	0.9
082	8,209	55	199	10.4	375.8	375.8	376.0	0.2
087	8,745	55	328	6.6	380.4	380.4	381.0	0.7
089	8,917	60	213	9.0	381.4	381.4	382.0	0.6
090	9,004	95	726	3.4	387.2	387.2	387.2	0.0
092	9,236	90	489	5.3	387.3	387.3	387.3	0.0
096	9,569	50	220	13.7	393.6	393.6	393.8	0.1
097	9,699	55	259	14.3	397.5	397.5	397.7	0.3
097	9,741	152	1,071	1.7	403.8	403.8	404.2	0.4
100	9,959	85	666	2.8	403.8	403.8	404.2	0.4
102	10,171	210	681	5.4	404.0	404.0	404.3	0.4
109	10,914	68	279	10.3	407.7	407.7	407.7	0.0
113	11,283	63	324	8.7	410.9	410.9	411.9	1.0
116	11,609	90	517	5.6	413.4	413.4	414.2	0.7
120	11,954	80	421	6.5	414.6	414.6	415.5	0.8
126	12,555	125	598	5.4	417.0	417.0	417.8	0.8
130	12,971	135	571	5.6	418.0	418.0	418.9	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
134	13,434	180	646	5.4	419.3	419.3	420.3	1.0
139	13,924	41	204	10.1	421.2	421.2	422.0	0.8
141	14,108	40	232	9.0	423.9	423.9	424.2	0.2
142	14,201	38	324	6.5	426.4	426.4	426.4	0.0
144	14,383	41	319	5.5	427.0	427.0	427.1	0.1
145	14,531	87	428	4.9	427.5	427.5	427.6	0.1
146	14,603	98	757	3.0	427.8	427.8	428.6	0.8
150	14,992	200	1,194	2.7	427.9	427.9	428.8	0.9
155	15,503	95	487	5.2	428.2	428.2	429.2	1.0
161	16,074	43	272	6.5	430.0	430.0	431.0	0.9
Nutbush Creek								
001	75	99	348	9.8	320.1[2]	304.0	304.3	0.3
003	303	170	955	6.0	320.1[2]	305.9	306.3	0.4
006	556	259	1,076	6.5	320.1[2]	306.4	307.0	0.6
010	1,024	308	1,581	4.6	320.1[2]	307.4	308.3	1.0
015	1,549	335	1,539	4.8	320.1[2]	308.0	309.0	1.0
020	2,049	269	1,204	5.8	320.1[2]	308.8	309.8	1.0
025	2,487	213	827	7.5	320.1[2]	309.8	310.8	1.0
030	2,993	207	888	6.4	320.1[2]	311.6	312.5	0.8
035	3,503	214	874	6.2	320.1[2]	312.8	313.7	0.9
040	3,982	184	819	6.4	320.1[2]	313.8	314.8	1.0
045	4,539	199	766	6.7	320.1[2]	315.4	316.3	0.9
051	5,130	54	570	6.1	320.1[2]	316.8	317.8	1.0
055	5,519	48	472	6.2	320.1[2]	317.8	318.7	0.9
059	5,930	43	416	7.0	320.1[2]	319.2	319.8	0.6
062	6,197	46	406	7.6	320.4	320.4	320.7	0.3
065	6,459	48	389	7.7	321.3	321.3	321.8	0.5
065	6,540	144	1,344	3.9	326.1	326.1	326.8	0.7
070	7,000	228	1,645	3.9	326.3	326.3	327.2	0.9
075	7,546	195	1,202	4.8	326.5	326.5	327.5	1.0
081	8,058	162	837	6.1	327.0	327.0	328.0	1.0
086	8,586	148	794	6.2	328.0	328.0	329.0	1.0
090	9,033	178	777	6.3	329.0	329.0	329.8	0.8
094	9,420	69	482	6.4	329.6	329.6	330.6	1.0
101	10,086	35	308	8.9	331.3	331.3	332.0	0.8
105	10,549	42	400	7.5	333.4	333.4	333.8	0.4
109	10,927	41	393	7.1	334.4	334.4	334.7	0.3
113	11,287	44	424	6.1	335.1	335.1	335.7	0.6
116	11,582	38	360	7.2	335.6	335.6	336.2	0.6
119	11,947	40	328	8.2	337.0	337.0	337.3	0.3
123	12,263	33	292	9.4	338.4	338.4	338.6	0.2
125	12,544	37	361	7.2	340.2	340.2	340.2	0.1
131	13,113	42	393	7.6	341.6	341.6	341.7	0.2
137	13,724	37	248	11.9	343.7	343.7	343.9	0.2
141	14,119	30	267	10.9	347.7	347.7	347.8	0.1

