FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 2

LOGAN COUNTY, OHIO

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
BELLE CENTER, VILLAGE OF	390339
BELLEFONTAINE, CITY OF	390340
DEGRAFF, VILLAGE OF	390609
HUNTSVILLE, VILLAGE OF *	391099
LAKEVIEW, VILLAGE OF	390341
LOGAN COUNTY UNINCORPORATED AREAS	390772
QUINCY, VILLAGE OF	390854
RIDGEWAY, VILLAGE OF *	391100
RUSHSYLVANIA, VILLAGE OF *	395337
RUSSELLS POINT, VILLAGE OF	390342
VALLEY HI, VILLAGE OF	391008
WEST LIBERTY, VILLAGE OF	390343
WEST MANSFIELD, VILLAGE OF*	390344
ZANESFIELD, VILLAGE OF	390345

*No Special Flood Hazard Areas Identified

FEMA

PRELIMINARY
APRIL 30, 2014

EFFECTIVE:

TBD

FLOOD INSURANCE STUDY NUMBER
39091CV001A

Version Number 1.0.0.0

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FLOOD INSURANCE STUDY REPORT
LOGAN COUNTY, OHIO

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 Logan County, Ohio.

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 Bellefontaine	390340	05080001	39091C0165D 39091C0169D 39091C0170D 39091C0190D 39091C0277D 39091C0281D 39091C0282D 39091C0284D 39091C0301D 39091C0305D	

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Logan County, Unincorporated Areas	390772	05060001, 05080001	39091C0015D 39091C0020D 39091C0040D 39091C0045D 39091C0075D 39091C0095D 39091C0100D 39091C0120D 39091C0125D 39091C0130D 39091C0131D 39091C0132D 39091C0133D 39091C0134D 39091C0140D 39091C0145D 39091C0155D 39091C0160D 39091C0165D 39091C0169D 39091C0170D 39091C0190D 39091C0195D 39091C0200D 39091C0225D 39091C0235D 39091C0245D 39091C0255D 39091C0258D 39091C0260D 39091C0261D 39091C0262D 39091C0265D 39091C0266D 39091C0270D 39091C0277D 39091C0280D 39091C0281D 39091C0282D 39091C0283D	

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Logan County, Unincorporated Areas	390772	05060001, 05080001	39091C0284D 39091C0290D 39091C0294D 39091C0295D 39091C0301D 39091C0305D 39091C0310D 39091C0313D 39091C0315D 39091C0320D 39091C0350D 39091C0357D 39091C0360D 39091C0376D 39091C0380D 39091C0400D 39091C0425D	
Village of Belle Center	390339	05080001	39091C0045D 39091C0075D	
Village of DeGraff	390609	05080001	39091C0258D 39091C0266D	
Village of Huntsville[1]	391099	05080001	39091C0160D 39091C0170D	

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Village of Lakeview	390341	05080001	39091C0131D	
Village of Quincy	390854	05080001	39091C0261D 39091C0262D	
Village of Ridgeway[1]	391100	05060001	39091C0095D 39091C0100D	
Village of Rushsylvania[1]	395377	05060001, 05080001	39091C0200D	
Village of Russells Point	390342	05080001	39091C0132D 39091C0134D	
Village of Valley Hi	391008	05080001	39091C0305D 39091C0310D 39091C0315D 39091C0320D	
Village of West Liberty	390343	05080001	39091C0294D 39091C0313D 39091C0357D 39091C0376D	
Village of West Mansfield[1]	390344	05060001	39091C0225D	
Village of Zanesfield	390345	05080001	39091C0310D	

[1] No Special Flood Hazard Areas Identified

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 Logan County became effective on TBD. Refer to Table 28 for information about subsequent revisions to the FIRMs.

