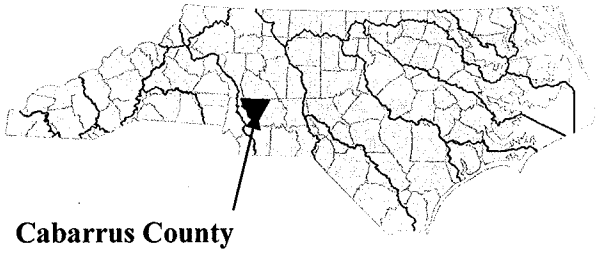
FLOOD INSURANCE STUDY

A Report of Flood Hazards in

CABARRUS COUNTY, NORTH CAROLINA

AND INCORPORATED AREAS



Community Name	Community Number	River Basin
Cabarrus County (Unincorporated Areas)	370036	Yadkin
Concord, City of	370037	Yadkin
Harrisburg, Town of	370038	Yadkin
Kannapolis, City of	370469	Yadkin
Midland, Town of	370182	Yadkin
Mount Pleasant, Town of	370470	Yadkin

NORTH CAROLINA Cooperating Technical State
FEMA'S COOPERATING TECHNICAL PARTNER

VOLUME 1 OF 3

November 5, 2008

Federal Emergency Management Agency
State of North Carolina

Flood Insurance Study Number
37025CV001A

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.

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

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:

November 5, 2008

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

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

Table of Contents

Volume 1 – November 5, 2008

Table of Contents

Volume 1 - Continued

Table of Contents

Volume 1- continued

Tables

Figures

Volume 2 – November 5, 2008

Flood Profiles

Table of Contents

Volume 2 - continued

Flood Profiles

Volume 3 – November 5, 2008

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

Table 1—Jurisdictions in Cabarrus County

Community	Included in this FIS	Not Included in this FIS	If Not Included, Location of Flood Hazard/Flood Insurance Rate Data
Cabarrus County (Unincorporated Areas)	X		
Concord, City of	X		
Harrisburg, Town of	X		
Kannapolis, City of	X		
Locust, City of		X	Stanly County
Midland, Town of	X		
Mount Pleasant, Town of	X		

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.

Flood Insurance Rate Map

The FIRM shows 1% annual chance (100-year) and 0.2% annual chance (500-year) floodplains, using tints, screens, and symbols. Floodways, the locations of selected cross sections used in the hydraulic analyses and floodway computations, and Velocity Zones are shown where applicable. The FIRM for North Carolina has been produced digitally, and there are separate data layers that are available in the public domain via the Internet.

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.

Flood Profiles

A Flood Profile is provided for every stream studied in detail, showing the continuum of calculated flood elevations of various recurrence periods along the studied reaches. Flood Profiles are the documents that serve as a basis for determining flood insurance rate zones.

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.

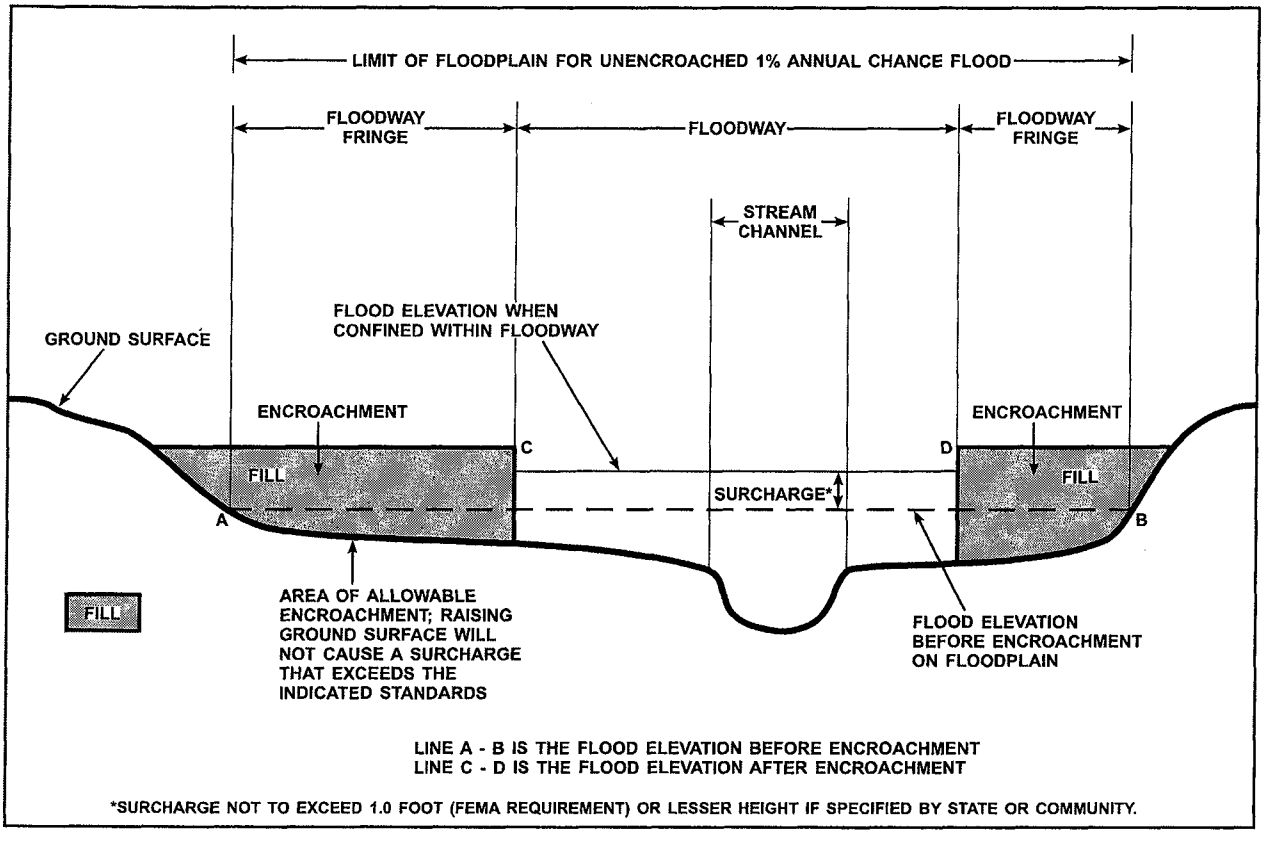


Figure 1—Floodway Schematic

2.3 Base Flood Elevations

Base Flood Elevations (BFEs) are shown on the FIRM and represent rounded, whole-foot elevations at selected locations along flooding sources that have been studied in detail. Flood Profiles in this FIS Report provide a comprehensive and definitive tool to determine specific flood elevations along a stream studied by detailed methods. In order to reduce the risk of damage from floods up to the base (1% annual chance) flood, communities are advised to consider these elevations when issuing building permits for structures.

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.

Section 3.0 – Insurance Applications

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 Zone 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.

Table 2—Flood Zone Designations

Zone	Description
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.

4.1 Basin Characteristics

Yadkin River Basin

The Yadkin River Basin drains from the Virginia border to South Carolina, cutting a swath through west central North Carolina. With 7,400 square miles, or 15.6% of the land area, this is the second largest drainage basin in the state. It also has the second largest number of stream miles - 5,855. The basin originates on the eastern slopes of the Blue Ridge Mountains in Caldwell, Wilkes, and Surry Counties. A small portion of the Yadkin River headwaters originates in Virginia and flows northeasterly for about 100 miles, then flows to the southeast until it joins the Uwharrie River to form the Pee Dee River. The Pee Dee River continues flowing southeasterly through South Carolina to the Atlantic Ocean. The North Carolina portion of the basin contains approximately 5,991 miles of freshwater streams and rivers.

Forest land covers approximately 50% of the basin and 95% of that forestry is privately owned. Agriculture (including cultivated and uncultivated cropland (15.6%) and pastureland (14.1%)) covers approximately 30% of the land area, while 13% of the land is developed. The urban and built-up category comprises roughly 11% and exhibited the most dramatic change between 1982 and 1992 (38% increase). Other categories that showed substantial changes during this period were pasturelands (19% increase) and the "Other" category, which includes rural transportation (26% increase).

Both cultivated and uncultivated cropland decreased by a total of 46% in the basin between 1982 and 1992. It is likely that some of this cropland was converted to pastureland and to urban and built-up areas. Major land use activities in the basin include agriculture (crops, swine, poultry and cattle operations) and construction activities related to growth. Iredell County has the largest dairy cattle population in the state. The map below shows a general area of the Yadkin River Basin, also known as the Yadkin-Pee Dee River Basin.

There are 28 counties and over 93 municipalities in this large drainage area. The basin includes all or portions of the following counties: Alexander, Allegheny, Anson, Ashe, Cabarrus, Caldwell, Davidson, Davie, Forsyth, Guilford, Iredell, Mecklenburg, Montgomery, Randolph, Richmond, Rowan, Scotland, Stanly, Stokes, Surry, Union, Watauga, Wilkes, and Yadkin. This is the second most densely populated watershed, with 1,193,353 people or 17.51 % of the state's total population. Based on 1990 census data, the population of the basin was 1.2 million people.

The most populated areas are in and near Winston-Salem and Charlotte. The overall population density is 163 persons per square mile versus a statewide average of 123 persons per square mile. While much of the basin contains rural areas surrounding small towns, many of the small to large cities have high density areas. The percent population growth over the ten year period between 1980 and 1990 was 10 percent.

This region is characterized by rolling hills and geologic formations consisting of crystalline or sedimentary rocks. Because of the moderate topography, more streams drain a smaller amount of land, creating moderate drainage density.

The Yadkin Basin serves as a corridor for plants and animals migrating from the mountains to the Coastal Plain, and vice-versa. This basin contains a variety of habitat types, as well as many rare plants and animals. Sportfishes in the Yadkin River upstream of the Kerr Scott Reservoir include smallmouth bass, redbreast sunfish and bullhead catfishes. A considerable amount of white and striped bass fish exist below Idols Dam (west of Clemmons – in Forsyth County) in the spring

when the fish migrate from downstream reservoirs to spawn. In addition to being important natural resources, these reservoir fisheries also help make the basin a popular place for recreation, significantly boosting the local economy.

4.2 Principal Flood Problems

Past flooding on the streams within Cabarrus County indicates that flooding may occur during any season of the year; however, most floods occur during the spring as a result of heavy rainfall. Floods are often associated with tropical storms moving north along the Atlantic coastline.

4.3 Historic Flood Elevations

September 13, 1984 (Hurricane Diana)
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.

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

July 12, 1996 (Hurricane Bertha)
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.

September 5, 1996 (Hurricane Fran)
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.

August 26, 1998 (Hurricane Bonnie)
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.

September 16, 1999 (Hurricane Floyd)
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.

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.

Additional Storm Data

On August 25, 1995, the remnants of Hurricane Jerry dropped eight to nine inches of rain producing serious flooding in Kannapolis and Harrisburg. A mobile home park and a nursing home were evacuated. Many homes and 30 roads sustained flood damage. Three miles of Interstate 85 were closed due to flooding from the Rocky River. This storm caused approximately $1.5 million dollars worth of damage.

On July 23, 1997, a cluster of thunderstorms producing very heavy rain sank south in the Charlotte metro area, including Mecklenburg and Cabarrus Counties, shortly before midnight of the 23rd and continued to redevelop over the area through mid-morning. Severe flash flooding resulted as nearly 10 inches of rain fell in some spots. Mecklenburg county officials requested that people not try to go to work or drive around. Numerous roads and bridges were washed out or damaged. A railroad trestle collapsed, dropping a locomotive 100 feet into a raging creek. Two women died after their vehicles became trapped in flood waters around 2 AM EST. A young girl perished around 9 AM EST when she went to play in the waters and was swept away. In Cabarrus County, 3 of the 4 injuries occurred when a plant roof collapsed due to the weight of the rain water. The fourth injury occurred in Mount Pleasant when a person drove into a wash-out. These storms caused $3 million worth of damage, of which $2 million was damage to crops.

One million dollars worth of damage occurred on March 20, 2003 after morning flash flooding, moderating rainfall contributed to slower rises, but continued and additional flooding along numerous creeks and streams into the evening hours. Flooding was quite severe from Kannapolis to Concord, as well as across southern and eastern sections of the county. A nursing home and a school had to be evacuated due to rising water. At least 10 roads were closed across the county.

On April 10, 2003, after a night of moderate to heavy rainfall, flooding developed during the morning along some creeks and streams between Kannapolis and Concord, causing several roads to be closed. Water levels on the Rocky River increased to 20 feet above normal. Significant flooding also occurred along the Irish Buffalo Creek. In some areas, boats were required to ferry people to and from work. These storms caused approximately $200,000 worth of damage.

On September 28, 2004, flash flooding developed across the county shortly after midnight in response to an intense tropical rain band. Roads were damaged and water entered homes and businesses, particularly in the Harrisburg area. There was approximately $700,000 worth of damage in and around Harrisburg.

In the Town of Midland, on June 2, 2005, flooding first began along several creeks including Clear, Muddy, and Little Meadow, as well as some small tributaries of the Rocky River. Later in the morning, the Rocky River flooded in the northwest part of the county, near Poplar Tent Rd.

Several roads were closed due to high water, including Hopewell Church Rd, where several homes were surrounded by high water.

Five thousand dollars worth of damage was reported when campground flooded near Lowes Motor Speedway on August 15, 2006, apparently due to a combination of poor drainage and flooding along a small tributary of Irish Buffalo Creek. Several roads were flooded, including Concord Parkway near Speedway Boulevard and Concord Parkway at Goodman Circle. Several campers were evacuated from the campground and at least 1 vehicle was flooded.

In the City of Concord on November 22, 2006, flooding developed along portions of the Rocky River, some of its tributaries, and along other streams, including Back Creek when 4 to 5 inches of rain fell in about an 18 hour period. Several roads were closed, including Mt Pleasant Road, Pharr Mill Road, Stallings Road, and Highway 200 in Harrisburg. A prolonged period of moderate rain lead to stream flooding in parts of the western North Carolina piedmont.

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).

To provide safe flood protection and be mapped as such, FEMA specifies that all levees must: have a minimum of three feet of freeboard against the 1% annual chance flood event; be equipped with closure devices at every opening; be constructed with embankments and foundations that are certified not to fail due to erosion, seepage, or instability; and be certified against future loss of freeboard due to settling. For additional requirements, please refer to 44 CFR 65.10.

Flood protection measures are not known to exist within Cabarrus County.

4.5 Scope of Study

In order to determine the areas studied by detailed and limited detailed methods in this FIS, initial research and community coordination was necessary. Initial scoping meetings were held in Cabarrus County to present the results of initial research to the county and communities within the county and to discuss their flood mapping needs. The county and communities were asked to provide input on proposed study priorities and analysis methods. Those meetings resulted in the identification of flooding sources having a flood mapping need. 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 Cabarrus 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 the FIRM. Please see Table 3, "Flooding Sources Studied by Detailed Methods: Revised or Newly Studied," for a list of flooding sources that were revised or newly studied by detailed methods for this FIS.

Table 3—Flooding Sources Studied by Detailed Methods: Revised or Newly Studied

Source	Riverine Sources		Affected Communities
	From	To	
Adams Creek	Approximately 150 feet upstream of NC-73	Approximately 1,450 feet upstream of NC-73	Cabarrus County (Unincorporated Areas)
Coddle Creek	Approximately 50 feet upstream of NC-73	The Cabarrus/Iredell County boundary	Cabarrus County (Unincorporated Areas)
Irish Buffalo Creek	Approximately 100 feet upstream of Cannon Farm Road	Approximately 0.5 mile upstream of Cannon Farm Road	City of Kannapolis
Mallard Creek	The confluence with Rocky River	The Cabarrus/Mecklenburg County boundary	Town of Harrisburg, Cabarrus County (Unincorporated Areas)
Morris Branch	The confluence with Rocky River	Approximately 1,280 feet upstream of Rocky River Crossing Road	Town of Harrisburg
Muddy Creek[1]	The confluence with Rocky River	Approximately 0.5 mile downstream of Hopewell Church Road	Town of Midland, Cabarrus County (Unincorporated Areas)
Rocky River (downstream)	The Cabarrus/Union County boundary	Approximately 50 feet downstream of Garmon Mill Road (SR 1189)	Cabarrus County (Unincorporated Areas)
Rocky River (upstream)	The confluence of West Branch Rocky River	The Cabarrus/Iredell County boundary	City of Kannapolis, Cabarrus County (Unincorporated Areas)

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

Table 4, "Flooding Sources Studied by Detailed Methods: Redelineated," contains a list of flooding sources that were studied by detailed methods for previous FISs, but were only partially revised in the current study. Their effective analyses remain valid; however, their floodplain delineations have been revised on the current FIRM.

Table 4—Flooding Sources Studied by Detailed Methods: Redelineated

Source	Riverine Sources		Affected Communities
	From	To	
Adams Creek	The confluence with Dutch Buffalo Creek	Approximately 150 feet upstream of NC-73	Town of Mount Pleasant, Cabarrus County (Unincorporated Areas)
Afton Run	The confluence with Coddle Creek	Approximately 50 feet upstream of Dogwood Boulevard	City of Concord, City of Kannapolis
Anderson Creek	The confluence with Rocky River	Approximately 50 feet upstream of Bethel Church Road	Town of Midland, Cabarrus County (Unincorporated Areas)

Table 4—Flooding Sources Studied by Detailed Methods: Redelineated

Source	Riverine Sources		Affected Communities
	From	To	
Back Creek	The confluence with Rocky River	The Cabarrus/Mecklenburg County boundary	City of Concord, Town of Harrisburg, Cabarrus County (Unincorporated Areas)
Baker Branch	The confluence of Irish Buffalo Creek	Approximately 1,535 feet upstream of West A Street	City of Kannapolis
Beaver Creek	The confluence with Cold Water Creek	The City of Kannapolis/ Town of Landis Corporate Limits	City of Kannapolis
Caldwell Creek	The confluence with Reedy Creek	The Cabarrus/Mecklenburg County boundary	Cabarrus County (Unincorporated Areas)
Chambers Branch	The confluence with Cold Water Creek	Approximately 120 feet upstream of US Highway 29	City of Concord, City of Kannapolis, Cabarrus County (Unincorporated Areas)
Clarke Creek	The confluence with Rocky River	The Cabarrus/Mecklenburg County boundary	City of Concord, Cabarrus County (Unincorporated Areas)
Coddle Creek	The confluence with Rocky River	Approximately 50 feet upstream of NC-73	City of Concord, City of Kannapolis, Town of Harrisburg, Cabarrus County (Unincorporated Areas)
Cold Water Creek (downstream portion)	The confluence with Rocky River	The confluence of Little Cold Water Creek	City of Concord, Cabarrus County (Unincorporated Areas)
Cold Water Creek (middle portion)	Approximately 310 feet upstream of Old Salisbury-Concord Road	Approximately 920 feet upstream of Lane Street	City of Concord, City of Kannapolis, Cabarrus County (Unincorporated Areas)
Cold Water Creek (upstream portion)	Approximately 0.5 mile upstream of Moose Road	Approximately 0.9 mile upstream of Moose Road	City of Kannapolis
Common Ford Branch	The confluence with Cold Water Creek	Approximately 0.4 mile upstream of Penniger Road	Cabarrus County (Unincorporated Areas)
Davis Branch	The confluence with Rocky River	Approximately 1.2 miles upstream of the confluence with Rocky River	Town of Harrisburg, Cabarrus County (Unincorporated Areas)
Dutch Buffalo Creek	The confluence with Rocky River	Approximately 100 feet upstream of NC-73	Town of Mount Pleasant, Cabarrus County (Unincorporated Areas)
Fisher Town Branch	The confluence with Irish Buffalo Creek	The Cabarrus/Rowan County boundary	City of Kannapolis, Cabarrus County (Unincorporated Areas)

Table 4—Flooding Sources Studied by Detailed Methods: Redelineated

Source	Riverine Sources		Affected Communities
	From	To	
Fuda Creek	The confluence with Back Creek	The Cabarrus/Mecklenburg County boundary	Town of Harrisburg, Cabarrus County (Unincorporated Areas)
Hamby Branch	The confluence with Rocky River	Approximately 2.1 miles upstream of NC-200	Cabarrus County (Unincorporated Areas)
Hamby Branch Tributary	The confluence with Hamby Branch	Approximately 1.0 mile upstream of the confluence with Hamby Branch	Cabarrus County (Unincorporated Areas)
Horse Branch	The confluence with Rocky River	Approximately 1,900 feet upstream of Parks Lafferty Road	Cabarrus County (Unincorporated Areas)
Horton Branch	The confluence with Anderson Creek	Approximately 80 feet upstream of Bethel Church Road	Cabarrus County (Unincorporated Areas)
Irish Buffalo Creek	The confluence with Cold Water Creek	Approximately 100 feet upstream of Cannon Farm Road	City of Concord, City of Kannapolis, Cabarrus County (Unincorporated Areas)
Little Cold Water Creek	The confluence with Cold Water Creek	Approximately 2.7 miles upstream of Sapp Road	City of Concord, Cabarrus County (Unincorporated Areas)
Little Meadow Creek	The confluence with Rocky River	Approximately 100 feet upstream of Reed Mine Road	Cabarrus County (Unincorporated Areas)
McCachern Branch	The confluence with Rocky River	Approximately 1,700 feet upstream of the confluence with Rocky River	Town of Harrisburg, Cabarrus County (Unincorporated Areas)
McKee Creek	The confluence with Reedy Creek	The Cabarrus/Mecklenburg County boundary	Cabarrus County (Unincorporated Areas)
Overcash Branch	The confluence with Irish Buffalo Creek	Approximately 1,000 feet upstream of the confluence with Irish Buffalo Creek	City of Kannapolis
Patterson Branch	The confluence with Chambers Branch	Approximately 200 feet downstream of Jackson Street	City of Kannapolis Cabarrus County (Unincorporated Areas)
Reedy Creek	The confluence with Rocky River	The Cabarrus/Mecklenburg County boundary	City of Concord, Town of Harrisburg, Cabarrus County (Unincorporated Areas)
Reedy Creek Tributary 1	The confluence with Reedy Creek	The Cabarrus/Mecklenburg County boundary	Cabarrus County (Unincorporated Areas)

Table 4—Flooding Sources Studied by Detailed Methods: Redelineated

Source	Riverine Sources		Affected Communities
	From	To	
Rocky River	Approximately 50 feet downstream of Garmon Mill Road (SR 1189)	The confluence of West Branch Rocky River	City of Kannapolis, City of Concord, Town of Harrisburg, Town of Midland Cabarrus County (Unincorporated Areas)
Rogers Lake Branch	The confluence with Irish Buffalo Creek	Approximately 100 feet upstream of Rogers Lake Road	City of Kannapolis
Shinn Branch	The confluence with Dutch Buffalo Creek	Approximately 0.6 mile upstream of the confluence with Dutch Buffalo Creek	Cabarrus County (Unincorporated Areas)
Threemile Branch	The confluence with Cold Water Creek	Approximately 50 feet downstream of Dakota Street	City of Concord, City of Kannapolis
Tucker Branch	The confluence with Anderson Creek	Approximately 900 feet downstream of US-601	Cabarrus County (Unincorporated Areas)
Yow Branch	The confluence with Rocky River	Approximately 250 feet upstream of NC-200	Cabarrus County (Unincorporated Areas)

Table 5, "Flooding Sources Studied by Detailed Methods: Modified Detailed," contains a list of flooding sources that were studied by detailed methods for previous FISs, but were only partially revised in the current study. Their effective analyses remain valid; however, their floodplain delineations have been revised on the current FIRM.

Table 5—Flooding Sources Studied by Detailed Methods: Modified Detailed

Source	Riverine Sources		Affected Communities
	From	To	
Baker Branch	Approximately 1,535 feet upstream of West A Street	Approximately 1.2 miles upstream of the confluence with Graeber Branch	City of Kannapolis
Beaver Creek Tributary	Approximately 1,300 feet upstream of the confluence with Beaver Creek	Approximately 150 feet upstream of East 22nd Street	City of Kannapolis
Dye Branch	The confluence with Baker Branch	Approximately 100 feet downstream of Goldston Street	City of Kannapolis
Graeber Branch	The confluence with Baker Branch	Approximately 0.75 mile upstream of the confluence with Baker Branch	City of Kannapolis

Table 5—Flooding Sources Studied by Detailed Methods: Modified Detailed

Source	Riverine Sources		Affected Communities
	From	To	
Graeber Tributary	The confluence with Baker Branch	Approximately 0.5 mile upstream of the confluence with Baker Branch	City of Kannapolis
Lumber Yard Branch	The confluence with Baker Branch	Approximately 2,740 feet upstream of Maple Avenue	City of Kannapolis
Moose Branch	The confluence with Beaver Creek Tributary	Approximately 2,000 feet from the confluence with Beaver Creek Tributary	City of Kannapolis
Muddy Creek	The confluence with Rocky River	Approximately 0.5 mile downstream of Hopewell Church Road	Cabarrus County (Unincorporated Areas)
Patterson Branch	Approximately 200 feet downstream of Jackson Street	Approximately 120 feet upstream of East 11th Street	City of Kannapolis
Rose Hill Branch	The confluence with Baker Branch	Approximately 1,400 feet upstream of Rosemont Avenue	City of Kannapolis

Table 6, "Flooding Sources Studied by Detailed Methods: Limited Detailed" contains a list of flooding sources that were studied by approximate methods in previous FISs but were revised using limited detailed methods for this FIS.