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
146	14,565	42	312	10.4	350.7	350.7	351.1	0.4
149	14,908	57	372	9.4	353.1	353.1	353.5	0.4
151	15,099	31	249	10.3	353.5	353.5	354.5	1.0
152	15,174	38	548	4.6	359.4	359.4	360.1	0.6
157	15,683	70	731	5.0	359.8	359.8	360.5	0.7
160	15,965	111	983	4.8	360.0	360.0	360.8	0.8
165	16,500	148	1,157	4.9	360.5	360.5	361.4	0.9
170	16,950	92	361	6.6	361.0	361.0	361.8	0.8
175	17,474	65	526	7.6	362.6	362.6	363.6	1.0
179	17,905	33	231	8.6	364.2	364.2	365.2	1.0
182	18,226	44	367	5.8	366.6	366.6	367.0	0.4
184	18,417	46	319	5.9	367.1	367.1	367.4	0.4
185	18,493	72	445	5.1	369.0	369.0	369.3	0.3
187	18,666	109	621	6.2	369.5	369.5	369.6	0.1
188	18,799	76	402	7.5	369.6	369.6	369.8	0.3
188	18,843	67	461	6.6	370.9	370.9	371.3	0.4
190	18,963	26	237	6.3	371.0	371.0	371.5	0.5
192	19,212	27	231	6.2	374.9	374.9	375.3	0.4
193	19,266	41	341	4.8	375.3	375.3	375.7	0.3
193	19,316	41	341	4.2	375.4	375.4	376.2	0.8
196	19,579	48	283	5.2	375.6	375.6	376.5	0.8
200	19,975	58	216	7.1	376.4	376.4	377.4	1.0
204	20,447	59	221	6.4	379.2	379.2	380.2	1.0
209	20,911	41	195	4.6	381.4	381.4	382.3	0.9
210	21,017	30	141	6.3	382.0	382.0	382.6	0.6
211	21,127	30	307	3.0	388.2	388.2	388.3	0.1
216	21,552	32	174	6.8	388.5	388.5	388.5	0.0
220	22,026	29	182	4.9	389.7	389.7	390.5	0.8
223	22,270	16	63	12.0	390.7	390.7	390.7	0.0
224	22,425	20	117	7.1	394.0	394.0	394.0	0.0
227	22,678	62	142	7.1	395.5	395.5	395.5	0.1
230	23,031	98	202	6.4	398.3	398.3	398.4	0.1
232	23,172	132	908	1.4	404.6	404.6	405.6	1.0
232	23,201	98	663	2.3	404.6	404.6	405.6	1.0
233	23,268	64	421	2.6	404.6	404.6	405.6	1.0
233	23,342	57	322	3.0	406.2	406.2	407.1	0.8
236	23,582	48	261	4.1	406.5	406.5	407.2	0.8
Nutbush Creek Tributary 3								
003	311	62	167	8.5	370.9[3]	369.2	369.2	0.0
006	594	98	445	4.9	373.3	373.3	373.3	0.0
008	754	211	411	5.5	373.6	373.6	373.6	0.0
010	988	83	279	5.8	374.1	374.1	374.1	0.0
011	1,126	39	177	8.4	374.4	374.4	374.4	0.0
012	1,234	57	176	10.6	375.4	375.4	375.4	0.0
014	1,359	46	157	8.6	377.5	377.5	377.5	0.0