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

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

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

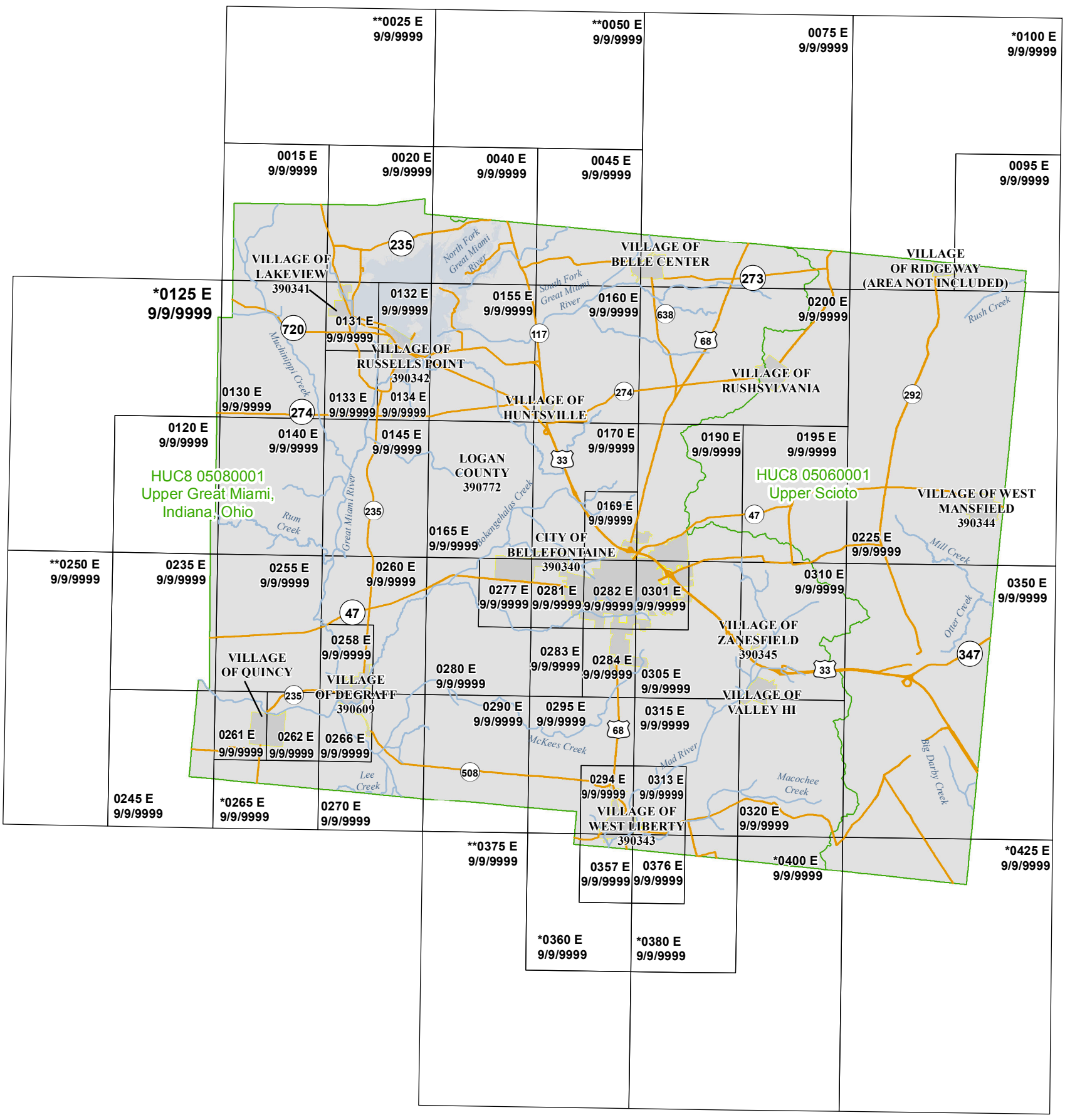
  The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Visit the FEMA Web site at http://www.fema.gov or contact your appropriate FEMA Regional Office for more information about this program.

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

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

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

Figure 1: FIRM Panel Index



1 inch = 20,000 feet 1:240,000

Feet
0 5,500 11,000 22,000 33,000 44,000

Map Projection:
State Plane Ohio North FIPS 3401;
North American Datum 1983

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

HTTP://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

* PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS
** PANEL NOT PRINTED - AREA OUTSIDE COUNTY BOUNDARY

COUNTY LOCATOR

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX

LOGAN COUNTY, USA and Incorporated Areas

PANELS PRINTED:

0015, 0020, 0040, 0045, 0075, 0095, 0120, 0130, 0131, 0132, 0133, 0134, 0140, 0145, 0155, 0160, 0165, 0169, 0170, 0190, 0195, 0200, 0225, 0235, 0245, 0255, 0258, 0260, 0261, 0262, 0266, 0270, 0277, 0280, 0281, 0282, 0283, 0284, 0290, 0294, 0295, 0301, 0305, 0310, 0313, 0315, 0320, 0350, 0357, 0376

PRELIMINARY
APRIL 30 2014

MAP NUMBER
39091CIND0A

MAP REVISED
PRELIMINARY

FEMA

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 State Plane Lambert Conformal Conic Ohio North Zone 3401. The horizontal datum was NAD83**.** 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 United States Geological Survey
(USGS), Logan County, and Ohio Department of Natural Resources. This information was derived from digital orthophotography at a 1-foot resolution from photography dated 2007. 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 Logan County, OH, 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.

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Logan County, OH, 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

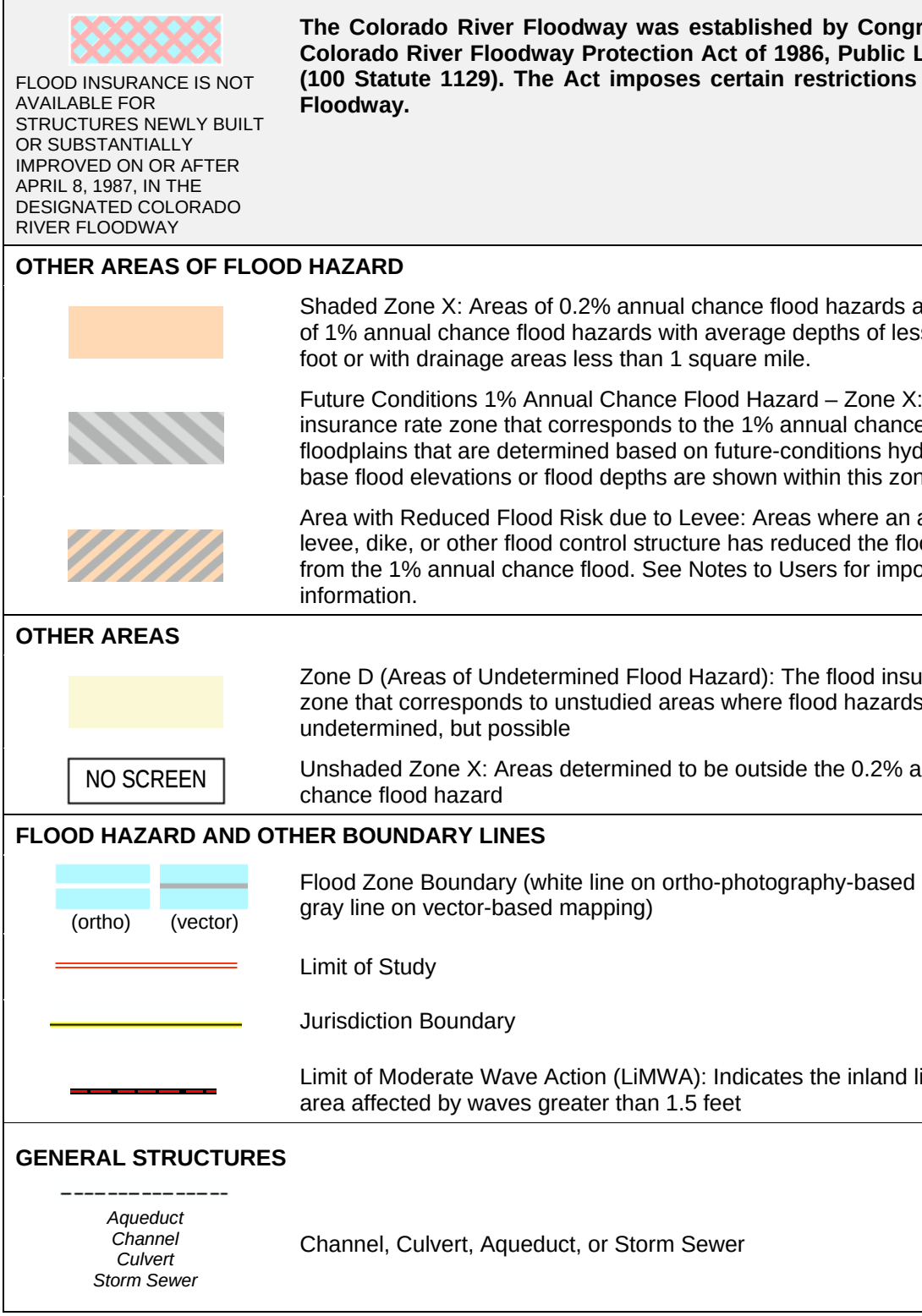
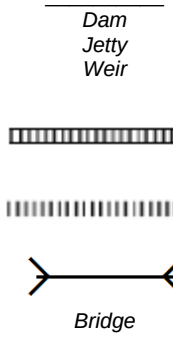