Table 6—Flooding Sources Studied by Detailed Methods: Limited Detailed

Source	Riverine Sources		Affected Communities
	From	To	
Afton Run	Approximately 50 feet upstream of Dogwood Boulevard	Approximately 1.5 miles upstream of Dogwood Boulevard	City of Kannapolis
Anderson Creek	Approximately 50 feet upstream of Bethel Church Road	Approximately 900 feet upstream of Sam Black Road	Cabarrus County (Unincorporated Areas)
Anderson Creek Tributary 1	The confluence with Anderson Creek	Approximately 1.0 mile upstream of the confluence with Anderson Creek	Cabarrus County (Unincorporated Areas)
Caldwell Creek Tributary	The confluence with Caldwell Creek	Approximately 1,700 feet upstream of Pioneer Mill Road	Cabarrus County (Unincorporated Areas)
Chambers Branch	Approximately 120 feet upstream of U.S. Highway 29	Approximately 1,180 feet upstream of East 1st Street	City of Kannapolis

Table 6—Flooding Sources Studied by Detailed Methods: Limited Detailed

Source	Riverine Sources		Affected Communities
	From	To	
Clear Creek	The Cabarrus/Union County boundary	Approximately 1.6 miles upstream of Ben Black Road	Town of Midland, Cabarrus County (Unincorporated Areas)
Coddle Creek Tributary 1	The confluence with Coddle Creek	Approximately 1,800 feet upstream of Rocky River Road	City of Concord, Town of Harrisburg Cabarrus County (Unincorporated Areas)
Coddle Creek Tributary 2	The confluence with Coddle Creek	Approximately 1,300 feet upstream of Chapel Creek Road SW	City of Concord, Cabarrus County (Unincorporated Areas)
Coddle Creek Tributary 3	The confluence with Coddle Creek	Approximately 1.0 mile upstream of Roberta Church Road	City of Concord
Cold Water Creek (downstream)	The confluence of Little Cold Water Creek	Approximately 310 feet upstream of Old Salisbury-Concord Road	City of Concord, Cabarrus County (Unincorporated Areas)
Cold Water Creek (upstream)	Approximately 920 feet upstream of Lane Street	Approximately 0.5 mile upstream of Moose Road	City of Kannapolis
Common Ford Branch	Approximately 0.4 mile upstream of Penniger Road	Approximately 1.5 miles upstream of Penniger Road	Cabarrus County (Unincorporated Areas)
Dutch Buffalo Creek	Approximately 220 feet upstream of NC-73	Approximately 1,120 feet upstream of Sapp Road	Cabarrus County (Unincorporated Areas)
Dutch Buffalo Tributary 1	The confluence with Dutch Buffalo Creek	Approximately 0.7 mile upstream of Pless Road (SR 2432)	Cabarrus County (Unincorporated Areas)
Horton Branch	Approximately 80 feet upstream of Bethel Church Road	Approximately 0.6 mile upstream of Sam Black Road	Cabarrus County (Unincorporated Areas)
Irish Buffalo Creek Tributary 1	The confluence with Irish Buffalo Creek	Approximately 910 feet upstream of Hanover Drive NW	City of Concord
Irish Buffalo Creek Tributary 2	The confluence with Irish Buffalo Creek	Approximately 1,950 feet upstream of Orphanage Road	City of Concord, City of Kannapolis
Irish Buffalo Creek Tributary 3	The confluence with Irish Buffalo Creek	Approximately 500 feet upstream of Mooresville Road	City of Kannapolis, Cabarrus County (Unincorporated Areas)
Irish Buffalo Creek Tributary 4	The confluence with Irish Buffalo Creek	Approximately 0.7 mile upstream of the confluence with Irish Buffalo Creek	City of Kannapolis
Irish Buffalo Creek Tributary 5	The confluence with Irish Buffalo Creek	Approximately 0.6 mile upstream of the confluence with Irish Buffalo Creek	City of Kannapolis

Table 6—Flooding Sources Studied by Detailed Methods: Limited Detailed

Source	Riverine Sources		Affected Communities
	From	To	
Jones Branch	The confluence with the Rocky River	Approximately 1,690 feet upstream of Falcon Drive (SR 1269)	Cabarrus County (Unincorporated Areas)
Lick Branch	The confluence with Dutch Buffalo Creek	Approximately 1,160 feet upstream of Sapp Road (SR 2443)	Cabarrus County (Unincorporated Areas)
Little Buffalo Creek	The confluence with Dutch Buffalo Creek	Approximately 1.9 miles upstream of Drye Road	Cabarrus County (Unincorporated Areas)
Little Meadow Creek	Approximately 100 feet upstream of Reed Mine Road (SR 1100)	Approximately 330 feet upstream of County Line Road (SR 2623)	Cabarrus County (Unincorporated Areas)
Mallard Creek Tributary 1	The confluence with Mallard Creek	The Cabarrus/Mecklenburg County boundary	Town of Harrisburg
Mallard Creek Tributary 1A	The confluence with Mallard Creek Tributary 1	Approximately 0.8 mile upstream of the confluence with Mallard Creek Tributary 1	Town of Harrisburg
Mallard Creek Tributary 1B	The confluence with Mallard Creek Tributary 1	Approximately 1,650 feet upstream of the confluence with Mallard Creek Tributary 1	Town of Harrisburg
Mallard Creek Tributary 2	The confluence with Mallard Creek	Approximately 1,290 feet upstream of Hudspeth Road (SR 1302)	City of Concord, Town of Harrisburg
Meadow Creek	The confluence with Rocky River	Approximately 0.5 mile upstream of Reed Mine Road (SR 1100)	Cabarrus County (Unincorporated Areas)
Mill Creek	The confluence with Coddle Creek	The Cabarrus/Rowan County boundary	Cabarrus County (Unincorporated Areas), City of Kannapolis
Miller Branch	The confluence with Irish Buffalo Creek	Approximately 0.9 mile upstream of Mooresville Road	City of Kannapolis, Cabarrus County (Unincorporated Areas)
Muddy Creek	Approximately 0.5 mile downstream of Hopewell Church Road	Approximately 0.7 mile upstream of US-601	Town of Midland, Cabarrus County (Unincorporated Areas)
Muddy Creek Tributary 1	The confluence with Muddy Creek	Approximately 150 feet upstream of NC-24/27	Town of Midland, Cabarrus County (Unincorporated Areas)
Overcash Branch	Approximately 1,000 feet upstream of the confluence with Irish Buffalo Creek	Approximately 740 feet upstream of Quail Woods Court	City of Kannapolis
Park Creek	The confluence with Coddle Creek	The Cabarrus/Rowan County Boundary	Cabarrus County (Unincorporated Areas)

Table 6—Flooding Sources Studied by Detailed Methods: Limited Detailed

Source	Riverine Sources		Affected Communities
	From	To	
Patterson Branch Tributary	The confluence with Patterson Branch	Approximately 1,800 feet upstream of Beaumont Avenue	City of Kannapolis
Ridenhour Branch	The confluence with Little Cold Water Creek	Approximately 0.5 mile upstream of the confluence of Ridenhour Branch Tributary	Cabarrus County (Unincorporated Areas)
Ridenhour Branch Tributary	The confluence with Ridenhour Branch	Approximately 1.2 miles upstream of Lake Lynn Road (SR 2640)	City of Concord, Cabarrus County (Unincorporated Areas)
Rocky River Tributary 11	The confluence with Rocky River	Approximately 0.7 mile upstream of NC-200	Cabarrus County (Unincorporated Areas)
Rocky River Tributary 14	The confluence with Rocky River	Approximately 1,310 feet upstream of Rocky River Crossing Road	Town of Harrisburg
Rogers Lake Branch	Approximately 100 feet upstream of Rogers Lake Road	Approximately 190 feet upstream of Richard Avenue	City of Kannapolis
Royal Oaks Branch	The confluence with Cold Water Creek	Approximately 650 feet upstream of Lake Concord Road	City of Concord, City of Kannapolis, Cabarrus County (Unincorporated Areas)
Shamrock Branch	The confluence with Threemile Branch	Approximately 1,050 feet upstream of Shamrock Street NE	City of Concord
Stricker Branch	The confluence with Irish Buffalo Creek	Approximately 180 feet upstream of NC-73	City of Concord
Threemile Branch	Approximately 50 feet downstream of Dakota Street	Approximately 370 feet upstream of Plymouth Street	City of Kannapolis
Water Creek	The confluence with Little Cold Water Creek	Approximately 0.7 mile upstream of Gold Hill Road	Cabarrus County (Unincorporated Areas)
Yow Branch	Approximately 250 feet upstream of NC Highway 200	Approximately 1,000 feet upstream of NC Highway 200	Town of Mt. Pleasant, Cabarrus County (Unincorporated Areas)

This FIS also incorporates the determinations of letters issued by FEMA resulting in map changes (Letters of Map Revision [LOMRs]), as shown in Table 7, "Letters of Map Revision."

Table 7—Letters of Map Revision

Case Number	Date Issued	Flooding Source(s) / Project Identifier	Community
96-04-225P	December 10, 1998	Threemile Branch	City of Concord; Cabarrus County (Unincorporated Areas)

Section 5.0 – Engineering Methods

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic methods were used to determine the flood hazard data required for this FIS.

5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationship for each flooding source studied in detail affecting the county.

Previous Countywide Analyses

The hydrologic analyses for Cabarrus County and incorporated areas have been compiled from the previous countywide FIS report and are summarized below. These analyses remain valid for those flooding sources listed in Table 4, "Flooding Sources Studied by Detailed Methods: Redelineated" and Table 5, "Flooding Sources Studied by Detailed Methods: Modified Detailed."

In the FIS report for the City of Concord dated July 1981 and the August 3, 1989 FIS report for the Unincorporated Areas of Cabarrus County, the hydrologic analyses for the streams studied by detailed methods used a combination of two methods developed by the USGS to establish peak discharge-frequency relationships for selected flood frequencies. The first method considered watershed urbanization, and the other is given in the USGS Water Resources Investigation 76-17 (U.S. Department of the Interior, 1972; U.S. Department of the Interior, 1976).

Discharge-frequency relationship for the streams studied by detailed methods were derived using the log-Pearson Type III method, based on 22 stream gages in the surrounding area, to provide guidelines for the hydrologic analyses (U.S. Department of the Interior, 1981).

In the November 2, 1994 FIS report for Cabarrus County and incorporated areas, the hydrologic analyses for all the streams studied by detailed methods utilized the HEC-1 Flood Hydrograph Package developed by the USACE Hydrologic Engineering Center (U.S. Army Corps of Engineers, 1970). HEC-1 estimates surface runoff of a river basin representing the basin as an interconnected system of hydrologic and hydraulic components. Technical Paper 40, developed by the National Weather Service, was used to determine the rainfall intensities for the estimated recurrence intervals (U.S. Department of Commerce, Weather Bureau, 1963). This report estimated floods having recurrence intervals of 50%, 20%, 10%,, 2%, and 1% annual chance floods. The analyses indicated that flood discharge is related to the drainage area and physiographic location of the basin.

The drainage areas were determined from topographic maps (U.S. Department of the Interior, 1987, et al.). The 0.2% annual chance discharges were determined through a log-log extrapolation of the HEC-1 results.

The HEC-1 results were checked for reasonability by comparing the results of other methods and previous studies; the Water Resources Council Investigation Reports 76-17 and 87-4096 developed by the USGS (U.S. Department of the Interior, 1976; U.S. Department of the Interior, 1987); the Mecklenburg County FIS prepared by USGS for flows on Back Creek, McKee Creek, Caldwell Creek, Clarke Creek, Reddy Creek Tributary #1, and Reedy Creek at the Cabarrus County Boundary (U.S. Department of the Interior, 1991) and the 1989 Cabarrus County FIS (Federal Emergency Management Agency, 1989).

Revised Analyses for Countywide FIS

The hydrologic analyses for the Yadkin River basin were performed using the urban and rural regression equations developed by the USGS. The urban equations were published in "Estimation of Flood-Frequency Characteristics of Small Urban Streams in North Carolina," Water Resources Investigations Report 96-4084 (U.S. Department of the Interior, 1996). The rural equations were published in "Estimating the Magnitude and Frequency of Floods in Rural Basins in North Carolina, - Revised," Water Resources Investigations Report 01-4207 (U.S. Department of the Interior, 2001). Regression equations are mathematical formulas that relate the flow in the stream to physical factors such as the area of the basin and the percentage of the surface that is impervious (paved). Regression equations are developed by fitting a line through the center of the points on a graph that compares flood flows to basin area. The results reflect the "statistical average" of the data. If a gage station is located on the stream being studied, data from that station can be used to adjust the regression results to more accurately estimate the flood flow. There are three separate regional regression equations that cover North Carolina. Cabarrus County is located in the hydrologic region known as the Piedmont region. Analyses of historical high-water marks obtained from interviews of county residents were used to confirm the accuracy of the regression equation estimates. The basin delineations and drainage areas were determined primarily using a 50 foot by 50 foot grid sized digital elevation model (DEM) generated from the Light Detection and Ranging (LiDAR) data collected and processed as part of the study.

A number of basins for the detail and limited detail study streams in Yadkin River Basin portion of Cabarrus County contained sufficient urbanization to require application of the USGS North Carolina urban equations. Percents imperviousness for these basins were estimated using a combination of digital orthophotographic data and street centerline data. The recurrence interval discharges presented in this report for streams draining these urbanized basins were computed using the USGS North Carolina urban regression equations for the Piedmont hydrologic region (WRIR 96-4084). The recurrence interval discharges for all other streams in Yadkin River Basin portion of Cabarrus County were determined using the USGS North Carolina rural regression equations for the Piedmont hydrologic area (WRIR 01-4207).

A summary of the drainage area-peak discharge relationships for the flooding sources studied by detailed methods is shown in Table 8, "Summary of Discharges."

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area *(square miles)*	Discharges *(cfs)*			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Adams Creek	At confluence with Dutch Buffalo Creek	16.7	4,539	7,198	8,373	11,895
	At SR 2637 (Mt. Pleasant Road)	13.7	4,232	6,702	7,767	10,939
	Approximately 1 mile upstream of SR 2637 (Mt. Pleasant Road)	9.1	2,943	4,752	5,504	7,741
	At SR 49	7.3	2,415	3,942	4,570	6,441
	At SR 2630	5.5	1,824	3,055	3,554	5,050
	At NC 73	3.2	1,106	1,955	2,288	3,297
	Approximately 300 feet upstream of NC 73	3.2	725	1,266	1,549	2,356
Afton Run	At confluence with Coddle Creek	6.1	1,626	2,545	2,972	4,260
	At Interstate Route 85	5.0	1,424	2,268	2,642	3,766
	At NC 73	3.5	1,201	1,933	2,234	3,126
	At SR 1838	1.7	518	923	1,084	1,575
	Approximately 350 feet upstream of Dogwood Boulevard	1.7	*	*	1,037	*
	Approximately 1,500 feet upstream of Dogwood Boulevard	1.2	*	*	835	*
	Approximately 0.6 mile upstream of Dogwood Boulevard	1.0	*	*	750	*
	Approximately 1.1 miles upstream of Dogwood Boulevard	0.7	*	*	573	*
	Approximately 1.4 miles upstream of Dogwood Boulevard	0.5	*	*	490	*
Anderson Creek	At confluence with the Rocky River	12.5	1,720	2,860	3,500	5,420
	At Jim Sossman Road	10.2	1,490	2,510	3,070	4,780
	At Troutman Road	8.6	1,340	2,250	2,760	4,310
	Approximately 50 feet upstream of Bethel Church Road	2.5	*	*	1,305	*
	Approximately 0.3 mile upstream of Bethel Church Road	1.3	*	*	889	*
	Approximately 0.4 mile upstream of Bethel Church Road	0.8	*	*	666	*

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area *(square miles)*	Discharges *(cfs)*			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Anderson Creek	Approximately 0.8 mile upstream of Bethel Church Road	0.7	*	*	571	*
	Approximately 1,000 feet downstream of Sam Black Road	0.4	*	*	410	*
Anderson Creek Tributary 1	At confluence with Anderson Creek	0.8	*	*	627	*
	Approximately 0.5 mile upstream of confluence with Anderson Creek	0.6	*	*	535	*
Back Creek	At the confluence with Rocky River	15.7	4,457	6,626	7,547	10,210
	Immediately upstream of the confluence of Fuda Creek	10.0	2,917	4,382	5,020	6,883
	At SR 1138	9.1	2,706	4,088	4,669	6,357
	Approximately 1,900 feet downstream of the Mecklenburg County boundary	7.0	1,920	3,020	3,450	4,720
Baker Branch	At Pump Station Road	2.5	854	1,429	1,693	2,316
	At Glenn Avenue	2.1	849	1,395	1,644	2,233
	At West "A" Street	2.0	848	1,381	1,624	2,197
	Approximately 0.45 mile upstream of 22nd Street	1.4	592	998	1,193	1,668
Beaver Creek	At China Grover Road	3.8	1,125	1,875	2,225	3,050
	Downstream of the confluence of Beaver Creek Tributary	3.2	1,050	1,725	2,100	2,800
	At Ebenezer Road	1.8	800	1,350	1,630	2,250
Beaver Creek Tributary	*	*	*	*	*	*
Caldwell Creek	At the confluence with Reedy Creek	8.7	2,138	3,340	3,913	5,652
	At Sternbridge Road	7.1	1,763	2,906	3,430	5,040
	At SR 1134	4.9	1,225	2,133	2,519	3,706
	At SR 1135	4.0	1,080	1,927	2,273	3,335
	Approximately 1,500 feet downstream of the Mecklenburg County boundary	2.0	620	1,140	1,400	2,190

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area (*square miles*)	Discharges (*cfs*)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Caldwell Creek Tributary	At confluence with Caldwell Creek	0.6	*	*	542	*
	Approximately 0.6 mile upstream of confluence with Caldwell Creek	0.5	*	*	486	*
	At Morrison Road	0.4	*	*	402	*
	At Pioneer Mill Road	0.2	*	*	298	*
Chambers Branch	At confluence with Cold Water Creek	5.1	1,230	2,090	2,460	3,320
	At Lake Concord Dam	4.9	1,330	2,200	2,580	3,440
	At Little Texas Road	2.1	880	1,490	1,770	2,420
	Approximately 115 feet upstream of U.S. Routes 29 and 601	0.8	520	920	1,120	1,590
	Approximately 1,000 feet upstream of East 1st Street	0.8	*	*	1,122	*
Clarke Creek	At the confluence with Rocky River	28.1	4,967	7,889	9,201	13,151
Clear Creek	Approximately 20 feet upstream of confluence of Long Branch	19.5	*	*	4,775	*
	Approximately 120 feet upstream of Ben Black Road	17.9	*	*	4,513	*
	Approximately 0.8 mile upstream of Ben Black Road	17.1	*	*	4,390	*
Coddle Creek	At the confluence with Rocky River	79.3	5,940	9,480	11,370	16,790
	At U.S. Route 29	64.1	5,100	8,310	9,950	14,530
	Upstream of confluence of Afton Run	54.8	4,620	7,580	9,130	13,440
	Approximately 50 feet downstream of NC 73	41.2	4,552	7,375	8,774	12,625
	Approximately 25 feet upstream of the confluence of Mill Creek	26.4	3,647	5,963	7,118	10,311
	Approximately 25 feet upstream of the confluence of Coddle Creek Tributary 4	22.2	3,365	5,520	6,597	9,579
	Approximately 25 feet upstream of the confluence of Park Creek	15.6	2,903	4,791	5,738	8,370

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area (*square miles*)	Discharges (*cfs*)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Coddle Creek Tributary 1	At confluence with Coddle Creek	1.5	*	*	958	*
	Approximately 600 feet upstream of Rocky River Road	1.3	*	*	881	*
Coddle Creek Tributary 2	At confluence with Coddle Creek	1.5	*	*	942	*
	Approximately 950 feet upstream of Chapel Creek Road SW	1.4	*	*	897	*
Coddle Creek Tributary 3	At confluence with Coddle Creek	1.0	*	*	870	*
	Approximately 0.6 mile upstream of Roberta Church Road	0.6	*	*	623	*
	Approximately 0.9 mile upstream of Roberta Church Road	0.5	*	*	486	*
Cold Water Creek	At the confluence with Rocky River	112.1	6,950	11,200	13,400	20,000
	Above the confluence of Irish Buffalo Creek	65.1	5,400	8,700	10,500	13,900
	At NC 49	58.7	5,150	8,350	10,000	12,900
	Approximately 0.8 mile upstream of NC 49	43.6	*	*	7,886	*
	Approximately 100 feet upstream of the confluence of Threemile Branch	35.6	*	*	6,947	*
	Approximately 1.4 miles upstream of NC 73	33.5	*	*	6,690	*
	Approximately 50 feet upstream of Old Salisbury – Concord Road	33.5	*	*	5,400	*
	Below confluence of Chamber Branch	24.5	2,800	4,600	5,400	6,670
	At Interstate 85	19.3	2,800	4,600	5,400	6,670
	At Lake Fisher Dam	18.8	2,000[1]	3,400[1]	3,940[1]	5,250[1]
	Cabarrus/Rowan County boundary	14.8	*	*	4,015	*
	Approximately 0.5 mile upstream of the Cabarrus/Rowan County boundary	13.5	*	*	3,784	*

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area (*square miles*)	Discharges (*cfs*)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Cold Water Creek	Approximately 0.9 mile upstream of Moose Road	12.8	2,300	3,630	4,170	5,480
Common Ford Branch	At confluence with Cold Water Creek	2.6	680	1,250	1,530	2,180
	Approximately 0.37 mile upstream of Penniger Road 2nd Crossing	0.9	380	740	920[2]	1,370
	Approximately 0.4 mile upstream of Penniger Road 2nd Crossing	0.9	*	*	931	*
	Approximately 0.5 mile upstream of Penniger Road 2nd Crossing	0.7	*	*	770	*
	Approximately 0.9 mile upstream of Penniger Road 2nd Crossing	0.5	*	*	685	*
	Approximately 1.2 miles upstream of Penniger Road 2nd Crossing	0.4	*	*	563	*
Davis Branch	At the confluence with Rocky River	0.5	230	470	610	940
	Approximately 0.73 mile upstream of the confluence with Rocky River	0.3	210	420	530	840
Dutch Buffalo Creek	At the confluence with Rocky River	98.9	6,048	10,344	11,750	15,796
	Approximately 0.6 mile downstream of Barrier Store Road (SR 2622)	88.4	5,973	10,246	11,628	15,599
	Approximately 700 feet downstream of Barrier Store Road (SR 2622)	86.5	5,932	10,189	11,562	15,506
	Approximately 0.9 mile upstream of Barrier Store Road (SR 2622)	83.1	5,861	10,082	11,446	15,368
	Immediately upstream of confluence of Adams Creek	64.9	5,170	8,936	10,484	15,193

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area (*square miles*)	Discharges (*cfs*)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Dutch Buffalo Creek	Approximately 1,950 feet upstream of NC-73	64.1	*	*	10,036	*
	Approximately 0.5 mile upstream of NC-73	63.3	*	*	9,952	*
	Approximately 1.1 mile upstream of NC-73	62.2	*	*	9,849	*
	Approximately 0.8 mile downstream of confluence of Little Buffalo Creek	61.6	*	*	9,789	*
	Approximately 10 feet upstream of confluence of Little Buffalo Creek	44.4	*	*	7,980	*
	Approximately 0.6 mile upstream of NC-49	43.5	*	*	7,873	*
	Approximately 0.7 mile downstream of Mt. Olive Road	40.4	*	*	7,514	*
	Approximately 490 feet downstream of Mt. Olive Road	33.5	*	*	6,691	*
	Approximately 650 feet downstream of Cline School Road	24.6	*	*	5,520	*
	Approximately 0.7 mile upstream of Cline School Road	23.6	*	*	5,370	*
	Approximately 1.9 miles upstream of Cline School Road	22.1	*	*	5,156	*
	Approximately 0.5 mile downstream of Gold Hill Road	20.7	*	*	4,945	*
	Approximately 0.6 mile upstream of Gold Hill Road	19.1	*	*	4,706	*
	Approximately 10 feet upstream of confluence of Lick Branch	17.1	*	*	4,391	*
	Approximately 250 feet upstream of Barrier Road	16.1	*	*	4,230	*

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area *(square miles)*	Discharges *(cfs)*			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Dutch Buffalo Creek	Approximately 500 feet downstream of confluence of Dutch Buffalo Creek Tributary 1	14.9	*	*	4,034	*
	Approximately 10 feet upstream of confluence of Dutch Buffalo Creek Tributary 1	10.6	*	*	3,263	*
	Approximately 750 feet downstream of Sapp Road	9.8	*	*	3,106	*
	Approximately 1,100 feet upstream of Sapp Road	12.0[3]	*	*	3,400	*
Dutch Buffalo Creek Tributary 1	At confluence with Dutch Buffalo Creek	4.2	*	*	1,827	*
	Approximately 0.8 mile upstream of Pless Road	3.9	*	*	1,747	*
Dye Branch	*	*	*	*	*	*
Fisher Town Branch	At confluence with Irish Buffalo Creek	1.4	580	1,040	1,270	1,810
	At Rowan County boundary	0.6	420	750	930	1,340
Fuda Creek	At confluence with Back Creek	3.7	2,448	3,649	4,134	5,523
	At Hickory Ridge Road (SR 1168)	2.2	1,797	2,695	3,052	4,074
	At the Mecklenburg County boundary	0.8	731	1,102	1,250	1,675
Graeber Branch	*	*	*	*	*	*
Graeber Tributary	*	*	*	*	*	*
Hamby Branch	At the confluence with Rocky River	6.8	1,270	2,190	2,590	3,520
	Approximately 1.33 mile upstream of confluence of Hamby Branch Tributary	2.8	760	1,370	1,660	2,340
Hamby Branch Tributary	At confluence with Hamby Branch	2.6	770	1,370	1,650	2,330
	Approximately 1.10 mile upstream of confluence with Hamby Branch	0.3	490	900	1,100	1,590
Horse Branch	At the confluence with Rocky River	2.0	650	1,180	1,430	2,040

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area (*square miles*)	Discharges (*cfs*)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Horton Branch	At confluence with Anderson Creek	2.5	630	1,170	1,430	2,070
	Upstream side of Bethel Church Road	1.7[3]	540	1,010	1,240	1,800
	Approximately 0.7 mile downstream of Sam Black Road	1.8	*	*	1,068	*
	Approximately 1,500 feet downstream of Sam Black Road	1.3	*	*	883	*
	Approximately 350 feet downstream of Sam Black Road	1.1	*	*	788	*
	Approximately 50 feet upstream of Sam Black Road	0.8	*	*	661	*
	Approximately 0.4 mile upstream of Sam Black Road	0.6	*	*	528	*
Irish Buffalo Creek	At confluence with Cold Water Creek	45.1	4,060	6,570	7,920	11,870
	At NC 49	39.5	3,720	6,030	7,280	10,950
	At Cabarrus Avenue (southwest)	34.3	3,380	5,500	6,660	9,460
	At McGill Avenue (northwest)	30.2	3,170	5,170	6,260	9,460
	At Interstate 85	22.5	2,670	4,390	5,330	8,110
	At Rogers Lake Road	16.5	2,060	3,420	4,170	6,410
	At Lake Kannapolis Dam	9.0	1,450	2,450	2,800	4,490
	At Cannon Farm Road	4.2[3]	545[2]	965[2]	1,165[2]	1,705[2]
	Approximately 250 feet upstream of Cannon Farm Road	5.7	1,052	1,809	2,200	3,309
	Approximately 712 feet upstream of Cannon Farm Road	4.8	937	1,620	1,974	2,979
Irish Buffalo Creek Tributary 1	At confluence with Irish Buffalo Creek	1.7	*	*	1,260	*
	Approximately 200 feet downstream of Chadbourne Avenue	1.2	*	*	1,011	*
	Approximately 250 feet downstream of Channing Circle	0.9	*	*	833	*
Irish Buffalo Creek Tributary 2	At confluence with Irish Buffalo Creek	1.3	*	*	1,291	*

