

# FLOOD INSURANCE STUDY

## FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 2



### CITY OF COLUMBUS – MUSCOGEE COUNTY, GEORGIA (CONSOLIDATED GOVERNMENT)

COMMUNITY NAME	COMMUNITY NUMBER
CITY OF COLUMBUS – MUSCOGEE COUNTY	135158



# FEMA

**PRELIMINARY**

**JUNE 30 2015**

**REVISED:**

**Month Day, Year**

FLOOD INSURANCE STUDY NUMBER  
**135158V001B**

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### Exhibits

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**Published Separately**

Flood Insurance Rate Map (FIRM)

# FLOOD INSURANCE STUDY REPORT CITY OF COLUMBUS – MUSCOGEE COUNTY, GEORGIA

## SECTION 1.0 – INTRODUCTION

### 1.1 The National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a voluntary Federal program that enables property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, sea-walls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection.

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act of 1994 and the Flood Insurance Reform Act of 2004. The NFIP is administered by the Federal Emergency Management Agency (FEMA), which is a component of the Department of Homeland Security (DHS).

Participation in the NFIP is based on an agreement between local communities and the Federal Government. If a community adopts and enforces floodplain management regulations to reduce future flood risks to new construction and substantially improved structures in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses. The community's floodplain management regulations must meet or exceed criteria established in accordance with Title 44 Code of Federal Regulations (CFR) Part 60.3, *Criteria for land Management and Use*.

SFHAs are delineated on the community's Flood Insurance Rate Maps (FIRMs). Under the NFIP, buildings that were built before the flood hazard was identified on the community's FIRMs are generally referred to as "Pre-FIRM" buildings. When the NFIP was created, the U.S. Congress recognized that insurance for Pre-FIRM buildings would be prohibitively expensive if the premiums were not subsidized by the Federal Government. Congress also recognized that most of these floodprone buildings were built by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. The NFIP requires that full actuarial rates reflecting the complete flood risk be charged on all buildings constructed or substantially improved on or after

the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later. These buildings are generally referred to as “Post-FIRM” buildings.

## 1.2 Purpose of this Flood Insurance Study Report

This Flood Insurance Study (FIS) report revises and updates information on the existence and severity of flood hazards for the study area. The studies described in this report developed flood hazard data that will be used to establish actuarial flood insurance rates and to assist communities in efforts to implement sound floodplain management.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. Contact your State NFIP Coordinator to ensure that any higher State standards are included in the community’s regulations.

## 1.3 Jurisdictions Included in the Flood Insurance Study Project

This FIS Report covers the entire geographic area of City of Columbus – Muscogee County, Georgia.

The jurisdictions that are included in this project area, along with the Community Identification Number (CID) for each community and the 8-digit Hydrologic Unit Codes (HUC-8) sub-basins affecting each, are shown in Table 1. The Flood Insurance Rate Map (FIRM) panel numbers that affect each community are listed. If the flood hazard data for the community is not included in this FIS Report, the location of that data is identified.

The location of flood hazard data for participating communities in multiple jurisdictions is also indicated in the table.

Jurisdictions that have no identified SFHAs as of the effective date of this study are indicated in the table. Changed conditions in these communities (such as urbanization or annexation) or the availability of new scientific or technical data about flood hazards could make it necessary to determine SFHAs in these jurisdictions in the future.

**Table 1: Listing of NFIP Jurisdictions**

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
City of Columbus – Muscogee County	135158	03130002 03130003	1351580001G	
			1351580002G	
			1351580003G	
			1351580004G	
			1351580005F	
			1351580006F	
			1351580007G	
			1351580008G	
			1351580009G	
			1351580010F	

**Table 1: Listing of NFIP Jurisdictions continued**

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
City of Columbus – Muscogee County	135158	03130002 03130003	1351580011F	
			1351580012F	
			1351580013F	
			1351580014F	
			1351580015F*	
			1351580016F	
			1351580017F	
			1351580018F	
			1351580019F	
			1351580020F	
			1351580021G	
			1351580022G	
			1351580023F	
			1351580024F	
			1351580025F	
			1351580026F	
			1351580027F	
			1351580028F	
			1351580029F	
			1351580030F	
			1351580031F	
			1351580032F	
			1351580033F	
			1351580034G	
			1351580035G	
			1351580036F	
			1351580037F	
			1351580038F	
			1351580039F	
			1351580040F	
1351580041F				
1351580042F				
1351580043F				
1351580044F				
1351580045F				
1351580046F				
1351580047F				

\* Panel not printed

**Table 1: Listing of NFIP Jurisdictions continued**

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
City of Columbus – Muscogee County	135158	03130002 03130003	1351580048F	
			1351580049F	
			1351580050F	
			1351580051F*	
			1351580052F	
			1351580053F*	
			1351580054F	
			1351580055F	
			1351580056F	
			1351580057F	
			1351580058F	
			1351580059F*	
			1351580060F*	
			1351580061F	
			1351580062F	
			1351580063F	
			1351580064F	
			1351580065F	
			1351580066F*	
			1351580067F	
			1351580068F	
1351580069F				
1351580070F				
1351580071F				
1351580072F				
1351580073F				
1351580074F				
1351580075F				
1351580076F				

\* Panel not printed

**1.4 Considerations for using this Flood Insurance Study Report**

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1% annual chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1% annual chance and 0.2% annual chance floodplains; and 1% annual chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal

Stillwater Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

This section presents important considerations for using the information contained in this FIS Report and the FIRM, including changes in format and content. Figures 1, 2, and 3 present information that applies to using the FIRM with the FIS Report.

- Part or all of this FIS Report may be revised and republished at any time. In addition, part of this FIS Report may be revised by a Letter of Map Revision (LOMR), which does not involve republication or redistribution of the FIS Report. Refer to Section 6.5 of this FIS Report for information about the process to revise the FIS Report and/or FIRM.

It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data for floodplain management and flood insurance purposes. Community map repository addresses are provided in Table 31, “Map Repositories,” within this FIS Report.

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

The initial Countywide FIS Report for City of Columbus – Muscogee County (Consolidated Government) became effective on June 1, 1982. Refer to Table 28 for information about subsequent revisions to the FIRMs.

- FEMA does not impose floodplain management requirements or special insurance ratings based on Limit of Moderate Wave Action (LiMWA) delineations at this time. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. If the LiMWA is shown on the FIRM, it is being provided by FEMA as information only. For communities that do adopt Zone VE building standards in the area defined by the LiMWA, additional Community Rating System (CRS) credits are available. Refer to Section 2.5.4 for additional information about the LiMWA.

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

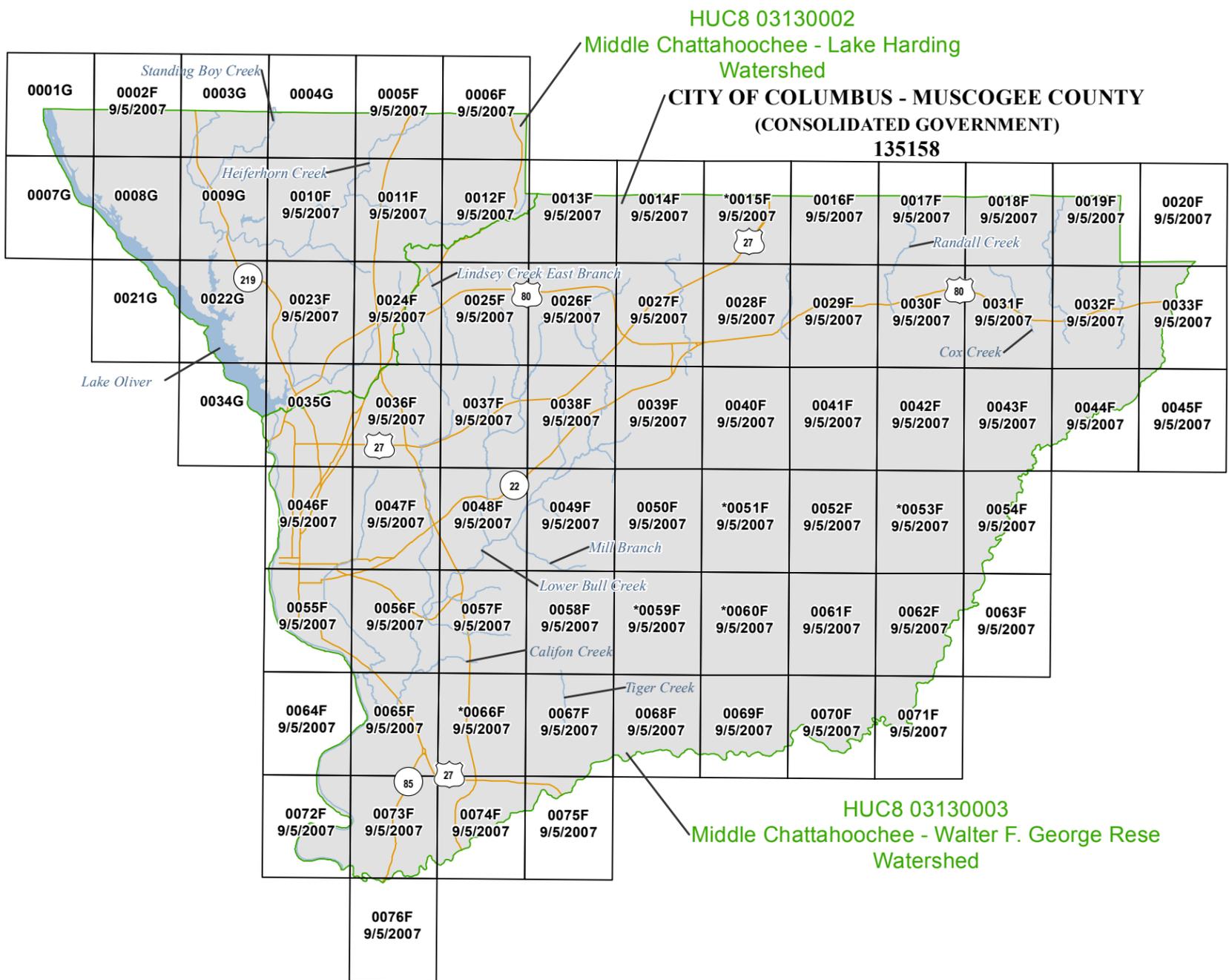
- Previous FIS Reports and FIRMs may have included levees that were accredited as reducing the risk associated with the 1% annual chance flood based on the information available and the mapping standards of the NFIP at that time. For FEMA to continue to accredit the identified levees, the levees must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

Since the status of levees is subject to change at any time, the user should contact the appropriate agency for the latest information regarding levees presented in Table 9 of this

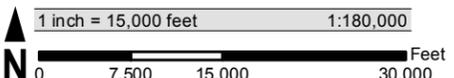
FIS Report. For levees owned or operated by the U.S. Army Corps of Engineers (USACE), information may be obtained from the USACE national levee database. For all other levees, the user is encouraged to contact the appropriate local community.

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

Figure 1: FIRM Panel Index



**ATTENTION:** The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before MONTH DAY, YEAR



Map Projection:  
Georgia State Plane Zone 1002;  
North American Datum 1983

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

\*PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS



**NATIONAL FLOOD INSURANCE PROGRAM**  
FLOOD INSURANCE RATE MAP PANEL INDEX

**CITY OF COLUMBUS - MUSCOGEE COUNTY, GEORGIA** (CONSOLIDATED GOVERNMENT)

PANELS PRINTED:

- 0001, 0003, 0004, 0005, 0006, 0007, 0008, 0009, 0010, 0011, 0012, 0013, 0014, 0016, 0017, 0018, 0019, 0020, 0021, 0022, 0023, 0024, 0025, 0026, 0027, 0028, 0029, 0030, 0031, 0032, 0033, 0034, 0035, 0036, 0037, 0038, 0039, 0040, 0041, 0042, 0043, 0044, 0045, 0046, 0047, 0048, 0049, 0050, 0052, 0054, 0055, 0056, 0057, 0058, 0061, 0062, 0063, 0064, 0065, 0067, 0068, 0069, 0070, 0071, 0072, 0073, 0074, 0075, 0076



**FEMA**

MAP NUMBER  
135185IND08  
MAP REVISED

**Figure 2: FIRM Notes to Users**

## **NOTES TO USERS**

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 28 in this FIS Report.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

PRELIMINARY FIS REPORT: FEMA maintains information about map features, such as street locations and names, in or near designated flood hazard areas. Requests to revise information in or near designated flood hazard areas may be provided to FEMA during the community review period, at the final Consultation Coordination Officer's meeting, or during the statutory 90-day appeal period. Approved requests for changes will be shown on the final printed FIRM.

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

BASE FLOOD ELEVATIONS: For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

FLOODWAY INFORMATION: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the FIS Report for this jurisdiction.

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 4.3 "Non-Levee Flood Protection Measures" of this FIS Report for information on flood control structures for this jurisdiction.

## Figure 2. FIRM Notes to Users

**PROJECTION INFORMATION:** The projection used in the preparation of the map was Georgia State Plane Zone 1002. The horizontal datum was North American Datum 1983, GRS 1980 Spheroid . Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

**ELEVATION DATUM:** Flood elevations on the FIRM are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

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

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 31 of this FIS Report.

**BASE MAP INFORMATION:** Base map information shown on this FIRM was provided in digital format by the City of Columbus – Muscogee County Consolidated Government and the Georgia Department of Transportation. Ortho imagery was originally produced by Photo Science in 2013 and has a 3 inch ground resolution. Supplementary imagery was produced by National Agriculture Imagery Program (NAIP) in 2013 and has a 1-meter ground resolution. For information about base maps, refer to Section 6.2 “Base Map” in this FIS Report.

The map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map.

Corporate limits shown on the map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

**Figure 2. FIRM Notes to Users**

**NOTES FOR FIRM INDEX**

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within City of Columbus – Muscogee County, GA, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Table 28 of this FIS Report to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

ATTENTION: The corporate limits shown are based on the best information available at the time of publication of this FIRM Index. As such, they may be more current than those shown on FIRM panels issued before September 5, 2007.

**SPECIAL NOTES FOR SPECIFIC FIRM PANELS**

This Notes to Users section was created specifically for City of Columbus – Muscogee County, GA, effective TBD.

FLOOD RISK REPORT: A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in this FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identify the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigation opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

**Figure 3: Map Legend for FIRM**

**SPECIAL FLOOD HAZARD AREAS:** *The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. 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. See note for specific types. If the floodway is too narrow to be shown, a note is shown.*



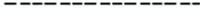
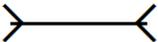
Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE)

- Zone A The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.
- Zone AE The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone, either at cross section locations or as static whole-foot elevations that apply throughout the zone.
- Zone AH 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 BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.
- Zone AO 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 hydraulic analyses are shown within this zone.
- Zone AR 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.
- Zone A99 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 flood depths are shown within this zone.
- Zone V The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.
- 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. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.

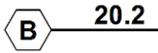
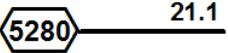
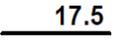
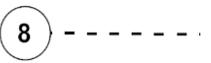


Regulatory Floodway determined in Zone AE.