Figure 3: Map Legend for FIRM



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.

Bridge

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA): *CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas. See Notes to Users for important information.*

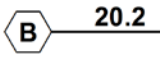
Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.

Otherwise Protected Area

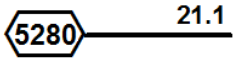
REFERENCE MARKERS

River mile Markers

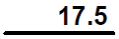
CROSS SECTION & TRANSECT INFORMATION



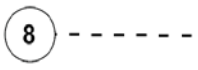
Lettered Cross Section with Regulatory Water Surface Elevation (BFE)



Numbered Cross Section with Regulatory Water Surface Elevation (BFE)



Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)



Coastal Transect

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.

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.

Figure 3: Map Legend for FIRM

513	Base Flood Elevation Line (shown for flooding sources for which no cross sections or profile are available)
ZONE AE (EL 16)	Static Base Flood Elevation value (shown under zone label)
ZONE AO (DEPTH 2)	Zone designation with Depth
ZONE AO (DEPTH 2) (VEL 15 FPS)	Zone designation with Depth and Velocity
BASE MAP FEATURES	
Missouri Creek	River, Stream or Other Hydrographic Feature
234	Interstate Highway
234	U.S. Highway
234	State Highway
234	County Highway
MAPLE LANE	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
RAILROAD	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
$^{42}76^{000m}$E	Horizontal Reference Grid Coordinates (UTM)
365000 FT	Horizontal Reference Grid Coordinates (State Plane)
80° 16’ 52.5”	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 Logan 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 Logan County, OH, 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.