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area *(square miles)*	Discharges *(cfs)*			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Irish Buffalo Creek Tributary 2	Approximately 150 feet upstream of Orphanage Road	1.0	*	*	1,207	*
	Approximately 1,050 feet upstream of Orphanage Road	0.9	*	*	1,119	*
Irish Buffalo Creek Tributary 3	At confluence with Irish Buffalo Creek	0.7	*	*	1,005	*
	Approximately 900 feet downstream of Mooresville Road	0.6	*	*	937	*
Irish Buffalo Creek Tributary 4	At the confluence with Irish Buffalo Creek	0.9	*	*	757	*
	Approximately 0.3 mile upstream of the confluence with Irish Buffalo Creek	0.7	*	*	684	*
	Approximately 0.5 mile upstream of the confluence with Irish Buffalo Creek	0.6	*	*	641	*
Irish Buffalo Creek Tributary 5	At the confluence with Irish Buffalo Creek	0.6	*	*	545	*
Jones Branch	At the confluence with the Rocky River	1.0	*	*	753	*
	Approximately 750 feet upstream of Zion Church Road	0.8	*	*	651	*
	Approximately 1,100 feet downstream of Falcon Drive	0.5	*	*	505	*
	Approximately 1,010 feet upstream of Falcon Drive	0.2	*	*	295	*
Lick Branch	At the confluence with Dutch Buffalo Creek	1.5	*	*	949	*
	Approximately 230 feet upstream of Barrier Road	1.0	*	*	748	*
	Approximately 0.6 mile upstream of Barrier Road	0.8	*	*	624	*
	Approximately 0.4 mile downstream of Sapp Road	0.6	*	*	547	*
Little Buffalo Creek	At the confluence with Dutch Buffalo Creek	17.0	*	*	4,381	*

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area (*square miles*)	Discharges (*cfs*)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Little Buffalo Creek	Approximately 0.6 mile downstream of NC-49	16.8	*	*	4,351	*
	Approximately 50 feet downstream of NC-49	15.7	*	*	4,170	*
	Approximately 0.7 mile upstream of NC-49	13.0	*	*	3,703	*
	Approximately 1,750 feet downstream of Drye Road	12.1	*	*	3,543	*
	Approximately 750 feet upstream of Drye Road	11.9	*	*	3,502	*
	Approximately 1.1 miles upstream of Drye Road	10.4	*	*	3,219	*
	Approximately 1.7 miles upstream of Drye Road	9.9	*	*	3,113	*
Little Cold Water Creek	At confluence with Cold Water Creek	14.1	1,740	2,960	3,470	4,650
	At NC 73	11.0	1,630	2,760	3,240	4,330
	At Gold Hill Road	9.3	1,520	2,580	3,040	4,080
	At Sapp Road	3.8	800	1,450	1,750	2,480
	Approximately 2.59 miles upstream of Sapp Road	0.4	250	490	620	960
Little Meadow Creek	At the confluence with Rocky River	5.5	980	1,670	2,060	3,250
	Approximately 150 feet upstream of Reed Mine Road	4.4[3]	850	1,450	1,790[2]	2,840
	Approximately 500 feet upstream of Reed Mine Road	4.7	*	*	1,968	*
	Approximately 1,300 feet upstream of Reed Mine Road	4.6	*	*	1,929	*
	Approximately 0.4 mile upstream of Reed Mine Road	4.1	*	*	1,795	*
	Approximately 1.6 miles downstream of NC-200	3.7	*	*	1,674	*
	Approximately 0.6 mile downstream of NC-200	3.2	*	*	1,534	*

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area *(square miles)*	Discharges *(cfs)*			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Little Meadow Creek	Approximately 100 feet upstream of NC-200	2.7	*	*	1,379	*
	Approximately 100 feet downstream of Mauney Road	1.6	*	*	1,007	*
	Approximately 2,000 feet upstream of Mauney Road	1.5	*	*	939	*
	Approximately 100 feet downstream of Crayton Road	1.0	*	*	741	*
Lumber Yard Branch	*	*	*	*	*	*
Mallard Creek	At the confluence with Rocky River	39.4	5,775	10,055	11,409	14,991
Mallard Creek Tributary 1	At the confluence with Mallard Creek	1.2	*	*	845	*
	Approximately 200 feet upstream of confluence with Mallard Creek	0.8	*	*	657	*
	Approximately 0.4 mile upstream of confluence with Mallard Creek	0.7	*	*	590	*
	Approximately 0.7 mile upstream of confluence with Mallard Creek	0.5	*	*	484	*
Mallard Creek Tributary 1A	At confluence with Mallard Creek Tributary 1	0.4	*	*	422	*
	Approximately 0.5 mile upstream of confluence with Mallard Creek Tributary 1	0.3	*	*	388	*
	Approximately 0.6 mile upstream of confluence with Mallard Creek Tributary 1	0.2	*	*	318	*
	Approximately 0.8 mile upstream of confluence with Mallard Creek Tributary 1	0.1	*	*	268	*

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area (*square miles*)	Discharges (*cfs*)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Mallard Creek Tributary 1B	At confluence with Mallard Creek Tributary 1	0.1	*	*	176	*
Mallard Creek Tributary 2	At the confluence with Mallard Creek	0.4	*	*	447	*
	Approximately 180 feet upstream of Hudspeth Road	0.1	*	*	251	*
McCachern Branch	At the confluence with Rocky River	0.3	230	460	580	900
McKee Creek	At the confluence with Reedy Creek	8.7	1,954	2,748	3,296	5,027
	Approximately 0.23 mile downstream of Peach Orchard Road (SR 1169)	7.7	1,923	2,732	3,272	4,974
	At the Mecklenburg County boundary	6.1	1,640	2,610	3,010	4,170
Meadow Creek	At the confluence with Rocky River	8.5	*	*	2,841	*
	Approximately 50 feet upstream of Reed Mine Road	7.8	*	*	2,685	*
	Approximately 0.6 mile upstream of Reed Mine Road	4.9	*	*	2,022	*
Mill Creek	Approximately 0.6 mile upstream of confluence with Coddle Creek	7.4	*	*	2,607	*
	Approximately 1.3 miles upstream of confluence with Coddle Creek	6.9	*	*	2,496	*
	Approximately 200 feet downstream of Stirewalt Road	5.9	*	*	2,264	*
	Approximately 0.5 mile upstream of Stirewalt Road	5.5	*	*	2,161	*
	Approximately 0.5 mile upstream of Mooresville Highway	4.1	*	*	1,798	*
	Approximately 250 feet downstream of Tuckaseegee Road	3.7	*	*	1,688	*
Miller Branch	At confluence with Irish Buffalo Creek	1.6	*	*	1,009	*

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area (*square miles*)	Discharges (*cfs*)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Miller Branch	Approximately 1,500 feet upstream of confluence with Irish Buffalo Creek	1.0	*	*	728	*
	Approximately 650 feet downstream of Mooresville Road	0.8	*	*	626	*
	Approximately 50 feet upstream of Mooresville Road	0.6	*	*	623	*
	Approximately 0.5 mile upstream of Mooresville Road	0.4	*	*	416	*
	Approximately 0.8 mile upstream of Mooresville Road	0.3	*	*	410	*
Moose Branch	*	*	*	*	*	*
Morris Branch	At the confluence with Rocky River	0.1	130	238	269	357
	Approximately 780 feet upstream of confluence with Rocky River	0.0	81	154	175	236
	Approximately 450 feet upstream of Rocky River Crossing Road	0.0	35	72	83	115
Muddy Creek	At the confluence with Rocky River	9.5	1,420	2,390	2,940	4,570
	Approximately 0.5 mile downstream of Hopewell Church Road	9.0	*	*	2,939	*
	Approximately 1,150 feet downstream of Hopewell Church Road	8.2	*	*	2,768	*
	Approximately 1,250 feet upstream of Hopewell Church Road	7.8	*	*	2,693	*
	Approximately 100 feet upstream of US-601	6.9	*	*	2,483	*
	Approximately 0.4 mile upstream of US-601	6.3	*	*	2,343	*
Muddy Creek Tributary 1	At the confluence with Muddy Creek	6.3	*	*	2,343	*

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area (*square miles*)	Discharges (*cfs*)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Muddy Creek Tributary 1	Approximately 50 feet upstream of confluence with Muddy Creek	3.6	*	*	1,645	*
	Approximately 0.4 mile downstream of Midland Road	2.4	*	*	1,270	*
	Approximately 1,000 feet downstream of Midland Road	1.8	*	*	1,063	*
	Approximately 1,100 feet downstream of NC-24	1.4	*	*	937	*
Overcash Branch	At confluence with Irish Buffalo Creek	0.5	330	620	770	1,150
	Approximately 1,100 feet upstream of confluence with Irish Buffalo Creek	0.5	*	*	719	*
	Approximately 0.5 mile upstream of confluence with Irish Buffalo Creek	0.4	*	*	682	*
Park Creek	At confluence with Coddle Creek	5.5	*	*	2,156	*
	Approximately 780 feet upstream on Alexander Road	5.0	*	*	2,048	*
	Approximately 1,850 feet upstream of Plum Road	4.6	*	*	1,920	*
Patterson Branch	At Centergrove Road	1.3	500	940	1,160	1,680
	Approximately 120 feet upstream of Thirteenth Street	0.6	410	750	920	1,330
Patterson Branch Tributary	At confluence with Patterson Branch	0.1	*	*	278	*
Reedy Creek	At the confluence with Rocky River	43.6	4,939	8,267	9,630	13,725
	Immediately upstream of the confluence of Caldwell Creek	31.6	4,084	7,152	8,428	12,339
	Approximately 1.33 mile downstream of Hickory Ridge Road (SR 1138)	27.9	3,836	6,787	8,097	12,198

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area *(square miles)*	Discharges *(cfs)*			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Reedy Creek	Immediately upstream of the confluence of McKee Creek	17.6	3,420	4,932	5,773	8,794
	Immediately upstream of the confluence of Reedy Creek Tributary 1	13.8	3,385	4,913	5,766	8,576
	At Mecklenburg County boundary	13.3	3,380	4,910	5,440	7,020
Reedy Creek Tributary 1	At confluence with Reedy Creek	2.0	611	1,155	1,372	2,046
	At Mecklenburg County boundary	1.2	430	820	1,030	1,640
Ridenhour Branch	At confluence with Little Cold Water Creek	1.7	*	*	1,031	*
	Approximately 50 feet downstream of Twinfield Drive	1.4	*	*	900	*
	Approximately 0.5 mile upstream of Twinfield Drive	0.3	*	*	362	*
	Approximately 0.9 mile upstream of Twinfield Drive	0.2	*	*	280	*
Ridenhour Branch Tributary	At confluence with Ridenhour Branch	0.9	*	*	692	*
	Approximately 0.5 mile upstream of confluence with Ridenhour Branch	0.7	*	*	579	*
	Approximately 0.7 mile upstream of confluence with Ridenhour Branch	0.4	*	*	413	*
	Approximately 0.9 mile upstream of confluence with Ridenhour Branch	0.3	*	*	316	*
Rocky River	At Cabarrus/Union County boundary	532.7	21,909	33,295	38,680	53,076
	Above confluence of Muddy Creek	520.5	20,940	31,960	37,530	52,900
	Above the confluence of Anderson Creek	482.3	20,020	30,600	35,960	50,770
	Above confluence of Dutch Buffalo Creek	379.6	17,040	26,200	30,870	43,840
	Above confluence of Hamby Branch	368.3	16,690	25,690	30,270	43,030

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area *(square miles)*	Discharges *(cfs)*			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Rocky River	Above confluence of Cold Water Creek	252.5	12,970	20,110	23,800	34,140
	Above confluence of Reedy Creek	203.5	11,200	17,480	20,740	29,910
	Above confluence of Coddle Creek	131.8	8,360	13,190	15,720	22,920
	Approximately 0.81 mile upstream of SR 1600	87.0	6,320	10,070	12,060	17,770
	Just upstream of SR 1445	76.8	5,991	9,765	11,722	16,923
	Just upstream of SR 1394	47.1	4,328	7,106	8,560	12,400
	Just upstream of SR 1449	44.4	4,162	6,839	8,241	11,943
	Just upstream of SR 1600	39.0	*	6,286	7,582	10,998
	At confluence of West Branch Rocky River	37.2	4,847	9,141	10,743	15,858
	Approximately 680 feet upstream of confluence of West Branch Rocky River	14.3	1,759	3,236	3,790	5,924
	Approximately 0.9 mile downstream of Rocky River Road	14.1	1,789	3,270	3,834	6,072
	Approximately 1,800 feet upstream of Rocky River Road	13.2	1,779	3,269	3,857	6,119
	Approximately 1.0 mile upstream of Rocky River Road	11.9	1,763	3,269	3,916	6,242
	Approximately 1.6 miles upstream of Rocky River Road	11.4	1,760	3,277[2]	3,944[2]	6,291[2]
Rocky River Tributary 11	At the confluence with Rocky River	0.8	*	*	621	*
	Approximately 1,550 feet upstream of confluence with Rocky River	0.6	*	*	544	*
Rocky River Tributary 14	At the confluence with Rocky River	0.6	*	*	952	*
	Approximately 150 feet downstream of Rocky River Crossing	0.4	*	*	755	*
Rogers Lake Branch	At confluence with Irish Buffalo Creek	2.2	740	1,310	1,580	2,220

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area (square miles)	Discharges (cfs)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Rogers Lake Branch	Approximately 100 feet upstream of Rogers Lake Road	0.5	390	710	870	1,260
	Approximately 250 feet upstream of Rogers Lake Road	0.4	*	*	797	*
	Approximately 150 feet downstream of Martin Drive	0.3	*	*	586	*
	Approximately 100 feet downstream of Walker Street	0.2	*	*	496	*
	Approximately 130 feet downstream of Richard Avenue	0.2	*	*	436	*
Rose Hill Branch	*	*	*	*	*	*
Royal Oaks Branch	At confluence with Cold Water Creek	2.0	*	*	1,291	*
	Approximately 880 feet upstream of Overbrook Drive	1.7	*	*	1,205	*
	Approximately 150 feet downstream of Bridlewood Place	1.6	*	*	1,187	*
	Approximately 300 feet upstream of Copperfield Boulevard	1.1	*	*	1,045	*
	Approximately 1,700 feet downstream of Concord Lake Road	0.7	*	*	890	*
	Approximately 100 feet downstream of Concord Lake Road	0.6	*	*	833	*
Shamrock Branch	At confluence with Threemile Branch	0.4	*	*	664	*
	Approximately 350 feet downstream of Shamrock Street	0.2	*	*	424	*
Shinn Branch	At confluence with Dutch Buffalo Creek	0.1	90	190	260	440
Stricker Branch	At confluence with Irish Buffalo Creek	1.7	*	*	1,557	*
	Approximately 800 feet upstream of McGill Avenue	1.2	*	*	1,274	*
	Approximately 1,600 feet upstream of Winecoff Avenue	0.7	*	*	927	*

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area *(square miles)*	Discharges *(cfs)*			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Stricker Branch	Approximately 400 feet downstream of Concord Parkway	0.6	*	*	816	*
Threemile Branch	At Crestside Road	7.2	1,410	2,390	2,810	3,780
	At NC 73	6.2	1,300	2,210	2,600	3,510
	At Interstate 85	2.9	980	1,700	2,030	2,790
	Approximately 0.89 mile upstream of Mt. Olive Road	1.6	740	1,280	1,530[2]	2,120
	Approximately 80 feet upstream of Dakota Street	1.3	*	*	1,542	*
	Approximately 400 feet downstream of Eddleman Road	1.0	*	*	1,359	*
	Approximately 550 feet downstream of Universal Street	0.7	*	*	1,041	*
	Approximately 120 feet upstream of Cook Street	0.5	*	*	918	*
	Approximately 100 feet downstream of Plymouth Street	0.4	*	*	769	*
Tucker Branch	At confluence with Anderson Creek	0.7	330	640	800	1,200
Water Creek	At confluence with Little Cold Water Creek	0.7	*	*	572	*
	Approximately 0.4 mile upstream of Gold Hill Road	0.5	*	*	490	*
Yow Branch	At the confluence with Rocky River	1.4	500	940	1,160	1,690
	Approximately 1,850 feet upstream of the confluence with Rocky River	0.8	*	*	661	*

*Data Not Available

[1] Decrease due to reservoir storage

[2] Discharges decrease due to inconsistencies between new and previously effective studies. The lower discharge is a result from an older study that is based on less accurate data.

[3] Increase in drainage area due to inconsistencies between new and previously effective studies. The larger calculated drainage area is a result from an older study that is based on less accurate terrain data.

There are no U.S. Geological Survey stream gages in Cabarrus County.

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. For stream segments for which BFEs were computed, selected cross-section locations are also shown on the FIRM. Flood profiles 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 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.

Previous Countywide Analyses

The hydrologic analyses for Cabarrus County and incorporated areas have been compiled from the previous countywide FIS report and are summarized below. These analyses remain valid for those flooding sources listed in Table 4, "Flooding Sources Studied by Detailed Methods: Redelineated" and Table 5, "Flooding Sources Studied by Detailed Methods: Modified Detailed."

The hydraulic analyses in the City of Concord FIS were reported on July 31, 1981 and the Unincorporated Areas of Cabarrus County FIS were reported on August 3, 1989. For streams that flow through two or more communities, each methodology described applies only to that portion of the stream studied by detailed methods within that particular community.

Cross sections for the streams studied by detailed methods were obtained from field surveys, as were elevation dada and structural geometry on bridges and culverts.

Water-surface elevations of floods of the selected recurrence intervals were computed using the USACE HEC-2 step-backwater computer program (U.S. Army Corps of Engineers, 1984). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations were determined using the HEC-2 step-backwater computer program (U.S. Army Corps of Engineers, 1984). Roughness coefficients (Manning's "n") were assigned on the basis of field observation.

In the November 2, 1994 FIS report for Cabarrus County and incorporated areas, cross sections were obtained from field surveys. All bridges, dams, and culverts, were field surveyed to obtain elevation data and structural geometry.

The overbank cross-sectional data for the backwater analyses were obtained from compiled five foot contour interval maps of the streams, provided by the Cabarrus County Geographical Information System for most of the study streams with the exclusion of Adams Creek and Dutch Buffalo Creek was digitized, by HSMM, from USGS quadrangle sheets at a contour interval of 10 feet.

Water-surface elevations of floods of the selected recurrence intervals were computed using the USACE HEC-2 step-backwater computer program (U.S. Army Corps of Engineers, 1984). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the detailed study streams were obtained by the slope/area method.

Revised Analyses for Countywide FIS

For the streams studied by detailed and limited 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 version 3.1.2 (U.S. Army Corps of Engineers, 2004). These computer models were calibrated using historic high water data collected during field investigations. Topographic data for the floodplain models was developed using recently flown LiDAR land data, field measurements of verified structure information, and updated hydrologic data. The model was developed using HEC-RAS 3.1.2, run for the 1% and 0.2% annual chance floods, and calibrated to known historic flood marks. Approximately 1% annual chance floodway models were also developed using method 4 in HEC-RAS 3.1.2. The hydraulic analyses were based on unobstructed flow. The flood elevations shown on the profiles 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 9, "Roughness Coefficients."

Table 9—Roughness Coefficients

Stream	Channel "n"	Overbank "n"[1]
Adams Creek	0.048-0.059	0.110-0.300
Afton Run	0.045-0.072	0.080-0.200
Anderson Creek	0.020-0.070	0.050-0.150
Anderson Creek Tributary 1	0.050	0.080-0.140
Back Creek	0.047-0.066	0.110-0.200
Baker Branch	0.025-0.070	0.025-0.100
Beaver Creek	0.025-0.070	0.025-0.100
Beaver Creek Tributary	0.025-0.070	0.025-0.100
Caldwell Creek	0.060-0.065	0.120-0.180
Caldwell Creek Tributary	0.035-0.050	0.080-0.150
Chambers Branch	0.020-0.070	0.050-0.150
Clarke Creek	0.048-0.070	0.120-0.260

Table 9—Roughness Coefficients

Stream	Channel "n"	Overbank "n"[1]
Clear Creek	0.048-0.055	0.080-0.150
Coddle Creek	0.020-0.070	0.050-0.150
Coddle Creek Tributary 1	0.050	0.070-0.150
Coddle Creek Tributary 2	0.050	0.080-0.150
Coddle Creek Tributary 3	0.050	0.080-0.150
Cold Water Creek	0.020-0.070	0.050-0.150
Common Ford Branch	0.020-0.070	0.040-0.150
Davis Branch	0.020-0.070	0.050-0.150
Dutch Buffalo Creek	0.040-0.052	0.025-0.260
Dutch Buffalo Creek Tributary 1	0.045	0.080-0.150
Dye Branch	0.025-0.070	0.025-0.100
Fisher Town Branch	0.020-0.070	0.050-0.150
Fuda Creek	0.055-0.060	0.100-0.190
Graeber Branch	0.025-0.070	0.025-0.100
Graeber Tributary	0.025-0.070	0.025-0.100
Hamby Branch	0.020-0.070	0.050-0.150
Hamby Branch Tributary	0.020-0.070	0.050-0.150
Horse Branch	0.020-0.070	0.050-0.150
Horton Branch	0.020-0.070	0.050-0.150
Irish Buffalo Creek	0.020-0.070	0.025-0.150
Irish Buffalo Creek Tributary 1	0.048	0.100-0.130
Irish Buffalo Creek Tributary 2	0.048	0.035-0.130
Irish Buffalo Creek Tributary 3	0.048-0.050	0.090-0.150
Irish Buffalo Creek Tributary 4	0.035-0.050	0.080-0.140
Irish Buffalo Creek Tributary 5	0.035-0.050	0.080-0.140
Jones Branch	0.048	0.080-0.130
Lick Branch	0.045	0.040-0.120
Little Buffalo Creek	0.048	0.080-0.140
Little Cold Water Creek	0.020-0.070	0.050-0.150
Little Meadow Creek	0.020-0.070	0.050-0.150
Lumber Yard Branch	0.025-0.070	0.025-0.100
Mallard Creek	0.048-0.054	0.090-0.185
Mallard Creek Tributary 1	0.050	0.090-0.150
Mallard Creek Tributary 1A	0.035-0.050	0.150
Mallard Creek Tributary 1B	0.055	0.150
Mallard Creek Tributary 2	0.050-0.055	0.100-0.150
McCachern Branch	0.020-0.070	0.050-0.150
McKee Creek	0.040	0.100-0.140
Meadow Creek	0.045	0.060-0.140
Mill Creek	0.040-0.050	0.080-0.150
Miller Branch	0.049-0.050	0.060-0.140
Morris Branch	0.051	0.060-0.090
Moose Branch	0.025-0.070	0.025-0.100
Muddy Creek	0.020-0.070	0.035-0.150
Muddy Creek Tributary 1	0.045	0.070-0.140
Overcash Branch	0.020-0.070	0.050-0.150
Park Creek	0.040-0.048	0.080-0.130
Patterson Branch	0.020-0.070	0.025-0.150
Patterson Branch Tributary	0.050	0.110-0.140
Reedy Creek	0.043-0.061	0.110-0.230
Reedy Creek Tributary 1	0.045-0.046	0.090-0.100

Table 9—Roughness Coefficients

Stream	Channel "n"	Overbank "n"[1]
Ridenhour Branch	0.035-0.050	0.080-0.150
Ridenhour Branch Tributary	0.035-0.050	0.080-0.150
Rocky River	0.020-0.070	0.045-0.150
Rocky River Tributary 11	0.048	0.080-0.130
Rocky River Tributary 14	0.048	0.060-0.140
Rogers Lake Branch	0.020-0.070	0.050-0.150
Rose Hill Branch	0.020-0.070	0.025-0.100
Royal Oaks Branch	0.049-0.050	0.060-0.130
Shamrock Branch	0.041	0.120
Shinn Branch	0.020-0.070	0.050-0.150
Stricker Branch	0.045	0.040-0.120
Threemile Branch	0.020-0.070	0.015-0.150
Tucker Branch	0.020-0.070	0.050-0.150
Water Creek	0.050	0.090-0.150
Yow Branch	0.020-0.070	0.050-0.150

[1] Does not include ineffective flow areas where n = 1.0 or 10.0

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 10, "Limited Detailed Flood Hazard Data"). Flood Profiles have not been developed for streams 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 10. 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 should 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 10. FEMA's current (as of August 2001) map revision structure exempts submittal fees for map revision requests based solely on the submission of more detailed data.