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
015	1,490	39	148	11.5	379.6	379.6	379.6	0.0
016	1,615	62	174	8.2	383.0	383.0	383.0	0.0
017	1,696	81	219	9.5	384.3	384.3	384.3	0.0
018	1,796	55	302	6.5	385.7	385.7	385.7	0.0
020	1,960	45	242	8.4	386.2	386.2	386.2	0.0
022	2,178	42	179	9.2	387.8	387.8	387.8	0.0
024	2,385	90	380	4.1	391.5	391.5	391.5	0.0
025	2,495	60	410	4.2	391.7	391.7	391.7	0.0
027	2,711	47	230	8.7	392.0	392.0	392.0	0.0
029	2,933	79	212	6.5	393.6	393.6	393.6	0.0
031	3,134	56	161	13.5	395.6	395.6	395.6	0.0
033	3,303	56	201	7.4	397.7	397.7	397.7	0.0
035	3,484	154	358	2.7	398.6	398.6	398.6	0.0
037	3,663	62	226	5.8	398.8	398.8	398.8	0.0
039	3,855	26	129	7.3	399.4	399.4	399.4	0.0
041	4,149	23	100	9.0	401.4	401.4	401.4	0.0
044	4,410	32	109	10.2	404.4	404.4	404.4	0.0
046	4,644	36	119	12.1	407.7	407.7	408.0	0.2
048	4,785	25	85	12.4	410.8	410.8	410.9	0.1
049	4,865	39	253	3.7	415.1	415.1	416.0	0.9
050	4,961	35	219	4.5	415.2	415.2	416.1	0.9
051	5,146	48	121	10.3	418.0	418.0	418.0	0.0
052	5,234	62	157	10.6	420.5	420.5	420.5	0.0
054	5,438	37	194	5.0	422.4	422.4	422.5	0.1
056	5,568	30	170	6.6	422.7	422.7	422.8	0.1
057	5,744	30	149	4.4	423.2	423.2	423.7	0.5
059	5,887	42	117	8.2	424.0	424.0	424.4	0.4
059	5,949	42	303	2.0	430.9	430.9	431.4	0.5
061	6,091	25	145	4.3	431.0	431.0	431.4	0.5
063	6,347	24	121	5.4	431.5	431.5	432.0	0.5
065	6,514	12	66	8.7	432.1	432.1	432.6	0.5
066	6,611	26	202	3.1	440.1	440.1	441.0	0.9
067	6,740	30	224	3.4	440.2	440.2	441.1	0.9
068	6,834	55	303	3.7	440.2	440.2	441.2	1.0
070	6,976	55	189	4.2	441.8	441.8	442.2	0.5
071	7,057	28	148	4.0	442.0	442.0	442.4	0.4
072	7,185	25	82	8.6	442.4	442.4	442.7	0.3
Nutbush Creek Tributary 3A								
003	269	22	43	6.7	373.9[4]	372.0	372.0	0.0
004	443	13	36	7.5	374.8	374.8	374.8	0.0
006	573	10	26	10.4	379.6	379.6	379.6	0.0
008	773	16	34	8.1	386.8	386.8	386.8	0.0
010	967	32	209	1.5	400.9	400.9	400.9	0.0
013	1,330	28	82	4.7	401.0	401.0	401.0	0.0
015	1,466	19	44	6.2	401.8	401.8	401.8	0.0