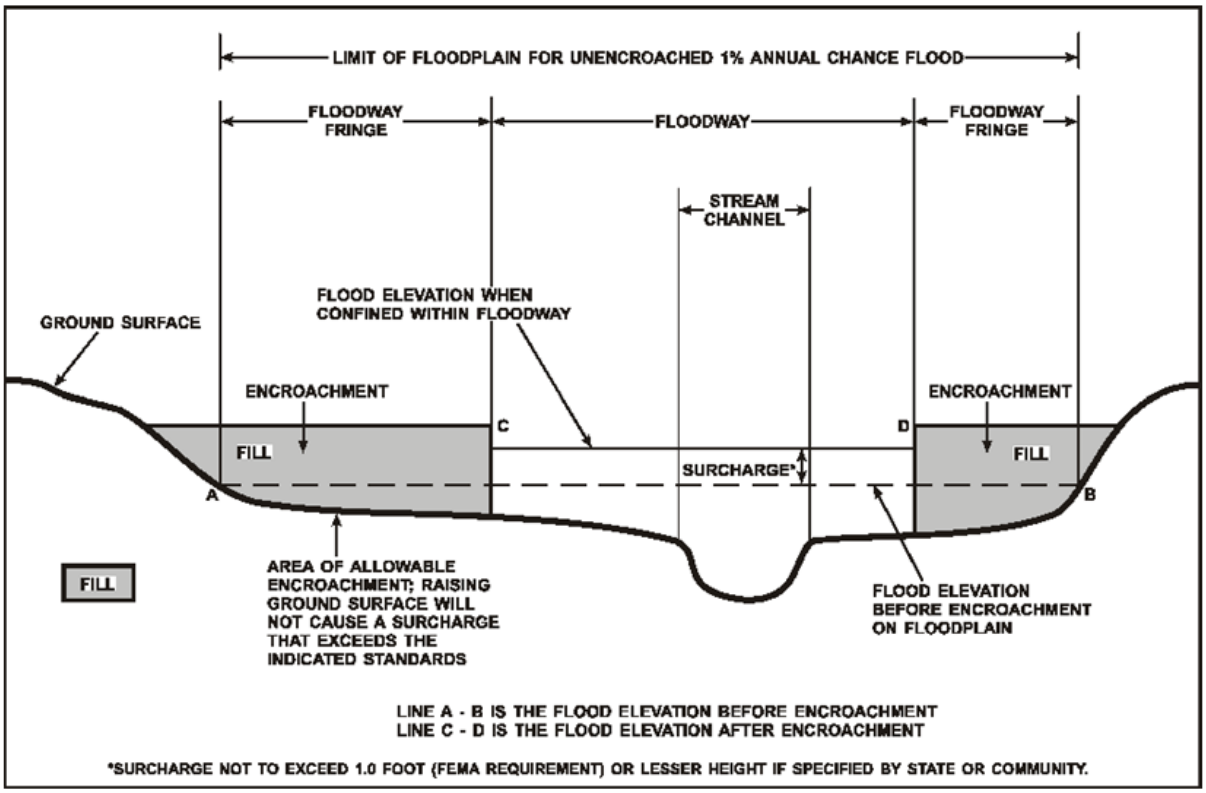
2.2 Floodways

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. 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^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Big Darby Creek	Logan County	County Boundary	5500 feet upstream of Township Route 157	05060001	2.4		N	A	December 2012
Black Lake Outlet	Logan County	Confluence with Stony Creek	Private Drive near Black Lake	05080001	0.4		N	AE	November 1984
Black Lake Unnamed Tributary 01A	Logan County	Confluence with Black Lake Outlet	1800 feet upstream of Township Route 33	05080001	1.9		N	A	December 2012
Black Lake Unnamed Tributary 01B	Logan County	Confluence with Black Lake Outlet	Just downstream of State Route 508	05080001	0.6		N	A	December 2012
Blue Jacket Creek	Logan County, City of Bellefontaine	Confluence with Bokengehalas Creek	Eastern Avenue	05080001	8.1		Y	AE	November 1984 July 1984
Bokengehalas Creek	City of Bellefontaine, Logan County, Village of DeGraff	Mouth of Bokengehalas	Approximately 2300 feet upstream of Township Route 36	05080001	14.4		Y	AE, A	December 2012 November 1984 July 1978
Brandywine Creek	Logan County	Confluence with Great Miami River	630 feet upstream of Township Route 53	05080001	2.9		N	A	December 2012
Calico Creek	Logan County	Confluence with Muchinippi Creek	2400 feet upstream of State Route 720	05080001	0.5		N	A	December 2012

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Cherokee Mans Run	Logan County	Confluence with Great Miami River	4300 feet upstream of Township Route 238	05080001	11.5		N	A	December 2012
Flat Branch	Logan County	Confluence with Bokengehalas Creek	Wish Road	05080001	4.8		N	AE	November 1984
Flat Branch	Logan County	Big Darby Creek	3000 feet upstream of mouth	05060001	0.6		N	A	December 2012
Graves Creek	Logan County	Confluence with Lee Creek	County Boundary	05080001	1.1		Y	AE	November 1984
Great Miami River	Logan County, Village of Russells Point, Village of DeGraff	3,100 feet upstream of upstream County Road 13	Indian Lake Dam	05080001	26.1		Y	AE, A	December 2012
Great Miami River Tributary 10	Logan County	Confluence with Great Miami River	4500 feet upstream of Township Route 229	05080001	1.0		N	A	December 2012
Great Miami River Tributary 15	Logan County	Confluence with Great Miami River	750 feet upstream of State Route 235	05080001	0.6		N	A	December 2012
Great Miami River Tributary 16	Logan County	Indian Lake	4850 feet upstream of mouth	05080001	0.9		N	A	December 2012
Great Miami River UT03	Logan County, Village of Lakeview	Confluence with Great Miami River	2150 feet upstream of County Route 275	05080001	5.0		N	A	December 2012