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
AFTON RUN				
211	21,054	1,084	665.2	40 / 135
215	21,487	1,037	665.7	175 / 166
219	21,897	835	666.9	176 / 13
224	22,401	835	670.1	153 / 13
228	22,776	835	672.0	114 / 13
231	23,102	835	673.6	93 / 53
235	23,463	835	675.0	141 / 13
238	23,795	835	676.3	107 / 13
243	24,259	750	678.5	62 / 13
248	24,762	750	682.6	104 / 9
254	25,428	750	686.8	49 / 13
259	25,885	750	690.6	67 / 13
262	26,238	750	692.9	105 / 11
267	26,718	573	696.0	51 / 13
272	27,173	573	699.6	25 / 11
276	27,645	573	703.5	26 / 13
279	27,883	573	705.4	48 / 13
283	28,298	573	708.0	22 / 13
285	28,458	490	708.5	13 / 13
287	28,720	490	710.2	17 / 8
ANDERSON CREEK				
317	31,694	1,240	566.1	20 / 30
320	32,000	1,305	569.4	117 / 37
323	32,319	1,305	569.7	49 / 66
327	32,700	1,305	570.9	49 / 14
330	33,000	1,305	572.8	14 / 65
333	33,252	1,305	573.5	45 / 18
336	33,600	889	575.1	12 / 60
339	33,900	666	575.9	12 / 42
342	34,200	666	576.7	12 / 17
345	34,500	666	578.9	12 / 20
347	34,719	666	580.7	12 / 20
350	35,000	666	582.7	54 / 12
352	35,243	666	583.6	12 / 67
357	35,700	666	585.4	44 / 15

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
ANDERSON CREEK				
359	35,872	571	586.0	9 / 9
360	35,992	571	587.2	5 / 9
364	36,392	571	593.2	36 / 16
366	36,561	571	593.9	15 / 12
368	36,786	410	595.3	7 / 16
372	37,200	410	597.8	18 / 7
375	37,500	410	599.7	7 / 9
380	38,026	410	606.1	7 / 19
381	38,100	410	606.4	7 / 7
382	38,232	410	608.0	7 / 22
384	38,400	410	609.4	11 / 9
385	38,530	410	609.7	7 / 7
387	38,747	410	612.9	7 / 7
ANDERSON CREEK TRIBUTARY 1				
003	288	627	574.5[4]	12 / 11
009	906	627	581.6	25 / 60
014	1,427	627	582.4	35 / 25
018	1,824	627	585.0	7 / 30
022	2,176	627	587.6	65 / 15
025	2,470	627	590.4	13 / 32
029	2,905	535	593.1	8 / 39
033	3,297	535	595.3	7 / 27
036	3,571	535	597.1	7 / 24
038	3,824	535	599.0	30 / 12
043	4,254	535	601.9	10 / 30
046	4,584	535	604.7	10 / 10
050	4,972	535	609.3	25 / 6
052	5,230	535	611.4	12 / 8
CALDWELL CREEK TRIBUTARY				
003	325	542	592.2[4]	70 / 8
006	552	542	592.2[4]	80 / 45
008	771	542	592.2[4]	70 / 66
010	1,042	542	592.4	50 / 19
013	1,288	542	593.8	15 / 25
017	1,720	542	596.1	14 / 19
021	2,095	542	599.5	18 / 6
022	2,206	542	601.5	20 / 6
023	2,291	542	603.2	14 / 6
024	2,384	542	605.7	8 / 10
025	2,480	542	607.9	12 / 11
026	2,638	542	611.3	10 / 30
028	2,754	542	612.4	10 / 30
031	3,076	486	614.8	6 / 25
033	3,289	486	616.9	30 / 10
035	3,478	486	618.7	3 / 25
037	3,675	486	621.6	15 / 30
038	3,840	486	622.5	20 / 10
039	3,916	486	623.5	6 / 16

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
CALDWELL CREEK TRIBUTARY				
043	4,327	402	630.3	18 / 16
046	4,552	402	630.9	12 / 18
048	4,800	402	633.6	35 / 20
050	5,036	402	636.1	12 / 50
053	5,331	402	638.4	15 / 51
056	5,614	402	641.5	12 / 50
059	5,905	402	644.6	12 / 35
062	6,240	298	650.8	20 / 30
064	6,363	298	650.8	16 / 10
065	6,474	298	651.1	13 / 6
066	6,631	298	653.4	10 / 9
068	6,805	298	657.4	16 / 10
071	7,116	298	660.9	13 / 12
073	7,272	298	663.0	6 / 6
074	7,433	298	665.6	10 / 15
075	7,549	298	666.4	9 / 8
077	7,667	298	667.8	8 / 14
078	7,794	298	668.6	8 / 10
CHAMBERS BRANCH				
145	14,489	1,120	702.3	35 / 15
147	14,663	1,122	704.6	24 / 12
150	14,996	1,122	706.7	13 / 37
156	15,574	1,122	711.1	38 / 30
158	15,844	1,122	712.5	35 / 18
160	16,030	1,122	714.3	40 / 17
162	16,230	1,122	716.3	40 / 13
164	16,420	1,122	718.4	28 / 17
CLEAR CREEK				
165	16,509	4,775	486.0	169 / 241
169	16,929	4,775	486.5	246 / 94
178	17,805	4,775	488.4	212 / 31
182	18,228	4,775	489.6	211 / 31
186	18,624	4,775	490.5	217 / 44
190	18,997	4,775	491.0	147 / 99
195	19,526	4,775	492.1	74 / 156
200	20,000	4,775	493.7	110 / 99
206	20,588	4,775	494.3	25 / 80
210	21,021	4,775	496.7	24 / 46
215	21,511	4,775	498.0	45 / 92
219	21,855	4,775	498.7	21 / 136
230	23,038	4,513	502.8	184 / 201
234	23,439	4,513	502.9	145 / 92
238	23,773	4,513	503.3	71 / 48
241	24,079	4,513	503.9	92 / 25
245	24,460	4,513	506.0	135 / 29
250	24,975	4,513	508.5	51 / 161
255	25,516	4,513	510.4	60 / 247
260	26,000	4,513	511.8	65 / 214

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
CLEAR CREEK				
264	26,439	4,513	513.1	26 / 163
270	27,000	4,390	514.7	128 / 21
275	27,500	4,390	517.3	102 / 26
280	27,994	4,390	518.7	20 / 58
285	28,500	4,390	523.0	24 / 91
289	28,940	4,390	524.4	66 / 98
295	29,500	4,390	527.1	75 / 100
300	29,975	4,390	529.8	49 / 95
306	30,561	4,390	534.9	69 / 75
CODDLE CREEK TRIBUTARY 1				
003	316	958	542.5[4]	11 / 36
007	745	958	542.5[4]	12 / 37
011	1,105	958	542.5[4]	22 / 20
014	1,406	958	542.6	17 / 14
021	2,137	958	545.7	11 / 10
023	2,275	958	546.7	39 / 19
027	2,655	881	548.0	18 / 13
030	3,005	881	550.6	19 / 7
033	3,285	881	553.2	24 / 10
036	3,628	881	554.8	22 / 20
CODDLE CREEK TRIBUTARY 2				
004	403	942	542.9[4]	11 / 150
007	682	942	542.9[4]	136 / 39
015	1,495	942	545.9	76 / 10
018	1,792	942	548.4	71 / 10
024	2,392	897	550.5	11 / 52
CODDLE CREEK TRIBUTARY 3				
001	88	870	568.7[4]	12 / 12
003	251	870	568.7[4]	12 / 12
007	745	870	568.7[4]	40 / 50
010	980	870	568.7[4]	29 / 26
012	1,166	870	568.7[4]	31 / 16
014	1,445	870	568.7[4]	41 / 27
018	1,796	870	568.7[4]	16 / 14
023	2,281	870	574.2	16 / 16
028	2,828	870	579.2	126 / 36
032	3,205	870	579.3	137 / 33
037	3,678	870	579.6	59 / 16
041	4,114	870	580.4	16 / 16
045	4,471	870	581.9	16 / 16
049	4,865	870	584.8	16 / 16
055	5,454	623	588.8	29 / 16
058	5,800	623	589.7	16 / 16
061	6,106	623	591.0	16 / 16
064	6,439	623	593.5	16 / 16
069	6,889	623	596.7	16 / 27
073	7,255	486	598.2	16 / 16

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
COLD WATER CREEK				
284	28,390	10,000	550.2	350 / 250
298	29,821	10,028	551.1	194 / 356
303	30,283	7,886	551.5	36 / 352
306	30,633	7,886	551.6	76 / 313
310	30,996	7,886	551.8	34 / 214
318	31,795	7,886	553.6	129 / 215
323	32,335	7,886	554.0	235 / 38
325	32,468	7,886	554.1	213 / 34
330	32,981	7,886	555.0	52 / 193
333	33,263	7,886	555.4	34 / 134
336	33,639	7,886	556.0	43 / 86
340	34,047	7,886	556.9	169 / 194
345	34,467	7,886	557.2	112 / 154
350	35,041	7,886	557.8	196 / 281
354	35,443	7,886	558.2	248 / 365
362	36,218	6,947	558.7	258 / 173
367	36,742	6,947	559.1	272 / 101
372	37,190	6,947	559.6	238 / 163
375	37,472	6,947	559.9	147 / 236
380	37,950	6,947	560.3	209 / 202
385	38,454	6,947	560.6	255 / 51
392	39,247	6,947	561.4	87 / 264
401	40,079	6,947	562.2	172 / 132
405	40,521	6,947	562.7	163 / 268
413	41,250	6,947	563.3	257 / 240
420	42,005	6,947	563.9	228 / 263
432	43,183	6,947	566.1	66 / 85
435	43,460	6,947	566.3	262 / 266
439	43,930	6,947	566.6	257 / 272
444	44,413	6,947	567.0	257 / 233
450	45,003	6,690	567.4	295 / 177
455	45,491	6,690	567.9	262 / 207
460	46,020	6,690	568.5	130 / 178
468	46,757	6,690	569.5	207 / 190
479	47,930	5,400	571.7	607 / 173
CROSS SECTIONS SHOWN ON FLODWAY DATA TABLE AND PROFILE FOR THIS PORTION				
776	77,617	3,940	650.0	867 / 483
779	77,931	4,015	650.0	325 / 210
785	78,489	4,015	650.0	340 / 447
791	79,099	4,015	650.0	365 / 435
806	80,575	3,784	650.2	420 / 170
811	81,083	3,784	650.4	200 / 40
815	81,454	3,784	650.9	200 / 40
820	81,970	3,784	651.7	85 / 84

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
COMMON FORD BRANCH				
115	11,450	920	618.0	50 / 110
117	11,650	931	619.0	30 / 80
120	11,969	770	621.0	70 / 11
120	12,021	770	621.0	40 / 5
123	12,282	770	623.2	17 / 17
125	12,500	770	623.9	9 / 27
128	12,750	770	626.7	18 / 40
130	13,013	770	627.1	16 / 9
133	13,250	770	629.9	9 / 50
135	13,500	770	632.2	32 / 42
138	13,767	770	634.4	17 / 8
139	13,857	770	635.6	15 / 11
140	13,963	770	638.3	12 / 27
142	14,185	685	640.8	20 / 21
143	14,327	685	640.9	9 / 13
145	14,467	685	642.9	20 / 12
146	14,561	685	643.5	7 / 7
147	14,667	685	645.1	12 / 11
147	14,745	685	646.0	10 / 9
150	14,997	685	652.0	8 / 19
153	15,250	685	655.9	14 / 13
155	15,500	685	658.0	12 / 17
158	15,779	563	660.9	10 / 14
159	15,865	563	662.3	16 / 14
159	15,940	563	663.6	28 / 6
163	16,250	563	667.0	10 / 10
165	16,500	563	670.0	6 / 27
167	16,696	563	672.2	15 / 5
170	17,000	563	675.4	5 / 11
173	17,250	563	679.2	6 / 55
176	17,566	563	682.2	11 / 51
DUTCH BUFFALO CREEK				
427	42,687	10,484	523.8	36 / 394
436	43,602	10,036	524.1	36 / 361
445	44,468	10,036	524.5	37 / 501
454	45,427	9,952	524.7	33 / 656
463	46,289	9,952	524.9	350 / 296
471	47,054	9,952	524.9	225 / 113
484	48,402	9,952	525.9	253 / 330
493	49,329	9,952	526.3	39 / 617
503	50,311	9,849	526.5	33 / 321
514	51,372	9,789	527.6	416 / 36
523	52,275	9,789	528.2	506 / 26
534	53,401	9,789	529.0	405 / 316
547	54,689	9,789	530.0	732 / 214
556	55,598	9,789	530.5	441 / 486
567	56,715	7,980	531.7	32 / 447
573	57,252	7,980	532.3	35 / 405

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
DUTCH BUFFALO CREEK				
583	58,300	7,980	534.1	35 / 213
599	59,924	7,980	540.7	38 / 270
606	60,559	7,980	542.3	38 / 169
612	61,246	7,980	544.4	38 / 75
619	61,908	7,980	545.8	38 / 38
625	62,456	7,873	548.0	42 / 43
630	62,960	7,873	548.2	38 / 36
635	63,538	7,873	551.1	49 / 36
640	64,020	7,873	553.2	30 / 34
644	64,431	7,873	555.4	65 / 40
647	64,738	7,873	556.3	97 / 39
654	65,430	7,873	559.6	175 / 35
661	66,078	7,873	560.5	176 / 32
668	66,769	7,873	564.7	337 / 33
674	67,389	7,514	565.7	353 / 33
679	67,927	7,514	567.3	286 / 29
685	68,469	7,514	569.5	251 / 36
689	68,883	7,514	570.2	93 / 73
693	69,286	7,514	571.8	33 / 63
698	69,847	7,514	575.9	43 / 40
707	70,667	6,691	582.3	36 / 115
713	71,321	6,691	582.8	43 / 43
716	71,579	6,691	584.3	33 / 33
718	71,789	6,691	585.4	33 / 33
725	72,453	6,691	591.3	28 / 64
728	72,816	6,691	592.2	68 / 58
733	73,298	6,691	593.7	33 / 160
741	74,062	6,691	595.7	53 / 61
744	74,444	6,691	598.3	43 / 31
751	75,132	6,691	601.2	43 / 31
754	75,390	6,691	602.4	28 / 28
756	75,595	5,520	604.1	80 / 29
765	76,459	5,520	611.9	59 / 107
769	76,881	5,520	611.9	71 / 67
773	77,333	5,520	615.1	26 / 88
777	77,693	5,520	618.1	25 / 107
780	77,986	5,520	620.0	26 / 195
784	78,449	5,520	621.7	119 / 41
789	78,869	5,520	624.6	202 / 25
797	79,673	5,370	627.6	208 / 25
805	80,532	5,370	630.9	154 / 25
812	81,197	5,370	633.7	220 / 41
820	82,047	5,370	637.6	284 / 25
828	82,849	5,370	641.1	25 / 204
840	84,048	5,370	644.5	370 / 25
846	84,635	5,370	645.5	314 / 32
855	85,454	5,370	647.0	273 / 73
862	86,177	5,156	647.9	420 / 24

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
DUTCH BUFFALO CREEK				
871	87,094	5,156	649.0	327 / 24
884	88,411	5,156	650.6	365 / 24
898	89,798	5,156	651.9	443 / 24
906	90,619	5,156	652.8	421 / 24
912	91,213	5,156	653.6	404 / 78
919	91,898	4,945	654.6	230 / 363
933	93,298	4,945	655.8	365 / 23
957	95,657	4,945	660.8	46 / 426
967	96,698	4,945	661.3	68 / 523
973	97,284	4,706	662.0	323 / 250
983	98,264	4,706	662.8	308 / 352
991	99,059	4,706	663.5	366 / 296
997	99,693	4,706	664.0	214 / 170
1007	100,712	4,706	666.5	22 / 260
1015	101,504	4,391	667.9	322 / 198
1025	102,471	4,391	668.3	83 / 810
1035	103,486	4,391	668.7	251 / 410
1053	105,287	4,230	671.2	452 / 295
1064	106,377	4,230	672.3	568 / 126
1072	107,220	4,034	673.3	407 / 118
1082	108,239	3,263	674.7	128 / 142
1088	108,818	3,263	676.0	14 / 345
1096	109,638	3,263	677.5	212 / 193
1105	110,456	3,263	678.8	266 / 19
1112	111,191	3,106	680.5	277 / 25
1125	112,512	3,106	683.3	170 / 200
1130	112,973	3,400	684.0	200 / 110
DUTCH BUFFALO CREEK TRIBUTARY 1				
008	820	1,827	674.1[4]	186 / 22
012	1,200	1,827	674.5	193 / 22
015	1,509	1,827	675.2	189 / 21
018	1,765	1,827	676.0	170 / 19
021	2,116	1,827	677.2	242 / 21
023	2,349	1,827	677.7	172 / 19
029	2,920	1,827	679.7	134 / 16
031	3,095	1,827	680.0	117 / 16
036	3,562	1,827	681.6	129 / 16
039	3,892	1,747	682.9	120 / 41
042	4,242	1,747	683.8	16 / 210
045	4,539	1,747	684.2	16 / 238
048	4,844	1,747	684.4	36 / 105
050	5,049	1,747	685.4	172 / 11
053	5,278	1,747	686.1	179 / 16
055	5,489	1,747	686.5	205 / 16
056	5,641	1,747	686.7	188 / 16
058	5,842	1,747	687.0	188 / 16
061	6,133	1,747	687.6	121 / 36

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
HORTON BRANCH				
098	9,839	1,240	575.2	43 / 7
100	10,000	1,068	577.6	18 / 28
102	10,157	1,068	579.0	24 / 44
104	10,400	1,068	580.6	50 / 19
108	10,800	1,068	582.7	8 / 66
112	11,220	1,068	584.6	9 / 47
116	11,600	1,068	587.9	8 / 53
120	12,000	1,068	590.5	77 / 11
124	12,400	883	592.4	84 / 8
128	12,800	883	594.4	24 / 50
132	13,200	883	596.5	7 / 35
136	13,550	788	600.2	48 / 7
144	14,400	661	605.9	55 / 7
148	14,800	661	609.8	30 / 22
150	14,979	661	611.0	39 / 7
152	15,200	661	614.2	21 / 26
155	15,471	661	615.9	24 / 13
156	15,600	661	617.0	20 / 24
160	16,000	528	619.8	7 / 32
164	16,400	528	623.0	7 / 26
167	16,675	528	625.3	7 / 30
172	17,237	528	631.7	20 / 7
IRISH BUFFALO CREEK TRIBUTARY 1				
009	935	1,260	610.8	11 / 18
015	1,500	1,011	618.5	87 / 7
020	2,019	1,011	618.8	102 / 8
025	2,500	1,011	619.6	10 / 60
035	3,500	1,011	626.9	52 / 9
054	5,406	833	638.9	51 / 7
IRISH BUFFALO CREEK TRIBUTARY 2				
010	1,000	1,291	623.4[4]	155 / 7
015	1,500	1,291	625.1	71 / 72
019	1,874	1,291	627.7	129 / 7
020	2,000	1,291	628.3	130 / 7
024	2,404	1,291	631.4	12 / 117
025	2,500	1,291	632.1	72 / 88
035	3,500	1,207	638.6	43 / 99
040	4,000	1,207	639.2	22 / 115
045	4,500	1,119	641.3	117 / 7
050	5,000	1,119	644.6	39 / 53
IRISH BUFFALO CREEK TRIBUTARY 3				
005	462	1,005	670.7[4]	135 / 7
011	1,069	1,005	674.9	54 / 20
013	1,262	1,005	676.9	27 / 33
016	1,607	1,005	678.6	7 / 10
017	1,711	1,005	681.7	20 / 15
020	2,049	1,005	684.2	60 / 10
022	2,244	1,005	684.7	15 / 24

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
IRISH BUFFALO CREEK TRIBUTARY 3				
024	2,385	1,005	685.8	42 / 12
027	2,673	937	687.3	22 / 20
029	2,914	937	690.7	17 / 42
031	3,067	937	692.5	25 / 25
037	3,728	937	699.2	35 / 7
040	3,996	937	703.8	45 / 15
IRISH BUFFALO CREEK TRIBUTARY 4				
011	1,057	757	731.1[4]	160 / 251
016	1,565	684	735.4	180 / 115
021	2,141	684	735.4	102 / 125
026	2,628	684	735.4	66 / 48
031	3,050	641	740.5	35 / 24
032	3,184	641	740.6	71 / 17
033	3,290	641	741.1	21 / 4
034	3,371	641	742.8	26 / 12
036	3,552	641	744.7	11 / 12
IRISH BUFFALO CREEK TRIBUTARY 5				
010	1,004	545	731.5[4]	300 / 120
014	1,359	545	735.1	100 / 30
016	1,586	545	735.2	238 / 22
017	1,741	545	735.2	21 / 22
019	1,855	545	735.2	20 / 18
019	1,945	545	735.9	25 / 8
020	2,041	545	736.7	17 / 7
021	2,134	545	737.7	35 / 10
023	2,305	545	739.0	14 / 14
025	2,499	545	740.9	21 / 22
029	2,858	545	743.7	26 / 37
032	3,157	545	746.7	73 / 44
033	3,319	545	746.7	62 / 43
035	3,466	545	747.7	50 / 10
036	3,628	545	749.3	25 / 50
038	3,754	545	749.8	15 / 40
JONES BRANCH				
002	196	753	530.4[4]	19 / 15
005	500	753	530.4[4]	36 / 11
008	750	753	530.4[4]	44 / 10
010	1,000	753	530.4[4]	43 / 9
013	1,250	753	530.4[4]	10 / 7
015	1,500	753	530.4[4]	9 / 51
017	1,678	753	530.4[4]	11 / 25
021	2,133	753	530.4[4]	19 / 12
023	2,268	753	530.4[4]	10 / 27
025	2,500	753	530.4[4]	14 / 17
028	2,750	651	532.8	13 / 7
030	3,000	651	538.1	10 / 8
032	3,183	651	543.0	7 / 19
035	3,500	651	546.8	9 / 11

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
JONES BRANCH				
038	3,750	651	550.6	8 / 26
040	4,000	505	554.8	10 / 25
043	4,250	505	557.1	10 / 10
043	4,316	505	558.8	13 / 5
045	4,500	505	562.7	42 / 14
048	4,750	505	564.3	7 / 7
053	5,250	505	572.8	7 / 5
055	5,500	505	577.5	7 / 12
056	5,634	505	580.3	7 / 26
058	5,750	505	582.2	16 / 9
060	6,000	505	583.4	8 / 8
061	6,104	505	585.8	15 / 4
063	6,250	295	588.7	10 / 7
065	6,483	295	590.5	7 / 12
067	6,739	295	595.2	9 / 9
LICK BRANCH				
007	694	949	666.5[4]	7 / 71
011	1,050	949	668.7	7 / 88
012	1,213	949	669.9	27 / 32
014	1,400	949	671.6	7 / 111
018	1,750	949	671.9	7 / 136
019	1,903	949	672.0	7 / 94
021	2,100	949	672.6	7 / 71
022	2,246	949	673.4	7 / 79
023	2,336	949	674.0	7 / 72
024	2,412	949	674.5	7 / 74
025	2,512	949	676.2	10 / 43
027	2,728	949	677.6	72 / 63
029	2,871	949	677.9	72 / 89
032	3,150	949	678.7	51 / 89
035	3,500	949	679.9	36 / 63
039	3,850	949	681.3	75 / 78
040	4,045	949	682.0	64 / 84
041	4,126	949	682.2	74 / 64
046	4,550	949	685.4	71 / 102
049	4,900	748	686.1	30 / 82
053	5,250	748	686.9	89 / 8
055	5,451	748	687.2	54 / 7
056	5,600	748	688.2	21 / 43
060	5,967	748	690.7	42 / 7
063	6,300	748	692.3	8 / 69
064	6,445	748	692.6	11 / 32
065	6,507	748	692.8	14 / 16
067	6,650	748	694.0	16 / 7
070	7,017	748	696.1	22 / 7
074	7,350	748	698.5	13 / 18
077	7,700	624	700.9	53 / 7
081	8,050	624	701.8	46 / 7

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
LICK BRANCH				
084	8,400	624	704.6	96 / 7
088	8,750	624	706.7	55 / 7
089	8,922	624	707.9	31 / 7
091	9,100	624	709.4	41 / 7
095	9,450	624	711.1	56 / 7
098	9,800	624	712.6	79 / 7
100	10,001	624	713.7	38 / 7
101	10,129	624	715.1	34 / 7
103	10,310	547	717.2	22 / 49
105	10,500	547	718.2	7 / 41
109	10,850	547	720.5	7 / 66
111	11,056	547	721.2	8 / 33
112	11,200	547	723.5	17 / 12
113	11,308	547	724.3	36 / 13
116	11,550	547	725.7	56 / 8
118	11,804	547	727.5	27 / 14
120	11,999	547	728.6	7 / 104
123	12,250	547	729.7	7 / 115
123	12,341	547	730.7	7 / 119
127	12,664	547	736.8	7 / 115
130	12,950	547	737.0	7 / 88
133	13,300	547	738.1	57 / 7
137	13,662	547	740.2	20 / 31
LITTLE BUFFALO CREEK				
003	304	4,381	530.5[4]	342 / 49
009	854	4,381	530.6	24 / 253
011	1,145	4,381	531.2	24 / 221
015	1,500	4,381	532.1	24 / 283
018	1,764	4,381	532.7	213 / 198
025	2,481	4,381	533.6	470 / 22
033	3,322	4,351	534.6	72 / 350
036	3,561	4,351	534.8	24 / 381
040	4,000	4,351	535.4	170 / 111
042	4,244	4,351	535.9	230 / 24
050	4,967	4,351	537.2	267 / 24
052	5,195	4,351	537.6	222 / 24
055	5,515	4,351	538.3	296 / 59
060	6,046	4,351	539.4	108 / 255
065	6,537	4,170	541.0	241 / 48
070	7,000	4,170	541.7	62 / 423
075	7,500	4,170	542.2	24 / 525
079	7,873	4,170	542.7	73 / 291
085	8,471	4,170	543.7	24 / 403
088	8,832	4,170	544.2	24 / 276
091	9,052	4,170	544.6	35 / 251
096	9,578	4,170	545.6	211 / 70
101	10,086	3,703	547.1	22 / 390
105	10,500	3,703	548.0	42 / 205

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
LITTLE BUFFALO CREEK				
110	11,000	3,703	549.6	22 / 301
115	11,500	3,543	550.9	31 / 427
120	11,969	3,543	552.3	81 / 148
125	12,500	3,543	554.3	21 / 163
128	12,773	3,543	555.2	21 / 218
129	12,926	3,543	555.5	21 / 181
134	13,436	3,543	557.3	21 / 232
138	13,800	3,543	557.8	187 / 29
140	14,000	3,502	558.1	200 / 21
146	14,559	3,502	559.4	381 / 21
151	15,112	3,502	560.5	84 / 115
155	15,500	3,502	561.5	21 / 246
160	16,000	3,502	563.8	21 / 314
165	16,500	3,502	565.0	21 / 177
167	16,666	3,502	566.2	47 / 130
170	16,960	3,502	567.3	26 / 56
171	17,117	3,502	569.1	28 / 21
172	17,230	3,502	569.6	28 / 23
176	17,642	3,502	572.6	21 / 153
181	18,103	3,502	574.2	21 / 195
184	18,438	3,502	575.3	21 / 191
188	18,848	3,502	576.7	171 / 64
191	19,119	3,219	577.5	240 / 20
197	19,671	3,219	579.6	20 / 146
205	20,538	3,219	583.2	259 / 20
207	20,692	3,219	583.6	202 / 20
212	21,190	3,219	585.2	139 / 20
216	21,639	3,219	587.0	70 / 20
220	22,026	3,219	588.8	20 / 156
226	22,560	3,113	590.1	20 / 131
231	23,059	3,113	591.9	20 / 191
234	23,350	3,113	592.8	315 / 56
LITTLE MEADOW CREEK				
072	7,183	1,790	501.0	72 / 8
076	7,647	1,968	502.9	59 / 46
080	7,998	1,968	506.2	40 / 45
084	8,377	1,968	507.6	17 / 137
090	8,954	1,929	509.9	24 / 98
094	9,395	1,795	512.9	30 / 92
098	9,814	1,795	516.0	28 / 49
102	10,209	1,795	519.9	63 / 22
107	10,714	1,795	524.6	73 / 13
110	11,035	1,795	527.6	57 / 25
114	11,352	1,795	530.5	39 / 16
116	11,600	1,795	532.8	26 / 60
120	12,032	1,795	535.2	26 / 42
123	12,299	1,795	536.8	34 / 80
125	12,472	1,795	537.1	99 / 45