**Figure 3: Map Legend for FIRM**

<b>OTHER AREAS OF FLOOD HAZARD</b>	
	Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.
	Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.
	Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood. See Notes to Users for important information.
<b>OTHER AREAS</b>	
	Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible
	Unshaded Zone X: Areas determined to be outside the 0.2% annual chance flood hazard
<b>FLOOD HAZARD AND OTHER BOUNDARY LINES</b>	
 (ortho) (vector)	Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)
	Limit of Study
	Jurisdiction Boundary
	Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet
<b>GENERAL STRUCTURES</b>	
 <i>Aqueduct Channel Culvert Storm Sewer</i>	Channel, Culvert, Aqueduct, or Storm Sewer
 <i>Dam Jetty Weir</i>	Dam, Jetty, Weir
	Levee, Dike, or Floodwall accredited or provisionally accredited to reduce the flood risk from the 1% annual chance flood.
	Levee, Dike or Floodwall not accredited to reduce the flood risk from the 1% annual chance flood.
 <i>Bridge</i>	Bridge

**Figure 3: Map Legend for FIRM**

<p><b>COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA):</b> <i>CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas. See Notes to Users for important information.</i></p>	
 <b>CBRS AREA</b> 09/30/2009	Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.
 <b>OTHERWISE PROTECTED AREA</b> 09/30/2009	Otherwise Protected Area
<p><b>REFERENCE MARKERS</b></p>	
	River mile Markers
<p><b>CROSS SECTION &amp; TRANSECT INFORMATION</b></p>	
	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
	Coastal Transect
  	<p>Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.</p> <p>Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.</p>
	Base Flood Elevation Line (shown for flooding sources for which no cross sections or profile are available)
<p><b>ZONE AE</b> (EL 16)</p>	Static Base Flood Elevation value (shown under zone label)
<p><b>ZONE AO</b> (DEPTH 2)</p>	Zone designation with Depth
<p><b>ZONE AO</b> (DEPTH 2) (VEL 15 FPS)</p>	Zone designation with Depth and Velocity

**Figure 3: Map Legend for FIRM**

<b>BASE MAP FEATURES</b>	
<u>Missouri Creek</u>	River, Stream or Other Hydrographic Feature
	Interstate Highway
	U.S. Highway
	State Highway
	County Highway
<u>MAPLE LANE</u>	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
	Railroad
	Horizontal Reference Grid Line
	Horizontal Reference Grid Ticks
	Secondary Grid Crosshairs
Land Grant	Name of Land Grant
7	Section Number
R. 43 W. T. 22 N.	Range, Township Number
<b>4276<sup>000m</sup>E</b>	Horizontal Reference Grid Coordinates (UTM)
<b>365000 FT</b>	Horizontal Reference Grid Coordinates (State Plane)
<b>80° 16' 52.5"</b>	Corner Coordinates (Latitude, Longitude)

## **SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS**

### **2.1 Floodplain Boundaries**

To provide a national standard without regional discrimination, the 1% annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2% annual chance (500-year) flood is employed to indicate additional areas of flood hazard in the community.

Each flooding source included in the project scope has been studied and mapped using professional engineering and mapping methodologies that were agreed upon by FEMA and City of Columbus – Muscogee County as appropriate to the risk level. Flood risk is evaluated based on factors such as known flood hazards and projected impact on the built environment. Engineering analyses were performed for each studied flooding source to calculate its 1% annual chance flood elevations; elevations corresponding to other floods (e.g. 10-, 4-, 2-, 0.2-percent annual chance, etc.) may have also been computed for certain flooding sources. Engineering models and methods are described in detail in Section 5.0 of this FIS Report. The modeled elevations at cross sections were used to delineate the floodplain boundaries on the FIRM; between cross sections, the boundaries were interpolated using elevation data from various sources. More information on specific mapping methods is provided in Section 6.0 of this FIS Report.

Depending on the accuracy of available topographic data (Table 23), study methodologies employed (Section 5.0), and flood risk, certain flooding sources may be mapped to show both the 1% and 0.2% annual chance floodplain boundaries, regulatory water surface elevations (BFEs), and/or a regulatory floodway. Similarly, other flooding sources may be mapped to show only the 1% annual chance floodplain boundary on the FIRM, without published water surface elevations. In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundary is shown on the FIRM. Figure 3, “Map Legend for FIRM”, describes the flood zones that are used on the FIRMs to account for the varying levels of flood risk that exist along flooding sources within the project area. Table 2 and Table 3 indicate the flood zone designations for each flooding source and each community within City of Columbus – Muscogee County, GA respectively.

Table 2, “Flooding Sources Included in this FIS Report,” lists each flooding source, including its study limits, affected communities, mapped zone on the FIRM, and the completion date of its engineering analysis from which the flood elevations on the FIRM and in the FIS Report were derived. Descriptions and dates for the latest hydrologic and hydraulic analyses of the flooding sources are shown in Table 13. Floodplain boundaries for these flooding sources are shown on the FIRM (published separately) using the symbology described in Figure 3. On the map, the 1% annual chance floodplain corresponds to the SFHAs. The 0.2% annual chance floodplain shows areas that, although out of the regulatory floodplain, are still subject to flood hazards.

Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data. The procedures to remove these areas from the SFHA are described in Section 6.5 of this FIS Report.

### **2.2 Floodways**

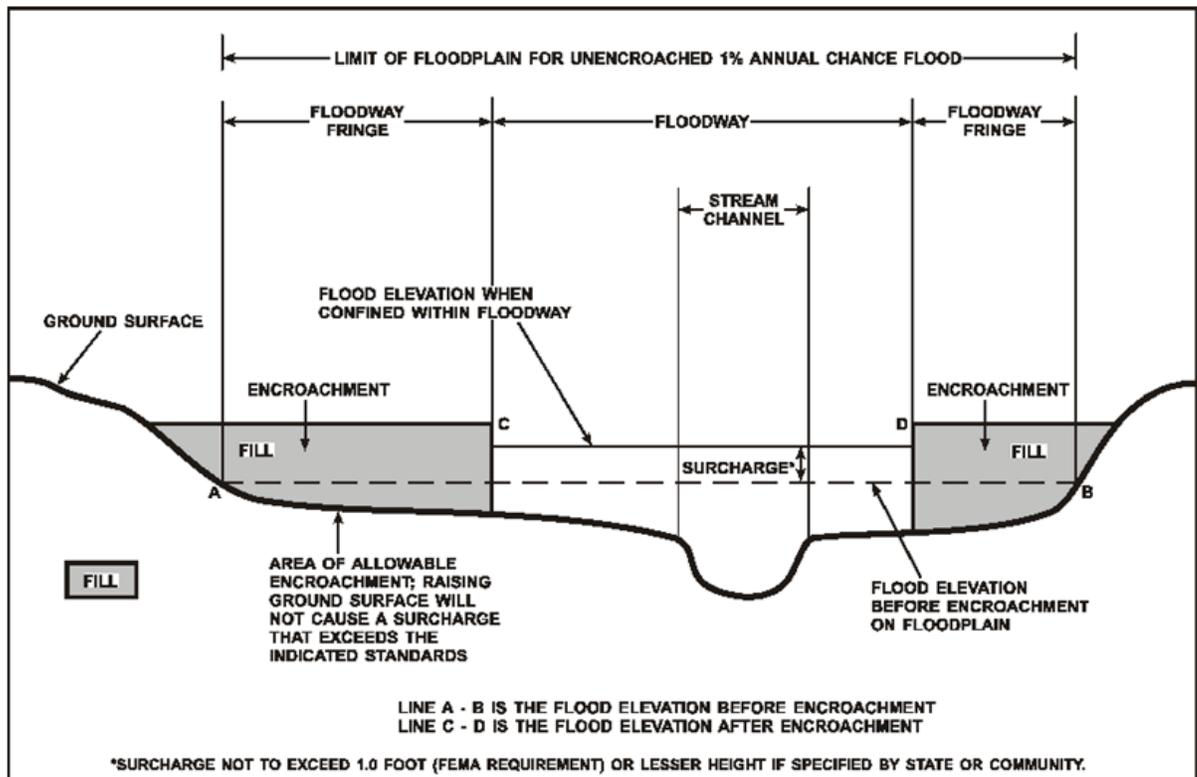
Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the

encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard.

For purposes of the NFIP, a floodway is used as a tool to assist local communities in balancing floodplain development against increasing flood hazard. With this approach, the area of the 1% annual chance floodplain on a river is divided into a floodway and a floodway fringe based on hydraulic modeling. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order to carry the 1% annual chance flood. The floodway fringe is the area between the floodway and the 1% annual chance floodplain boundaries where encroachment is permitted. The floodway must be wide enough so that the floodway fringe could be completely obstructed without increasing the water surface elevation of the 1% annual chance flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. Regulations for Georgia require communities in City of Columbus – Muscogee County to limit increases caused by encroachment to 1.0 foot and several communities have adopted additional restrictions. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

**Figure 4: Floodway Schematic**



Floodway widths presented in this FIS Report and on the FIRM were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. For certain stream segments, floodways were adjusted so that the amount of floodwaters conveyed on each side of the floodplain would be reduced equally. The results of the floodway computations have been tabulated for selected cross sections and are shown in Table 24, "Floodway Data."

**Table 2: Flooding Sources Included in this FIS Report**

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi <sup>2</sup> ) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
All Zone A Streams in HUC-8 03130002	City of Columbus – Muscogee County	Various	Various	03130002	9.95		N	A	N/A
All Zone A Streams in HUC-8 03130003	City of Columbus – Muscogee County	Various	Various	03130003	73.20		N	A	N/A
Biggers Lake	City of Columbus – Muscogee County	At Creekrise Drive	Approximately 1,750 feet Creekrise Drive	03130002		0.04	N	AE	2011
Califon Creek	City of Columbus – Muscogee County	Confluence with Lower Bull Creek	At Farr Road	03130003	1.60		Y	AE	1993
Chattahoochee River in HUC-8 03130002	City of Columbus – Muscogee County	Approximately 2,070 feet upstream of U.S. Highway 80	Harris County boundary	03130002	8.42		Y	AE	2014
Chattahoochee River in HUC-8 03130003	City of Columbus – Muscogee County	Chattahoochee County boundary	Approximately 2,070 feet upstream of U.S. Highway 80	03130003	13.30		Y	AE	1979
Cooper Branch	City of Columbus – Muscogee County	Confluence with Cooper Creek	Approximately 2,450 feet upstream of Randall Drive	03130003	2.21		Y	AE	1979
Cooper Creek	City of Columbus – Muscogee County	Confluence with Lower Bull Creek	Approximately 3,100 feet upstream of Warm Spring Road	03130003	6.00		Y	AE	1979
Cooper Creek Tributary	City of Columbus – Muscogee County	Confluence with Cooper Creek	Approximately 1,570 feet upstream of Miller Road	03130003	1.29		N	AE	2005

**Table 2: Flooding Sources Included in this FIS Report continued**

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi <sup>2</sup> ) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Cox Creek	City of Columbus – Muscogee County	Approximately 2,300 feet downstream of Upatoi Lane	Approximately 180 feet downstream of Jenkins Road	03130003	1.90		Y	AE	1993
Dozier Creek	City of Columbus – Muscogee County	At Chattsworth Road	Approximately 2,500 feet upstream of Garrett Lake Drive	03130003	1.77		Y	AE	1993
Dram Branch	City of Columbus – Muscogee County	Confluence with Lower Bull Creek	Approximately 200 feet upstream of Wright Drive	03130003	1.27		Y	AE	1979
Flatrock Creek	City of Columbus – Muscogee County	Confluence with Lower Bull Creek	At Pierce Chapel Road	03130003	5.10		Y	AE	1979
Flatrock Creek Tributary No.1	City of Columbus – Muscogee County	Confluence with Flatrock Creek	At Big Oak Drive	03130003	0.91		Y	AE	1993
Heiferhorn Creek	City of Columbus – Muscogee County	Confluence with Standing Boy Creek	Harris County boundary	03130002	7.73		Y	AE	1993
Heiferhorn Creek Tributary No.1	City of Columbus – Muscogee County	Confluence with Heiferhorn Creek	Approximately 100 feet downstream of I-85	03130002	1.60		Y	AE	1993
Heiferhorn Creek Tributary No. 2	City of Columbus – Muscogee County	Confluence with Heiferhorn Creek	Harris County boundary	03130002	4.60		Y	AE	1993
Kendall Creek	City of Columbus – Muscogee County	At Norfolk Southern Railway	Harris County boundary	03130003	4.06		Y	AE	1993
Lindsey Branch	City of Columbus – Muscogee County	Confluence with Lindsey Creek	Approximately 800 feet upstream of Flood Control Dam No. 27	03130003	0.30		Y	AE	1979
Lindsey Creek	City of Columbus – Muscogee County	Confluence with Lower Bull Creek	Approximately 1,830 feet upstream of Vultee Drive	03130003	6.82		Y	AE	1979

**Table 2: Flooding Sources Included in this FIS Report continued**

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi <sup>2</sup> ) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Lindsey Creek East Branch	City of Columbus – Muscogee County	Approximately 2,000 feet upstream of the confluence with Lindsey Creek	Approximately 800 feet upstream U.S. Highway 27/ Veterans Parkway	03130002	2.70		N	A	2005
Lindsey Creek Tributary	City of Columbus – Muscogee County	Confluence with Lindsey Creek	Approximately 650 feet upstream of Whittlesey Boulevard	03130003	1.35		N	AE	2005
Lower Bull Creek	City of Columbus – Muscogee County	Confluence with Chattahoochee River	At Schatulga Road	03130003	10.70		Y	AE	1979
Lower Bull Creek Tributary No. 1	City of Columbus – Muscogee County	Confluence with Lower Bull Creek	Approximately 3,750 feet upstream of Forrest Road	03130003	1.83		Y	AE	1993
Lower Bull Creek Tributary No. 2	City of Columbus – Muscogee County	Confluence with Lower Bull Creek	Approximately 2,000 feet upstream of Mutec Drive	03130003	0.96		N	AE	2005
Lower Bull Creek Tributary No. 3	City of Columbus – Muscogee County	Confluence with Lower Bull Creek	At Woodruff Farm Road	03130003	1.82		Y	AE	1993
Mill Branch	City of Columbus – Muscogee County	Confluence with Lower Bull Creek	Approximately 1,100 feet upstream of Valencia Drive	03130003	1.92		Y	AE	1979
Randall Creek	City of Columbus – Muscogee County	At Chattsworth Road	Harris County boundary	03130003	3.04		Y	AE	1993
Roaring Branch	City of Columbus – Muscogee County	At River Road	Approximately 120 feet upstream of Hobbs Road	03130002	4.22		Y	AE	1993
Roaring Branch Tributary No. 1	City of Columbus – Muscogee County	Confluence with Roaring Branch	Approximately 2,000 feet upstream stream of Ranch Forest Drive	03130002	2.10		Y	AE	1993

**Table 2: Flooding Sources Included in this FIS Report continued**

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi <sup>2</sup> ) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Standing Boy Creek	City of Columbus – Muscogee County	Approximately 1,600 feet downstream of confluence of Heiferhorn Creek	Harris County boundary	03130002	4.84		Y	AE	1993
Standing Boy Creek Tributary No. 1	City of Columbus – Muscogee County	Confluence with Standing Boy Creek	Harris County boundary	03130002	2.27		Y	AE	1993
St. Marys Branch	City of Columbus – Muscogee County	Confluence with Lower Bull Creek	At Mays Avenue	03130003	2.00		Y	AE	1979
Tar River	City of Columbus – Muscogee County	At Norfolk Southern Railway	Talbot County boundary	03130003	2.22		Y	AE	1993
Tiger Creek	City of Columbus – Muscogee County	Approximately 2,545 feet downstream of St. Marys Road	Approximately 3,435 feet upstream of St. Marys Road	03130003	1.14		Y	AE	1993
Upper Bull Creek	City of Columbus – Muscogee County	Approximately 2,000 feet downstream of U.S. Highway 27/State Highway 85	At Warm Springs Road	03130003	2.26		Y	AE	1993
Upper Bull Creek	City of Columbus – Muscogee County	Approximately 185 feet downstream of Chattsworth Road	Approximately 2,000 feet downstream of U.S. Highway 27/State Route 85	03130003	1.10		Y	AE	1979
Weracoba Creek	City of Columbus – Muscogee County	Confluence with Lower Bull Creek	At Warm Springs Road	03130003	5.80		Y	AE, AH, AO	1993

All floodways that were developed for this FIS project are shown on the FIRM using the symbology described in Figure 3. In cases where the floodway and 1% annual chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown on the FIRM. For information about the delineation of floodways on the FIRM, refer to Section 6.3.

## **2.3 Base Flood Elevations**

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The Base Flood Elevation (BFE) is the elevation of the 1% annual chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM.

Cross sections with BFEs shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. BFEs are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM.

## **2.4 Non-Encroachment Zones**

Some States and communities use non-encroachment zones to manage floodplain development. While not a FEMA designated floodway, the non-encroachment zone represents that area around the stream that should be reserved to convey the 1% annual chance flood event.

Regulations for Georgia require communities in City of Columbus – Muscogee County (Consolidated Government) to limit increases caused by encroachment to 1.0 foot and several communities have adopted additional restrictions for non-encroachment areas.