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
016	1,613	9	25	10.4	404.2	404.2	404.2	0.0
018	1,771	17	54	6.2	408.1	408.1	408.2	0.0
019	1,868	15	30	9.3	409.3	409.3	409.3	0.0
020	2,009	16	52	5.4	412.0	412.0	412.1	0.0
021	2,079	12	40	6.5	412.5	412.5	412.5	0.0
022	2,187	10	33	8.1	414.0	414.0	414.0	0.0
023	2,336	17	43	6.7	416.9	416.9	416.9	0.0
025	2,512	11	31	8.4	419.7	419.7	419.7	0.0
028	2,758	13	33	8.6	426.0	426.0	426.0	0.0
029	2,947	8	31	6.8	430.3	430.3	430.3	0.0
031	3,057	11	34	6.8	432.1	432.1	432.0	0.0
032	3,187	8	22	9.8	436.3	436.3	436.3	0.0
033	3,321	7	23	9.2	441.8	441.8	441.8	0.0
034	3,423	48	51	7.1	445.7	445.7	445.7	0.0
035	3,511	61	51	8.1	447.9	447.9	447.9	0.0
Nutbush Creek Tributary 3B								
002	159	21	76	9.6	392.8[4]	389.2	389.2	0.0
004	413	24	79	9.6	395.7	395.7	395.7	0.0
007	693	23	113	6.7	400.0	400.0	400.1	0.0
010	1,000	26	75	11.1	404.6	404.6	404.6	0.0
014	1,447	23	116	6.6	411.4	411.4	411.6	0.2
019	1,891	20	69	11.5	419.4	419.4	419.4	0.0
021	2,084	19	89	9.5	424.3	424.3	424.3	0.0
023	2,289	25	86	8.5	427.9	427.9	428.3	0.3
024	2,368	38	197	3.7	431.2	431.2	431.2	0.0
027	2,681	27	62	9.8	432.6	432.6	432.6	0.0
031	3,055	17	89	7.5	439.2	439.2	439.6	0.4
Poplar Creek								
135	13,454	67	390	8.5	379.7	379.7	380.5	0.8
140	14,006	88	522	6.4	381.9	381.9	382.8	0.9
144	14,404	101	522	6.8	383.1	383.1	383.9	0.8
149	14,940	125	579	6.3	384.7	384.7	385.7	1.0
155	15,522	126	528	6.9	386.7	386.7	387.7	1.0
160	15,953	139	573	7.7	388.3	388.3	389.2	0.9
164	16,439	143	560	6.8	389.8	389.8	390.8	0.9
169	16,863	132	456	9.0	391.3	391.3	392.3	1.0
172	17,209	98	429	7.9	393.0	393.0	394.0	1.0
178	17,795	194	767	5.4	395.3	395.3	396.3	1.0
184	18,424	86	372	8.8	397.1	397.1	397.9	0.8
189	18,907	70	401	7.9	399.2	399.2	400.2	1.0
191	19,054	36	249	9.5	399.6	399.6	400.6	1.0
192	19,169	36	299	8.2	401.0	401.0	402.0	1.0
195	19,548	102	667	5.4	402.7	402.7	403.6	0.9
199	19,863	85	533	6.3	403.1	403.1	404.0	1.0
204	20,385	91	541	6.6	404.5	404.5	405.2	0.8