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
LITTLE MEADOW CREEK				
129	12,859	1,795	538.0	131 / 16
133	13,279	1,795	539.5	101 / 75
136	13,551	1,795	540.2	129 / 16
140	13,963	1,795	541.5	118 / 79
145	14,450	1,795	542.5	149 / 16
151	15,078	1,795	543.9	126 / 34
155	15,472	1,795	545.0	100 / 43
159	15,905	1,674	546.2	78 / 132
166	16,560	1,674	547.6	105 / 71
171	17,083	1,674	549.3	188 / 34
177	17,653	1,674	550.7	192 / 15
182	18,241	1,674	552.2	153 / 53
187	18,669	1,674	553.3	148 / 67
191	19,071	1,674	554.6	92 / 68
195	19,487	1,674	555.8	15 / 202
200	20,000	1,674	557.3	137 / 57
205	20,481	1,674	559.1	21 / 194
210	21,000	1,534	560.5	209 / 38
215	21,521	1,534	561.7	224 / 17
221	22,125	1,534	563.0	118 / 158
226	22,620	1,534	564.3	141 / 160
230	23,000	1,534	565.4	111 / 65
245	24,539	1,379	571.0	65 / 45
252	25,223	1,379	574.8	137 / 31
257	25,699	1,379	576.5	74 / 76
262	26,226	1,379	578.6	78 / 15
269	26,859	1,379	581.2	161 / 15
273	27,267	1,379	582.6	37 / 159
284	28,366	1,007	586.4	145 / 14
290	28,959	1,007	588.0	32 / 95
295	29,483	1,007	589.5	59 / 56
300	29,971	939	590.9	100 / 49
305	30,487	939	592.3	90 / 49
310	30,971	939	593.8	123 / 14
315	31,473	939	595.0	21 / 116
317	31,727	939	595.7	104 / 23
326	32,575	939	599.6	20 / 166
330	33,021	939	600.8	39 / 82
335	33,525	939	603.1	14 / 150
341	34,065	939	604.7	125 / 14
348	34,835	741	607.2	14 / 101
MALLARD CREEK TRIBUTARY 1				
002	188	845	570.9[4]	84 / 12
004	432	657	570.9[4]	14 / 43
008	775	657	570.9[4]	12 / 62
010	1,034	657	570.9[4]	9 / 35
014	1,408	657	570.9[4]	9 / 34
017	1,734	657	572.2	23 / 12

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
MALLARD CREEK TRIBUTARY 1				
020	2,036	657	574.0	49 / 12
023	2,310	590	575.4	15 / 18
024	2,444	590	576.1	9 / 12
026	2,578	590	577.0	9 / 15
028	2,775	590	578.1	9 / 9
031	3,090	590	580.5	9 / 9
033	3,349	590	582.3	9 / 9
035	3,493	590	583.9	9 / 9
037	3,749	590	585.7	11 / 15
039	3,898	484	586.5	9 / 9
041	4,089	484	588.4	11 / 7
043	4,281	484	589.7	11 / 7
MALLARD CREEK TRIBUTARY 1A				
003	258	422	570.9[4]	8 / 18
005	519	422	570.9[4]	5 / 47
008	814	422	570.9[4]	34 / 12
011	1,133	422	570.9[4]	45 / 7
013	1,323	422	571.7	9 / 20
015	1,482	422	574.2	7 / 13
016	1,602	422	576.1	7 / 13
018	1,756	422	579.2	7 / 30
021	2,100	422	582.3	48 / 9
024	2,375	422	585.0	23 / 9
024	2,421	422	586.0	13 / 16
026	2,571	422	587.4	13 / 7
027	2,658	388	588.6	7 / 14
028	2,805	388	589.9	9 / 15
029	2,900	388	591.0	8 / 17
030	3,027	388	594.2	7 / 32
031	3,134	388	595.3	7 / 15
032	3,189	388	596.2	8 / 19
033	3,342	388	598.4	7 / 22
036	3,621	318	603.4	17 / 9
039	3,900	318	606.6	25 / 19
041	4,121	318	609.1	8 / 17
043	4,336	318	613.0	12 / 7
044	4,412	268	613.3	6 / 4
045	4,494	268	615.6	5 / 6
049	4,879	268	640.7	92 / 92
051	5,092	268	640.7	44 / 44
052	5,163	268	642.8	23 / 7
MALLARD CREEK TRIBUTARY 1B				
000	36	176	585.7[4]	9 / 4
001	144	176	586.7	4 / 4
002	199	176	589.0	4 / 4
003	277	176	590.5	4 / 4
004	363	176	591.8	3 / 10
005	455	176	592.8	4 / 6

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
MALLARD CREEK TRIBUTARY 1B				
006	568	176	595.4	3 / 5
007	704	176	600.0	4 / 11
008	834	176	602.6	4 / 14
009	921	176	604.5	20 / 4
010	988	176	605.6	21 / 4
011	1,101	176	608.2	8 / 10
012	1,207	176	609.5	4 / 11
013	1,300	176	610.7	4 / 6
014	1,413	176	614.6	4 / 4
015	1,526	176	618.5	5 / 4
016	1,649	176	622.7	10 / 4
MALLARD CREEK TRIBUTARY 2				
009	854	447	572.6[4]	50/70
012	1,181	447	572.6[4]	10/20
015	1,461	447	573.3	10/10
017	1,749	447	576.7	6/7
021	2,063	447	581.5	4/4
023	2,310	447	587.7	4/7
025	2,512	447	591.3	14/9
027	2,706	447	592.4	5/5
029	2,940	447	599.3	8/11
030	2,996	251	600.5	11/7
031	3,146	251	606.9	6/4
032	3,196	251	609.5	4/4
032	3,237	251	612.6	8/6
033	3,317	251	618.4	7/6
034	3,388	251	620.9	20/22
035	3,500	251	622.7	6/10
036	3,643	251	624.0	4/4
038	3,795	251	627.1	4/4
039	3,930	251	629.4	4/3
041	4,112	251	634.0	4/4
MEADOW CREEK				
007	676	2,841	494.3[5]	26 / 115
011	1,066	2,841	494.4[5]	24 / 29
014	1,432	2,841	494.6[5]	101 / 34
019	1,908	2,841	494.7[4]	159 / 21
022	2,244	2,841	494.7[4]	35 / 20
025	2,535	2,841	494.7[4]	30 / 20
028	2,783	2,841	494.7[4]	76 / 24
030	3,011	2,841	494.7[4]	48 / 17
033	3,317	2,841	494.7[4]	21 / 21
037	3,715	2,841	494.7[4]	23 / 22
044	4,366	2,685	494.7[4]	19 / 58
047	4,672	2,685	494.7[4]	18 / 98
049	4,902	2,685	494.7[4]	18 / 98
052	5,201	2,685	494.7[4]	52 / 18
054	5,417	2,685	494.7[4]	29 / 19

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
MEADOW CREEK				
057	5,694	2,685	494.7[4]	39 / 17
060	5,979	2,685	494.7[4]	21 / 19
063	6,304	2,685	496.9	29 / 18
065	6,534	2,685	497.9	17 / 15
068	6,809	2,685	499.6	18 / 16
MILL CREEK				
037	3,707	2,607	650.2[4]	413 / 405
046	4,594	2,607	650.2[4]	327 / 451
053	5,275	2,607	650.2[4]	280 / 318
058	5,831	2,607	650.2[4]	199 / 378
063	6,308	2,607	650.2[4]	110 / 330
072	7,172	2,496	650.2[4]	65 / 260
080	8,005	2,496	650.4	375 / 55
088	8,756	2,496	651.9	335 / 50
094	9,390	2,496	655.8	55 / 145
097	9,707	2,496	658.1	88 / 45
106	10,586	2,496	660.9	60 / 142
112	11,223	2,496	662.4	130 / 45
116	11,645	2,496	663.7	15 / 100
119	11,871	2,496	664.6	35 / 39
122	12,197	2,496	666.5	45 / 55
127	12,654	2,264	668.5	30 / 120
130	13,035	2,264	668.8	40 / 220
137	13,672	2,264	669.6	190 / 30
144	14,397	2,264	672.5	215 / 15
153	15,259	2,264	675.6	230 / 15
157	15,673	2,161	676.9	192 / 25
164	16,375	2,161	680.2	190 / 75
168	16,762	2,161	680.8	115 / 60
175	17,524	2,161	685.6	75 / 90
181	18,103	2,161	687.3	50 / 40
190	18,993	1,798	692.2	36 / 67
197	19,651	1,798	693.8	80 / 75
202	20,151	1,798	694.9	67 / 70
212	21,179	1,798	697.4	75 / 94
218	21,754	1,798	699.5	45 / 90
226	22,628	1,798	703.4	130 / 45
233	23,301	1,688	705.4	110 / 50
238	23,840	1,688	708.7	50 / 110
244	24,355	1,688	709.6	65 / 90
252	25,154	1,688	713.6	20 / 70
255	25,546	1,688	715.4	60 / 35
MILLER BRANCH				
001	74	1,009	655.7[4]	49 / 14
007	659	1,009	656.2	9 / 18
008	848	1,009	660.9	17 / 34
010	1,010	1,009	662.9	49 / 46
015	1,513	728	664.4	59 / 65

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
MILLER BRANCH				
018	1,752	728	665.0	51 / 12
022	2,204	728	669.1	48 / 12
025	2,500	728	671.2	55 / 14
029	2,857	728	673.3	26 / 12
033	3,271	728	677.5	13 / 47
039	3,915	728	683.8	27 / 24
043	4,331	728	687.3	12 / 44
048	4,796	728	690.5	13 / 14
057	5,678	728	699.7	12 / 13
062	6,194	626	706.9	30 / 16
064	6,438	626	708.6	24 / 7
072	7,184	623	715.6	2 / 38
076	7,615	623	720.5	16 / 10
080	8,044	623	723.7	16 / 18
086	8,572	623	728.5	8 / 20
089	8,863	623	731.8	10 / 8
091	9,116	623	735.9	6 / 9
094	9,423	623	742.5	7 / 29
098	9,771	416	746.0	12 / 12
101	10,093	416	748.3	10 / 10
105	10,494	416	751.3	11 / 27
110	10,975	410	755.3	13 / 7
113	11,332	410	761.6	9 / 11
118	11,762	410	767.1	14 / 9
MUDDY CREEK				
056	5,564	2,939	478.0[4]	62 / 20
061	6,060	2,939	478.0[4]	31 / 30
065	6,528	2,939	478.0[4]	38 / 20
070	6,982	2,768	478.0[4]	31 / 39
072	7,218	2,768	478.0[4]	51 / 21
076	7,564	2,768	478.0[4]	51 / 24
083	8,257	2,768	478.0[4]	71 / 19
089	8,904	2,768	478.2	61 / 19
093	9,254	2,693	478.7	36 / 64
097	9,672	2,693	479.3	64 / 24
100	9,984	2,693	479.7	46 / 22
103	10,265	2,693	480.3	26 / 25
118	11,795	2,483	486.2	66 / 54
122	12,195	2,483	488.1	94 / 32
128	12,762	2,483	489.3	20 / 21
132	13,169	2,343	490.4	20 / 21
136	13,638	2,343	491.4	47 / 21
141	14,080	2,343	491.8	37 / 53
144	14,421	2,343	492.2	57 / 28
MUDDY CREEK TRIBUTARY 1				
000	0	2,343	492.2	62 / 23
005	497	1,645	493.1	122 / 178
009	915	1,645	493.6	45 / 64

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
MUDDY CREEK TRIBUTARY 1				
014	1,353	1,645	494.3	21 / 21
016	1,638	1,645	495.3	21 / 21
022	2,219	1,645	497.3	21 / 71
025	2,516	1,645	498.6	17 / 17
028	2,810	1,645	500.9	17 / 71
032	3,247	1,270	502.9	17 / 17
036	3,600	1,270	505.2	21 / 21
040	3,982	1,270	506.9	17 / 17
043	4,322	1,063	508.2	60 / 17
046	4,594	1,063	508.6	17 / 17
050	5,000	1,063	512.1	22 / 22
054	5,421	1,063	514.8	24 / 24
055	5,529	1,063	514.9	16 / 69
059	5,857	1,063	515.5	19 / 19
062	6,177	1,063	516.1	14 / 68
066	6,611	1,063	517.3	19 / 22
069	6,944	1,063	518.6	50 / 15
071	7,107	937	519.2	69 / 13
073	7,306	937	520.0	14 / 7
075	7,546	937	521.6	90 / 12
079	7,887	937	522.9	77 / 13
083	8,318	937	525.2	14 / 14
OVERCASH BRANCH				
011	1,077	770	664.0	20 / 30
013	1,290	719	666.9	25 / 20
016	1,553	719	669.9	20 / 15
018	1,848	719	673.4	7 / 41
021	2,103	719	675.1	17 / 12
025	2,512	719	680.8	7 / 47
027	2,688	719	683.0	7 / 42
031	3,098	682	689.5	25 / 10
033	3,304	682	692.5	25 / 15
035	3,539	682	696.0	14 / 22
037	3,667	682	697.1	14 / 23
PARK CREEK				
006	624	2,156	651.8[4]	180 / 179
010	1,041	2,156	651.8[4]	129 / 127
015	1,542	2,156	651.8[4]	136 / 132
020	2,021	2,156	651.8[4]	83 / 84
024	2,381	2,156	653.4	120 / 31
034	3,371	2,156	658.5	84 / 118
036	3,629	2,156	659.0	99 / 74
041	4,129	2,048	660.6	83 / 36
045	4,548	2,048	662.2	65 / 70
051	5,074	2,048	666.2	147 / 11
056	5,629	2,048	666.6	124 / 39
062	6,238	2,048	667.5	78 / 12
066	6,629	2,048	669.1	129 / 65

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
PARK CREEK				
071	7,121	1,920	669.9	18 / 101
074	7,441	1,920	671.2	18 / 14
078	7,829	1,920	673.5	61 / 15
082	8,227	1,920	675.2	39 / 75
086	8,629	1,920	676.1	23 / 110
088	8,819	1,920	676.4	11 / 65
092	9,191	1,920	678.5	109 / 12
PATTERSON BRANCH TRIBUTARY				
001	51	278	702.2[4]	9 / 8
001	116	278	705.5	10 / 9
002	184	278	707.7	8 / 8
002	240	278	709.6	10 / 10
003	288	278	710.2	15 / 15
004	376	278	711.3	12 / 20
006	615	278	719.3	26 / 18
008	773	278	719.4	11 / 18
010	974	278	722.2	12 / 12
011	1,143	278	724.8	14 / 10
013	1,311	278	728.5	11 / 11
014	1,414	278	731.0	7 / 6
015	1,500	278	733.0	12 / 12
016	1,590	278	734.2	12 / 12
017	1,678	278	735.4	12 / 12
018	1,755	278	736.1	12 / 12
018	1,846	278	737.9	14 / 24
019	1,932	278	739.3	20 / 20
020	1,996	278	740.9	12 / 12
020	2,035	278	743.3	12 / 12
021	2,095	278	744.8	12 / 12
022	2,195	278	746.1	12 / 18
023	2,290	278	747.0	12 / 12
RIDENHOUR BRANCH				
001	132	1,031	551.5[4]	50 / 30
005	501	1,031	554.3	60 / 55
008	771	1,031	554.9	23 / 60
010	959	1,031	555.6	18 / 40
012	1,153	1,031	556.8	60 / 9
014	1,390	1,031	558.2	100 / 8
017	1,696	1,031	559.9	25 / 30
018	1,827	1,031	561.4	45 / 10
020	1,950	1,031	561.9	40 / 10
021	2,140	1,031	563.1	20 / 30
025	2,489	900	565.1	35 / 28
028	2,786	900	566.7	25 / 18
030	3,031	900	568.7	40 / 20
031	3,122	900	569.8	10 / 50
032	3,181	900	570.3	20 / 60
032	3,240	900	570.9	15 / 70

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
RIDENHOUR BRANCH				
037	3,679	900	598.9	213 / 212
040	4,010	900	598.9	216 / 215
046	4,560	900	598.9	144 / 143
051	5,141	362	598.9	135 / 135
053	5,275	362	598.9	101 / 99
055	5,507	362	598.9	75 / 30
056	5,593	362	599.1	22 / 24
058	5,785	362	600.6	20 / 35
060	5,961	362	601.5	12 / 50
063	6,290	362	603.7	10 / 15
064	6,393	362	606.0	16 / 16
065	6,503	362	607.7	10 / 15
067	6,689	362	611.0	10 / 10
069	6,879	362	613.0	15 / 6
071	7,129	280	615.6	15 / 7
072	7,213	280	616.3	7 / 7
074	7,414	280	620.4	8 / 7
076	7,625	280	622.9	7 / 7
078	7,753	280	624.7	18 / 7
080	7,983	280	627.9	10 / 4
RIDENHOUR BRANCH TRIBUTARY				
007	696	692	598.9[4]	15 / 70
010	1,019	692	610.0	106 / 105
014	1,443	692	615.5	159 / 158
021	2,114	692	615.5	70 / 30
026	2,569	692	615.6	30 / 60
029	2,895	579	615.6	70 / 25
032	3,198	579	615.7	50 / 20
035	3,514	579	616.7	40 / 6
037	3,704	579	618.0	50 / 25
040	3,953	413	619.6	120 / 7
041	4,087	413	620.8	160 / 2
044	4,405	413	634.3	310 / 7
047	4,744	316	634.3	185 / 7
051	5,052	316	634.3	180 / 10
053	5,284	316	634.3	40 / 70
056	5,552	316	635.4	10 / 39
058	5,834	316	639.0	14 / 33
061	6,051	316	640.8	35 / 7
062	6,228	316	642.7	29 / 7
063	6,325	316	643.8	26 / 7
065	6,508	316	645.6	23 / 7
067	6,662	316	647.2	20 / 8
068	6,841	316	649.7	15 / 7
069	6,932	316	652.4	12 / 9
072	7,209	316	670.8	116 / 109
075	7,477	316	670.8	44 / 36

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
ROCKY RIVER TRIBUTARY 11				
003	250	621	507.7[4]	12 / 7
005	460	621	507.7[4]	15 / 11
007	745	621	507.7[4]	14 / 34
015	1,500	621	507.7[4]	22 / 14
018	1,750	544	507.7[4]	11 / 7
020	2,000	544	509.5	15 / 23
023	2,250	544	514.0	18 / 28
030	2,995	544	527.0	7 / 37
031	3,149	544	528.6	24 / 16
033	3,250	544	529.7	16 / 23
035	3,508	544	533.1	25 / 7
040	4,009	544	541.8	7 / 8
042	4,211	544	546.3	7 / 7
048	4,757	544	554.5	7 / 38
ROCKY RIVER TRIBUTARY 14				
002	156	952	561.0[4]	13/13
004	420	952	561.0[4]	13/13
006	639	952	561.0[4]	12/12
009	943	952	561.0[4]	11/22
014	1,382	755	561.3	13/23
016	1,621	755	564.0	18/42
020	2,011	755	568.8	31/17
024	2,369	755	571.3	11/16
027	2,683	755	574.0	15/11
ROGERS LAKE BRANCH				
120	12,010	870	715.3	25 / 25
123	12,329	797	715.4	20 / 55
126	12,564	586	716.2	9 / 40
129	12,881	586	720.2	36 / 8
132	13,220	586	725.2	52 / 7
138	13,830	496	732.6	9 / 22
140	14,044	496	734.8	7 / 48
145	14,512	436	742.2	8 / 13
ROYAL OAKS BRANCH				
007	716	1,291	582.2[4]	12 / 13
011	1,102	1,291	582.2[4]	11 / 11
016	1,606	1,291	586.2	15 / 16
020	1,997	1,291	592.0	26 / 21
023	2,263	1,291	593.0	11 / 20
025	2,500	1,291	593.9	31 / 17
030	3,000	1,205	595.6	29 / 29
034	3,438	1,205	596.9	12 / 13
038	3,809	1,205	600.3	10 / 31
046	4,584	1,187	609.4	53 / 53
050	4,980	1,187	609.7	9 / 48
054	5,372	1,187	611.7	11 / 44
062	6,247	1,045	619.6	19 / 12
066	6,597	1,045	620.6	8 / 9

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
ROYAL OAKS BRANCH				
077	7,702	1,045	634.6	47 / 20
081	8,112	890	637.2	45 / 24
084	8,377	890	642.2	51 / 28
086	8,622	890	645.1	17 / 41
091	9,057	890	648.2	15 / 11
094	9,373	890	652.6	21 / 11
104	10,425	833	660.1	12 / 25
SHAMROCK BRANCH				
004	401	664	594.7[4]	8 / 8
005	500	664	594.7[4]	10 / 8
008	761	664	599.2	9 / 29
008	834	664	599.8	21 / 26
010	1,000	664	600.4	25 / 7
013	1,303	664	602.8	55 / 12
015	1,472	424	603.4	16 / 7
016	1,567	424	603.6	12 / 13
016	1,616	424	604.6	10 / 15
018	1,804	424	607.1	20 / 24
018	1,840	424	607.3	30 / 35
019	1,938	424	607.9	22 / 37
020	1,988	424	608.6	7 / 23
020	2,041	424	610.2	24 / 17
021	2,106	424	612.3	7 / 26
022	2,235	424	615.1	7 / 35
023	2,338	424	616.6	11 / 15
025	2,456	424	618.4	7 / 29
025	2,504	424	621.2	14 / 16
025	2,546	424	623.4	12 / 14
026	2,605	424	627.5	14 / 14
027	2,652	424	630.9	7 / 16
027	2,691	424	640.6	15 / 7
027	2,747	424	644.0	8 / 17
STRICKER BRANCH				
003	345	1,557	596.6[4]	20 / 186
005	545	1,557	596.6[4]	7 / 184
008	750	1,557	596.6[4]	7 / 140
013	1,250	1,557	602.4	14 / 102
015	1,500	1,557	602.5	13 / 70
018	1,750	1,557	602.6	7 / 99
020	1,986	1,557	602.8	94 / 7
025	2,500	1,557	606.1	124 / 122
032	3,185	1,557	611.7	20 / 92
035	3,487	1,557	611.9	70 / 61
037	3,737	1,557	612.1	113 / 54
040	3,985	1,274	612.4	93 / 43
042	4,232	1,274	612.7	74 / 34
047	4,734	1,274	615.3	84 / 33
050	4,984	1,274	615.5	56 / 77

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
STRICKER BRANCH				
052	5,234	1,274	615.8	66 / 78
055	5,457	1,274	616.1	84 / 58
057	5,734	1,274	616.6	29 / 108
060	5,984	1,274	617.4	43 / 75
062	6,234	927	618.4	108 / 10
065	6,484	927	619.3	25 / 55
068	6,845	927	620.8	35 / 7
070	6,982	927	622.5	20 / 46
072	7,232	927	624.2	21 / 59
075	7,511	927	626.6	7 / 123
078	7,786	816	629.4	11 / 69
083	8,311	816	633.7	27 / 30
085	8,504	816	633.7	25 / 9
086	8,640	816	634.8	10 / 19
090	8,988	816	636.4	65 / 7
THREEMILE BRANCH				
360	36,000	1,542	705.0	130 / 52
365	36,522	1,542	705.9	21 / 87
370	36,994	1,542	709.0	77 / 60
374	37,389	1,542	710.7	55 / 112
376	37,640	1,359	711.6	12 / 128
381	38,145	1,359	715.9	48 / 129
386	38,627	1,359	717.4	49 / 51
390	39,034	1,359	720.9	78 / 28
395	39,451	1,359	722.7	29 / 34
400	39,990	1,041	726.8	37 / 12
404	40,363	1,041	731.8	96 / 19
406	40,633	1,041	732.5	67 / 28
409	40,885	1,041	733.6	20 / 50
413	41,263	918	739.0	73 / 54
415	41,540	918	739.2	42 / 32
418	41,810	918	742.3	53 / 12
422	42,215	918	744.2	33 / 18
427	42,692	769	749.5	12 / 12
429	42,874	769	750.5	15 / 12
WATER CREEK				
002	192	572	585.8[4]	11 / 50
004	438	572	585.8[4]	67 / 11
011	1,053	572	590.1	16 / 16
012	1,248	572	591.8	17 / 15
014	1,368	572	592.6	58 / 10
015	1,489	572	595.0	33 / 56
016	1,588	572	595.4	18 / 19
017	1,664	572	595.5	12 / 12
018	1,846	572	597.3	8 / 25
020	2,042	572	599.9	18 / 12
022	2,249	572	603.2	13 / 15
024	2,397	572	603.8	11 / 8

Table 10—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width[3] *(feet)*
WATER CREEK				
025	2,531	490	605.7	12 / 11
026	2,628	490	607.2	10 / 25
028	2,826	490	610.4	7 / 70
033	3,278	490	613.2	7 / 89
035	3,541	490	616.5	10 / 40
038	3,798	490	619.5	12 / 45
040	3,994	490	620.5	19 / 12
042	4,159	490	623.4	22 / 12
043	4,326	490	624.5	8 / 11
YOW BRANCH				
025	2,470	1,160	506.7[4]	50 / 50
028	2,832	661	506.7[4]	37 / 25
031	3,071	661	506.7[4]	21 / 13
033	3,327	661	506.7[4]	18 / 30

[1] This table reflects all modeled cross sections. Some cross sections shown in this table may not appear on the map.
[2] Feet above mouth.
[3] Left/right distance from the mapped center of stream to encroachment boundary based on a 1.0 foot or less surcharge (looking downstream).
[4] Elevation includes backwater effects.
[5] Flooding controlled by Rocky River.

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. Until recently, the standard vertical datum in use for newly created or revised FISs was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the finalization of the North American Vertical Datum of 1988 (NAVD 88), many FISs are being prepared using NAVD 88 as the referenced vertical datum.

All flood elevations shown on the FIRM for Cabarrus 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 may be referenced to NGVD 29. This may result in BFE differences across political boundaries between the communities.

Prior versions of this FIS were referenced to NGVD 29. When a datum conversion is effected for an FIS, the Flood Profiles, BFEs, and bench marks reflect the new datum values. To compare structural and ground elevations to 1% annual chance flood elevations shown in this FIS, the subject structural and ground elevations must be referenced to the new datum values.

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 Cabarrus County is -0.8 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 11, "Datum Conversion Locations and Values," is shown below.