Non-encroachment determinations may be delineated where it is not possible to delineate floodways because specific channel profiles with bridge and culvert geometry were not developed. Any non-encroachment determinations for this FIS project have been tabulated for selected cross sections and are shown in Table 25, “Flood Hazard and Non-Encroachment Data for Selected Streams.”

## **2.5 Coastal Flood Hazard Areas**

This section is not applicable to this FIS project.

### **2.5.1 Water Elevations and the Effects of Waves**

This section is not applicable to this FIS project.

### **Figure 5: Wave Runup Transect Schematic**

[Not Applicable to this FIS project]

### 2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

This section is not applicable to this FIS project.

### 2.5.3 Coastal High Hazard Areas

This section is not applicable to this FIS project.

### Figure 6: Coastal Transect Schematic

[Not Applicable to this FIS project]

### 2.5.4 Limit of Moderate Wave Action

This section is not applicable to this FIS project.

## SECTION 3.0 – INSURANCE APPLICATIONS

### 3.1 National Flood Insurance Program Insurance Zones

For flood insurance applications, the FIRM designates flood insurance rate zones as described in Figure 3, “Map Legend for FIRM.” Flood insurance zone designations are assigned to flooding sources based on the results of the hydraulic or coastal analyses. Insurance agents use the zones shown on the FIRM and depths and base flood elevations in this FIS Report in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

The 1% annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (e.g. Zones A, AE, V, VE, etc.), and the 0.2% annual chance floodplain boundary corresponds to the boundary of areas of additional flood hazards.

Table 3 lists the flood insurance zones in the unincorporated and incorporated areas of City of Columbus – Muscogee County (Consolidated Government).

**Table 3: Flood Zone Designations by Community**

Community	Flood Zone(s)
City of Columbus – Muscogee County	A, AE, AH, AO, X

### 3.2 Coastal Barrier Resources System

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

**Table 4: Coastal Barrier Resources System Information**

[Not Applicable to this FIS project]

**SECTION 4.0 – AREA STUDIED**

**4.1 Basin Description**

Table 5 contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its drainage area.

**Table 5: Basin Characteristics**

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
Middle Chattahoochee – Lake Harding Watershed	03130002	Chattahoochee River	Encompasses the northwestern portion of the county	3,060
Middle Chattahoochee – Walter F. George Rese Watershed	03130003	Chattahoochee River	Largest watershed within the county, encompassing the southeastern portion of the county	2,880

**4.2 Principal Flood Problems**

Table 6 contains a description of the principal flood problems that have been noted for City of Columbus – Muscogee County (Consolidated Government) by flooding source.

**Table 6: Principal Flood Problems**

Flooding Source	Description of Flood Problems
All sources	Limited flood records are available. In 1976, the USGS was contracted to install and maintain four gages, but due to the short duration of gauging and flood control projects, the gage readings and historical high water marks have only limited value.
	Significant floods of record occurred in May 1957, March 1966, and August 1977. The 1966 flood had a 10% annual-chance exceedance probability and crested at 236.0 feet NAVD88 at Cusseta Road on Weracoba Creek causing flooding of low-lying pavements and lawns. Substantial damage has occurred due to intense local rainstorms. The August 3, 1977 storm caused rapid flooding of short duration and in some locations was estimated to approximate a 4% annual-chance-flood according to a report prepared by the City of Columbus- Muscogee Department of Engineering, titled, "Report on Windsor Park Area Flood of August 3, 1977."

**Table 6: Principal Flood Problems continued**

Flooding Source	Description of Flood Problems
Chattahoochee River	A flood of the Chattahoochee River reached an elevation of 238.2 feet NAVD88 in March 1929. Since that time, the maximum recorded elevation was 232.8 feet NAVD88 during February 1961. The 1929 flood was estimated to correspond to a 0.77% annual-chance-flood (130-year recurrence interval). Since that time there have been substantial changes to the Chattahoochee River due to channelization, and the construction of private dams at West Point Dam and the Walter F. George Dam. As a result of these improvements, the 1% annual-chance-flood elevation is estimated as 226.9 feet NAVD88 and the 0.2% annual-chance-flood elevation is estimated as 232.9 feet NAVD88.

Table 7 contains information about historic flood elevations in the communities within City of Columbus – Muscogee County (Consolidated Government).

**Table 7: Historic Flooding Elevations**

Flooding Source	Location	Historic Peak (Feet NAVD88)	Event Date	Approximate Recurrence Interval (years)	Source of Data
Chattahoochee River	N/A	238.2	March 1929	130	USGS
Chattahoochee River	N/A	232.8	February 1961	N/A	USGS
Weracoba Creek	At Cusseta Road	236.0	June 1967	N/A	Survey Report, 1968

### 4.3 Non-Levee Flood Protection Measures

Table 8 contains information about non-levee flood protection measures within City of Columbus – Muscogee County (Consolidated Government) such as dams, jetties, and or dikes. Levees are addressed in Section 4.4 of this FIS Report.

**Table 8: Non-Levee Flood Protection Measures**

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
All Sources	Land Treatment	Land Treatment	City of Columbus – Muscogee County	In December 1959, the Pine Mountain Soil and Water Conservation District, Muscogee County, and the City of Columbus requested assistance with flood problems Under Public Law 566, the Watershed Protection and Flood Prevention Act. As a result of this application, a work plan was developed by the SCS and the U.S. Department of Agriculture. The last contract for work under this plan was awarded in November 1973. Land treatment measures consisted of planting perennial grasses, legumes, and trees on critical runoff and sediment producing areas. Channel improvement included over 41,000 linear feet of channel enlargement and lining, and over 21,000 feet of channel clearing and snagging.
Chattahoochee River	West Point Dam and Walter F. George Dam	Dam	City of Columbus – Muscogee County	In 1974, the USACE completed construction of West Point Dam on the Chattahoochee River as another measure of flood control. Although the effects are relatively small compared to those of the Buford Dam, notable downstream reductions in peak flood discharges have been observed since its construction.
Cooper Creek, Lindsey Creek, Flatrock Creek, Bull Creek, and unnamed tributaries	Earth Fill Dams	Bull Creek Watershed Project	Bull Creek Watershed	Eleven flood retarding structures were installed as part of the Bull Creek Watershed Project. Three of these structures regulate Cooper Creek, three regulate Lindsey Creek, two are on Flatrock Creek, one is on Bull Creek, and two are on unnamed tributaries. The watershed area tributary to the floodwater retarding structures is 35.98 square miles, which is 51% of the area of Bull Creek and its tributaries. The design detention capacity of the structures was 11,331 acre-feet. All of the structures have Class "C" damage ratings due to the proximity of urban areas. All of the structures are earth fill dams with vegetated earth emergency spillways and 36-inch minimum size conduit principal spillways.

**4.4 Levees**

This section is not applicable to this FIS project.

**Table 9: Levees**

[Not Applicable to this FIS project]

## SECTION 5.0 – ENGINEERING METHODS

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2% annual chance, respectively, of being equaled or exceeded during any year.

Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

The engineering analyses described here incorporate the results of previously issued Letters of Map Change (LOMCs) listed in Table 27, “Incorporated Letters of Map Change”, which include Letters of Map Revision (LOMRs). For more information about LOMRs, refer to Section 6.5, “FIRM Revisions.”

### 5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for each stream is provided in Table 13. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 10. Frequency Discharge-Drainage Area Curves used to develop the hydrologic models may also be shown in Figure 7 for selected flooding sources. A summary of stillwater elevations developed for non-coastal flooding sources is provided in Table 11. (Coastal stillwater elevations are discussed in Section 5.3 and shown in Table 17.) Stream gage information is provided in Table 12.

**Table 10: Summary of Discharges**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Biggers Lake	Outflow from Biggers Lake at approximately 250 feet east of intersection of Heiferhorn Creek and State Route 103/River Road	1.3	523	*	615	669	1,438
Biggers Lake	Inflow to Biggers Lake at approximately 1,500 feet east and 1,150 feet north of the intersection of Heiferhorn Creek and State Route 103/River Road	1.3	1,057	*	1,534	1,853	2,737
Califon Creek	At the confluence with Lower Bull Creek	1.19	422	*	668	791	1,175
Califon Creek	Just upstream of Norfolk Southern Railway	0.56	222	*	490	642	1,125
Chattahoochee River in HUC-8 03130003	Approximately 2,100 feet downstream of confluence of Lower Bull Creek	4,744	86,900	*	134,200	158,000	217,100
Chattahoochee River in HUC-8 03130002	At Norfolk Southern Railway	4,670	91,300	113,400	130,000	146,500	185,400

\* Not calculated for this FIS project

**Table 10: Summary of Discharges continued**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Chattahoochee River in HUC-8 03130002	Approximately 12,170 feet upstream of Oliver Dam	4,600	88,568	110,102	126,335	142,530	180,938
Chattahoochee River in HUC-8 03130002	Approximately 17,110 feet upstream of Oliver Dam	4,550	86,616	107,746	123,717	139,694	177,750
Cooper Branch	Just upstream of confluence with Cooper Creek	3.69	926	*	1,340	1,536	2,192
Cooper Creek	Just upstream of confluence with Lower Bull Creek	10.01	1,810	*	2,661	3,079	4,540
Cooper Creek	At State Highway 22/Macon Road	9.36	1,541	*	2,283	2,646	3,912
Cooper Creek	Just upstream of confluence of Cooper Branch	2.20	674	*	976	1,115	1,613
Cox Creek	Just upstream of Norfolk Southern Railway	3.54	623	*	990	1,164	1,725
Dozier Creek	At Chattsworth Road	3.37	463	*	726	856	1,495
Dram Branch	Just upstream of confluence with Lower Bull Creek	1.49	899	*	1,366	1,600	2,436

\* Not calculated for this FIS project

**Table 10: Summary of Discharges continued**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Flatrock Creek	Just upstream of confluence with Lower Bull Creek	9.31	839	*	1,144	1,286	1,797
Flatrock Creek	At Alternate U.S. Highway 27/State Highway 85	7.91	2,010	*	2,984	3,466	5,321
Flatrock Creek	At Warm Springs Road	6.49	1,715	*	2,491	2,882	4,277
Flatrock Creek Tributary No. 1	At confluence with Flatrock Creek	0.41	263	*	433	518	783
Heiferhorn Creek	Just upstream of confluence with Standing Boy Creek	23.18	2,850	*	4,501	5,172	7,190
Heiferhorn Creek	Just upstream of confluence of Heiferhorn Creek Tributary No. 1	18.58	2,501	*	3,959	4,559	6,550
Heiferhorn Creek	Just upstream of confluence of Heiferhorn Creek Tributary No. 2	11.99	1,931	*	3,070	3,551	4,950
Heiferhorn Creek Tributary No. 1	Just upstream of confluence with Heiferhorn Creek	1.49	565	*	918	1,084	1,490
Heiferhorn Creek Tributary No. 2	Just upstream of confluence with Heiferhorn Creek	4.57	1,093	*	1,755	2,049	2,915

\* Not calculated for this FIS project

**Table 10: Summary of Discharges continued**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Heiferhorn Creek Tributary No. 2	Just upstream of Norfolk Southern Railway	2.91	838	*	1,352	1,586	2,330
Kendall Creek	Just upstream of Norfolk Southern Railway	17.66	2,158	*	3,410	3,935	5,490
Kendall Creek	Just upstream of confluence of Boyd Branch	6.15	1,302	*	2,085	2,427	3,500
Lindsey Branch	Just upstream of confluence with Lindsey Creek	1.60	1,545	*	2,156	2,453	3,484
Lindsey Creek	Just upstream of confluence with Lower Bull Creek	9.30	3,195	*	4,499	5,136	7,359
Lindsey Creek	At State Highway 22/Macon Road	8.84	3,150	*	4,435	5,062	7,246
Lindsey Creek	At State Highway 85/Manchester Expressway	6.61	1,885	*	2,680	3,072	4,455
Lindsey Creek	Just upstream of Muscogee County Airport Runway	3.97	*	*	*	1,453	*
Lower Bull Creek	Just upstream of the confluence with Chattahoochee River	78.21	16,673	*	22,686	25,678	36,271

\* Not calculated for this FIS project

**Table 10: Summary of Discharges continued**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Lower Bull Creek	Just upstream of confluence of Weracoba Creek	70.60	12,478	*	18,265	21,144	31,347
Lower Bull Creek	Just upstream of confluence of Lindsey Creek	54.85	8,847	*	13,092	15,247	22,871
Lower Bull Creek	Just upstream of confluence of Dram Branch	53.14	8,433	*	12,524	14,556	21,749
Lower Bull Creek	Just upstream of confluence of Cooper Creek	41.32	6,423	*	9,529	11,097	16,735
Lower Bull Creek	Just upstream of confluence of Mill Branch	38.65	5,339	*	7,948	9,256	13,922
Lower Bull Creek	Just upstream of confluence of Flatrock Creek	23.84	3,149	*	4,555	5,259	7,762
Lower Bull Creek Tributary No. 1	Just upstream of confluence with Lower Bull Creek	1.58	457	*	732	873	1,320
Lower Bull Creek Tributary No. 1	Just upstream of Forest Road	1.12	351	*	565	671	995
Lower Bull Creek Tributary No. 3	Just upstream of confluence with Lower Bull Creek	1.47	362	*	594	713	1,090

\* Not calculated for this FIS project

**Table 10: Summary of Discharges continued**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Lower Bull Creek Tributary No. 3	Approximately 2,425 feet upstream of State Highway 22/Macon Road	0.95	297	*	483	574	880
Mill Branch	Just upstream of confluence with Lower Bull Creek	2.45	1,184	*	1,746	2,025	3,017
Randall Creek	Approximately 200 feet downstream of Chattsworth Road	18.51	2,495	*	3,950	4,549	6,300
Randall Creek	Approximately 3,500 feet upstream of U.S. Highway 80/State Highway 22/Macon Road	9.44	1,977	*	2,673	3,099	4,800
Roaring Branch	Just upstream of River Road/State Highway 103	5.99	2,016	*	3,187	3,721	5,330
Roaring Branch	Just upstream of Whitesville Road	2.00	852	*	1,365	1,597	2,300
Roaring Branch	Just upstream of Interstate Highway 185/State Highway 411	0.84	664	*	1,016	1,169	1,560
Roaring Branch	Just upstream of Double Churches Road	0.29	328	*	501	574	790

\* Not calculated for this FIS project

**Table 10: Summary of Discharges continued**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Roaring Branch Tributary No. 1	Just upstream of confluence with Roaring Branch	1.86	648	*	1,070	1,264	1,815
Roaring Branch Tributary No. 1	Just upstream of Mobley Road	1.13	481	*	790	930	1,365
Standing Boy Creek	At confluence with Chattahoochee River	69.60	5,451	*	8,516	9,678	12,750
Standing Boy Creek	Just upstream of confluence of Heiferhorn Creek	46.36	4,289	*	6,728	7,677	10,250
Standing Boy Creek	Just upstream of confluence of Standing Boy Tributary No. 1	31.81	3,434	*	5,407	6,193	9,350
Standing Boy Creek Tributary No. 1	At confluence with Standing Boy Creek	13.40	2,062	*	3,275	3,784	5,200
Standing Boy Creek Tributary No. 1	At the county boundary	9.15	1,646	*	2,625	3,044	4,300
St. Marys Branch	Just upstream of confluence with Lower Bull Creek	1.34	1,011	*	1,457	1,675	2,442
Tar River	Just upstream of Norfolk Southern Railway	3.86	401	*	622	735	1,080

\* Not calculated for this FIS project

**Table 10: Summary of Discharges continued**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Tar River	Just upstream of U.S. Highway 80/State Highway 22/Macon Road	3.03	378	*	590	698	1,020
Tiger Creek	Just upstream of St. Marys Road	3.50	678	*	1,117	1,348	2,075
Upper Bull Creek	At State Highway 22/Macon Road	14.54	1,724	*	2,534	2,938	4,375
Upper Bull Creek	At Warm Springs Road	10.31	1,767	*	2,813	3,259	4,600
Weracoba Creek	Just upstream of confluence with Lower Bull Creek	7.54	7,634	*	9,213	9,978	12,629
Weracoba Creek	Just upstream of Wynnton Road	3.17	3,632	*	4,931	5,557	7,718
Weracoba Creek	Just upstream of Garrard Street	2.11	2,937	*	3,995	4,517	6,322

\* Not calculated for this FIS project

**Figure 7: Frequency Discharge-Drainage Area Curves**

[Not Applicable to this FIS project]

**Table 11: Summary of Non-Coastal Stillwater Elevations**

Flooding Source	Location	Elevations (feet NAVD88)				
		10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Biggers Lake	Approximately 650 feet east and 750 feet north of the intersection of Hiferhorn Creek and State Route 103/River Road	344.0	*	345.6	346.7	348.8

\* Not calculated for this FIS project

**Table 12: Stream Gage Information used to Determine Discharges**

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
Chattahoochee River	02339500	USGS	Chattahoochee River at West Point, GA	3,550	1886	2011

## 5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole-foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. The hydraulic analyses for this FIS 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.