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
209	20,907	112	524	6.0	405.8	405.8	406.8	1.0
214	21,425	51	289	8.0	407.4	407.4	408.3	1.0
220	22,025	42	274	7.8	409.9	409.9	410.7	0.8
224	22,378	57	296	7.2	411.7	411.7	412.4	0.7
231	23,052	101	465	5.7	415.8	415.8	415.8	0.0
235	23,507	49	184	8.2	417.3	417.3	417.3	0.0
240	23,966	69	252	5.9	419.5	419.5	420.3	0.8
246	24,582	19	107	8.6	422.0	422.0	423.0	1.0
250	24,993	40	168	7.6	426.2	426.2	426.2	0.0
255	25,505	72	241	6.6	429.0	429.0	429.4	0.4
260	26,038	78	238	7.1	431.7	431.7	432.4	0.8
265	26,540	73	291	5.6	434.2	434.2	435.0	0.7
268	26,785	28	130	7.4	434.7	434.7	435.7	1.0
Red Bud Creek								
001	87	130	616	5.5	310.9[5]	309.8	310.7	0.9
004	381	175	605	6.0	310.9[2]	310.4	311.4	0.9
007	738	94	459	7.0	311.5	311.5	312.4	0.9
008	825	94	472	6.7	312.8	312.8	313.0	0.2
009	945	75	494	6.6	313.3	313.3	313.4	0.1
013	1,284	80	481	4.6	313.9	313.9	314.4	0.5
018	1,806	100	520	5.0	314.4	314.4	315.2	0.8
022	2,223	73	308	6.3	315.2	315.2	316.1	1.0
024	2,449	57	349	5.4	316.0	316.0	317.0	1.0
027	2,656	49	294	5.8	316.5	316.5	317.5	1.0
030	2,959	50	350	4.9	317.8	317.8	318.4	0.6
031	3,070	50	467	3.8	319.9	319.9	320.5	0.6
035	3,462	48	367	4.6	320.4	320.4	321.0	0.5
039	3,899	44	277	6.2	321.6	321.6	322.0	0.3
043	4,262	32	238	7.9	323.2	323.2	323.6	0.4
046	4,644	36	267	6.9	325.0	325.0	325.8	0.8
050	5,048	102	447	5.9	326.9	326.9	327.6	0.8
054	5,380	80	424	4.7	327.6	327.6	328.6	1.0
058	5,810	45	265	8.1	328.9	328.9	329.8	0.9
062	6,158	42	217	8.7	331.7	331.7	332.6	0.9
066	6,590	67	302	6.9	335.8	335.8	336.4	0.7
069	6,927	45	249	7.1	337.5	337.5	338.5	1.0
071	7,137	51	346	4.6	338.8	338.8	339.6	0.8
073	7,333	51	298	5.2	339.0	339.0	339.7	0.7
077	7,681	40	171	9.4	340.7	340.7	341.1	0.4
081	8,063	70	354	6.2	344.3	344.3	345.0	0.7
084	8,401	47	242	7.0	345.7	345.7	346.6	1.0
088	8,839	40	241	6.6	348.2	348.2	349.2	0.9
090	8,970	70	346	4.9	349.1	349.1	350.0	0.9
091	9,075	75	423	4.2	351.4	351.4	352.3	1.0
093	9,339	35	238	6.8	351.9	351.9	352.8	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
096	9,584	125	325	6.7	353.8	353.8	354.3	0.4
097	9,673	203	1,664	0.9	360.0	360.0	360.6	0.7
098	9,778	205	1,658	0.9	360.0	360.0	360.6	0.7
100	10,007	122	964	1.5	360.0	360.0	360.6	0.7
101	10,138	95	403	4.3	360.0	360.0	360.6	0.6
102	10,164	95	461	3.8	360.0	360.0	360.8	0.7
102	10,199	115	509	3.6	360.0	360.0	360.8	0.8
103	10,297	111	410	4.3	360.1	360.1	360.9	0.8
103	10,342	66	236	6.9	360.2	360.2	360.9	0.7
104	10,372	66	276	5.8	360.2	360.2	361.2	1.0
104	10,428	53	216	7.2	360.5	360.5	361.4	0.9
Tabbs Creek								
001	111	637	5,727	4.6	235.4[6]	227.2	228.2	1.0
005	506	492	4,995	4.9	235.4[6]	227.4	228.4	1.0
012	1,197	570	6,728	3.6	235.4[6]	227.7	228.7	1.0
018	1,781	455	4,959	4.8	235.4[2]	227.8	228.8	1.0