Table 11—Datum Conversion Locations and Values

Latitude	Longitude	Conversion from NGVD 29 to NAVD 88 (feet)
35.500	80.750	-0.74
35.500	80.625	-0.77
35.500	80.500	-0.80
35.500	80.375	-0.80
35.375	80.750	-0.76
35.375	80.625	-0.85
35.375	80.500	-0.84
35.375	80.375	-0.84
35.250	80.625	-0.78
35.250	80.500	-0.85
Average conversion in Cabarrus County from NGVD 29 to NAVD 88 = -0.8 feet		

The 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 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 Cabarrus 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)

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/datasheet.html, 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 20910-3282
(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

County orthophotos, based on 2005 aerial imagery, are used as the base maps for digital FIRM production for Cabarrus County. The base maps are supplemented with stream centerlines, shoreline, and political boundaries, and road name data from other sources; this includes locally available GIS data.

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.

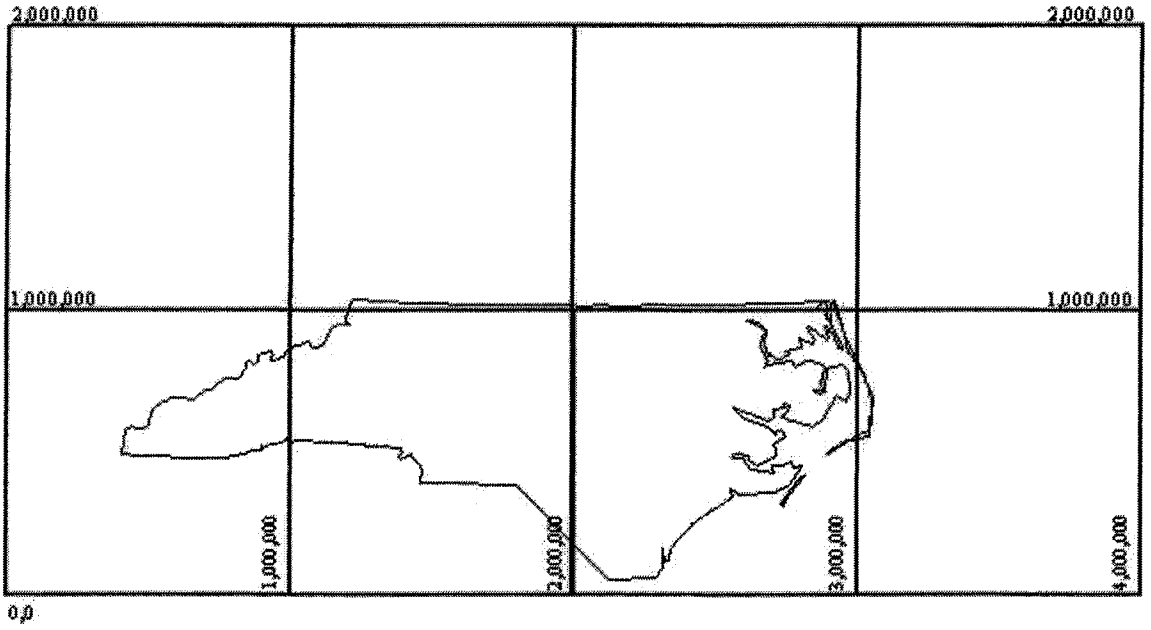


Figure 2—North Carolina's State Plane Coordinate System

6.3 Floodplain and Floodway Delineation

Floodplain Delineation

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 winter 2002-2003 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 12, "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 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.

Floodway data was not computed for Beaver Creek Tributary, Dye Branch, Graeber Branch, Graeber Tributary, Lumber Yard Branch, Moose Branch, Rose Hill Branch, and a portion of Baker Branch, Coddle Creek, and Patterson Branch.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Adams Creek								
006	625	107	1,134	7.4	517.6	515.0[2]	515.0	0.0
011	1,060	177	1,670	5.0	517.6	516.2[2]	516.7	0.5
017	1,735	129	1,225	6.8	518.3	518.3	519.3	1.0
025	2,546	242	2,370	3.5	521.0	521.0	522.0	1.0
029	2,937	94	1,046	8.0	521.5	521.5	522.1	0.6
038	3,842	70	949	8.8	526.2	526.2	527.2	1.0
048	4,763	108	1,341	6.2	530.4	530.4	531.4	1.0
071	7,133	95	1,141	7.3	535.6	535.6	536.6	1.0
078	7,843	143	1,688	5.0	538.9	538.9	539.6	0.7
086	8,624	106	1,148	7.3	541.8	541.8	542.5	0.7
095	9,519	94	1,192	7.0	545.7	545.7	546.6	0.9
104	10,355	87	807	10.4	549.2	549.2	549.7	0.5
113	11,262	79	1,233	6.8	554.6	554.6	555.6	1.0
119	11,918	199	2,063	4.1	556.5	556.5	557.4	0.9
135	13,489	59	663	11.7	559.7	559.7	560.5	0.8
144	14,396	134	1,350	5.8	567.3	567.3	568.3	1.0
152	15,241	83	883	8.8	572.0	572.0	572.6	0.6
159	15,853	48	699	11.1	575.7	575.7	576.6	0.9
164	16,367	80	1,101	7.1	579.0	579.0	580.0	1.0
173	17,297	105	1,366	5.7	582.2	582.2	583.0	0.8
178	17,845	80	988	7.9	583.2	583.2	584.0	0.8
186	18,604	72	910	6.0	586.2	586.2	587.2	1.0

[1]Feet above confluence with Dutch Buffalo Creek

[2]Elevation computed without consideration of backwater effects from Dutch Buffalo Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

ADAMS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Adams Creek								
195	19,505	80	913	6.0	588.9	588.9	589.9	1.0
204	20,447	70	896	6.1	591.6	591.6	592.5	0.9
212	21,229	96	1,094	5.0	594.2	594.2	594.8	0.6
221	22,132	100	1,122	4.9	596.4	596.4	597.4	1.0
230	22,971	150	1,280	4.3	598.4	598.4	599.4	1.0
257	25,730	192	1,008	4.5	602.2	602.2	603.2	1.0
281	28,140	100	891	4.0	609.1	609.1	610.1	1.0
290	29,043	110	663	5.4	611.3	611.3	612.2	0.9
299	29,859	152	1,160	3.1	614.7	614.7	615.7	1.0
308	30,847	288	2,492	1.4	616.7	616.7	617.7	1.0
318	31,752	94	667	5.3	618.6	618.6	619.5	0.9
327	32,739	111	771	4.6	622.6	622.6	623.6	1.0
336	33,576	105	976	3.6	625.2	625.2	625.9	0.7
344	34,423	118	1,018	3.5	627.1	627.1	627.9	0.8
363	36,321	100	758	3.0	630.0	630.0	630.5	0.5
368	36,785	260	1,500	1.0	630.1	630.1	631.1	1.0
372	37,192	260	1,191	1.3	630.2	630.2	631.2	1.0
376	37,617	120	536	2.9	630.4	630.4	631.4	1.0

[1]Feet above confluence with Dutch Buffalo Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

ADAMS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Afton Run								
012	1,225	179	1,238	2.4	604.1	600.2[2]	601.0	0.8
022	2,183	58	467	6.4	604.2	602.2[3]	603.2	1.0
030	3,020	130	978	3.0	605.0	605.0	606.0	1.0
036	3,596	85	466	6.4	606.9	606.9	607.3	0.4
051	5,134	79	834	3.6	617.8	617.8	618.3	0.5
066	6,550	125	1,054	2.5	619.5	619.5	620.4	0.9
075	7,475	191	1,467	1.8	621.1	621.1	622.1	1.0
081	8,114	131	928	2.8	622.6	622.6	623.6	1.0
086	8,592	152	1,088	2.4	624.3	624.3	625.3	1.0
093	9,298	149	1,173	2.3	626.4	626.4	627.4	1.0
098	9,760	144	993	2.7	627.8	627.8	628.8	1.0
118	11,799	199	1,575	1.4	635.5	635.5	636.4	0.9
127	12,740	148	883	2.5	639.0	639.0	640.0	1.0
133	13,310	248	1,990	1.1	641.2	641.2	642.2	1.0
139	13,892	144	1,081	2.1	642.5	642.5	643.5	1.0
144	14,408	177	1,399	1.6	643.9	643.9	644.9	1.0
150	15,024	119	914	2.4	645.2	645.2	646.2	1.0
157	15,712	139	1,445	2.0	646.9	646.9	647.9	1.0
164	16,421	150	1,072	2.1	648.5	648.5	649.5	1.0
184	18,414	99	594	3.8	654.0	654.0	654.8	0.8
190	18,975	164	1,306	1.7	656.5	656.5	657.5	1.0
197	19,747	144	840	2.7	659.4	659.4	660.3	0.9
204	20,402	140	1,074	2.1	662.9	662.9	663.9	1.0

[1] Feet above confluence with Coddle Creek
[2] Flooding Controlled by Coddle Creek
[3] Elevation computed without consideration of backwater effects from Coddle Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

AFTON RUN

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Anderson Creek								
013	1,325	180	1,066	3.3	497.8	481.8[2]	482.3	0.5
058	5,750	250	1,203	2.7	497.8	487.1[2]	488.1	1.0
059	5,927	170	1,562	2.1	497.8	491.4[2]	492.2	0.8
087	8,675	220	1,486	2.2	497.8	492.6[2]	493.5	0.9
092	9,221	200	631	4.9	497.8	494.3[2]	494.7	0.4
118	11,775	200	782	3.9	500.6	500.6	500.9	0.3
119	11,888	280	982	3.1	501.2	501.2	502.0	0.8
139	13,850	310	1,334	2.2	506.0	506.0	507.0	1.0
162	16,241	180	499	5.5	509.6	509.6	510.3	0.7
164	16,359	260	612	4.5	510.8	510.8	511.6	0.8
196	19,600	90	492	4.4	522.8	522.8	522.9	0.1
223	22,250	130	383	5.7	530.8	530.8	531.7	0.9
249	24,900	60[3]	323	4.3	541.4	541.4	541.5	0.1
294	29,441	50	238	5.2	565.4	565.4	565.7	0.3
296	29,559	50	291	4.3	566.1	566.1	566.4	0.3

[1]Feet above mouth

[2]Elevation computed without consideration of backwater effects from Rocky River

[3]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

ANDERSON CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Back Creek								
002	210	250	1,683	4.5	539.4	528.9[2]	528.9	0.0
011	1,145	260	2,102	3.6	539.4	530.8[2]	531.3	0.5
019	1,910	294	2,583	2.9	539.4	532.2[2]	533.1	0.9
029	2,904	313	3,017	2.5	539.4	534.1[2]	535.1	1.0
037	3,673	159	1,416	5.3	539.4	536.0[2]	537.0	1.0
053	5,343	639	6,288	1.2	540.5	540.5	541.3	0.8
059	5,873	568	6,080	1.2	541.1	541.1	541.9	0.8
067	6,685	560	3,946	1.9	541.9	541.9	542.7	0.8
074	7,435	460	4,083	1.8	543.6	543.6	544.4	0.8
084	8,364	485	3,167	2.4	545.4	545.4	546.2	0.8
092	9,234	440	3,310	2.3	547.6	547.6	548.4	0.8
100	9,987	321	2,962	2.5	549.4	549.4	550.3	0.9
109	10,922	301	3,338	2.3	551.3	551.3	552.1	0.8
132	13,158	320	2,989	2.5	555.0	555.0	555.8	0.8
150	14,990	610	5,339	1.4	559.5	559.5	560.5	1.0
157	15,740	490	3,960	1.9	561.8	561.8	562.4	0.6
165	16,542	542	3,929	1.3	564.1	564.1	565.0	0.9
175	17,492	286	3,211	1.6	565.6	565.6	566.5	0.9
183	18,349	154	1,435	3.5	566.8	566.8	567.7	0.9

[1]Feet above confluence with Rocky River

[2]Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

BACK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Back Creek								
204	20,417	179	1,958	2.6	570.7	570.7	571.7	1.0
227	22,660	154	1,683	3.0	573.9	573.9	574.9	1.0
233	23,344	126	961	5.2	575.3	575.3	576.2	0.9
240	24,024	130	1,413	3.6	577.8	577.8	578.8	1.0
263	26,263	205	1,599	2.9	584.9	584.9	585.4	0.5
280	27,957	243	2,342	2.0	587.7	587.7	588.7	1.0
288	28,765	158	1,527	3.1	589.0	589.0	590.0	1.0
297	29,677	105	1,036	4.5	590.9	590.9	591.8	0.9
305	30,480	93	1,181	4.0	592.7	592.7	593.6	0.9
314	31,354	79	821	5.7	594.4	594.4	595.3	0.9
331	33,082	101	752	6.2	602.3	602.3	603.1	0.8
338	33,830	191	1,757	2.7	605.7	605.7	606.6	0.9
358	35,794	258	2,428	1.4	609.1	609.1	610.1	1.0
370	36,964	108	807	4.3	610.7	610.7	611.5	0.8

[1]Feet above confluence with Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

BACK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Baker Branch								
001	105	50	183	9.3	688.8	682.3[3]	682.3	0.0
003	275	50	229	7.4	688.8	683.9[3]	683.9	0.0
010	1,000	240	298	5.7	688.8	687.8[3]	687.8	0.0
021	2,050	60	322	5.3	691.6	691.6	691.7	0.1
032	3,225	80	226	7.3	696.8	696.8	696.8	0.0
034	3,396	80	222	7.4	698.8	698.8	698.8	0.0
046	4,600	265	273	6.0	707.5	707.5	707.5	0.0
048	4,775	265	296	5.5	709.7	709.7	709.8	0.1
062	6,175	100	215	5.6	717.4	717.4	717.4	0.0
084-131*								
Beaver Creek								
009	875	255	512	4.4	653.3	650.5[4]	650.5	0.0
011	1,093	165	691	3.2	653.3	653.1[4]	653.4	0.3
036	3,565	360[2]	520	4.0	662.2	662.2	662.2	0.0
066	6,615	85	198	8.2	697.1	697.1	697.1	0.0
068	6,815	135[2]	427	4.0	702.4	702.4	702.4	0.0

[1] Feet above mouth

[2] Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain Redelineation

[3] Elevation computed without consideration of backwater effects from Irish Buffalo Creek

[4] Elevation computed without consideration of backwater effects from Cold Water Creek

* No floodway data computed

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

BAKER BRANCH – BEAVER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Caldwell Creek								
001	87	150	873	4.5	543.6	539.1[2]	539.1	0.0
010	1,030	160	1,333	2.9	543.6	541.8[2]	542.6	0.8
019	1,902	150	932	4.2	544.6	544.6	545.4	0.8
037	3,676	135	1,186	3.3	556.4	556.4	557.3	0.9
044	4,435	394	2,388	1.6	557.8	557.8	558.7	0.9
054	5,415	77	722	5.4	559.7	559.7	560.6	0.9
061	6,059	92	888	4.4	561.5	561.5	562.5	1.0
070	6,957	122	1,037	3.8	563.4	563.4	564.4	1.0
079	7,889	104	849	4.6	566.0	566.0	566.6	0.6
089	8,855	72	685	5.7	569.6	569.6	570.6	1.0
095	9,522	149	1,374	2.8	571.9	571.9	572.8	0.9
104	10,409	175	1,740	2.2	573.9	573.9	574.8	0.9
122	12,198	150	1,302	3.0	576.9	576.9	577.8	0.9
131	13,103	325	1,920	2.0	579.1	579.1	580.0	0.9
145	14,511	405	2,344	1.5	583.6	583.6	584.3	0.7
154	15,383	147	1,115	3.1	586.3	586.3	587.3	1.0
162	16,207	302	2,154	1.6	589.2	589.2	590.2	1.0
178	17,800	154	1,326	1.9	593.0	593.0	594.0	1.0
187	18,686	139	1,121	2.2	594.3	594.3	595.3	1.0

[1]Feet above confluence with Reedy Creek

[2]Elevation computed without consideration of backwater effects from Reedy Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

CALDWELL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Caldwell Creek								
195	19,511	102	844	3.0	596.2	596.2	597.2	1.0
207	20,671	189	1,336	1.9	599.3	599.3	600.3	1.0
219	21,851	151	976	2.6	603.1	603.1	604.1	1.0
228	22,813	240	1,801	1.4	605.9	605.9	606.8	0.9
241	24,089	173	987	2.3	607.3	607.3	608.1	0.8
248	24,768	204	1,349	1.7	609.0	609.0	610.0	1.0
259	25,862	154	977	2.3	611.5	611.5	612.5	1.0
270	26,998	105	793	2.9	614.9	614.9	615.9	1.0
288	28,753	89	628	2.2	619.1	619.1	620.1	1.0
294	29,390	270	1,111	1.3	620.5	620.5	621.4	0.9
302	30,246	328	935	1.5	623.3	623.3	623.6	0.3

[1]Feet above confluence with Reedy Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

CALDWELL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Chambers Branch								
004	350	160	750	3.3	599.2	599.2	600.2	1.0
025	2,471	150	860	2.9	625.0	625.0	625.7	0.7
041	4,075	230[2]	722	3.6	641.6	641.6	642.1	0.5
042	4,225	590	9,817	0.3	664.3	664.3	664.3	0.0
061	6,117	560[2]	6,019	0.3	664.3	664.3	664.3	0.0
062	6,235	530[2]	5,258	0.3	664.3	664.3	664.3	0.0
096	9,638	220	985	1.8	674.3	674.3	675.3	1.0
119	11,928	80	408	3.6	683.5	683.5	684.5	1.0
121	12,050	110	525	2.8	685.0	685.0	685.2	0.2
135	13,484	80[2]	268	5.5	692.5	692.5	693.2	0.7
139	13,920	50	258	4.3	695.7	695.7	696.2	0.5
142	14,150	50	254	4.4	702.3	702.3	702.3	0.0

[1]Feet above mouth

[2]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

CHAMBERS BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Clarke Creek								
015	1,468	356	4,450	2.1	606.0	604.4[3]	605.2	0.8
021	2,143	283	3,685	2.5	606.4	606.4	607.2	0.8
029	2,883	610	8,387	1.1	608.7	608.7	609.6	0.9
038	3,805	1,160	15,813	0.6	609.9	609.9	610.8	0.9
048	4,785	1,285	17,192	0.5	610.8	610.8	611.7	0.9
055	5,500	1,225	14,876	0.6	611.6	611.6	612.6	1.0
061	6,092	900	11,944	0.8	612.3	612.3	613.3	1.0
069	6,889	690	8,551	1.1	613.7	613.7	614.5	0.8
082	8,214	431	6,316	1.5	616.7	616.7	617.4	0.7
090	8,964	630	9,486	1.0	617.6	617.6	618.3	0.7
097	9,654	452	6,538	1.4	618.1	618.1	618.8	0.7
106	10,571	458	6,095	1.5	619.4	619.4	620.2	0.8
113	11,315	370	5,026	1.8	620.8	620.8	621.7	0.9
125	12,514	237	3,713	2.5	622.7	622.7	623.7	1.0
144	14,374	187	2,595	3.5	625.5	625.5	626.5	1.0
152	15,244	240	3,387	2.7	627.1	627.1	628.0	0.9
162	16,234	162	2,450	3.8	628.8	628.8	629.7	0.9
180	18,006	834/173[2]	14,763	0.6	630.8	630.8	631.8	1.0

[1]Feet above confluence with Rocky River

[2]Width/width within county boundary

[3]Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

CLARKE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Coddle Creek								
011	1,100	270	2,893	3.9	541.4	538.6[2]	539.6	1.0
044	4,400	250	2,845	4.0	541.4	541.4	542.4	1.0
081	8,100	250	3,449	3.3	543.9	543.9	544.9	1.0
097	9,743	140	1,537	7.4	545.3	545.3	546.3	1.0
099	9,857	460	4,293	2.5	546.9	546.9	547.5	0.6
107	10,685	120	1,589	7.2	547.2	547.2	548.0	0.8
108	10,816	200[3]	1,951	5.8	548.0	548.0	548.5	0.5
145	14,500	170	2,429	4.5	552.8	552.8	553.8	1.0
196	19,600	200	2,343	4.7	558.6	558.6	559.6	1.0
237	23,700	285	3,256	3.3	563.2	563.2	564.1	0.9
268	26,800	250	2,717	3.9	567.3	567.3	567.8	0.5
269	26,900	190	2,504	4.2	568.2	568.2	568.6	0.4
304	30,400	321	3,644	2.9	571.5	571.5	572.3	0.8
376	37,600	258	3,238	3.3	577.4	577.4	578.3	0.9
433	43,335	441	3,948	2.7	582.4	582.4	583.4	1.0
435	43,535	430	5,292	1.9	585.6	585.6	585.7	0.1
488	48,800	215	2,111	4.7	587.7	587.7	588.7	1.0
530	53,000	214	2,591	3.8	593.4	593.4	594.4	1.0
532	53,200	281	4,376	2.3	595.2	595.2	596.2	1.0
567	56,700	686	5,276	1.9	596.7	596.7	597.7	1.0
602	60,230	390	2,614	3.8	600.2	600.2	600.9	0.7
604	60,430	430	4,509	2.2	604.0	604.0	604.1	0.1
627	62,700	230[3]	2,190	4.5	604.8	604.8	605.8	1.0
630	63,000	254[3]	2,488	3.7	608.5	608.5	608.9	0.4

[1]Feet above mouth

[2]Elevation computed without consideration of backwater effects from Rocky River

[3]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

CODDLE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Coddle Creek								
677	67,700	315	3,281	2.8	613.6	613.6	614.1	0.5
707	70,700	545	4,994	1.9	615.4	615.4	616.2	0.8
751	75,075	390	3,094	3.0	618.4	618.4	619.4	1.0
753	75,275	410	3,642	2.3	620.1	620.1	620.8	0.7
799	79,916	4,457	91,244	0.1	650.2	650.2	650.2	0.0
832	83,242	3,952	70,697	0.1	650.2	650.2	650.2	0.0
859	85,899	1,912	30,644	0.2	650.2	650.2	650.2	0.0
887	88,654	2,112	28,762	0.2	650.2	650.2	650.2	0.0
911	91,120	1,492	17,798	0.3	650.2	650.2	650.2	0.0
932	93,180	1,397	14,392	0.4	650.2	650.2	650.2	0.0
945	94,516	983	5,462	1.0	650.2	650.2	650.2	0.0
958	95,782	318	1,550	3.7	651.6	651.6	651.6	0.0
967	96,749	215	1,158	5.0	652.1	652.1	652.1	0.0
976	97,608	220	1,434	4.0	654.3	654.3	654.6	0.3
984	98,397	311	2,336	2.5	656.4	656.4	657.0	0.6
992	99,228	195	1,537	3.7	657.2	657.2	658.2	1.0
1003	100,261	200	1,725	3.3	659.7	659.7	660.6	0.9
1013	101,270	82	1,004	5.7	661.0	661.0	662.0	1.0
1021	102,103	103	1,062	5.4	662.7	662.7	663.7	1.0
1030	102,964	193	1,820	3.2	665.1	665.1	666.1	1.0
1040	104,000	300	1,967	2.9	666.3	666.3	667.3	1.0
1052	105,175	140	1,311	4.4	668.5	668.5	669.0	0.5

[1]Feet above mouth

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

CODDLE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Coddle Creek								
1063	106,274	215	1,919	3.0	670.3	670.3	671.2	0.9
1072	107,245	365	2,916	2.0	671.3	671.3	672.3	1.0
1081	108,115	300	2,578	2.2	673.6	673.6	674.3	0.7
Cold Water Creek								
009	900	670	4,709	2.8	523.8	514.8[3]	515.8	1.0
046	4,575	380	3,166	3.3	523.8	519.1[3]	520.1	1.0
081	8,110	190	2,018	5.2	524.9	524.9	525.9	1.0
082	8,241	170	2,003	5.2	525.1	525.1	526.1	1.0
130	12,980	350	3,045	3.4	532.2	532.2	533.2	1.0
188	18,815	150	1,756	5.9	538.2	538.2	539.2	1.0
189	18,935	340	2,935	3.5	538.8	538.8	539.7	0.9
216	21,550	240	1,880	5.5	541.7	541.7	542.6	0.9
250	25,035	270[2]	2,837	3.5	547.8	547.8	548.6	0.8
252	25,166	280	3,228	3.1	548.1	548.1	549.0	0.9
275	27,500	350	3,231	3.1	549.7	549.7	550.7	1.0

[1]Feet above mouth

[2]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

[3]Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

CODDLE CREEK – COLD WATER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Cold Water Creek								
481	48,075	1,440[2]	5,887	1.2	572.4	572.4	573.4	1.0
601	60,075	860	3,461	1.8	585.6	585.6	586.6	1.0
641	64,075	390[2]	1,199	4.5	597.2	597.2	598.2	1.0
670	67,005	170[2]	667	8.1	607.1	607.1	607.1	0.0
684	68,388	140[2]	895	6.0	611.7	611.7	611.8	0.1
685	68,512	130	877	6.2	613.0	613.0	613.3	0.3
703	70,336	80[2]	775	5.1	621.0	621.0	621.4	0.4
705	70,486	360[2]	6,447	0.6	649.8	649.8	649.8	0.0
725	72,461	1,450	23,501	0.2	649.9	649.9	649.9	0.0
744	74,428	1,370	18,610	0.3	649.9	649.9	649.9	0.0
764	76,395	1,000[2]	14,085	0.3	649.9	649.9	649.9	0.0
766	76,556	990	12,808	0.4	649.9	649.9	649.9	0.0
774	77,400	1,350[2]	12,561	0.4	650.0	650.0	650.0	0.0
821	82,100	145[2]	1,351	3.1	653.2	653.2	654.2	1.0
841	84,060	460	3,114	1.1	654.7	654.7	655.7	1.0

[1]Feet above mouth

[2]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

COLD WATER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Common Ford Branch								
020	1,950	150	396	3.9	576.6	576.6[3]	577.6	1.0
021	2,050	150	422	3.6	577.5	577.5[3]	578.5	1.0
044	4,375	70[2]	382	4.0	583.5	583.5	584.3	0.8
045	4,475	50	266	5.8	586.6	586.6	587.0	0.4
058	5,800	50	348	4.4	596.9	596.9	597.3	0.4
059	5,900	220	1,152	2.4	599.7	599.7	600.2	0.5
076	7,630	150[2]	276	4.2	600.9	600.9	601.6	0.7
093	9,280	200	649	1.8	614.2	614.2	614.3	0.1
112	11,230	160	157	5.9	617.9	617.9	618.1	0.2
Davis Branch								
005	450	50	151	4.0	556.3	544.8[4]	545.8	1.0
027	2,700	80	168	3.2	581.7	581.7	582.7	1.0
039	3,850	50	169	3.2	587.1	587.1	587.8	0.7