For streams for which hydraulic analyses were based on cross sections, locations of selected cross sections are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 6.3), selected cross sections are also listed on Table 24, "Floodway Data."

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 13. Roughness coefficients are provided in Table 14. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

**Table 13: Summary of Hydrologic and Hydraulic Analyses**

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
All Zone A Streams in HUC-8 03130002	Various	Various	N/A	N/A	N/A	A	Digital Conversion streams, not model backed.
All Zone A Streams in HUC-8 03130003	Various	Various	N/A	N/A	N/A	A	Digital Conversion streams, not model backed.
Biggers Lake	At Creekrise Drive	Approximately 1,750 feet upstream of Creekrise Drive	Other	Other	05/31/2011	AE	Entire study completed in LOMR Case No. 11-04-4624P (05/31/2011).
Califon Creek	Confluence with Lower Bull Creek	At Farr Road	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Chattahoochee River in HUC-8 03130002	Approximately 2,070 feet upstream of U.S. Highway 80	Harris County boundary	Gage Analysis	HEC-RAS 4.1.0	06/01/2014	AE w/ floodway	
Chattahoochee River in HUC-8 03130003	Chattahoochee County boundary	Approximately 2,070 feet upstream of U.S. Highway 80	Other	HEC-2	04/01/1979	AE w/ floodway	The hydrologic analysis was completed as part of the April 1979 Special Flood Hazard Information Report - Chattahoochee River.
Cooper Branch	Confluence with Cooper Creek	Approximately 2,450 feet upstream of Randall Drive	HEC-1	HEC-2	12/01/1979	AE w/ floodway	
Cooper Creek	Confluence with Lower Bull Creek	Approximately 3,100 feet upstream of Warm Spring Road	HEC-1	HEC-2	12/01/1979	AE w/ floodway	

**Table 13: Summary of Hydrologic and Hydraulic Analyses continued**

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Cooper Creek Tributary	Confluence with Cooper Creek	Approximately 1,570 feet upstream of Miller Road	N/A	N/A	06/01/2005	AE w/ floodway	Flood profiles recreated based on BFEs shown on the previous FIRM. No technical data for this stream was located.
Cox Creek	Approximately 2,300 feet downstream of Upatoi Lane	Approximately 180 feet downstream of Jenkins Road	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Dozier Creek	At Chattsworth Road	Approximately 2,500 feet upstream of Garrett Lake Drive	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Dram Branch	Confluence with Lower Bull Creek	Approximately 200 feet upstream of Wright Drive	HEC-1	HEC-2	12/01/1979	AE w/ floodway	
Flatrock Creek	Confluence with Lower Bull Creek	At Pierce Chapel Road	HEC-1	HEC-2	12/01/1979	AE w/ floodway	
Flatrock Creek Tributary No.1	Confluence with Flatrock Creek	At Big Oak Drive	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Heiferhorn Creek	Confluence with Standing Boy Creek	Harris County boundary	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Heiferhorn Creek Tributary No.1	Confluence with Heiferhorn Creek	Approximately 100 feet downstream of I-85	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Heiferhorn Creek Tributary No.2	Confluence with Heiferhorn Creek	Harris County boundary	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Kendall Creek	At Norfolk Southern Railway	Harris County boundary	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	

**Table 13: Summary of Hydrologic and Hydraulic Analyses continued**

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Lindsey Branch	Confluence with Lindsey Creek	Approximately 800 feet upstream of Flood Control Dam No.27	HEC-1	HEC-2	12/01/1979	AE w/ floodway	
Lindsey Creek	Confluence with Lower Bull Creek	Approximately 1,830 feet upstream of Vultee Drive	HEC-1	HEC-2	12/01/1979	AE	Small portion updated upstream of the Muscogee County Airport runway at Greer Avenue in LOMR Case No. 93-04-211P (08/11/1993). Resulted in a decrease of floodway by approximately 25 feet.
Lindsey Creek East Branch	Approximately 2,000 feet upstream of the confluence with Lindsey Creek	Approximately 800 feet upstream of U.S. Highway 27/ Veterans Parkway	Regression Equations	HEC-RAS 3.1.2, HEC-GeoRAS	06/01/2005	A	
Lindsey Creek Tributary	Confluence with Lindsey Creek	Approximately 650 feet upstream of Whittlesey Boulevard	N/A	N/A	06/01/2005	AE	Flood profiles recreated based on BFEs shown on the previous FIRM. No technical data for this stream was located.
Lower Bull Creek	Confluence with Chattahoochee River	At Schatulga Road	HEC-1	HEC-2	12/01/1979	AE w/ floodway	
Lower Bull Creek Tributary No. 1	Confluence with Lower Bull Creek	Approximately 3,750 feet upstream of Forrest Road	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Lower Bull Creek Tributary No. 2	Confluence with Lower Bull Creek	Approximately 2,000 feet upstream of Mutec Drive	N/A	N/A	06/01/2005	AE	Flood profiles recreated based on BFEs shown on the previous FIRM. No technical data for this stream was located.

**Table 13: Summary of Hydrologic and Hydraulic Analyses continued**

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Lower Bull Creek Tributary No.3	Confluence with Lower Bull Creek	At Woodruff Farm Road	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Mill Branch	Confluence with Lower Bull Creek	Approximately 1,100 feet upstream of Valencia Drive	HEC-1	HEC-2	12/01/1979	AE w/ floodway	
Randall Creek	At Chattsworth Road	Harris County boundary	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Roaring Branch	At River Road	Approximately 120 feet upstream of Hobbs Road	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Roaring Branch Tributary No. 1	Confluence with Roaring Branch	Approximately 2,000 feet upstream stream of Ranch Forest Drive	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Standing Boy Creek	Approximately 1,600 feet downstream of confluence of Heiferhorn Creek	Harris County boundary	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Standing Boy Creek Tributary No. 1	Confluence with Standing Boy Creek	Harris County boundary	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
St. Marys Branch	Confluence with Lower Bull Creek	At Mays Avenue	HEC-1	HEC-2	12/01/1979	AE w/ floodway	
Tar River	At Norfolk Southern Railway	Talbot County boundary	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Tiger Creek	Approximately 2,545 feet downstream of St. Marys Road	Approximately 3,435 feet upstream of St. Marys Road	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	

**Table 13: Summary of Hydrologic and Hydraulic Analyses continued**

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Upper Bull Creek	Approximately 185 feet downstream of Chattsworth Road	Approximately 2,000 feet downstream of U.S. Highway 27/ State Route 85	HEC-1	HEC-2	12/01/1979	AE	
Upper Bull Creek	Approximately 2,000 feet downstream of U.S. Highway 27/ State Highway 85	At Warm Springs Road	Regression Equations	HEC-2	05/03/1993	AE w/ floodway	
Weracoba Creek	Confluence with Lower Bull Creek	At Warm Springs Road	Regression Equations	HEC-2	05/03/1993	AE w/ floodway, AH, AO	Zone AO depth of 2 ft. Zone AH static BFE of 239 ft. Small portion of floodway was revised in LOMR Case No. 98-04-329P (11/05/1998).

**Table 14: Roughness Coefficients**

Flooding Source	Channel “n”	Overbank “n”
All Zone A Streams in HUC-8 03130002	*	*
All Zone A Streams in HUC-8 03130003	*	*
Califon Creek	0.040-0.150	0.040-0.150
Chattahoochee River in HUC-8 03130002	0.045	0.060-0.150
Chattahoochee River in HUC-8 03130003	N/A	N/A
Cooper Branch	0.020-0.080	0.030-0.100
Cooper Creek	0.020-0.080	0.030-0.100
Cooper Creek Tributary	N/A	N/A
Cox Creek	0.040-0.150	0.040-0.150
Dozier Creek	0.040-0.150	0.040-0.150
Dram Branch	0.020-0.080	0.030-0.100
Flatrock Creek	0.020-0.080	0.030-0.100
Flatrock Creek Tributary No. 1	0.040-0.150	0.040-0.150
Heiferhorn Creek	0.040-0.150	0.040-0.150
Heiferhorn Creek Tributary No. 1	0.040-0.150	0.040-0.150
Heiferhorn Creek Tributary No. 2	0.040-0.150	0.040-0.150
Kendall Creek	0.040-0.150	0.040-0.150
Lindsey Branch	0.020-0.080	0.030-0.100
Lindsey Creek	0.020-0.080	0.030-0.100
Lindsey Creek Tributary	N/A	N/A
Lower Bull Creek	0.020-0.080	0.030-0.100
Lower Bull Creek Tributary No. 1	0.040-0.150	0.040-0.150
Lower Bull Creek Tributary No. 2	N/A	N/A
Lower Bull Creek Tributary No. 3	0.040-0.150	0.040-0.150
Mill Branch	0.020-0.080	0.030-0.100
Randall Creek	0.040-0.150	0.040-0.150
Roaring Branch	0.020-0.150	0.040-0.150
Roaring Branch Tributary No. 1	0.020-0.150	0.040-0.150
Standing Boy Creek	0.040-0.150	0.040-0.150

\* Data not available as streams are not model backed

**Table 14: Roughness Coefficients continued**

Flooding Source	Channel “n”	Overbank “n”
Standing Boy Creek Tributary No. 1	0.040-0.150	0.040-0.150
St. Marys Branch	0.020-0.080	0.030-0.100
Tar River	0.040-0.150	0.040-0.150
Tiger Creek	0.040-0.150	0.040-0.150
Upper Bull Creek	0.020-0.150	0.030-0.150
Weracoba Creek	0.020-0.150	0.040-0.150

**5.3 Coastal Analyses**

This section is not applicable to this FIS project.

**Table 15: Summary of Coastal Analyses**

[Not Applicable to this FIS project]

**5.3.1 Total Stillwater Elevations**

This section is not applicable to this FIS project.

**Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas**

[Not Applicable to this FIS project]

**Table 16: Tide Gage Analysis Specifics**

[Not Applicable to this FIS project]

**5.3.2 Waves**

This section is not applicable to this FIS project.

**5.3.3 Coastal Erosion**

This section is not applicable to this FIS project.

**5.3.4 Wave Hazard Analyses**

This section is not applicable to this FIS project.

**Table 17: Coastal Transect Parameters**

[Not Applicable to this FIS project]

**Figure 9: Transect Location Map**

[Not Applicable to this FIS project]

## 5.4 Alluvial Fan Analyses

This section is not applicable to this FIS project.

### Table 18: Summary of Alluvial Fan Analyses

[Not Applicable to this FIS project]

### Table 19: Results of Alluvial Fan Analyses

[Not Applicable to this FIS project]

## SECTION 6.0 – MAPPING METHODS

### 6.1 Vertical and Horizontal Control

All FIS Reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS Reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS Reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS Report and on the FIRMs are referenced to NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between NGVD29 and NAVD88 or other datum conversion, visit the National Geodetic Survey website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov), or contact the National Geodetic Survey at the following address:

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

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the archived project documentation associated with the FIS Report and the FIRMs for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks in the area, please contact information services Branch of the NGS at (301) 713-3242, or visit their website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov).

The datum conversion locations and values that were calculated for City of Columbus – Muscogee County are provided in Table 20.

**Table 20: Countywide Vertical Datum Conversion**

[Not Applicable to this FIS project]

**Table 21: Stream-by-Stream Vertical Datum Conversion**

[Not Applicable to this FIS project]

**6.2 Base Map**

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA’s FIRM database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features. For example, the information contained in the Floodway Data table and Flood Profiles can be linked to the cross sections that are shown on the FIRMs. Additional information about the FIRM Database and its contents can be found in FEMA’s *Guidelines and Standards for Mapping Partners*, Appendix L.

Base map information shown on the FIRM was derived from the sources described in Table 22.

**Table 22: Base Map Sources**

Data Type	Data Provider	Data Date	Data Scale	Data Description
Digital Orthophoto	National Agriculture Imagery Program	09/14/2013	N/A	S_Base_Index table contains information about the raster data used as a base map for the study area. Used on areas around county boarder.
Digital Orthophoto	Photo Science, Inc.	12/03/2013	N/A	S_Base_Index table contains information about the raster data used as a base map for the study area. Used on the interior of county.
Incorporated Community Boundaries	Georgia Department of Transportation	10/13/2000	N/A	S_Pol_Ar. County and Corporate Boundaries.
Surface Water Features	Georgia Department of Transportation	04/12/2001	N/A	S_Wtr_Ar. Water areas within the study area.
Transportation Features	City of Columbus – Muscogee County, Georgia	01/30/2013	N/A	S_Trnsport_Ln. All roads and railroads within the study area.

### 6.3 Floodplain and Floodway Delineation

The FIRM shows tints, screens, and symbols to indicate floodplains and floodways as well as the locations of selected cross sections used in the hydraulic analyses and floodway computations.

For riverine flooding sources, the mapped floodplain boundaries shown on the FIRM have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 23.

In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

The floodway widths presented in this FIS Report and on the FIRM 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. Table 2 indicates the flooding sources for which floodways have been determined. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 24, "Floodway Data."

**Table 23: Summary of Topographic Elevation Data used in Mapping**

Community	Flooding Source	Source for Topographic Elevation Data			
		Description	Scale	Contour Interval	Citation
City of Columbus – Muscogee County	All Zone A Streams in HUC-8 03130002	Topographic Maps	1:2,400	5 ft	Piedmont Aerial Surveys
City of Columbus – Muscogee County	All Zone A Streams in HUC-8 03130003	Topographic Maps	1:2,400	5 ft	Piedmont Aerial Surveys
City of Columbus – Muscogee County	Biggers Lake	LiDAR	N/A	2 ft	Atlanta Regional Commission (ARC) 2010
City of Columbus – Muscogee County	Califon Creek	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Chattahoochee River in HUC-8 03130002	LiDAR	1:1,200	2 ft	ARC 2010
City of Columbus – Muscogee County	Chattahoochee River in HUC-8 03130003	Topographic Maps	1:24,000	5 ft	U.S. Army Corps of Engineers District
City of Columbus – Muscogee County	Cooper Branch	Topographic Maps	1:2,400	5 ft	Piedmont Aerial Surveys

**Table 23: Summary of Topographic Elevation Data used in Mapping continued**

Community	Flooding Source	Source for Topographic Elevation Data			
		Description	Scale	Contour Interval	Citation
City of Columbus – Muscogee County	Cooper Creek	Topographic Maps	1:2,400	5 ft	Piedmont Aerial Surveys
City of Columbus – Muscogee County	Cooper Creek Tributary	N/A	N/A	N/A	N/A
City of Columbus – Muscogee County	Cox Creek	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Dozier Creek	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Dram Branch	Topographic Maps	1:2,400	5 ft	Piedmont Aerial Surveys
City of Columbus – Muscogee County	Flatrock Creek	Topographic Maps	1:2,400	5 ft	Piedmont Aerial Surveys
City of Columbus – Muscogee County	Flatrock Creek Tributary No. 1	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Heiferhorn Creek	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Heiferhorn Creek Tributary No. 1	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Heiferhorn Creek Tributary No. 2	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Kendall Creek	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Lindsey Branch	Topographic Maps	1:2,400	5 ft	Piedmont Aerial Surveys
City of Columbus – Muscogee County	Lindsey Creek	Topographic Maps	1:2,400	5 ft	Piedmont Aerial Surveys
City of Columbus – Muscogee County	Lindsey Creek East Branch	Digital Topographic Maps	N/A	2 ft	City of Columbus – Muscogee County
City of Columbus – Muscogee County	Lindsey Creek Tributary	N/A	N/A	N/A	N/A
City of Columbus – Muscogee County	Lower Bull Creek	Topographic Maps	1:2,400	5 ft	Piedmont Aerial Surveys
City of Columbus – Muscogee County	Lower Bull Creek Tributary No. 1	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Lower Bull Creek Tributary No. 2	N/A	N/A	N/A	N/A

**Table 23: Summary of Topographic Elevation Data used in Mapping continued**

Community	Flooding Source	Source for Topographic Elevation Data			
		Description	Scale	Contour Interval	Citation
City of Columbus – Muscogee County	Lower Bull Creek Tributary No. 3	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Mill Branch	Topographic Maps	1:2,400	5 ft	Piedmont Aerial Surveys
City of Columbus – Muscogee County	Randall Creek	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Roaring Branch	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Roaring Branch Tributary No. 1	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Standing Boy Creek	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Standing Boy Creek Tributary No. 1	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	St. Marys Branch	Topographic Maps	1:2,400	5 ft	Piedmont Aerial Surveys
City of Columbus – Muscogee County	Tar River	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Tiger Creek	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Upper Bull Creek	Topographic Maps	1:2,400	5 ft	Piedmont Aerial Surveys
City of Columbus – Muscogee County	Upper Bull Creek	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS
City of Columbus – Muscogee County	Weracoba Creek	7.5-Minute Series Topographic Maps	1:24,000	10 ft	USGS

BFEs shown at cross sections on the FIRM represent the 1% annual chance water surface elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations.