023	2,267	305	3,520	5.5	235.4[2]	228.1	229.0	1.0
027	2,708	410	4,253	5.6	235.4[2]	228.4	229.3	1.0
034	3,355	260	2,830	7.0	235.4[2]	228.8	229.7	1.0
039	3,863	360	3,432	6.4	235.4[2]	229.3	230.3	1.0
043	4,320	240	2,598	6.7	235.4[2]	229.6	230.6	1.0
047	4,707	300	3,250	5.4	235.4[2]	230.2	231.2	1.0
053	5,321	315	3,334	5.8	235.4[2]	230.5	231.5	1.0
058	5,816	205	2,383	7.6	235.4[2]	230.8	231.8	1.0
064	6,420	155	1,820	8.8	235.4[2]	231.5	232.5	0.9
068	6,836	237	2,826	6.4	235.4[2]	232.4	233.4	1.0
075	7,462	301	3,518	5.2	235.4[2]	233.0	234.0	1.0
079	7,937	401	4,506	5.1	235.4[2]	233.3	234.2	1.0
082	8,155	240	2,803	7.3	235.4[2]	233.3	234.2	0.9
082	8,225	240	3,148	6.5	235.4[2]	234.3	234.8	0.6
085	8,549	205	3,039	6.5	235.4[2]	234.4	235.2	0.7
091	9,108	260	3,684	5.9	235.4[2]	235.0	235.8	0.8
096	9,621	370	5,111	4.4	235.4	235.4	236.3	0.9
100	10,016	370	5,022	4.4	235.6	235.6	236.5	0.9
106	10,618	315	3,978	5.4	235.8	235.8	236.8	1.0
108	10,850	375	4,080	5.4	236.0	236.0	237.0	1.0
113	11,328	317	4,214	4.4	236.4	236.4	237.4	1.0
590	59,002	208	2,143	5.2	284.4	284.4	284.9	0.5
593	59,307	120	1,242	8.0	284.9	284.9	285.3	0.4
Tar River								
8150	814,956	1,223	19,498	1.3	228.9	228.9	229.8	0.9
8157	815,727	1,071	17,005	1.4	229.0	229.0	230.0	0.9
8173	817,310	627	9,542	2.6	229.3	229.3	230.3	0.9
8181	818,144	761	10,848	2.2	229.7	229.7	230.6	1.0
8198	819,841	933	13,993	1.7	230.4	230.4	231.3	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
8213	821,259	564	10,117	2.4	230.8	230.8	231.7	0.9
8229	822,906	1,248	20,321	1.2	231.5	231.5	232.4	0.9
8247	824,686	1,483	22,341	1.1	231.7	231.7	232.7	0.9
8260	825,992	1,077	16,824	1.4	231.9	231.9	232.8	0.9
8272	827,152	428	6,702	3.6	231.9	231.9	232.8	0.9
8290	828,993	419	7,502	3.2	233.8	233.8	234.7	1.0
8310	830,993	436	7,078	3.3	235.8	235.8	236.6	0.8
8317	831,662	274	5,546	4.2	235.7	235.7	236.6	0.8
8328	832,786	504	8,638	2.7	236.8	236.8	237.8	0.9
8343	834,280	424	8,256	2.8	237.4	237.4	238.4	0.9
8353	835,296	340	6,331	3.7	237.6	237.6	238.5	0.9
8367	836,701	774	14,661	1.6	238.8	238.8	239.8	1.0
8380	837,995	421	8,428	2.8	239.0	239.0	239.9	1.0
8393	839,321	346	7,133	3.3	239.4	239.4	240.4	1.0
8411	841,080	304	6,571	3.6	240.2	240.2	241.2	1.0
8429	842,907	287	6,078	3.8	241.0	241.0	242.0	1.0
8436	843,638	308	6,065	3.8	241.6	241.6	242.5	0.9
8449	844,939	503	8,689	2.7	242.3	242.3	243.2	0.9
8463	846,348	676	12,585	1.8	243.2	243.2	244.1	1.0
8476	847,607	907	15,796	1.5	243.4	243.4	244.4	1.0
8497	849,701	370	6,981	3.3	243.4	243.4	244.4	1.0
8520	851,958	1,218	18,960	1.2	244.6	244.6	245.6	1.0
8522	852,241	895	13,130	1.8	245.0	245.0	246.0	1.0
8533	853,255	851	11,570	2.0	245.1	245.1	246.0	1.0
8542	854,231	643	10,274	2.2	245.1	245.1	246.1	1.0
8550	854,968	454	8,743	2.6	245.2	245.2	246.2	1.0
8553	855,252	475	8,794	2.6	245.3	245.3	246.2	1.0