[1]Feet above mouth

[2]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

[3]Flooding Controlled by Cold Water Creek

[4]Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

COMMON FORD BRANCH – DAVIS BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Dutch Buffalo Creek								
039	3,946	510	4,789	2.5	506.1	497.6[2]	497.6	0.0
046	4,641	525	4,916	2.4	506.1	498.2[2]	498.6	0.4
053	5,346	620	6,907	1.7	506.1	499.0[2]	499.5	0.5
060	6,011	605	6,776	1.7	506.1	499.4[2]	499.8	0.4
070	6,950	450	5,126	2.3	506.1	500.1[2]	500.5	0.4
079	7,917	530	5,659	2.1	506.1	500.8[2]	501.5	0.7
087	8,657	700	9,733	1.2	506.1	501.4[2]	502.4	1.0
095	9,548	800	9,605	1.2	506.1	501.8[2]	502.8	1.0
105	10,492	640	8,463	1.4	506.1	502.4[2]	503.3	0.9
114	11,406	590	7,702	1.5	506.1	503.1[2]	504.0	0.9
122	12,215	501	7,502	1.6	506.1	503.8[2]	504.6	0.8
132	13,177	650	9,509	1.2	506.1	504.4[2]	505.3	0.9
148	14,846	625	6,222	1.9	506.1	505.0[2]	506.0	1.0
157	15,734	435	4,231	2.8	506.1	506.0[2]	506.9	0.9
166	16,642	360	4,104	2.9	507.3	507.3	508.2	0.9
175	17,499	214	2,930	4.0	508.2	508.2	509.2	1.0
185	18,450	441	6,162	1.9	510.0	510.0	511.0	1.0
192	19,193	1,062	14,560	0.8	510.7	510.7	511.7	1.0
196	19,588	1,222	16,154	0.7	510.8	510.8	511.8	1.0

[1]Feet above confluence with Rocky River

[2]Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

DUTCH BUFFALO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Dutch Buffalo Creek								
204	20,369	1,225	14,255	0.8	511.0	511.0	512.0	1.0
219	21,917	1,211	16,333	0.7	511.5	511.5	512.5	1.0
225	22,514	989	10,846	1.1	511.7	511.7	512.7	1.0
254	25,448	850	10,764	1.1	513.4	513.4	514.4	1.0
263	26,316	1,089	15,061	0.8	513.7	513.7	514.7	1.0
275	27,461	976	14,394	0.8	514.0	514.0	515.0	1.0
284	28,447	726	9,378	1.2	514.2	514.2	515.2	1.0
296	29,554	489	7,480	1.5	514.4	514.4	515.4	1.0
302	30,162	392	5,532	2.1	514.7	514.7	515.7	1.0
310	31,007	312	4,434	2.6	515.2	515.2	516.2	1.0
317	31,697	200	2,946	3.9	515.6	515.6	516.6	1.0
327	32,706	337	4,773	2.4	516.8	516.8	517.8	1.0
337	33,678	426	4,412	2.6	517.5	517.5	518.5	1.0
343	34,316	450	5,057	2.1	518.1	518.1	519.1	1.0
353	35,321	544	6,359	1.6	519.0	519.0	519.9	0.9
366	36,598	1,031	10,678	1.0	520.2	520.2	521.1	0.9
387	38,703	709	7,805	1.3	521.2	521.2	522.2	1.0
399	39,892	342	4,567	2.3	522.0	522.0	522.9	0.9
407	40,678	358	4,214	2.5	522.6	522.6	523.5	0.9

[1]Feet above confluence with Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

DUTCH BUFFALO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fisher Town Branch								
011	1,110[1]	60	271	4.7	668.3	668.3	669.3	1.0
013	1,302[1]	70	291	4.4	674.7	674.7	675.3	0.6
034	3,360[1]	90	390	3.3	690.7	690.7	691.7	1.0
038	3,795[1]	80	323	3.9	692.4	692.4	693.3	0.9
066	6,590[1]	70[3]	308	3.0	720.6	720.6	721.5	0.9
Fuda Creek								
002	198[2]	134	862	4.8	563.8	559.9[4]	559.9	0.0
015	1,485[2]	143	1,068	3.9	565.1	565.1	566.1	1.0
034	3,417[2]	184	1,538	2.7	572.6	572.6	573.6	1.0
040	4,002[2]	135	996	4.2	573.6	573.6	574.6	1.0
045	4,463[2]	139	928	4.5	575.5	575.5	576.4	0.9
053	5,263[2]	143	1,013	4.1	579.8	579.8	580.8	1.0
060	5,983[2]	118	772	5.4	584.0	584.0	584.8	0.8
066	6,638[2]	112	1,015	4.1	588.6	588.6	589.6	1.0
071	7,104[2]	111	999	4.1	591.2	591.2	592.1	0.9
095	9,493[2]	134	1,231	3.4	602.2	602.2	603.2	1.0
117	11,678[2]	266	1,314	2.3	609.0	609.0	609.8	0.8
122	12,245[2]	215	931	3.3	611.4	611.4	611.7	0.3

[1]Feet above mouth
[2]Feet above confluence with Back Creek
[3]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation
[4]Elevation computed without consideration of backwater effects from Back Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

FISHER TOWN BRANCH – FUDA CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fuda Creek								
127	12,745[1]	125	618	4.9	613.8	613.8	613.8	0.0
136	13,620[1]	150	784	3.9	618.7	618.7	618.8	0.1
147	14,711[1]	114	756	4.0	624.5	624.5	625.0	0.5
158	15,764[1]	225	1,206	2.5	629.5	629.5	630.0	0.5
174	17,373[1]	119	823	3.7	635.5	635.5	635.8	0.3
201	20,145[1]	158	2,689	1.1	674.6	674.6	675.6	1.0
Hamby Branch								
003	284[2]	50	249	10.4	511.1	490.8[4]	490.8	0.0
005	496[2]	50	239	10.9	511.1	494.7[4]	494.7	0.0
015	1,500[2]	120	305	8.5	511.1	505.1[4]	505.1	0.0
044	4,350[2]	120	467	5.6	527.9	527.9	528.2	0.3
068	6,800[2]	70	174	9.7	550.0	550.0	550.0	0.0
090	8,950[2]	60	316	5.3	560.7	560.7	561.4	0.7
115	11,500[2]	50	157	10.6	571.5	571.5	572.1	0.6
Hamby Branch Tributary								
009	850[2]	60	270	6.1	535.5	535.5	536.5	1.0
044	4,428[2]	80	185	6.0	560.2	560.2	560.7	0.5
046	4,581[2]	80	277	4.0	562.2	562.2	562.9	0.7
048	4,795[2]	80	277	4.0	563.1	563.1	564.1	1.0
050	4,980[2]	140	568	1.9	565.1	565.1	566.1	1.0
056	5,597[2]	100[3]	337	3.3	566.7	566.7	567.3	0.6
058	5,802[2]	50	235	4.7	568.4	568.4	569.3	0.9

[1]Feet above confluence with Back Creek

[2]Feet above mouth

[3]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

[4]Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

FUDA CREEK – HAMBY BRANCH - HAMBY BRANCH TRIBUTARY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Horse Branch								
006	560	90	234	6.1	517.6	501.2[3]	502.2	1.0
025	2,510	60	321	4.5	517.6	509.8[3]	510.6	0.8
Horton Branch								
009	860	170	756	1.9	518.6	518.6	519.6	1.0
028	2,765	120[2]	242	5.9	529.0	529.0	529.0	0.0
038	3,790	100	334	4.3	539.5	539.5	540.0	0.5
039	3,915	130	684	2.1	543.9	543.9	544.0	0.1
066	6,600	50	377	3.8	560.5	560.5	561.3	0.8
093	9,270	50	199	6.2	574.4	574.4	574.7	0.3
094	9,390	50	247	5.0	575.2	575.2	575.7	0.5

[1]Feet above mouth

[2]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

[3]Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

HORSE BRANCH – HORTON BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Irish Buffalo Creek								
006	625	250	1,534	5.2	523.8	516.9[2]	517.9	1.0
032	3,190	90	602	13.1	528.6	528.6	528.9	0.3
061	6,149	260	2,512	3.2	536.9	536.9	537.9	1.0
063	6,261	220	2,346	3.4	537.7	537.7	538.4	0.7
065	6,452	280	2,589	3.1	537.7	537.7	538.5	0.8
066	6,558	280	2,816	2.8	538.0	538.0	538.8	0.8
102	10,179	190	922	8.3	542.9	542.9	542.9	0.0
144	14,350	240	1,175	6.5	555.8	555.8	555.8	0.0
146	14,571	260	1,768	4.3	557.7	557.7	557.8	0.1
168	16,800	200	1,309	5.9	561.1	561.1	561.8	0.7
196	19,634	290	2,346	3.1	565.7	565.7	566.7	1.0
198	19,755	320	2,480	2.9	565.9	565.9	566.9	1.0
225	22,530	460	3,347	2.2	568.7	568.7	569.4	0.7
226	22,632	460	2,853	2.6	570.0	570.0	570.0	0.0
246	24,584	330	1,980	3.7	572.5	572.5	572.5	0.0
247	24,705	1,410	9,130	0.8	573.0	573.0	573.5	0.5
272	27,184	330	1,780	4.1	575.0	575.0	575.2	0.2
273	27,290	270	1,600	4.6	575.5	575.5	575.9	0.4
288	28,750	230	1,460	5.0	577.4	577.4	578.1	0.7

[1]Feet above mouth

[2]Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

IRISH BUFFALO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Irish Buffalo Creek								
289	28,879	230[2]	1,520	4.8	578.2	578.2	578.7	0.5
296	29,635	280	1,450	4.7	579.4	579.4	580.1	0.7
331	33,133	160[2]	1,740	3.9	582.8	582.8	583.5	0.7
333	33,257	170	2,250	3.0	588.2	588.2	589.2	1.0
342	34,204	180[2]	880	7.6	588.2	588.2	589.2	1.0
343	34,341	190	1,270	5.2	591.2	591.2	591.3	0.1
345	34,463	130	1,200	5.5	591.9	591.9	591.9	0.0
360	35,990	160	2,110	3.0	593.0	593.0	593.3	0.3
394	39,440	280	2,100	3.0	597.8	597.8	598.1	0.3
424	42,366	290	1,770	3.5	600.2	600.2	601.2	1.0
425	42,534	230	1,580	4.0	602.4	602.4	602.6	0.2
427	42,720	230	1,530	4.1	602.6	602.6	603.0	0.4
429	42,910	370[2]	1,450	4.3	602.7	602.7	603.1	0.4
430	42,991	400[2]	1,350	4.6	602.9	602.9	603.2	0.3
444	44,400	210	1,475	4.1	604.9	604.9	605.7	0.8
462	46,220	620	3,532	1.7	607.0	607.0	607.6	0.6
493	49,257	200	1,131	5.3	610.3	610.3	611.3	1.0
526	52,607	240	1,455	3.7	617.7	617.7	618.7	1.0
549	54,906	300	2,058	2.6	623.1	623.1	623.9	0.8

[1]Feet above mouth

[2]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

IRISH BUFFALO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Irish Buffalo Creek								
551	55,147	220	1,648	3.2	623.5	623.5	624.2	0.7
572	57,203	430	2,037	2.5	625.5	625.5	626.4	0.9
574	57,393	220	2,221	2.3	629.5	629.5	629.8	0.3
623	62,310	400	3,514	1.3	636.6	636.6	637.6	1.0
657	65,690	360	2,116	2.1	643.4	643.4	644.2	0.8
693	69,296	290	678	6.1	650.3	650.3	650.3	0.0
694	69,421	400	1,886	2.2	654.6	654.6	654.6	0.0
749	74,882	270	695	6.0	662.6	662.6	663.4	0.8
766	76,630	180	620	6.0	666.0	666.0	666.8	0.8
768	76,751	360	1,874	2.0	669.1	669.1	669.9	0.8
788	78,775	190	639	5.8	671.9	671.9	672.3	0.4
789	78,871	260	1,382	2.7	675.2	675.2	675.2	0.0
820	82,000	150	683	5.0	681.2	681.2	682.2	1.0
832	83,160	180	613	5.6	685.5	685.5	685.5	0.0
833	83,266	140	941	3.6	686.3	686.3	687.3	1.0
955	95,513	285	2,203	0.5	732.0	732.0	732.4	0.4
957	95,687	205	1,354	0.9	732.1	732.1	733.1	1.0
969	96,920	205	1,268	2.2	732.2	732.2	733.2	1.0
980	97,971	150	950	2.1	732.9	732.9	733.9	1.0
988	98,782	150	668	3.0	734.0	734.0	734.8	0.8
998	99,770	50	335	5.9	737.3	737.3	737.8	0.5
1005	100,500	48	327	5.8	739.6	739.6	740.4	0.8
1015	101,476	43	286	5.8	743.8	743.8	744.2	0.4

[1]Feet above mouth

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

IRISH BUFFALO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Cold Water Creek								
017	1,675	260	1,061	3.3	550.2	548.0[2]	549.0	1.0
028	2,770	190	902	3.8	551.4	551.4	552.3	0.9
071	7,140	150	959	3.6	561.9	561.9	562.8	0.9
100	10,034	300[3]	2,105	1.5	564.6	564.6	565.6	1.0
120	11,984	90	565	5.7	569.9	569.9	570.9	1.0
121	12,120	100	666	4.9	571.0	571.0	571.8	0.8
163	16,315	240	1,374	2.2	579.0	579.0	580.0	1.0
178	17,765	240	1,028	3.0	581.0	581.0	582.0	1.0
179	17,885	250[3]	1,067	2.8	581.8	581.8	582.5	0.7
188	18,753	130	729	3.9	583.9	583.9	584.8	0.9
189	18,867	180	1,305	2.2	585.3	585.3	586.3	1.0
226	22,628	200	519	4.9	591.0	591.0	591.9	0.9
261	26,135	180	785	2.2	603.0	603.0	604.0	1.0
289	28,885	180	391	4.5	610.9	610.9	611.5	0.6
290	29,035	110	314	5.6	612.0	612.0	612.3	0.3
334	33,435	90	475	3.4	631.7	631.7	632.5	0.8
361	36,100	60	296	5.4	643.7	643.7	644.1	0.4
375	37,475	60	260	4.9	653.0	653.0	653.1	0.1
377	37,710	70	353	3.6	654.3	654.3	654.5	0.2
403	40,340	130[3]	218	5.9	675.9	675.9	675.9	0.0
426	42,600	90	162	3.8	715.9	715.9	716.0	0.1

[1]Feet above mouth

[2]Elevation computed without consideration of backwater effects from Cold Water Creek

[3]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE COLD WATER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Meadow Creek								
008	800	90	715	2.9	495.0	479.3[2]	480.3	1.0
039	3,920	120	881	2.0	495.0	481.5[2]	482.5	1.0
060	5,991	120	327	5.5	498.1	498.1	498.4	0.3
063	6,309	80	389	4.6	501.0	501.0	502.0	1.0
Mallard Creek								
004	387	130	2,306	4.9	569.4	564.9[2]	565.9	1.0
011	1,146	190	2,977	3.8	569.4	565.9[2]	566.9	1.0
020	2,021	190	2,954	3.9	569.4	566.8[2]	567.8	1.0
028	2,792	275	4,210	2.7	569.4	567.6[2]	568.6	1.0
033	3,252	670	10,608	1.1	569.4	568.8[2]	569.8	1.0
042	4,197	590	9,042	1.3	569.4	569.0[2]	569.9	0.9
048	4,785	465	6,843	1.7	569.4	569.1[2]	570.1	1.0
056	5,605	420	5,758	2.0	569.7	569.7	570.7	1.0
065	6,498	660	8,886	1.3	570.3	570.3	571.3	1.0
075	7,477	605	7,311	1.6	570.7	570.7	571.7	1.0
083	8,310	400	4,934	2.3	571.4	571.4	572.3	0.9
092	9,182	520	6,274	1.8	572.3	572.3	573.3	1.0
101	10,059	495	5,846	2.0	573.0	573.0	574.0	1.0
109	10,934	360	4,241	2.7	574.0	574.0	575.0	1.0
120	11,975	225	2,908	3.9	576.1	576.1	577.0	0.9

[1]Feet above mouth

[2]Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE MEADOW CREEK – MALLARD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
McCachern Branch								
004	350[1]	50	167	3.5	555.1	545.7[4]	546.7	1.0
017	1,700[1]	230	290	2.0	555.1	550.4[4]	551.4	1.0
McKee Creek								
004	378[2]	203	804	4.1	576.4	567.9[5]	567.9	0.0
011	1,072[2]	260	1,942	1.7	576.8	570.9[6]	571.9	1.0
018	1,769[2]	287	2,435	1.4	576.8	571.8[6]	572.7	0.9
026	2,627[2]	299	1,541	2.1	576.8	573.0[6]	573.8	0.8
036	3,556[2]	270	1,879	1.8	576.8	574.8[6]	575.8	1.0
044	4,440[2]	133	1,176	2.8	576.8	575.9[6]	576.9	1.0
053	5,338[2]	95	925	3.6	577.0	577.0	578.0	1.0
061	6,080[2]	111	1,066	3.1	577.9	577.9	578.9	1.0
064	6,428[2]	106	1,096	3.0	578.2	578.2	579.2	1.0
073	7,306[2]	270	2,164	1.5	578.9	578.9	579.8	0.9
082	8,226[2]	165	1,038	3.2	579.6	579.6	580.6	1.0
091	9,062[2]	250	1,762	1.9	582.2	582.2	582.7	0.5
096	9,643[2]	200[3]	1,368	2.4	583.0	583.0	583.4	0.4
113	11,274[2]	89	834	3.9	588.7	588.7	589.6	0.9
117	11,687[2]	51[3]	428	7.6	589.0	589.0	590.0	1.0
122	12,219[2]	45	314	10.4	591.5	591.5	591.9	0.4
129	12,869[2]	45	355	9.2	595.6	595.6	596.2	0.6
138	13,788[2]	89	646	4.7	598.8	598.8	599.7	0.9
143	14,341[2]	45	370	8.1	599.7	599.7	600.7	1.0
148	14,808[2]	54	352	8.6	602.2	602.2	602.6	0.4

[1]Feet above mouth
[2]Feet above confluence with Reedy Creek
[3]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation
[4]Elevation computed without consideration of backwater effects from Rocky River
[5]Flooding Controlled by Reedy Creek
[6]Elevation computed without consideration of backwater effects from Reedy Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

McCACHERN BRANCH – McKEE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Morris Branch								
003	307	21	64	4.2	566.3	551.4[2]	552.4	1.0
005	546	13	53	5.0	566.3	554.2[2]	555.1	0.8
007	717	13	35	7.7	566.3	558.3[2]	558.5	0.2
010	1,003	13	27	6.5	571.7	571.7	571.8	0.1
013	1,346	15	31	5.6	580.4	580.4	580.6	0.1
018	1,752	18	30	5.9	585.6	585.6	585.6	0.0
021	2,091	11	23	3.6	592.4	592.4	592.8	0.4
026	2,557	10	19	4.3	598.2	598.2	598.6	0.4
028	2,821	11	17	4.8	601.5	601.5	601.8	0.2
Muddy Creek								
004	400	50	485	6.1	478.0	460.2[2]	461.2	1.0
024	2,400	70	634	4.5	478.0	464.0[2]	464.8	0.8
052	5,200	80	699	4.1	478.0	467.2[2]	468.2	1.0
Overcash Branch								
005	500	50	165	4.7	660.7	660.7	661.7	1.0
010	1,000	50	126	6.1	664.0	664.0	664.1	0.1

[1]Feet above mouth

[2] Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

MORRIS BRANCH – MUDDY CREEK - OVERCASH BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Patterson Branch								
063	6,260	70[2]	221	5.5	702.4	702.4	702.7	0.3
064	6,400	50	361	3.4	707.4	707.4	707.9	0.5
074	7,395	130	784	1.6	729.3	729.3	730.1	0.8
080	7,970	50	335	2.7	729.5	729.5	730.3	0.8
085	8,540	50	187	4.9	730.9	730.9	731.7	0.8
100	9,960	120	404	2.3	740.0	740.0	740.7	0.7
101	10,139	100[2]	244	3.8	741.5	741.5	741.9	0.4
103	10,325	130	187	4.9	743.5	743.5	743.8	0.3
104	10,435	160	411	2.2	744.8	744.8	745.5	0.7
112	11,240	50	188	4.9	748.9	748.9	749.4	0.5
114-147*								

[1]Feet above mouth

[2]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

* Floodway Data was not computed

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

PATTERSON BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Reedy Creek								
013	1,331	247	4,529	2.1	532.7	531.7[2]	531.7	0.0
023	2,270	266	4,820	2.0	532.7	531.9[2]	532.1	0.2
033	3,261	809	13,582	0.7	532.7	532.1[2]	532.4	0.3
043	4,272	389	6,556	1.5	532.7	532.2[2]	532.6	0.4
051	5,118	523	9,387	1.0	532.7	532.4[2]	532.9	0.5
069	6,877	627	9,150	1.1	532.7	532.7	533.2	0.5
078	7,841	380	5,532	1.7	533.0	533.0	533.6	0.6
088	8,762	542	8,166	1.2	533.4	533.4	534.1	0.7
097	9,654	313	4,507	2.1	533.5	533.5	534.3	0.8
111	11,081	297	4,349	2.2	534.3	534.3	535.3	1.0
120	11,959	227	2,894	3.3	535.0	535.0	536.0	1.0
130	12,965	172	2,453	3.9	536.5	536.5	537.5	1.0
139	13,896	366	4,528	2.1	537.8	537.8	538.8	1.0
148	14,826	463	6,289	1.5	538.3	538.3	539.2	0.9
158	15,785	120	2,020	4.8	538.5	538.5	539.4	0.9
167	16,719	237	2,873	3.4	540.0	540.0	540.8	0.8
176	17,575	164	2,644	3.6	540.8	540.8	541.6	0.8
185	18,479	451	5,989	1.6	541.6	541.6	542.5	0.9
192	19,180	481	6,211	1.6	542.0	542.0	542.9	0.9
201	20,140	362	4,685	2.1	542.6	542.6	543.5	0.9
210	21,016	594	7,474	1.3	543.3	543.3	544.3	1.0
219	21,870	692	7,096	1.2	543.8	543.8	544.7	0.9
237	23,675	567	7,254	1.2	547.2	547.2	548.1	0.9

[1]Feet above confluence with Rocky River

[2]Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

REEDY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Reedy Creek								
246	24,634	680	7,010	1.2	547.5	547.5	548.4	0.9
256	25,617	465	4,828	1.7	548.1	548.1	549.0	0.9
265	26,523	472	4,910	1.7	549.0	549.0	549.9	0.9
274	27,356	430	4,158	2.0	549.9	549.9	550.9	1.0
276	27,595	455	4,873	1.7	551.0	551.0	551.8	0.8
307	30,729	433	5,061	1.6	557.0	557.0	557.5	0.5
314	31,437	197	2,562	3.2	558.3	558.3	558.9	0.6
319	31,931	373	4,130	2.0	559.0	559.0	559.6	0.6
327	32,729	418	4,906	1.7	560.8	560.8	561.7	0.9
332	33,198	287	3,840	2.1	561.4	561.4	562.3	0.9
336	33,623	219	3,030	2.7	561.8	561.8	562.7	0.9
342	34,245	280	3,616	2.2	562.6	562.6	563.6	1.0
348	34,798	486	5,971	1.4	563.2	563.2	564.2	1.0
357	35,703	477	3,897	2.1	564.4	564.4	565.3	0.9
364	36,355	260	3,254	2.5	565.8	565.8	566.7	0.9
368	36,811	350	3,689	2.2	566.7	566.7	567.7	1.0
381	38,098	300	3,297	2.5	568.6	568.6	569.5	0.9
390	38,996	318	4,090	2.0	571.2	571.2	572.1	0.9
399	39,926	536	6,158	1.3	573.5	573.5	574.5	1.0
408	40,781	258	2,726	3.0	575.4	575.4	576.4	1.0
413	41,323	363	4,930	1.2	576.8	576.8	577.7	0.9
421	42,072	149	2,140	2.7	577.3	577.3	578.2	0.9
426	42,613	124	1,772	3.3	577.8	577.8	578.7	0.9

[1]Feet above confluence with Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

REEDY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Reedy Creek								
435	43,476[1]	200	2,461	2.3	579.1	579.1	580.1	1.0
443	44,287[1]	250	2,840	2.0	580.4	580.4	581.3	0.9
449	44,906[1]	235	3,176	1.8	581.2	581.2	582.1	0.9
454	45,365[1]	181	2,431	2.4	581.7	581.7	582.6	0.9
461	46,100[1]	318	4,744	1.2	582.2	582.2	583.1	0.9
469	46,944[1]	122	2,177	2.7	582.5	582.5	583.4	0.9
484	48,435[1]	298	3,098	1.9	585.3	585.3	585.9	0.6
490	48,971[1]	216	2,142	2.7	586.1	586.1	586.7	0.6
496	49,610[1]	83	922	6.3	587.1	587.1	587.7	0.6
506	50,588[1]	51	546	10.6	591.2	591.2	592.2	1.0
512	51,188[1]	114	1,343	4.3	595.2	595.2	596.2	1.0
522	52,153[1]	109	1,206	4.8	598.2	598.2	598.9	0.7
531	53,096[1]	145	1,808	3.2	601.4	601.4	602.0	0.6
540	53,986[1]	280[5]	3,352	1.7	603.2	603.2	603.8	0.6
549	54,854[1]	463[5]	4,506	1.3	604.5	604.5	605.1	0.6
558	55,810[1]	350	3,006	1.8	605.6	605.6	606.2	0.6
566	56,561[1]	107	1,130	4.8	606.6	606.6	607.3	0.7
Reedy Creek Tributary 1								
024	2,444[2]	102	371	3.7	605.2	604.2[4]	605.2	1.0
035	3,530[2]	41	189	7.3	610.8	610.8	611.3	0.5
042	4,175[2]	179	969	1.4	612.4	612.4	613.4	1.0
048	4,839[2]	40[3]	296	4.6	613.0	613.0	614.0	1.0

[1]Feet above confluence with Rocky River
[2]Feet above confluence with Reedy Creek
[3]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation
[4]Elevation computed without consideration of backwater effects from Reedy Creek
[5]Combined Reedy Creek Tributary 1/Reedy Creek floodway