**Table 24: Floodway Data**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	75	61	731	1.1	228.0	222.5 <sup>2</sup>	223.3	0.8
B	775	51	234	3.4	228.0	222.5 <sup>2</sup>	223.3	0.8
C	1,028	42	147	5.4	228.0	223.7 <sup>2</sup>	224.1	0.4
D	1,828	22	81	9.8	234.3	234.3	234.3	0.0
E	2,299	33	201	3.9	241.5	241.5	241.5	0.0
F	3,211	35	142	5.6	244.4	244.4	244.4	0.0
G	3,531	26	95	8.4	246.1	246.1	246.1	0.0
H	3,731	18	125	6.3	250.4	250.4	250.4	0.0
I	3,887	25	338	2.3	259.2	259.2	259.6	0.4
J	4,376	45	399	1.6	259.3	259.3	259.7	0.4
K	4,956	30	139	4.6	261.0	261.0	261.5	0.5
L	6,103	23	80	8.0	271.1	271.1	271.1	0.0
M	7,128	23	94	6.8	282.4	282.4	282.4	0.0
N	7,553	39	108	6.0	284.9	284.9	284.9	0.0
O	7,873	14	66	9.8	290.2	290.2	290.5	0.3

<sup>1</sup> Feet above confluence with Lower Bull Creek

<sup>2</sup> Elevation computed without consideration of backwater effects from Chattahoochee River

**TABLE 24**

**FEDERAL EMERGENCY MANAGEMENT AGENCY  
CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA  
(CONSOLIDATED GOVERNMENT)**

**FLOODWAY DATA**

**FLOODING SOURCE: CALIFON CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH <sup>2</sup> (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	103,650	11,388/8,371 <sup>2</sup>	243,791	0.6	224.1	224.1	224.9	0.8
B	119,200	3,390/307 <sup>2</sup>	48,487	3.2	224.5	224.5	225.3	0.8
C	138,110	640/429 <sup>2</sup>	26,641	5.9	228.7	228.7	229.4	0.7
D	144,770	495/406 <sup>2</sup>	22,225	7.1	230.2	230.2	230.8	0.6
E	153,450	759/670 <sup>2</sup>	19,057	8.2	239.6	239.6	239.7	0.1
F	155,000	921/829 <sup>2</sup>	25,770	6.1	249.2	249.2	249.2	0.0
G	156,630	625/548 <sup>2</sup>	19,606	8.0	249.6	249.6	249.6	0.0
H	158,360	740/660 <sup>2</sup>	22,427	7.0	250.6	250.6	250.7	0.1
I	164,380	1,200/1,128 <sup>2</sup>	24,221	6.5	283.8	283.8	283.9	0.1
J	166,450	1,565	20,221	7.8	284.7	284.7	284.9	0.2
K	168,343	2,005/1,846 <sup>2</sup>	74,344	2.0	336.4	336.4	336.4	0.0
L	175,459	1,757	68,220	2.2	336.6	336.6	336.6	0.0
M	180,102	1,071	44,543	3.2	336.7	336.7	336.7	0.0
N	185,374	1,810/1,700 <sup>2</sup>	60,522	2.4	337.2	337.2	337.3	0.1
O	188,869	1,165/1,050 <sup>2</sup>	43,785	3.2	337.5	337.5	337.5	0.0
P	191,883	1,033/810 <sup>2</sup>	40,488	3.5	337.7	337.7	337.8	0.1
Q	195,874	829/604 <sup>2</sup>	29,769	4.7	338.0	338.0	338.1	0.1
R	199,375	533	17,863	7.8	338.7	338.7	338.8	0.1
S	202,875	533	12,037	11.6	341.6	341.6	341.9	0.3
T	206,645	1,825/942 <sup>2</sup>	25,383	5.5	348.9	348.9	349.5	0.6
U	209,374	2,523/1,272 <sup>2</sup>	39,467	3.5	354.2	354.2	354.9	0.7
V	212,130	1,045/912 <sup>2</sup>	20,977	6.7	356.8	356.8	357.5	0.7

<sup>1</sup>Feet above downstream county boundary/confluence of Upatoi Creek

<sup>2</sup>Total floodway width / width within jurisdiction

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE COUNTY**  
 COUNTY  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: CHATTAHOOCHEE RIVER**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	200	126	664	2.4	340.5	340.5	341.5	1.0
B	800	151	1,070	1.4	340.9	340.9	341.9	1.0
C	1,585	112	765	2.0	342.2	342.2	343.2	1.0
D	2,885	44	235	6.5	344.8	344.8	345.7	0.9
E	4,415	39	275	5.6	357.4	357.4	357.9	0.5
F	4,585	81	345	3.9	358.4	358.4	358.6	0.2
G	5,885	71	349	3.9	362.8	362.8	363.8	1.0
H	7,535	48	267	5.0	370.2	370.2	371.0	0.8
I	8,985	40	246	1.7	373.4	373.4	374.3	0.9
J	9,655	34	213	2.0	376.8	376.8	377.5	0.7
K	10,875	26	120	1.6	377.6	377.6	378.1	0.5
L	12,045	445	8,443	0.3	404.8	404.8	404.8	0.0

<sup>1</sup> Feet above confluence with Cooper Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: COOPER BRANCH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	325	95	575	5.4	255.6	252.8 <sup>2</sup>	253.8	1.0
B	615	200	594	5.2	255.6	254.5 <sup>2</sup>	255.1	0.6
C	1,095	82	568	5.4	255.6	255.6	256.4	0.8
D	2,935	79	704	4.4	261.7	261.7	262.6	0.9
E	4,695	65	587	4.5	265.9	265.9	266.1	0.2
F	5,655	70	754	3.5	268.1	268.1	269.0	0.9
G	6,665	46	274	9.7	269.3	269.3	270.1	0.8
H	7,675	61	433	6.1	277.1	277.1	277.1	0.0
I	9,575	69	496	5.3	282.2	282.2	282.9	0.7
J	11,075	60	485	5.5	285.7	285.7	286.6	0.9
K	12,195	87	621	2.3	287.7	287.7	288.3	0.6
L	12,415	80	450	3.1	287.8	287.8	288.8	1.0
M	13,815	48	201	6.1	298.8	298.8	298.8	0.0
N	14,805	30	152	2.3	301.4	301.4	301.7	0.3
O	15,205	100	71	4.9	304.3	304.3	304.3	0.0
P	15,845	610	9,756	0.4	324.3	324.3	324.3	0.0
Q	18,055	915	7,301	0.5	324.3	324.3	324.3	0.0
R	19,105	82	493	4.9	324.3	324.3	324.3	0.0
S	19,905	82	625	5.5	326.3	326.3	326.5	0.2
T	21,315	63	448	5.8	332.6	332.6	333.2	0.6
U	21,665	188	1213	2.1	334.2	334.2	335.2	1.0
V	22,015	99	622	4.2	336.4	336.4	336.7	0.3

<sup>1</sup> Feet above confluence with Lower Bull Creek

<sup>2</sup> Elevation computed without consideration of backwater effects from Lower Bull Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: COOPER CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
W	23,020	101	471	2.4	339.6	339.6	340.1	0.5
X	25,220	63	292	3.8	351.5	351.5	351.8	0.3
Y	28,105	80	*	*	367.2	367.2	368.0	0.8
Z	29,685	67	*	*	376.3	376.3	377.0	0.7
AA	29,845	196	*	*	378.6	378.6	378.9	0.3
AB	30,925	80	*	*	380.3	380.3	380.5	0.2
AC	31,865	25	*	*	392.3	392.3	392.3	0.0
AD	32,350	430	*	*	426.0	426.0	426.0	0.0
AE	32,950	270	*	*	426.0	426.0	426.0	0.0

<sup>1</sup> Feet above confluence with Lower Bull Creek

\* Data not available

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: COOPER CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	300	31	203	5.7	362.8	362.8	363.6	0.8
B	1,050	27	160	7.3	369.1	369.1	369.9	0.8
C	2,429	88	648	1.8	376.8	376.8	377.5	0.7
D	3,095	46	311	3.7	378.6	378.6	379.1	0.5
E	4,695	67	204	5.7	387.6	387.6	388.3	0.7
F	4,972	449	9,016	0.1	417.6	417.6	417.6	0.0
G	7,602	69	252	4.6	421.4	421.4	421.9	0.5
H	8,777	182	1,252	0.9	422.6	422.6	423.6	1.0
I	9,752	238	1,058	1.1	423.1	423.1	424.1	1.0

<sup>1</sup> Feet above Norfolk Southern Railway

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: COX CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	200	183	388	2.2	371.5	371.5	371.9	0.4
B	1,300	28	164	5.2	378.3	378.3	379.0	0.7
C	1,545	15	122	7.0	384.0	384.0	384.0	0.0
D	1,835	20	166	5.2	386.2	386.2	386.2	0.0
E	2,985	36	198	4.3	388.8	388.8	389.8	1.0
F	3,935	42	168	5.1	393.3	393.3	393.3	0.0
G	5,235	22	118	7.2	401.3	401.3	401.7	0.4
H	6,535	28	164	5.2	409.5	409.5	409.9	0.4
I	7,735	27	108	7.9	417.8	417.8	418.0	0.2

<sup>1</sup> Feet above Chattsworth Road

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: DOZIER CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	225	20	221	7.3	245.9	245.9	246.9	1.0
B	520	171	1,675	1.0	255.2	255.2	256.2	1.0
C	1,400	52	475	3.4	255.3	255.3	256.3	1.0
D	2,080	22	119	13.5	259.0	259.0	259.0	0.0
E	2,750	36	191	8.4	263.8	263.8	263.8	0.0
F	3,320	21	118	13.6	268.0	268.0	268.6	0.6
G	2,430	70	355	4.5	272.2	272.2	272.8	0.6
H	3,600	36	247	6.5	272.2	272.2	272.8	0.6
I	3,870	35	149	10.8	275.0	275.0	275.0	0.0
J	3,990	35	165	9.7	276.4	276.4	276.5	0.1
K	4,480	73	188	6.4	281.3	281.3	281.4	0.1
L	5,020	108	414	2.9	286.6	286.6	287.5	0.9
M	5,470	48	265	4.6	288.4	288.4	289.2	0.8
N	5,920	81	261	4.6	294.3	294.3	295.1	0.8
O	6,050	136	716	1.7	298.8	298.8	299.7	0.9
P	6,220	35	269	4.5	298.8	298.8	299.7	0.9

<sup>1</sup> Feet above confluence with Lower Bull Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA**  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: DRAM BRANCH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	600	60	334	3.9	285.0	281.1 <sup>2</sup>	282.1	1.0
B	865	48	291	4.4	285.0	282.5 <sup>2</sup>	283.3	0.8
C	3,495	35	222	5.8	290.5	290.5	290.7	0.2
D	5,445	68	308	4.2	295.0	295.0	295.2	0.2
E	7,040	57	239	5.4	301.9	301.9	302.8	0.9
F	9,270	41	100	5.1	311.5	311.5	311.5	0.0
G	10,760	627	16,069	0.2	360.8	360.8	360.8	0.0
H	12,210	297	7,031	0.5	360.8	360.8	360.8	0.0
I	12,910	457	4,219	0.9	360.8	360.8	360.8	0.0
J	13,345	237	3,426	1.1	364.1	364.1	365.0	0.9
K	13,575	477	4,057	0.9	364.7	364.7	365.6	0.9
L	14,375	108	1,125	2.8	364.7	364.7	365.6	0.9
M	15,075	102	990	3.2	364.8	364.8	365.8	1.0
N	15,645	62	599	4.8	364.9	364.9	365.8	0.9
O	18,265	200	1,314	2.4	380.7	380.7	380.9	0.2
P	18,735	53	250	12.5	381.3	381.3	381.3	0.0
Q	19,455	93	659	4.8	384.8	384.8	384.8	0.0
R	19,605	130	846	3.7	386.9	386.9	386.9	0.0
S	20,355	100	293	9.8	410.7	410.7	410.7	0.0
T	20,525	211	1,383	2.1	423.6	423.6	424.4	0.8
U	20,855	73	400	7.2	423.7	423.7	424.4	0.7
V	22,315	92	496	3.2	429.1	429.1	429.6	0.5

<sup>1</sup> Feet above confluence with Lower Bull Creek

<sup>2</sup> Elevation computed without consideration of backwater effects from Chattahoochee River

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: FLATROCK CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
W	24,265	55	281	5.6	436.2	436.2	436.5	0.3
X	27,295	96	327	4.8	450.2	450.2	451.1	0.9
Y	27,445	224	806	1.9	452.3	452.3	452.8	0.5

<sup>1</sup> Feet above confluence with Lower Bull Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: FLATROCK CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	375	16	94	5.5	365.2	365.2	366.2	1.0
B	1,125	43	109	4.7	374.0	374.0	374.0	0.0
C	2,045	36	107	4.9	383.4	383.4	384.4	1.0
D	2,595	69	162	3.2	388.5	388.5	389.4	0.9
E	3,045	27	78	3.7	393.3	393.3	393.3	0.0
F	3,145	23	39	7.5	410.2	410.2	410.2	0.0
G	3,945	129	235	1.2	415.4	415.4	415.4	0.0
H	4,395	40	66	4.4	431.3	431.3	431.3	0.0
I	4,745	13	45	6.4	441.1	441.1	441.6	0.5

<sup>1</sup> Feet above confluence with Flatrock Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: FLATROACK CREEK TRIBUTARY NO.1**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	280	119	972	5.3	343.2	343.2	344.2	1.0
B	578	69	724	7.1	344.1	344.1	344.8	0.7
C	1,528	125	1,167	4.4	347.4	347.4	347.8	0.4
D	3,378	87	684	7.6	356.1	356.1	357.0	0.9
E	5,728	67	615	8.4	366.7	366.7	367.4	0.7
F	7,528	76	819	6.3	370.9	370.9	371.7	0.8
G	9,528	55	545	9.5	375.3	375.3	375.9	0.6
H	11,628	539	2,907	1.8	379.6	379.6	380.5	0.9
I	13,478	179	1,675	3.1	381.8	381.8	382.8	1.0
J	13,978	82	549	9.4	389.7	389.7	390.6	0.9
K	15,228	189	1,264	3.6	399.2	399.2	400.1	0.9
L	16,828	272	2,094	2.2	402.2	402.2	403.1	0.9
M	18,728	229	1,400	3.3	405.1	405.1	405.9	0.8
N	21,028	68	793	5.8	410.6	410.6	411.6	1.0
O	22,429	98	641	7.1	416.6	416.6	417.3	0.7
P	24,179	88	834	5.5	422.7	422.7	423.2	0.5
Q	25,729	44	661	5.4	426.1	426.1	426.7	0.6
R	26,629	290	1,636	2.2	427.4	427.4	428.2	0.8
S	28,379	148	1,057	3.4	430.0	430.0	431.0	1.0
T	30,829	314	1,675	2.1	435.0	435.0	436.0	1.0
U	32,329	122	541	6.6	439.2	439.2	440.0	0.8
V	33,779	135	913	3.9	445.8	445.8	446.6	0.8