[1]**Sandy Creek**

[2]**Elevation includes backwater effects**

[3]**Nutbush Creek**

[4]**Nutbush Creek Tributary 3**

[5]**Ruin Creek**

[6]**Tar River**

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 Vance 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 Vance 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 4/16/2007 North Carolina Statewide FIRM, which includes Vance County, are presented in Table 22, “Community Map History.”

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Vance 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 Vance County.

Table 24 - Map Revision History

Community	Initial Identification Date	Initial FIRM Effective Date	FIS Revision Date
CITY OF HENDERSON	4/25/1975	8/4/1987	04/16/2013
TOWN OF KITTRELL	*	4/16/2007	04/16/2013
TOWN OF MIDDLEBURG	*	4/16/2007	04/16/2013
VANCE COUNTY	8/4/1978	7/16/1991	04/16/2013

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 Vance 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 HENDERSON	4/16/2007	NCFMP	NCFMP	286-000022	10/29/2012
CITY OF HENDERSON	4/16/2007	NCFMP	NCFMP	286-000022	12/1/2012
CITY OF HENDERSON	4/16/2007	NCFMP	NCFMP	286-000022	7/1/2014
TOWN OF KITTRELL	4/16/2007	NCFMP	NCFMP	286-000022	10/29/2012
TOWN OF KITTRELL	4/16/2007	NCFMP	NCFMP	286-000022	12/1/2012
TOWN OF KITTRELL	4/16/2007	NCFMP	NCFMP	286-000022	7/1/2014
TOWN OF MIDDLEBURG	4/16/2007	NCFMP	NCFMP	286-000022	10/29/2012

Table 25 — Authority and Acknowledgments

Community	FIS Dated	Study Contracted By	Data Source	Contract or IAA Number	Work Completed In
TOWN OF MIDDLEBURG	4/16/2007	NCFMP	NCFMP	286-000022	12/1/2012
TOWN OF MIDDLEBURG	4/16/2007	NCFMP	NCFMP	286-000022	7/1/2014
VANCE COUNTY	4/16/2007	NCFMP	NCFMP	286-000022	10/29/2012
VANCE COUNTY	4/16/2007	NCFMP	NCFMP	286-000022	12/1/2012
VANCE COUNTY	4/16/2007	NCFMP	NCFMP	286-000022	7/1/2014

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 Vance County were produced by NCFMP under contract with the State of North Carolina and issued on effective 3/31/2015. 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 Vance 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
VANCE COUNTY	7/16/1991	6/30/1987	Representatives of FEMA, the county, Vance County Emergency Management Agency, and Wang Engineering	8/20/1990	Representatives of the study contractor, FEMA, and the county
VANCE COUNTY	7/16/1991	6/30/1987	Representatives of FEMA, the county, Vance County Emergency Management Agency, and Wang Engineering	8/21/1990	Representatives of local communities, Sampson County, the State, FEMA, and the study contractor
VANCE COUNTY	7/16/1991	6/30/1987	Representatives of FEMA, the county, Vance County Emergency Management Agency, and Wang Engineering	8/21/1990	Representatives of the communities, FEMA, and the study contractor
VANCE COUNTY	7/16/1991	6/30/1987	Representatives of FEMA, the county, Vance County Emergency Management Agency, and Wang Engineering	8/21/1990	Representatives of the Study Contractor, FEMA, and the community
VANCE COUNTY	7/16/1991	6/30/1987	Representatives of FEMA, the county, Vance County Emergency Management Agency, and Wang Engineering	8/21/1990	Representatives of the study contractor, FEMA, and the county

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 Vance County are shown in Table 27, "Scoping Meetings." Meetings held for the map maintenance revision are also included below for Vance County.

Table 27 — Scoping Meetings

Community	Riverbasin	Initial Scoping Date	Attended By	Final Scoping Date	Attended By
CITY OF HENDERSON	ROANOKE	9/16/2003	Representatives of the State, FEMA, Dewberry, the county, and the community	12/20/2004	Representatives of the State, FEMA, Dewberry, and the community
CITY OF HENDERSON	ROANOKE	9/16/2003	Representatives of the State, FEMA, Dewberry, the county, and the community	8/8/8888	NP
CITY OF HENDERSON	TAR-PAMLICO	11/1/2000	Representatives of the State, FEMA, Dewberry, the county, and the community	12/20/2004	Representatives of the State, FEMA, Dewberry, and the community
CITY OF HENDERSON	TAR-PAMLICO	11/1/2000	Representatives of the State, FEMA, Dewberry, the county, and the community	8/8/8888	NP
CITY OF HENDERSON ETJ	ROANOKE	9/16/2003	Representatives of the State, FEMA, Dewberry, the county, and the community	12/20/2004	Representatives of the State, FEMA, Dewberry, and the community
CITY OF HENDERSON ETJ	ROANOKE	9/16/2003	Representatives of the State, FEMA, Dewberry, the county, and the community	8/8/8888	NP
CITY OF HENDERSON ETJ	TAR-PAMLICO	11/1/2000	Representatives of the State, FEMA, Dewberry, the county, and the community	12/20/2004	Representatives of the State, FEMA, Dewberry, and the community
CITY OF HENDERSON ETJ	TAR-PAMLICO	11/1/2000	Representatives of the State, FEMA, Dewberry, the county, and the community	8/8/8888	NP
VANCE COUNTY	ROANOKE	9/16/2003	Representatives of the State, FEMA, Dewberry, and the county	1/31/2001	Representatives of the State, FEMA, Dewberry, and the county
VANCE COUNTY	ROANOKE	9/16/2003	Representatives of the State, FEMA, Dewberry, and the county	8/8/8888	NP
VANCE COUNTY	TAR-PAMLICO	11/1/2000	Representatives of the State, FEMA, Dewberry, and the county	1/31/2001	Representatives of the State, FEMA, Dewberry, and the county
VANCE COUNTY	TAR-PAMLICO	11/1/2000	Representatives of the State, FEMA, Dewberry, and the county	8/8/8888	NP