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

REEDY CREEK – REEDY CREEK TRIBUTARY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rocky River								
2123	212,349	540	10,604	3.6	468.9	468.9	469.7	0.8
2133	213,290	520	7,713	5.0	469.5	469.5	470.3	0.8
2144	214,424	468	6,991	5.5	470.4	470.4	471.2	0.8
2158	215,753	390	7,422	5.2	471.9	471.9	472.8	0.9
2177	217,673	325	6,594	5.9	474.1	474.1	475.0	0.9
2191	219,127	396	8,147	4.7	475.4	475.4	476.3	0.9
2208	220,790	567	9,526	4.1	476.6	476.6	477.5	0.9
2216	221,606	341	7,348	5.3	476.9	476.9	477.9	1.0
2236	223,581	301	6,718	5.6	478.2	478.2	479.1	0.9
2247	224,652	343	7,251	5.2	479.0	479.0	480.0	1.0
2260	225,954	451	8,662	4.3	479.9	479.9	480.8	0.9
2273	227,295	632	12,367	3.0	480.9	480.9	481.9	1.0
2289	228,871	371	7,767	4.8	481.6	481.6	482.5	0.9
2228	222,840	440	8,636	4.3	481.6	481.6	482.4	0.8
2258	225,794	290	6,395	5.9	482.9	482.9	483.7	0.8
2259	225,906	520[2]	7,077	5.3	483.3	483.3	484.3	1.0
2282	228,200	390	7,278	5.2	486.7	486.7	487.4	0.7
2327	232,730	490	9,770	3.8	490.3	490.3	491.1	0.8
2376	237,600	550	10,849	3.4	492.6	492.6	493.4	0.8
2399	239,859	290	6,043	6.2	493.1	493.1	493.9	0.8
2400	239,992	330	6,006	6.2	493.5	493.5	494.5	1.0
2449	244,880	680	11,916	3.1	497.1	497.1	497.9	0.8

[1]Feet above mouth

[2] Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

ROCKY RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rocky River								
2514	251,360	830	12,510	2.9	499.7	499.7	500.5	0.8
2577	257,670	930	14,200	2.5	502.1	502.1	503.0	0.9
2638	263,790	480	7,376	4.8	504.5	504.5	505.4	0.9
2682	268,200	660	15,035	2.1	506.6	506.6	507.6	1.0
2704	270,411	1,150[2]	18,003	1.7	506.9	506.9	507.9	1.0
2704	270,440	950[2]	16,991	1.8	507.2	507.2	508.2	1.0
2734	273,440	330	5,200	5.9	507.4	507.4	508.4	1.0
2798	279,760	260	5,870	5.2	511.6	511.6	512.2	0.6
2841	284,140	310	5,167	5.9	514.5	514.5	515.2	0.7
2843	284,280	320	5,135	5.9	514.8	514.8	515.6	0.8
2900	290,020	340	5,354	5.6	521.3	521.3	521.6	0.3
2929	292,900	1,000	9,278	3.2	523.4	523.4	524.0	0.6
2945	294,500	950	11,199	2.1	524.4	524.4	525.4	1.0
2997	299,650	320	4,801	4.9	525.6	525.6	526.4	0.8
3050	304,965	300	5,467	4.3	529.5	529.5	530.1	0.6
3065	306,520	510	8,658	2.7	530.4	530.4	531.1	0.7
3066	306,640	290	5,843	4.1	530.5	530.5	531.2	0.7
3098	309,770	390	6,800	3.5	532.0	532.0	532.7	0.7
3144	314,430	200	4,185	5.0	534.0	534.0	534.8	0.8
3183	318,280	230	4,296	4.8	536.5	536.5	537.3	0.8
3234	323,427	730	9,086	2.3	539.2	539.2	540.1	0.9
3236	323,554	580	8,883	2.3	539.4	539.4	540.3	0.9
3282	328,220	180	2,855	5.5	541.8	541.8	542.7	0.9

[1]Feet above mouth

[2]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

ROCKY RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rocky River								
3349	334,920	730	9,339	1.7	544.9	544.9	545.9	1.0
3391	339,110	210	2,838	5.5	546.2	546.2	547.2	1.0
3392	339,230	260	2,774	5.6	546.4	546.4	547.4	1.0
3432	343,169	200[2]	2,219	7.0	551.5	551.5	552.1	0.6
3434	343,407	240[2]	2,815	5.5	552.8	552.8	553.6	0.8
3445	344,480	280	3,794	4.1	554.3	554.3	554.9	0.6
3501	350,070	330	3,098	5.0	557.9	557.9	558.5	0.6
3502	350,190	230	2,965	5.2	560.5	560.5	560.8	0.3
3561	356,110	350	5,028	3.0	567.5	567.5	568.3	0.8
3592	359,180	190	3,448	3.5	569.7	569.7	570.5	0.8
3611	361,060	300	5,473	2.2	570.4	570.4	571.2	0.8
3649	364,885	630	10,135	1.2	571.0	571.0	571.8	0.8
3667	366,655	600	9,388	1.3	571.2	571.2	572.0	0.8
3683	368,250	250	3,847	3.1	571.4	571.4	572.2	0.8
3702	370,190	180	2,702	4.5	572.6	572.6	573.4	0.8
3728	372,755	300	3,957	3.0	574.5	574.5	575.3	0.8
3747	374,685	275	4,140	2.9	575.3	575.3	576.2	0.9
3761	376,055	750	11,825	1.0	575.8	575.8	576.7	0.9
3775	377,505	430	6,088	2.0	576.0	576.0	576.9	0.9
3789	378,880	290	4,425	2.7	576.4	576.4	577.2	0.8
3792	379,180	235	3,794	3.2	576.6	576.6	577.4	0.8
3807	380,740	150	2,352	5.1	577.5	577.5	578.3	0.8
3837	383,745	500[2]	6,461	1.9	579.2	579.2	580.1	0.9

[1]Feet above mouth

[2]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

ROCKY RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rocky River								
3847	384,705	310	4,329	2.8	579.4	579.4	580.3	0.9
3864	386,415	230	2,820	4.3	580.3	580.3	581.1	0.8
3880	388,045	280	3,701	3.3	581.9	581.9	582.7	0.8
3917	391,670	725	8,058	1.5	583.8	583.8	584.7	0.9
3936	393,640	1,290	11,801	1.0	584.5	584.5	585.4	0.9
3963	396,270	750	5,955	2.0	585.7	585.7	586.5	0.8
3980	398,030	620	5,325	2.3	587.3	587.3	588.0	0.7
4004	400,435	200	2,462	4.9	590.5	590.5	591.1	0.6
4020	401,960	260	2,797	4.3	593.6	593.6	594.1	0.5
4023	402,260	350	3,920	3.1	595.0	595.0	595.4	0.4
4040	403,990	400	3,558	3.4	597.2	597.2	597.5	0.3
4064	406,410	900	5,320	2.3	600.6	600.6	601.3	0.7
4080	407,950	450	4,750	2.5	601.9	601.9	602.6	0.7
4081	408,080	500	5,320	2.2	602.4	602.4	603.1	0.7
4089	408,910	300	2,954	4.0	603.2	603.2	603.7	0.5
4102	410,230	540	5,173	2.3	605.5	605.5	606.2	0.7
4133	413,325	375	4,264	2.7	608.7	608.7	609.6	0.9
4145	414,510	350	3,978	2.9	610.1	610.1	610.9	0.8
4162	416,235	290	3,631	3.2	612.1	612.1	612.8	0.7
4185	418,490	400	4,508	2.6	613.9	613.9	614.7	0.8
4200	420,010	250	2,719	4.3	615.1	615.1	615.9	0.8
4208	420,815	390	4,122	2.1	616.0	616.0	616.8	0.8
4209	420,945	450	4,964	1.7	616.1	616.1	616.9	0.8

[1]Feet above mouth

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

ROCKY RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rocky River								
4218	421,840	800	8,806	1.0	616.4	616.4	617.2	0.8
4236	423,550	500	4,542	1.9	616.8	616.8	617.6	0.8
4261	426,060	500	3,151	2.7	618.9	618.9	619.6	0.7
4275	427,540	140	1,720	4.8	620.7	620.7	621.2	0.5
4277	427,660	190	1,963	4.2	621.1	621.1	621.6	0.5
4290	428,985	800	6,555	1.3	622.1	622.1	622.7	0.6
4301	430,115	650	3,453	2.4	622.3	622.3	623.1	0.8
4321	432,060	800	4,303	1.9	624.7	624.7	625.6	0.9
4343	434,310	700	4,069	2.0	626.7	626.7	627.5	0.8
4350	435,030	210	1,343	6.1	627.4	627.4	628.1	0.7
4352	435,170	220	1,659	5.0	628.9	628.9	629.2	0.3
4367	436,650	700	3,081	2.7	632.1	632.1	632.5	0.4
4382	438,180	210	1,559	4.9	634.5	634.5	635.1	0.6
4391	439,145	400	1,785	4.2	636.5	636.5	636.8	0.3
4400	440,030	300	1,386	5.5	638.0	638.0	638.4	0.4
4410	441,010	160	1,689	4.5	639.4	639.4	639.9	0.5
4411	441,140	181	1,502	5.0	639.8	639.8	640.2	0.4
4417	441,650	175	1,335	5.7	640.7	640.7	641.0	0.3
4421	442,080	280	2,506	3.0	641.8	641.8	642.1	0.3
4421	442,130	280	2,195	3.5	641.8	641.8	642.1	0.3
4438	443,760	250	1,655	4.6	644.5	644.5	645.1	0.6
4456	445,567	379	2,726	1.4	647.2	647.2	647.7	0.5
4465	446,469	300	1,864	2.0	647.7	647.7	648.1	0.4

[1]Feet above mouth

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

ROCKY RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rocky River								
4473	447,305	145	854	4.5	648.7	648.7	649.0	0.3
4479	447,945	160	887	4.3	650.6	650.6	650.9	0.3
4483	448,274	101	762	5.0	653.2	653.2	653.3	0.1
4490	448,954	314	1,756	2.2	654.5	654.5	655.0	0.5
4498	449,809	125	827	4.6	656.2	656.2	656.7	0.5
4505	450,511	269	1,362	2.8	657.9	657.9	658.4	0.5
4512	451,204	186	1,007	3.8	659.0	659.0	659.5	0.5
4517	451,678	204	1,291	3.0	660.0	660.0	660.5	0.5
4521	452,105	406	2,382	1.6	662.0	662.0	662.5	0.5
4526	452,639	276	1,593	2.4	662.3	662.3	662.8	0.5
4534	453,427	67	610	6.3	663.8	663.8	664.3	0.5
4540	454,025	166	1,046	3.7	665.7	665.7	666.2	0.5
4547	454,707	468	2,628	1.5	666.7	666.7	667.2	0.5
4554	455,424	119	908	4.3	667.2	667.2	667.6	0.4
4563	456,252	363	1,411	2.7	669.1	669.1	669.6	0.5
4568	456,829	131	880	4.4	670.2	670.2	670.7	0.5
4574	457,386	263	808	4.8	671.8	671.8	672.3	0.5
4580	457,951	69	577	6.8	674.3	674.3	674.8	0.5
4588	458,753	232	1,151	3.4	677.2	677.2	677.7	0.5
4595	459,506	300	1,491	2.6	678.3	678.3	678.7	0.4
4601	460,099	381	1,724	2.3	679.0	679.0	679.5	0.5
4612	461,178	263	1,192	3.3	680.7	680.7	681.2	0.5
4623	462,297	274	1,336	3.0	683.0	683.0	683.5	0.5
4632	463,236	263	918	4.3	684.5	684.5	685.0	0.5

[1]Feet above mouth

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

ROCKY RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rogers Lake Branch								
008	790	120	506	3.1	632.2	631.6[2]	632.6	1.0
023	2,310	90	348	4.5	636.9	636.9	637.9	1.0
024	2,390	100	467	3.4	639.0	639.0	639.1	0.1
037	3,730	80	264	6.0	643.6	643.6	643.7	0.1
044	4,400	70	301	5.2	647.0	647.0	647.5	0.5
068	6,750	120	288	5.5	663.8	663.8	664.5	0.7
074	7,400	120	531	2.2	666.9	666.9	667.7	0.8
082	8,200	130	373	3.1	673.1	673.1	673.5	0.4
097	9,650	80	289	4.0	689.2	689.2	689.7	0.5
108	10,830	80	332	3.5	706.3	706.3	706.6	0.3
109	10,901	100	446	2.6	708.4	708.4	708.7	0.3
118	11,818	50	316	2.8	710.5	710.5	710.9	0.4
120	11,971	50	429	2.0	715.3	715.3	715.5	0.2
Shinn Branch								
013	1,294	50	95	2.7	505.5	498.4[3]	499.4	1.0
015	1,455	50	193	1.3	505.5	504.0[3]	504.6	0.6
036	3,648	100	52	5.0	556.7	556.7	556.7	0.0
038	3,752	50	141	1.8	559.5	559.5	560.3	0.8

[1]Feet above mouth

[2]Elevation computed without consideration of backwater effects from Irish Buffalo Creek

[3]Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

ROGERS LAKE BRANCH – SHINN BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Threemile Branch								
008	800	77	354	7.9	558.2	555.6[3]	556.4	0.8
030	2,975	65	584	4.8	562.7	562.7	562.7	0.0
031	3,125	64[2]	244	11.5	562.7	562.7	562.7	0.0
045	4,450	90	530	5.3	567.6	567.6	568.1	0.5
077	7,748	73[2]	549	4.7	574.3	574.3	544.6	0.3
080	7,953	65[2]	368	7.1	575.6	575.6	575.8	0.2
092	9,200	65	459	5.7	579.9	579.9	580.1	0.2
093	9,303	65	481	5.4	580.2	580.2	580.5	0.3
106	10,627	140	440	5.9	586.2	586.2	586.2	0.0
109	10,938	70	470	5.5	587.3	587.3	587.7	0.4
111	11,062	50	530	4.9	592.8	592.8	593.3	0.5
143	14,300	260[2]	1,070	2.2	597.8	597.8	597.8	0.0
164	16,376	230	1,080	2.2	606.8	606.8	607.1	0.3
165	16,494	440[2]	3,610	0.7	612.5	612.5	613.0	0.5
172	17,196	470[2]	3,230	0.7	612.6	612.6	613.1	0.5
174	17,355	550	3,640	0.7	613.4	613.4	613.8	0.4
181	18,074	260	1,180	2.0	613.6	613.6	614.0	0.4
215	21,456	100	440	4.6	624.3	624.3	625.0	0.7
216	21,559	90	340	6.1	625.0	625.0	625.4	0.4

[1]Feet above mouth

[2]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

[3] Elevation computed without consideration of backwater effects from Cold Water Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

THREEMILE BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Threemile Branch								
218	21,763	50	410	4.9	626.3	626.3	626.5	0.2
219	21,924	70	400	5.1	626.9	626.9	627.6	0.7
239	23,915	70	550	3.7	641.9	641.9	642.9	1.0
247	24,680	50	280	7.2	644.3	644.3	644.9	0.6
248	24,793	50	300	6.7	644.8	644.8	645.2	0.4
251	25,133	50	440	4.6	650.3	650.3	651.0	0.7
276	27,644	70	720	2.8	657.9	657.9	658.9	1.0
290	28,989	50	353	5.7	664.0	664.0	664.0	0.0
292	29,171	50	465	4.4	669.6	669.6	669.6	0.0
300	30,041	50[2]	391	5.2	670.3	670.3	670.6	0.3
306	30,603	60	522	3.4	672.6	672.6	672.8	0.2
307	30,727	60	452	3.9	672.9	672.9	673.4	0.5
331	33,065	85	504	3.5	679.9	679.9	680.9	1.0
354	35,380	100[2]	212	7.2	699.6	699.6	699.6	0.0

[1]Feet above mouth

[2]Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

THREEMILE BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Tucker Branch								
012	1,210	50	178	4.5	497.8	479.5[2]	480.3	0.8
033	3,325	60	214	3.7	497.8	492.7[2]	492.8	0.1
Yow Branch								
021	2,078	290	486	2.4	506.7	495.2[2]	496.1	0.9
022	2,225	100	804	1.4	506.7	500.9[2]	501.6	0.7

[1]Feet above mouth

[2]Elevation computed without consideration of backwater effects from Rocky River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CABARRUS COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

TUCKER BRANCH – YOW BRANCH

This FIS is based on the most up-to-date data available to FEMA or the State at the time of production; however, flood hazard conditions change over time. Communities or private parties may request flood map revisions at any time; certain types of revisions will require the submission of supporting data. FEMA or the State may also initiate a revision. FIS revisions may take several forms; these include Letters of Map Amendment (LOMAs), Letters of Map Revision - based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs), Physical Map Revisions (PMRs), and FEMA or the State-contracted restudies.

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 Assistance Center 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 before construction takes place. This assures communities participating in the NFIP that proposed projects meet minimum NFIP requirements. The result of the review by FEMA and the NCFMP 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 Assistance Center 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, 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 more information regarding FEMA-contracted restudies, please contact the FEMA Map Assistance Center 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 Cabarrus 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 November 5, 2008, North Carolina Statewide FIRM, which includes Cabarrus County, are presented in Table 13, "Community Map History."

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

Table 13—Community Map History

Community Name	Initial Identification Date	FHBM Revision Date	FIRM Effective Date	FIRM Revision Date
Cabarrus County (Unincorporated Areas)	December 27, 1974	November 4, 1977	May 5, 1981	November 2, 1994 November 5, 2008
Concord, City of	December 21, 1973	November 4, 1977	March 4, 1980	July 31, 1981 November 2, 1994 November 5, 2008
Harrisburg, Town of	November 2, 1994	None	November 2, 1994	November 5, 2008
Kannapolis, City of	December 27, 1974 (Cabarrus County); July 28, 1978 (Rowan County)	November 4, 1977 (Cabarrus County)	May 5, 1981 (Cabarrus County); November 1, 1979 (Rowan County)	November 2, 1994 (Cabarrus County) November 5, 2008
Midland, Town of	December 27, 1974[1]	November 4, 1977[1]	May 5, 1981[1]	November 2, 1994[1] November 5, 2008
Mount Pleasant, Town of	November 2, 1994	None	November 2, 1994	November 5, 2008

[1]This community did not have its own FIRM prior to this countywide FIS. The land area for this community was previously shown on the FIRM for the unincorporated areas of Cabarrus County. Therefore, the map history dates associated with this community were taken from the FIRM for Cabarrus County.

Section 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 Cabarrus County and Incorporated Areas. Table 14, "Authority and Acknowledgments," includes information for the previous countywide FIS and for this revision.

Table 14—Authority and Acknowledgments

Community	FIS Dated	Study Contracted by	Data Source *(Study Contractor or Source of Data)*	Contract or Inter-Agency Agreement (IAA) Number	Work Completed in *(month and/or year)*
Cabarrus County and Incorporated Areas	November 5, 2008	FEMA	North Carolina Floodplain Mapping Program	N/A	February 2007
Concord, City of	July 31, 1981	Federal Insurance Administration	Moore, Gardner, and Associates, Inc.	H-4581	January 1979
Cabarrus County and Unincorporated Areas	August 3, 1989	Federal Insurance Administration	Moore, Gardner, and Associates, Inc.	H-4581	January 1979
Cabarrus County and Incorporated Areas	November 2, 1994	FEMA	Hayes, Seay, Mattern & Mattern, Inc.	EMW-90-C-3101	October 1991

N/A – Not Applicable

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 were produced by Watershed Concepts, under contract with the State of North Carolina.

In August 2000, the North Carolina General Assembly allocated $23 million to Phase I of the Program. FEMA has contributed an additional $10.0 million towards the Program, as well as in-kind contributions of engineering, mapping, and program management services.

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.

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

The dates of the initial and final CCO meetings held for Cabarrus County and Incorporated Areas were compiled from the previous countywide FIS Report and are shown in Table 15, "Consultation Coordination Officer's Meetings."

Table 15—Consultation Coordination Officer's Meetings

Community Name	For FIS Dated	Initial CCO Date	Attended by	Final CCO Date	Attended by
Cabarrus County (Unincorporated Areas)	August 3, 1989	June 1977	Representatives of Cabarrus County, FEMA, and the Study Contractor	*	Representatives of Cabarrus County, FEMA, and the Study Contractor
City of Concord	July 31, 1981	June 1977	Representatives of the City of Concord, FEMA, and the Study Contractor	*	Representatives of the City of Concord, FEMA, and the Study Contractor
Cabarrus County and Incorporated Areas	November 2, 1994	June 28, 1989	Representatives of Cabarrus County, FEMA, and the Study Contractor	June 2, 1993	Representatives of Cabarrus County, FEMA, and the Study Contractor

*Data Not Available

A Preliminary Meeting was held in Concord, North Carolina on July 10, 2007 to disseminate and review the FIS Report and FIRM panels for the Yadkin River Basin portion of Cabarrus County. This meeting was attended by community officials from Cabarrus County and the Incorporated Communities, along with representatives from the State of North Carolina, and Watershed Concepts. A Public Participation Meeting was held on August 28, 2007, to review and discuss the FIS Report and FIRM panels for the Yadkin River Basin portion of Cabarrus County in a public setting.

The dates of the Initial and Final Scoping Meetings held for Cabarrus County are shown in Table 16, "Scoping Meetings."

Table 16—Scoping Meetings

Community Name	Basin	Initial Scoping Date	Attended by	Final Scoping Date	Attended by
Cabarrus County (Unincorporated Areas)	Yadkin	January 7, 2004	Representatives of local communities, Dewberry, NCFMP, and Cabarrus County	January 17, 2006	Representatives of local communities, the City of Concord, the City of Kannapolis, Dewberry, NCFMP, and Cabarrus County
City of Concord	Yadkin	January 7, 2004	*	January 17, 2006	Representatives of local communities, the City of Concord, the City of Kannapolis, Dewberry, NCFMP, and Cabarrus County
City of Kannapolis	Yadkin	January 7, 2004	*	January 17, 2006	Representatives of local communities, the City of Concord, the City of Kannapolis, Dewberry, NCFMP, and Cabarrus County

*Did not attend Initial Scoping Meeting

Section 9.0 – Guide to Additional Information

This is a multivolume FIS. Each volume may be revised separately, in which case it supersedes the previously printed volume. Users should refer to the Table of Contents in Volume 1 for the current date of each volume; volumes bearing these dates contain the most up-to-date flood hazard data.

FISs have been prepared for Union County and Incorporated Areas (FEMA, 2008), Stanly County and Incorporated Areas (FEMA, 2008), and Iredell County and Incorporated Areas (FEMA, 2008). Countywide FISs to accompany the Statewide FIRM are being prepared for Mecklenburg County and Incorporated Areas (FEMA, 2004) and Rowan County and Incorporated Areas (FEMA, 1979). 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 17, "Additional Information," contains useful contact information regarding this FIS, the FIRM, and data.

Table 17—Additional Information

FEMA and the NFIP	
FEMA website	www.fema.gov
NFIP Internet website	http://www.fema.gov/business/nfip/
Other Federal Agencies	
USGS website	www.usgs.gov/
Hydraulic Engineering Center website	www.hec.usace.army.mil/
State Agencies and Organizations	
CGIA website	www.cgia.state.nc.us/
NCGS website	www.ncgs.state.nc.us/
NCFMP website	www.ncfloodmaps.com

Section 10.0 – Bibliography and References

Federal Emergency Management Agency. (October 16, 2008). Flood Insurance Study, Union County, North Carolina and Incorporated Areas. Washington, D.C.

Federal Emergency Management Agency. (September 3, 2008). Flood Insurance Study, Stanly County, North Carolina and Incorporated Areas. Washington, D.C.

Federal Emergency Management Agency. (March 18, 2008). Flood Insurance Study, Iredell County, North Carolina and Incorporated Areas. Washington, D.C.

Federal Emergency Management Agency. (February 4, 2004). Flood Insurance Study, Mecklenburg County, North Carolina and Incorporated Areas. Washington, D.C. Currently being revised.

Federal Emergency Management Agency, (August 3, 1989). Flood Insurance Study, Cabarrus County, North Carolina (Unincorporated Areas). Washington, D.C. Currently being revised.

Federal Emergency Management Agency, (May 1979). Flood Insurance Study, Rowan County, North Carolina (Unincorporated Areas). Washington, D.C. Currently being revised.

U.S. Army Corps of Engineers, Hydrologic Engineering Center. (2004). HEC-RAS Step-Backwater Computer Program, Version 3.1.2. Davis, California.

U.S. Army Corps of Engineers, Hydrologic Engineering Center. (April 1984). HEC-2 Water Surface Profiles, Users Manual. Davis California.

U.S. Army Corps of Engineers, Hydrologic Engineering Center. (October 1970). HEC-1 Flood Hydrograph Package. Davis, California.

U.S. Department of Commerce, Weather Bureau. (1961, Revised 1963). Technical Paper No. 40, Rainfall Frequency Atlas of the United States. Washington, D.C.

U.S. Department of the Interior, Geological Survey. (2001). Water Resources Investigations Report 01-4207, Estimating the Magnitude and Frequency of Floods in Rural Basins in North Carolina – Revised. J.C. Robbins, B.F. Pope, and G.D. Tasker (authors).

U.S. Department of the Interior, Geological Survey. (1996). Water Resources Investigations Report 96-4084, Estimation of Flood Frequency Characteristics of Small Urban Streams in North Carolina. J.C. Robbins and B.F. Pope (authors).

U.S. Department of the Interior, Geological Survey. (April 1991). Preliminary Flood Insurance Study, Mecklenburg County, North Carolina. Charlotte, North Carolina.

U.S. Department of the Interior, Geological Survey. (1987). Water Resources Investigations Report 87-4096, Techniques for Estimating Magnitude and Frequency of Floods Rural and Urban Basins of North Carolina. Curtis Gunter, Robert R. Mason, and Timothy C. Stamey (authors).

U.S. Department of the Interior, Geological Survey. Quadrangle Maps, Scale 1:24,000, Contour Interval 20 Feet: China Grove, North Carolina, 1987; Concord, North Carolina, 1987; Cornelius, North Carolina, 1970; Derita, North Carolina, 1972; Gold Hill, North Carolina, 1962; Kannapolis, North Carolina, 1988; Harrisburg, North Carolina, 1988; Locust, North Carolina, 1980; Midland, North Carolina, 1980; Mint Hill North Carolina, 1988; Mount Pleasant, North Carolina, 1980; Richfield, North Carolina, 1981; Rockwell, North Carolina, 1987; and Concord SE, North Carolina, 1987.

U.S. Department of the Interior, Geological Survey. (September 1981). Office of Water Data Collection, Interagency Advisory Committee on Water Data, "Guidelines for Determining Flood Flow Frequency," Bulletin 17B. Reston, Virginia.

U.S. Department of the Interior, Geological Survey. (March 1976). Water Resources Investigation 76-17, Magnitude and Frequency of Floods in North Carolina. N.M. Jackson, Jr. (author).

U.S. Department of the Interior, Geological Survey. (1976). Water Resources Investigation 76-17, Techniques for Estimating Magnitude and Frequency of Floods on Natural Streams in North Carolina. N.M. Jackson, Jr. (author).

U.S. Department of the Interior, Geological Survey. (1972). Effect of Urban Development of Floods in the Piedmont Province of North Carolina. Arthur L. Putnam (author).