<sup>1</sup> Feet above confluence with Standing Boy Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA**  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: HEIFERHORN CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
W	34,829	211	1,225	2.9	448.8	448.8	449.6	0.8
X	35,765	36	479	7.4	451.7	451.7	452.6	0.9
Y	36,365	66	642	5.5	454.1	454.1	454.6	0.5
Z	37,008	35	460	7.7	457.0	457.0	457.8	0.8
AA	38,565	135	1,238	2.9	461.7	461.7	462.8	0.7

<sup>1</sup> Feet above confluence with Standing Boy Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: HEIFERHORN CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	700	28	153	7.1	395.9	395.9	396.9	1.0
B	1,600	103	223	4.9	432.0	432.0	432.0	0.0
C	3,100	90	379	2.9	442.4	442.4	443.2	0.8
D	3,850	28	210	5.2	446.3	446.3	447.2	0.9
E	4,100	31	221	4.9	447.7	447.7	448.7	1.0
F	4,650	71	401	2.7	449.7	449.7	450.7	1.0
G	5,590	84	411	2.6	459.1	459.1	459.2	0.1
H	6,790	187	664	1.6	463.3	463.3	464.3	1.0
I	8,290	29	171	6.4	472.8	472.8	473.0	0.2

<sup>1</sup> Feet above confluence with Heiferhorn Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: HEIFERHORN CREEK TRIBUTARY NO.1**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	0	94	370	5.5	424.4	421.9 <sup>2</sup>	422.9	1.0
B	1,190	193	955	2.1	427.6	427.6	428.6	1.0
C	2,990	111	537	3.8	433.7	433.7	434.5	0.8
D	3,732	34	387	5.3	437.3	437.3	438.3	1.0
E	4,944	270	2,294	0.9	446.8	446.8	447.3	0.5
F	6,300	242	1,302	1.6	448.2	448.2	449.0	0.8
G	7,680	475	2,650	0.8	455.0	455.0	456.0	1.0
H	8,531	37	1,042	1.5	479.3	479.3	480.2	0.9
I	9,961	118	2,403	0.7	479.4	479.4	480.3	0.9
J	11,251	189	2,229	0.7	479.4	479.4	480.4	1.0
K	12,351	157	892	1.8	479.7	479.7	480.6	0.9
L	13,741	78	463	3.4	483.4	483.4	484.3	0.9
M	14,741	74	422	3.8	487.8	487.8	488.8	1.0
N	15,851	28	205	7.8	493.3	493.3	494.2	0.9
O	17,576	187	377	4.2	528.6	528.6	528.6	0.0
P	18,286	42	265	6.0	534.0	534.0	534.8	0.8
Q	19,906	98	510	3.1	543.8	543.8	544.8	1.0
R	21,383	239	2,101	0.8	561.9	561.9	562.5	0.6
S	22,683	103	437	3.6	566.1	566.1	567.1	1.0

<sup>1</sup> Feet above confluence with Heiferhorn Creek

<sup>2</sup> Elevation computed without consideration of backwater effects from Heiferhorn Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: HEIFERHORN CREEK TRIBUTARY NO.2**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	50	79	987	4.0	348.4	348.4	349.3	0.9
B	625	79	983	4.0	349.1	349.1	349.9	0.8
C	2,225	106	569	6.9	353.2	353.2	353.6	0.4
D	3,092	93	346	11.4	376.1	376.1	376.1	0.0
E	5,025	94	898	4.4	385.9	385.9	386.6	0.7
F	7,525	74	670	5.9	392.3	392.3	392.5	0.2
G	9,575	80	811	4.8	397.9	397.9	398.2	0.3
H	11,555	61	702	5.6	402.1	402.1	402.8	0.7
I	14,505	64	684	5.8	410.1	410.1	411.1	1.0
J	18,080	69	790	5.0	419.0	419.0	419.8	0.8
K	19,760	64	601	4.0	422.5	422.5	422.8	0.3
L	21,560	66	353	6.9	428.5	428.5	428.5	0.0

<sup>1</sup> Feet above Norfolk Southern Railway

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: KENDALL CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,265	5	20	7.3	328.9	328.9	329.9	1.0
B	1,565	346	1,594	0.1	330.8	330.8	331.0	0.2
C	1,765	705	8,504	0.0	354.0	354.0	354.0	0.0
D	2,425	530	6,183	0.4	354.0	354.0	354.0	0.0

<sup>1</sup> Feet above confluence with Lindsey Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: LINDSEY BRANCH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	450	81	1,062	4.8	241.7	240.2 <sup>2</sup>	241.2	1.0
B	635	71	915	5.6	241.7	240.5 <sup>2</sup>	241.4	0.9
C	2,285	88	965	5.3	245.1	245.1	245.9	0.8
D	3,065	112	1,393	3.7	246.6	246.6	247.3	0.7
E	3,220	127	1,398	3.7	247.0	247.0	247.7	0.7
F	3,625	44	424	12.1	247.0	247.0	247.6	0.6
G	3,865	229	992	5.2	249.6	249.6	250.1	0.5
H	6,525	262	1,008	5.0	256.0	256.0	256.7	0.7
I	6,685	341	1,369	3.7	256.6	256.6	257.4	0.8
J	7,835	164	678	7.5	258.0	258.0	258.2	0.2
K	8,685	277	1,312	3.9	261.4	261.4	262.1	0.7
L	9,165	378	1,705	3.0	262.8	262.8	263.5	0.7
M	9,760	378	1,690	3.0	264.2	264.2	264.9	0.7
N	10,800	256	1,104	4.6	268.7	268.7	269.5	0.8
O	11,180	75	671	7.5	269.6	269.6	270.2	0.6
P	11,555	349	1,180	4.3	271.1	271.1	271.6	0.5
Q	12,735	217	1,167	4.3	273.2	273.2	273.8	0.6
R	12,885	244	2,089	2.4	273.7	273.7	274.4	0.7
S	13,315	613	3,315	1.5	273.9	273.9	274.5	0.6
T	14,815	296	1,527	2.4	278.8	278.8	279.3	0.5
U	15,065	65	640	5.7	279.0	279.0	279.9	0.9
V	16,825	144	815	4.4	285.0	285.0	285.6	0.6

<sup>1</sup> Feet above confluence with Lower Bull Creek

<sup>2</sup> Elevation computed without consideration of backwater effects from Lower Bull Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: LINDSEY CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
W	17,505	77	622	5.8	286.8	286.8	287.6	0.8
X	17,765	44	387	9.3	287.4	287.4	288.4	1.0
Y	19,670	78	808	4.5	298.9	298.9	299.7	0.8
Z	20,490	81	316	9.7	302.0	302.0	302.1	0.1
AA	20,790	88	377	8.1	306.9	306.9	307.6	0.7
AS	21,105	528	4,292	0.7	326.6	326.6	326.6	0.0
AC	21,765	204	1,421	2.1	326.7	326.7	326.8	0.1
AD	22,315	90	749	3.9	326.8	326.8	326.9	0.1
AE	22,565	88	737	4.0	328.2	328.2	328.3	0.1
AF	23,610	60	364	6.9	329.3	329.3	330.3	1.0
AG	237,501	60	411	6.1	331.1	331.1	331.5	0.4
AH	269,801	38	159	7.5	340.0	340.0	341.0	1.0
AI	273,001	38	213	5.6	342.8	342.8	343.5	0.7
AJ	282,901	356	3,246	0.4	357.0	357.0	357.0	0.0
AK	291,151	224	1,413	1.0	357.0	357.0	357.0	0.0
AL	303,051	152	1,049	1.2	357.1	357.1	357.2	0.1
AM	312,301	102	306	4.1	363.3	363.3	363.3	0.0
AN	321,001	50	205	6.1	364.2	364.2	364.2	0.0
AO	329,901	37	119	8.3	372.2	372.2	372.2	0.0
AP	333,901	39	106	9.4	374.6	374.6	374.6	0.0
AQ	341,401	35	190	5.2	387.4	387.4	388.4	1.0
AR	352,601	95	156	6.4	394.1	394.1	394.1	0.0
AS	359,701	46	129	7.7	408.2	408.2	408.2	0.0

<sup>1</sup> Feet above confluence with Lower Bull Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA**  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: LINDSEY CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,200	240	3,192	8.0	228.0	209.4 <sup>2</sup>	210.4	1.0
B	2,000	253	1,921	11.0	228.0	210.6 <sup>2</sup>	211.4	0.8
C	4,700	157	2,747	7.7	228.0	216.7 <sup>2</sup>	217.1	0.4
D	6,710	233	3,202	6.6	228.0	218.8 <sup>2</sup>	219.4	0.6
E	8,040	215	3,241	6.5	228.0	219.9 <sup>2</sup>	220.7	0.8
F	8,730	127	2,001	10.3	228.0	220.1 <sup>2</sup>	221.1	1.0
G	9,180	181	2,539	8.1	228.0	221.8 <sup>2</sup>	222.8	1.0
H	9,830	493	6,816	3.0	228.0	223.2 <sup>2</sup>	223.9	0.7
I	12,550	276	2,788	7.4	228.0	224.5 <sup>2</sup>	225.2	0.7
J	13,560	275	3,275	6.1	228.0	225.8 <sup>2</sup>	226.8	1.0
K	13,825	219	2,570	7.8	228.0	226.3 <sup>2</sup>	227.3	1.0
L	14,025	190	2,442	8.2	228.0	226.7 <sup>2</sup>	227.3	0.6
M	16,945	235	3,045	6.6	231.4	231.4	232.4	1.0
N	18,065	302	4,083	4.9	233.1	233.1	234.0	0.9
O	18,235	232	2,599	7.7	233.4	233.4	234.0	0.6
P	18,555	183	2,218	9.1	234.1	234.1	234.7	0.6
Q	20,035	267	3,254	6.2	240.6	240.6	240.8	0.2
R	20,340	303	3,760	5.3	241.5	241.5	242.0	0.5
S	21,180	425	4,458	3.4	242.8	242.8	243.4	0.6
T	22,620	323	3,573	4.3	243.8	243.8	244.4	0.6
U	23,760	222	2,864	5.3	244.8	244.8	245.4	0.6
V	24,760	203	2,285	6.4	246.0	246.0	246.7	0.7

<sup>1</sup> Feet above confluence with Chattahoochee River

<sup>2</sup> Elevation computed without consideration of backwater effects from Chattahoochee River

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: LOWER BULL CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
W	26,760	294	3,990	3.6	248.3	248.3	249.1	0.8
X	27,490	375	4,271	3.4	248.7	248.7	249.5	0.8
Y	27,850	704	7,942	1.8	249.6	249.6	250.4	0.8
Z	29,420	117	1,295	11.1	249.9	249.9	250.4	0.5
AA	30,990	225	2,210	6.3	252.8	252.8	253.8	1.0
AS	32,290	168	1,937	7.2	254.8	254.8	255.4	0.6
AC	34,840	118	1,435	7.7	259.7	259.7	260.4	0.7
AD	36,090	162	1,600	5.8	261.6	261.6	262.3	0.7
AE	37,160	81	955	9.7	262.7	262.7	263.4	0.7
AF	37,800	172	1,815	5.1	264.5	264.5	265.3	0.8
AG	38,040	80	1,220	7.6	264.6	264.6	265.3	0.7
AH	41,040	110	1,272	6.4	267.6	267.6	268.4	0.8
AI	42,820	120	1,286	6.4	269.8	269.8	270.3	0.5
AJ	44,220	115	868	9.4	272.1	272.1	272.3	0.2
AK	46,120	126	1,130	5.5	277.9	277.9	278.6	0.7
AL	47,790	106	978	6.3	279.9	279.9	280.3	0.4
AM	49,910	77	739	8.4	283.3	283.3	283.6	0.3
AN	50,470	123	895	6.9	284.7	284.7	285.1	0.4
AO	51,020	225	1,669	3.2	285.8	285.8	286.6	0.8
AP	53,340	455	1,674	2.5	290.7	290.7	291.0	0.3
AQ	55,110	292	1,217	3.5	291.9	291.9	292.4	0.5
AR	56,000	138	1,243	3.4	293.1	293.1	293.7	0.6

<sup>1</sup> Feet above confluence with Chattahoochee River

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: LOWER BULL CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,000	63	250	3.5	266.3	252.5 <sup>2</sup>	253.5	1.0
B	1,925	57	146	6.0	266.8	262.3 <sup>3</sup>	262.3	0.0
C	2,850	101	300	2.9	273.4	273.4	274.1	0.7
D	4,550	50	268	3.3	284.6	284.6	285.3	0.7
E	5,100	54	206	4.2	293.1	293.1	293.1	0.0
F	5,442	30	123	7.1	294.9	294.9	295.8	0.9
G	5,709	30	157	4.3	300.0	300.0	300.7	0.7
H	7,159	25	115	5.8	307.1	307.1	307.3	0.2
J	8,609	27	120	5.6	324.7	324.7	324.9	0.2
K	9,459	119	319	2.1	339.0	339.0	340.0	1.0

<sup>1</sup> Feet above confluence with Lower Bull Creek

<sup>2</sup> Elevation computed without consideration of flooding controlled by Lower Bull Creek

<sup>3</sup> Elevation computed without consideration of backwater effects from Lower Bull Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE  
 COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: LOWER BULL CREEK TRIBUTARY NO.1**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,500	32	157	4.5	275.4	275.4	276.4	1.0
B	2,347	15	110	6.5	280.9	280.9	281.3	0.4
C	4,176	35	196	3.6	291.6	291.6	291.9	0.3
D	4,405	125	607	1.2	292.1	292.1	292.6	0.5
E	5,880	70	262	2.7	299.5	299.5	300.4	0.9
F	9,280	28	151	3.8	327.4	327.4	328.2	0.8

<sup>1</sup> Feet above confluence with Lower Bull Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: LOWER BULL CREEK TRIBUTARY NO.3**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	350	48	338	6.0	261.3	256.4 <sup>2</sup>	257.4	1.0
B	800	52	243	8.3	261.3	260.3 <sup>2</sup>	260.4	0.1
C	2,000	45	353	5.7	270.6	270.6	270.8	0.2
D	3,770	90	361	4.1	281.6	281.6	282.0	0.4
E	5,120	36	150	9.8	292.5	292.5	292.5	0.0
F	5,310	197	407	3.6	297.0	297.0	297.0	0.0
G	6,570	28	128	11.4	298.5	298.5	298.7	0.2
H	7,720	43	205	7.1	315.1	315.1	315.1	0.0
I	7,920	100	461	3.2	320.0	320.0	320.0	0.0
J	8,840	67	379	3.9	323.2	323.2	323.6	0.4
K	9,270	93	307	4.8	327.0	327.0	327.3	0.3
L	10,270	34	273	5.4	335.3	335.3	335.5	0.2

<sup>1</sup> Feet above confluence with Lower Bull Creek

<sup>2</sup> Elevation computed without consideration of backwater effects from Lower Bull Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: MILL BRANCH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	175	73	850	5.4	367.9	367.9	368.1	0.2
B	725	97	584	7.8	370.2	370.2	370.3	0.1
C	1,175	63	654	7.0	377.0	377.0	377.0	0.0
D	3,075	75	991	4.6	381.5	381.5	382.0	0.5
E	5,175	66	482	6.4	389.6	389.6	389.7	0.1
F	6,675	97	828	3.7	395.4	395.4	396.3	0.9
G	7,975	99	767	4.0	398.3	398.3	399.3	1.0
H	9,650	78	545	5.7	403.2	403.2	403.6	0.4
I	11,275	48	385	8.0	412.1	412.1	412.5	0.4
J	12,575	224	1,157	2.7	416.9	416.9	417.8	0.9
K	13,775	176	692	4.5	420.9	420.9	421.5	0.6
L	14,430	408	2,662	1.2	427.1	427.1	428.0	0.9