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 28, “Preliminary and Public Participation Meetings.”

Table 28 — Preliminary and Public Participation Meetings

Community	For FIS Dated	Meeting Location	Preliminary Meeting Date	Attended By	Public Meeting Date	Attended By
VANCE COUNTY	4/16/2007	Henderson	12/17/2002	Representatives of the county, the State, Dewberry, and Watershed Concepts	2/27/2003	NP
VANCE COUNTY	4/16/2007	Henderson	12/17/2002	Representatives of the county, the State, Dewberry, and Watershed Concepts	10/20/2003	NP
VANCE COUNTY	4/16/2007	Henderson	12/17/2002	Representatives of the county, the State, Dewberry, and Watershed Concepts	3/2/2006	NP
VANCE COUNTY	4/16/2007	Henderson	3/29/2006	Representatives of the county and the State	2/27/2003	NP
VANCE COUNTY	4/16/2007	Henderson	3/29/2006	Representatives of the county and the State	10/20/2003	NP
VANCE COUNTY	4/16/2007	Henderson	3/29/2006	Representatives of the county and the State	3/2/2006	NP
VANCE COUNTY	4/16/2013	Louisburg	7/15/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry	8/10/2010	Representatives of the State, Franklin County and Incorporated Communities

Table 28 — Preliminary and Public Participation Meetings

Community	For FIS Dated	Meeting Location	Preliminary Meeting Date	Attended By	Public Meeting Date	Attended By
VANCE COUNTY	4/16/2013	Louisburg	7/15/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry	8/10/2010	Representatives of the State, Granville County, and Dewberry
VANCE COUNTY	4/16/2013	Louisburg	7/15/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry	8/10/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry
VANCE COUNTY	4/16/2013	Louisburg	7/15/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry	8/10/2010	Representatives of the State, Wake County and Incorporated Communities, and Dewberry
VANCE COUNTY	4/16/2013	Louisburg	7/15/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry	11/15/2010	Representatives of the State, Nash County and Incorporated Communities, and Dewberry
VANCE COUNTY	4/16/2013	Louisburg	7/15/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry	1/16/2011	Representatives of the State, Nash County and Incorporated Communities, and Dewberry
VANCE COUNTY	4/16/2013	Louisburg	7/15/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry	4/18/2011	Representatives of the State, FEMA, Dewberry, and Wilson County and Incorporated Areas
VANCE COUNTY	4/16/2013	Louisburg	7/15/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry	10/19/2011	Representatives of the State, FEMA, Dewberry, and Pitt County and Incorporated Areas
VANCE COUNTY	4/16/2013	Louisburg	7/15/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry	10/20/2011	Representatives of the State, FEMA, Dewberry, and Lenoir County and Incorporated Areas
VANCE COUNTY	4/16/2013	Louisburg	7/15/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry	12/2/2011	Representatives of the State, FEMA, Dewberry, and Greene County and Incorporated Areas
VANCE COUNTY	4/16/2013	Louisburg	7/15/2010	Representatives of the State, Vance County and Incorporated Communities, and Dewberry	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 Vance 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
City of Henderson	Henderson City Planning Department, 180 South Beckford Drive	Henderson	NC	27536
Vance County	Vance County Planning and Development Office, 156 Church Street, Suite 003	Henderson	NC	27536
Town of Middleburg	Vance County Planning and Development Office, 156 Church St, Suite 003	Henderson	NC	27536

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 28, “Additional Information” is not applicable in Vance 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