<sup>1</sup> Feet above Chattsworth Road

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: RANDALL CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	200	114	1,127	3.3	344.4	344.4	345.4	1.0
B	1,020	303	2,387	1.6	345.7	345.7	346.7	1.0
C	1,690	121	715	5.2	346.8	346.8	347.8	1.0
D	2,390	53	462	8.1	351.7	351.7	352.6	0.9
E	3,200	129	965	3.9	359.8	359.8	360.8	1.0
F	3,950	140	1,122	3.3	367.6	367.6	368.5	0.9
G	4,235	109	600	6.2	377.7	377.7	378.6	0.9
H	4,755	203	1,930	1.9	388.3	388.3	389.0	0.7
I	5,255	99	914	4.1	389.2	389.2	389.9	0.7
J	6,120	168	1,414	2.6	394.1	394.1	394.6	0.5
K	6,765	126	1,026	3.6	397.0	397.0	398.0	1.0
L	8,623	61	614	6.1	405.1	405.1	405.1	0.0
M	9,023	74	641	5.8	406.3	406.3	406.6	0.3
N	10,428	94	1,119	1.4	417.5	417.5	418.3	0.8
O	10,613	83	1,000	1.6	417.8	417.8	418.5	0.7
P	10,963	217	1,867	0.9	417.9	417.9	418.6	0.7
Q	11,988	98	812	2.0	418.1	418.1	418.8	0.7
R	12,813	99	642	2.5	419.2	419.2	420.0	0.8
S	13,433	206	1,206	1.3	425.1	425.1	425.1	0.0
T	14,093	44	230	6.9	426.2	426.2	426.8	0.6
U	15,081	309	3,705	0.3	437.2	437.2	437.7	0.5
V	15,509	46	528	2.2	438.5	438.5	439.0	0.5

<sup>1</sup> Feet above River Road/State Highway 103

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: ROARING BRANCH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
W	15,916	78	800	1.5	441.9	441.9	442.4	0.5
X	16,722	27	180	6.5	444.7	444.7	445.1	0.4
Y	17,847	343	1,002	1.2	451.9	451.9	451.9	0.0
Z	18,007	729	7,803	0.1	463.9	463.9	463.9	0.0
AA	19,729	26	205	5.7	484.3	484.3	484.5	0.2
AB	20,130	161	2,938	0.2	485.8	485.8	486.7	0.9
AC	21,230	40	233	2.5	485.8	485.8	486.7	0.9

<sup>1</sup> Feet above River Road/State Highway 103

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: ROARING BRANCH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	250	52	380	3.3	344.4 <sup>2</sup>	341.8	342.8	1.0
B	1,830	64	389	3.3	349.4	349.4	350.3	0.9
C	2,730	50	359	3.5	351.3	351.3	352.1	0.8
D	4,180	122	352	3.6	356.3	356.3	356.3	0.0
E	5,030	36	159	7.9	365.6	365.6	366.2	0.6
F	6,130	167	667	1.9	370.5	370.5	371.4	0.9
G	7,373	173	1,502	0.6	382.3	382.3	382.7	0.4
H	8,323	55	124	7.5	383.4	383.4	383.5	0.1
I	9,103	107	708	1.3	395.0	395.0	395.6	0.6
J	9,451	31	103	9.1	410.9	410.9	410.9	0.0
K	9,914	59	189	4.9	422.4	422.4	422.9	0.5
L	11,098	24	162	5.8	436.0	436.0	436.8	0.8

<sup>1</sup> Feet above confluence with Roaring Branch

<sup>2</sup> Flooding controlled by Roaring Branch

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: ROARING BRANCH TRIBUTARY NO.1**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	11,450	148	1,956	3.9	343.1	343.1	343.9	0.8
B	15,750	91	1,017	7.5	346.0	346.0	346.9	0.9
C	18,050	93	1,111	6.9	349.5	349.5	350.4	0.9
D	18,255	227	2,643	2.9	350.2	350.2	350.8	0.6
E	19,255	150	1,724	3.6	350.7	350.7	351.5	0.8
F	19,925	399	3,899	1.6	351.7	351.7	352.3	0.6
G	23,625	60	885	7.0	354.7	354.7	355.4	0.7
H	27,550	384	2,085	3.0	360.7	360.7	361.4	0.7
I	30,050	104	899	6.9	364.7	364.7	365.7	1.0
J	32,025	55	646	9.6	370.5	370.5	370.9	0.4
K	33,650	50	483	12.8	377.6	377.6	378.6	1.0

<sup>1</sup> Feet above confluence with Chattahoochee River

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA**  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: STANDING BOY CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	420	324	1,618	2.3	350.4	345.4 <sup>2</sup>	345.8	0.4
B	2,595	486	2,463	1.5	350.4	349.4 <sup>2</sup>	350.4	1.0
C	5,495	335	1,588	1.9	356.5	356.5	357.4	0.9
D	7,727	241	909	3.3	360.3	360.3	360.7	0.4
E	11,927	499	2,424	1.3	369.2	369.2	370.2	1.0

<sup>1</sup> Feet above confluence with Standing Boy Creek

<sup>2</sup> Elevation computed without consideration of backwater effects from Standing Boy Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: STANDING BOY CREEK TRIBUTARY NO.1**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	300	35	227	7.4	241.8	238.4 <sup>2</sup>	239.2	0.8
B	630	39	341	4.9	244.3	244.3	244.5	0.2
C	1,140	173	820	2.0	244.9	244.9	245.1	0.2
D	1,825	280	881	1.9	249.5	249.5	250.0	0.5
E	2,475	25	151	11.1	250.2	250.2	250.6	0.4
F	3,045	42	271	6.2	255.5	255.5	256.1	0.6
G	3,130	198	1,468	1.1	261.5	261.5	261.5	0.0
H	3,720	53	375	4.5	265.0	265.0	266.0	1.0
I	4,650	56	221	5.9	268.1	268.1	268.9	0.8
J	4,800	54	191	6.8	271.0	271.0	271.0	0.0
K	5,490	59	167	7.9	277.1	277.1	277.1	0.0
L	5,980	56	298	4.4	281.9	281.9	281.9	0.0
M	6,620	47	135	9.7	285.1	285.1	285.1	0.0
N	8,100	151	600	2.2	305.1	305.1	306.0	0.9
O	8,505	28	147	8.9	308.4	308.4	308.5	0.1
P	9,285	29	155	8.4	313.5	313.5	314.5	1.0
Q	9,865	33	132	9.9	318.9	318.9	319.3	0.4
R	10,085	34	222	5.9	324.7	324.7	325.5	0.8
S	10,325	34	177	7.4	325.2	325.2	326.0	0.8

<sup>1</sup> Feet above confluence with Lower Bull Creek

<sup>2</sup> Elevation computed without consideration of backwater effects from Lower Bull Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: ST. MARYS BRANCH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	325	376	1,920	0.4	354.7	354.7	355.7	1.0
B	1,525	28	123	0.6	355.2	355.2	356.2	1.0
C	2,875	54	355	2.1	362.2	362.2	363.1	0.9
D	3,325	784	7,412	0.1	373.5	373.5	373.5	0.0
E	5,408	32	210	3.3	376.9	376.9	377.2	0.3
F	6,428	32	182	3.8	380.3	380.3	380.6	0.3
G	8,738	80	224	3.1	398.8	398.8	399.7	0.9
H	10,728	58	334	2.1	406.4	406.4	407.2	0.8

<sup>1</sup> Feet above Norfolk Southern Railway

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: TAR RIVER**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	8,006	168	1.09	1.4	270.1	270.1	270.5	0.4
B	8,806	164	689	2.3	270.9	270.9	271.5	0.6
C	9,881	117	564	2.8	274.7	274.7	275.6	0.9
D	10,551	187	1.1	1.4	278.3	278.3	278.8	0.5
E	11,611	217	955	1.6	279.4	279.4	280.3	0.9
F	13,011	318	2,038	0.8	286.8	286.8	287.7	0.9
G	13,986	83	396	4.0	287.5	287.5	288.5	1.0

<sup>1</sup> Feet above confluence with Upatoi Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: TIGER CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	25	70	811	3.6	332.8	332.8	333.8	1.0
B	250	103	774	3.8	332.9	332.9	333.9	1.0
C	950	74	583	5.0	333.7	333.7	334.7	1.0
D	3,430	105	477	2.3	343.4	343.4	343.5	0.1
E	3,740	59	212	5.2	344.1	344.1	345.0	0.9
F	5,280	65	183	0.9	358.0	358.0	358.2	0.2
G	1,435	95	521	6.3	404.0	404.0	404.1	0.1
H	14,576	50	275	11.9	406.4	406.4	406.6	0.2
I	15,476	65	642	5.1	413.4	413.4	414.2	0.8

<sup>1</sup> Feet above Limit of Detailed Study (Limit of Detailed Study is approximately 185 feet downstream of Chattsworth Road)

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: UPPER BULL CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	250	135	1,370	7.3	228.0	206.5 <sup>2</sup>	207.5	1.0
B	2,060	193	4,243	2.4	236.0	236.0	236.0	0.0
C	4,390	163	2,910	3.4	236.2	236.2	236.2	0.0
D	7,020	497	4,374	2.1	236.8	236.8	236.9	0.1
E	9,270	804	5,393	0.8	237.1	237.1	237.3	0.2
F	11,830	332	2,525	1.8	237.3	237.3	237.6	0.3
G	13,360	234	1,422	3.1	238.4	238.4	238.7	0.3
H	14,210	330	1,645	2.6	238.6	238.6	239.1	0.5
I	16,775	265	1,314	4.2	250.1	250.1	250.4	0.3
J	17,090	248	1,272	4.4	250.9	250.9	251.2	0.3
K	17,750	132	484	11.5	251.2	251.2	251.2	0.0
L	17,960	408	1,223	4.5	253.4	253.4	253.4	0.0
M	19,600	171	1,015	5.5	261.2	261.2	262.1	0.9
N	20,305	214	1,398	4.0	262.2	262.2	263.1	0.9
O	21,165	294	2,088	2.6	268.2	268.2	268.2	0.0
P	22,985	66	395	13.9	269.9	269.9	269.9	0.0
Q	23,475	58	418	13.1	273.0	273.0	273.9	0.9
R	23,640	284	2,501	2.2	279.6	279.6	280.0	0.4
S	25,400	205	1,318	3.4	288.0	288.0	288.0	0.0
T	26,150	118	700	6.5	288.3	288.3	288.3	0.0
U	26,610	204	1,152	3.9	290.3	290.3	290.8	0.5
V	27,160	153	571	7.9	291.4	291.4	291.7	0.3

<sup>1</sup> Feet above confluence with Lower Bull Creek

<sup>2</sup> Elevation computed without consideration of backwater effects from Chattahoochee River

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
CITY OF COLUMBUS – MUSCOGEE  
COUNTY, GA  
(CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: WERACOBA CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
W	27,910	146	991	4.6	296.6	296.6	297.6	1.0
X	28,350	219	1,173	3.8	298.1	298.1	299.1	1.0
Y	28,715	188	930	4.9	300.1	300.1	300.9	0.8
Z	29,675	111	633	7.1	306.5	306.5	307.5	1.0
AA	30,315	135	1,218	3.7	309.0	309.0	309.8	0.8
AB	30,425	301	1,288	3.5	309.1	309.1	309.9	0.8
AC	31,325	84	239	9.0	317.1	317.1	317.1	0.0

<sup>1</sup> Feet above confluence with Lower Bull Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**CITY OF COLUMBUS – MUSCOGEE**  
**COUNTY, GA**  
 (CONSOLIDATED GOVERNMENT)

**FLOODWAY DATA**

**FLOODING SOURCE: WERACOBA CREEK**

## **Table 25: Flood Hazard and Non-Encroachment Data for Selected Streams**

[Not Applicable to this FIS project]

### **6.4 Coastal Flood Hazard Mapping**

This section is not applicable to this FIS project.

## **Table 26: Summary of Coastal Transect Mapping Considerations**

[Not Applicable to this FIS project]

### **6.5 FIRM Revisions**

This FIS Report and the FIRM are based on the most up-to-date information available to FEMA at the time of its publication; however, flood hazard conditions change over time. Communities or private parties may request flood map revisions at any time. Certain types of requests require submission of supporting data. FEMA may also initiate a revision. Revisions to FIS projects may take several forms, including Letters of Map Amendment (LOMAs), Letters of Map Revision Based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs) (referred to collectively as Letters of Map Change (LOMCs)), Physical Map Revisions (PMRs), and FEMA-contracted restudies. These types of revisions are further described below. Some of these types of revisions do not result in the republishing of the FIS Report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data (shown in Table 31, “Map Repositories”).

#### **6.5.1 Letters of Map Amendment**

A LOMA is an official revision by letter to an effective NFIP map. A LOMA results from an administrative process that involves the review of scientific or technical data submitted by the owner or lessee of property who believes the property has incorrectly been included in a designated SFHA. A LOMA amends the currently effective FEMA map and establishes that a specific property is not located in a SFHA. A LOMA cannot be issued for properties located on the PFD (primary frontal dune).

To obtain an application for a LOMA, visit <http://www.fema.gov> and download the form “MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill”. Visit the “Flood Map-Related Fees” section to determine the cost, if any, of applying for a LOMA.

FEMA offers a tutorial on how to apply for a LOMA. The LOMA Tutorial Series can be accessed at [http://www.fema.gov/plan/prevent/fhm/ot\\_lmreq.shtm](http://www.fema.gov/plan/prevent/fhm/ot_lmreq.shtm).

For more information about how to apply for a LOMA, call the FEMA Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627).

#### **6.5.2 Letters of Map Revision Based on Fill**

A LOMR-F is an official revision by letter to an effective NFIP map. A LOMR-F states FEMA’s determination concerning whether a structure or parcel has been elevated on fill above the base flood elevation and is, therefore, excluded from the SFHA.

Information about obtaining an application for a LOMR-F can be obtained in the same manner as that for a LOMA, by visiting <http://www.fema.gov> for the “MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill” or by calling the FEMA Map Information eXchange, toll free, at 1-877-FEMA MAP (1-877-336-2627). Fees for applying for a LOMR-F, if any, are listed in the “Flood Map-Related Fees” section.

A tutorial for LOMR-F is available at [http://www.fema.gov/plan/prevent/fhm/ot\\_lmreq.shtm](http://www.fema.gov/plan/prevent/fhm/ot_lmreq.shtm).

### 6.5.3 Letters of Map Revision

A LOMR is an official revision to the currently effective FEMA map. It is used to change flood zones, floodplain and floodway delineations, flood elevations and planimetric features. All requests for LOMRs should be made to FEMA through the chief executive officer of the community, since it is the community that must adopt any changes and revisions to the map. If the request for a LOMR is not submitted through the chief executive officer of the community, evidence must be submitted that the community has been notified of the request.

To obtain an application for a LOMR, visit <http://www.fema.gov> and download the form “MT-2 Application Forms and Instructions for Conditional Letters of Map Revision and Letters of Map Revision”. Visit the “Flood Map-Related Fees” section to determine the cost of applying for a LOMR. For more information about how to apply for a LOMR, call the FEMA Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627) to speak to a Map Specialist.

Previously issued mappable LOMCs (including LOMRs) that have been incorporated into the City of Columbus – Muscogee County FIRM are listed in Table 27.

**Table 27: Incorporated Letters of Map Change**

Case Number	Effective Date	Flooding Source	FIRM Panel(s)
11-04-4624P	05/31/2011	Biggers Lake	1351580009G

### 6.5.4 Physical Map Revisions

PMRs are an official republication of a community’s NFIP map to effect changes to base flood elevations, floodplain boundary delineations, regulatory floodways and planimetric features. These changes typically occur as a result of structural works or improvements, annexations resulting in additional flood hazard areas or correction to base flood elevations or SFHAs.

The community’s chief executive officer must submit scientific and technical data to FEMA to support the request for a PMR. The data will be analyzed and the map will be revised if warranted. The community is provided with copies of the revised information and is afforded a review period. When the base flood elevations are changed, a 90-day appeal period is provided. A 6-month adoption period for formal approval of the revised map(s) is also provided.

For more information about the PMR process, please visit <http://www.fema.gov> and visit the “Flood Map Revision Processes” section.

### 6.5.5 Contracted Restudies

The NFIP provides for a periodic review and restudy of flood hazards within a given community.

FEMA accomplishes this through a national watershed-based mapping needs assessment strategy, known as the Coordinated Needs Management Strategy (CNMS). The CNMS is used by FEMA to assign priorities and allocate funding for new flood hazard analyses used to update the FIS Report and FIRM. The goal of CNMS is to define the validity of the engineering study data within a mapped inventory. The CNMS is used to track the assessment process, document engineering gaps and their resolution, and aid in prioritization for using flood risk as a key factor for areas identified for flood map updates. Visit [www.fema.gov](http://www.fema.gov) to learn more about the CNMS or contact the FEMA Regional Office listed in Section 8 of this FIS Report.

### **6.5.6 Community Map History**

The current FIRM presents flooding information for the entire geographic area of City of Columbus – Muscogee County. Previously, separate FIRMs, Flood Hazard Boundary Maps (FHBM) and/or Flood Boundary and Floodway Maps (FBFM) may have been prepared for the incorporated communities and the unincorporated areas in the county that had identified SFHAs. Current and historical data relating to the maps prepared for the project area are presented in Table 28, “Community Map History.” A description of each of the column headings and the source of the date is also listed below.

- *Community Name* includes communities falling within the geographic area shown on the FIRM, including those that fall on the boundary line, nonparticipating communities, and communities with maps that have been rescinded. Communities with No Special Flood Hazards are indicated by a footnote. If all maps (FHBM, FBFM, and FIRM) were rescinded for a community, it is not listed in this table unless SFHAs have been identified in this community.
- *Initial Identification Date (First NFIP Map Published)* is the date of the first NFIP map that identified flood hazards in the community. If the FHBM has been converted to a FIRM, the initial FHBM date is shown. If the community has never been mapped, the upcoming effective date or “pending” (for Preliminary FIS Reports) is shown. If the community is listed in Table 28 but not identified on the map, the community is treated as if it were unmapped.
- *Initial FHBM Effective Date* is the effective date of the first Flood Hazard Boundary Map (FHBM). This date may be the same date as the Initial NFIP Map Date.
- *FHBM Revision Date(s)* is the date(s) that the FHBM was revised, if applicable.
- *Initial FIRM Effective Date* is the date of the first effective FIRM for the community. This is the first effective date that is shown on the FIRM panel.
- *FIRM Revision Date(s)* is the date(s) the FIRM was revised, if applicable. This is the revised date that is shown on the FIRM panel, if applicable. As countywide studies are completed or revised, each community listed should have its FIRM dates updated accordingly to reflect the date of the countywide study. Once the FIRMs exist in countywide format, as Physical Map Revisions (PMR) of FIRM panels within the county are completed, the FIRM Revision Dates in the table for each community affected by the PMR are updated with the date of the PMR, even if the PMR did not revise all the panels within that community.

The initial effective date for the City of Columbus – Muscogee County FIRMs in countywide format was 12/01/1982.

**Table 28: Community Map History**

Community Name	Initial Identification Date (First NFIP Map Published)	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
City of Columbus – Muscogee County	10/30/1970	N/A	N/A	10/30/1970	TBD 09/05/2007 05/03/1993 04/17/1985 12/01/1982 07/01/1977 07/01/1974

## SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION

### 7.1 Contracted Studies

Table 29 provides a summary of the contracted studies, by flooding source, that are included in this FIS Report.

**Table 29: Summary of Contracted Studies Included in this FIS Report**

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
All Zone A Streams in HUC-8 03130002	06/01/1982	John J. Harte Associates, Inc.	Contract No. H-4812	December 1979	City of Columbus – Muscogee County
All Zone A Streams in HUC-8 03130003	06/01/1982	John J. Harte Associates, Inc.	Contract No. H-4812	December 1979	City of Columbus – Muscogee County
Biggers Lake	TBD	See LOMR Case No. 11-04-4624	See LOMR Case No. 11-04-4624	05/31/2011	City of Columbus – Muscogee County
Califon Creek	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	May 1993	City of Columbus – Muscogee County
Chattahoochee River in HUC-8 03130002	TBD	AECOM	FY11.13	June 2014	City of Columbus – Muscogee County
Chattahoochee River in HUC-8 03130003	06/01/1982	USACE	N/A	April 1979	City of Columbus – Muscogee County

Table 29: Summary of Contracted Studies Included in this FIS Report (continued)

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Cooper Branch	06/01/1982	John J. Harte Associates, Inc.	Contract No. H-4812	December 1979	City of Columbus – Muscogee County
Cooper Creek	06/01/1982	John J. Harte Associates, Inc.	Contract No. H-4812	December 1979	City of Columbus – Muscogee County
Cooper Creek Tributary	09/05/2007	PBS & J	Contract No. EMA-2003-GR-5369	November 2005	City of Columbus – Muscogee County
Cox Creek	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Dozier Creek	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Dram Branch	06/01/1982	John J. Harte Associates, Inc.	Contract No. H-4812	December 1979	City of Columbus – Muscogee County
Flatrock Creek	06/01/1982	John J. Harte Associates, Inc.	Contract No. H-4812	December 1979	City of Columbus – Muscogee County
Flatrock Creek Tributary No. 1	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Heiferhorn Creek	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Heiferhorn Creek Tributary No. 1	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Heiferhorn Creek Tributary No. 2	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Kendall Creek	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Lindsey Branch	06/01/1982	John J. Harte Associates, Inc.	Contract No. H-4812	December 1979	City of Columbus – Muscogee County
Lindsey Creek	06/01/1982	John J. Harte Associates, Inc.	Contract No. H-4812	December 1979	City of Columbus – Muscogee County
Lindsey Creek East Branch	09/05/2007	PBS & J	Contract No. EMA-2003-GR-5369	November 2005	City of Columbus – Muscogee County
Lindsey Creek Tributary	09/05/2007	PBS & J	Contract No. EMA-2003-GR-5369	November 2005	City of Columbus – Muscogee County

Table 29: Summary of Contracted Studies Included in this FIS Report (continued)

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Lower Bull Creek	06/01/1982	John J. Harte Associates, Inc.	Contract No. H-4812	December 1979	City of Columbus – Muscogee County
Lower Bull Creek Tributary No. 1	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Lower Bull Creek Tributary No. 2	09/05/2007	PBS & J	Contract No. EMA-2003-GR-5369	November 2005	City of Columbus – Muscogee County
Lower Bull Creek Tributary No. 3	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Mill Branch	06/01/1982	John J. Harte Associates, Inc.	Contract No. H-4812	December 1979	City of Columbus – Muscogee County
Randall Creek	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Roaring Branch	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Roaring Branch Tributary No. 1	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Standing Boy Creek	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Standing Boy Creek Tributary No. 1	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
St. Marys Branch	06/01/1982	John J. Harte Associates, Inc.	Contract No. H-4812	December 1979	City of Columbus – Muscogee County
Tar River	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Tiger Creek	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County
Upper Bull Creek	06/01/1982	John J. Harte Associates, Inc.	Contract No. H-4812	December 1979	City of Columbus – Muscogee County
Upper Bull Creek	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County

Table 29: Summary of Contracted Studies Included in this FIS Report (continued)

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Weracoba Creek	05/03/1993	Braswell Engineering, Inc.	Contract No. EMW-90-C-3092	05/03/1993	City of Columbus – Muscogee County

## 7.2 Community Meetings

The dates of the community meetings held for this FIS project and any previous FIS projects are shown in Table 30. These meetings may have previously been referred to by a variety of names (Community Coordination Officer (CCO), Scoping, Discovery, etc.), but all meetings represent opportunities for FEMA, community officials, study contractors, and other invited guests to discuss the planning for and results of the project.

**Table 30: Community Meetings**

Community	FIS Report Dated	Date of Meeting	Meeting Type	Attended By
City of Columbus – Muscogee County	TBD	02/27/2012	Discovery	Georgia DNR, FEMA, GEMA, Dewberry, Atkins, Bender Consulting, and community officials
		TBD	Resilience	TBD
		TBD	CCO Open House	TBD
City of Columbus – Muscogee County	09/05/2007	10/09/2004	Scoping	Representatives from City of Columbus-Muscogee County, Georgia DNR, Georgia Department of Transportation, Greenhome and O'Mara, and FEMA
		05/23/2006	Final CCO	City of Columbus-Muscogee County, Georgia DNR, and PBS&J
City of Columbus – Muscogee County	06/01/1982	06/01/1978	Initial CCO	The study contractor, FEMA, and City of Columbus - Muscogee County
		01/21/1982	Final CCO	The study contractor, FEMA, and community officials

## SECTION 8.0 – ADDITIONAL INFORMATION

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

Table 31 is a list of the locations where FIRMs for City of Columbus – Muscogee County (Consolidated Government) can be viewed. Please note that the maps at these locations are for reference only and are not for distribution. Also, please note that only the maps for the community listed in the table are available at that particular repository. A user may need to visit another repository to view maps from an adjacent community.

**Table 31: Map Repositories**

Community	Address	City	State	Zip Code
City of Columbus – Muscogee County	Storm Water Management 420 10 <sup>th</sup> Street, 2 <sup>nd</sup> Floor	Columbus	GA	31901

The National Flood Hazard Layer (NFHL) dataset is a compilation of effective FIRM databases and LOMCs. Together they create a GIS data layer for a State or Territory. The NFHL is updated as studies become effective and extracts are made available to the public monthly. NFHL data can be viewed or ordered from the website shown in Table 32.

Table 32 contains useful contact information regarding the FIS Report, the FIRM, and other relevant flood hazard and GIS data. In addition, information about the state NFIP Coordinator and GIS Coordinator is shown in this table. At the request of FEMA, each Governor has designated an agency of State or territorial government to coordinate that State's or territory's NFIP activities. These agencies often assist communities in developing and adopting necessary floodplain management measures. State GIS Coordinators are knowledgeable about the availability and location of state and local GIS data in their state.

**Table 32: Additional Information**

FEMA and the NFIP	
FEMA and FEMA Engineering Library website	<a href="http://www.fema.gov">http://www.fema.gov</a>
NFIP website	<a href="http://www.fema.gov/business/nfip">http://www.fema.gov/business/nfip</a>
NFHL Dataset	<a href="http://msc.fema.gov">http://msc.fema.gov</a>
FEMA Region IV	Federal Emergency Management Agency 3003 Chamblee Tucker Road Atlanta, GA 30341 (770) 220-5200
Other Federal Agencies	
USGS website	<a href="http://www.usgs.gov">http://www.usgs.gov</a>

**Table 32: Additional Information continued**

Hydraulic Engineering Center website	<a href="http://www.hec.usace.army.mil">http://www.hec.usace.army.mil</a>
<b>State Agencies and Organizations</b>	
State NFIP Coordinator	Mork Winn Interim Program Manager 4220 International Parkway, Suite 101 Atlanta, GA 30354 Phone: 404-362-2606 Mork.Winn@dnr.state.ga.us
State GIS Coordinator	Lisa Westin Senior GIS Specialist 60 Executive Park South, NE Atlanta, GA 30329 Phone: 404-679-3125 Lwestin@dca.state.ga.us
Statewide Regulatory Coordinator	Tom Shillock, CFM Georgia Statewide Regulatory Coordinator 4220 International Parkway, Suite 101 Atlanta, GA 30354 Phone: 404-675-1607 Tom.Shillock@dnr.state.ga.us

**SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES**

Table 33 includes sources used in the preparation of and cited in this FIS Report as well as additional studies that have been conducted in the study area.

**Table 33: Bibliography and References**

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
FEMA 1982	Federal Emergency Management Agency	<i>Flood Insurance Study, City of Columbus – Muscogee County, Georgia (Consolidated Government)</i>		Washington, D.C.	June 1982	FEMA Map Service Center <a href="http://msc.fema.gov">http://msc.fema.gov</a>
FEMA 1993	Federal Emergency Management Agency	<i>Flood Insurance Study, City of Columbus – Muscogee County, Georgia (Consolidated Government)</i>		Washington, D.C.	05/03/1993	FEMA Map Service Center <a href="http://msc.fema.gov">http://msc.fema.gov</a>
FEMA 2007	Federal Emergency Management Agency	<i>Flood Insurance Study, City of Columbus – Muscogee County, Georgia (Consolidated Government)</i>		Washington, D.C.	09/05/2007	FEMA Map Service Center <a href="http://msc.fema.gov">http://msc.fema.gov</a>
USACE	U.S. Army Engineer District	<i>Special Flood Hazard Information Report - Chattahoochee River, Alabama, Georgia</i>		Mobile, AL	April, 1979	
GA DNR	Georgia Department of Natural Resources	<i>Chattahoochee River Hydrologic Study: Buford Dam to West Point Lake</i>			April 2011	
City of Columbus, Georgia	City of Columbus – Muscogee County, Georgia (Consolidated Government)	<i>Digital Topographic Data, City of Columbus - Muscogee County, Georgia, Contour Interval 2 feet</i>			February 2000, March 2003	
City of Columbus, Georgia	City of Columbus, Georgia	<i>Stormwater Management Program</i>			August 1977	

**Table 33: Bibliography and References continued**

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USACE	U.S. Army Engineering District	<i>Survey of Chattahoochee River at and in the Vicinity of Columbus, Georgia</i>		Mobile, AL	September 1968	
FIA	Department of Housing and Urban Development	<i>Federal Insurance Administration, Flood Insurance Study Bull Creek</i>		Columbus, GA	June 1970	
USGS	U.S. Department of Interior, Geological Survey	<i>Verification of Regression Equations for Estimating Flood Magnitudes for Selected Frequencies on Small Streams in Georgia, Water Resources Investigations, Report 86-4337</i>			1986	
USGS	U.S. Department of Interior, Geological Survey	<i>Flood Frequency Relations for Urban Streams in Georgia, Water Resources Investigations, Report 88-4085</i>			1988	
USGS	U.S. Department of Interior, Geological Survey	<i>Floods in Georgia, Magnitude and Frequency, Water Resources Investigations, Report 78-137</i>			1978	
USGS	U.S. Department of Interior, Geological Survey	<i>Flood-Frequency Relations for Urban Streams in Georgia - 1994 Update, Water Resources Investigations Report 95-4017</i>			1995	

**Table 33: Bibliography and References continued**

Citation in this FIS	Publisher/ Issuer	<i>Publication Title, "Article,"</i> Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USACE 1973	U.S. Army Corps of Engineers, Hydrologic Engineering Center	HEC-1 Flood Hydrograph Package	U.S. Army Corps of Engineers	Davis, CA	January 1973	
USACE 1979	U.S. Army Corps of Engineers, Hydrologic Engineering Center	HEC-2 Water Surface Profiles	U. S. Army Corps of Engineers	Davis, CA	August 1979	
USACE 1982	U.S. Army Corps of Engineers, Hydrologic Engineering Center	HEC-2 Water Surface Profiles	U. S. Army Corps of Engineers	Davis, CA	September 1982	
USACE 2004	U.S. Army Corps of Engineers	<i>HEC-RAS River Analysis System Version 3.1.2</i>	U. S. Army Corps of Engineers	Davis, CA	April 2004	
USACE 2010	U. S. Army Corps of Engineers	Hydrologic Engineering Center. <i>HEC-RAS River Analysis System, Version 4.1.0, Computer Software</i>	U. S. Army Corps of Engineers	Davis, CA	January 2010	
USACE 2004	U.S. Army Corps of Engineers	HEC-GeoRAS	U. S. Army Corps of Engineers	Davis, CA	April 2004	
GA DNR	Georgia Department of Natural Resources	<i>Flood Profiles for Streams Studied by Limited Detailed Methods</i>	City of Columbus – Muscogee County, Georgia	Atlanta, GA	August 2004	
USGS	U.S. Department of the Interior, Geological Survey	7.5-Minute Topographic Maps		Villa Rica, GA	Photo revised 1985	

**Table 33: Bibliography and References continued**

Citation in this FIS	Publisher/ Issuer	<i>Publication Title, "Article," Volume, Number, etc.</i>	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
Watershed Concepts	Watershed Concepts, a Division of Hayes, Seay, Mattern & Mattern, Inc.	<i>Watershed Information System (WISE) Computer Software</i>	Watershed Concepts		2008	