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Great Miami River UT03A	Logan County, Village of Russells Point	Confluence with Great Miami River UT03	1800 feet upstream of County Route 52	05080001	1.1		N	A	December 2012
Great Miami River UT03A1	Logan County, Village of Russells Point	Confluence with Great Miami River UT03A	630 feet upstream of US Route 33	05080001	0.8		N	A	December 2012
Great Miami River UT03A1 Tributary 1	Logan County, Village of Russells Point	Confluence with Great Miami River UT03A1	1100 feet upstream of mouth	05080001	0.2		N	A	December 2012
Great Miami River UT03A1 Tributary 1.2	Logan County, Village of Russells Point	Confluence with Great Miami River UT03A1 Tributary 1	1050 feet upstream of mouth	05080001	0.2		N	A	December 2012
Great Miami River UT03A1 Tributary 1.2.2	Logan County	Confluence with Great Miami River UT03A1 Tributary 1.2	1050 feet upstream of mouth	05080001	0.2		N	A	December 2012
Great Miami River UT03B	Logan County	Confluence with Great Miami River UT03	4700 feet upstream of State Route 235	05080001	1.5		N	A	December 2012
Great Miami River UT03B Tributary 1	Logan County	Confluence with Great Miami River UT03B	1200 feet upstream of Township Route 240	05080001	0.7		N	A	December 2012
Indian Creek	Logan County	Confluence with Great Miami River	Just downstream of County Route 24	05080001	0.7		N	A	December 2012
Jordan Creek	Logan County, Village of Russells Point	Confluence with Great Miami River	560 feet upstream of State Route 274	05080001	1.5		N	A	December 2012

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Lee Creek	Logan County	Confluence with Lee Creek	County Boundary	05080001	2.5		Y	AE	November 1984
Little Muchinippi Creek	Logan County	Confluence with Muchinippi Creek	County Route 23	05080001	1.1		N	A	December 2012
Macochee Creek	Logan County, Village of West Liberty	Confluence with Mad River	6400 feet upstream of County Route 28	05080001	7.6		Y	AE	November 1984 September 1984
Mad River	Logan County, Village of Valley Hi, Village of West Liberty	County Boundary	State Route 540	05080001	12.7		Y	AE	November 1984 September 1984
McKees Creek	Logan County	Confluence with Stony Creek	Ludlow Road	05080001	9.8		Y	AE	November 1984
Mill Creek	Logan County	County Boundary	2800 feet above County Route 8	05060001	5.8		N	A	December 2012
Mill Creek Tributary 1	Logan County	Confluence with Mill Creek	2300 feet above mouth	05060001	0.4		N	A	December 2012
Mill Creek Tributary 7	Logan County	Confluence with Mill Creek	1100 feet upstream of County Route 2	05060001	0.4		N	A	December 2012
Mill Creek Tributary 8	Logan County	Confluence with Mill Creek	2900 feet above mouth	05060001	0.6		N	A	December 2012
Muchinippi Creek	Logan County	Confluence with Great Miami River	County Boundary	05080001	11.0		N	A	December 2012
Muchinippi Creek Tributary 2	Logan County	Confluence with Muchinippi Creek	2900 feet above mouth	05080001	0.6		N	A	December 2012

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Muchinippi Creek Tributary 3	Logan County	Confluence with Muchinippi Creek	5500 feet upstream of County Route 54	05080001	1.1		N	A	December 2012
Muchinippi Creek Tributary 5	Logan County	Confluence with Muchinippi Creek	2000 feet upstream of County Route 52	05080001	0.8		N	A	December 2012
Mud Run	Logan County, Village of West Liberty	Confluence with Mad River	450 feet upstream of Conrail	05080001	1.5		Y	AE	November 1984 September 1984
Neals Run	Logan County	Confluence with Great Miami River	2000 feet upstream of Township Route 229	05080001	0.4		N	A	December 2012
North Fork Great Miami River	Logan County	Indian Lake	2300 feet upstream of County Route 97	05080001	5.2		N	A	December 2012
North Fork Great Miami River Tributary 3	Logan County	Confluence with North Fork Great Miami River	1200 feet upstream of State Route 273	05080001	0.6		N	A	December 2012
North Fork Great Miami River Tributary 4	Logan County	Confluence with North Fork Great Miami River	2600 feet above mouth	05080001	0.5		N	A	December 2012
North Fork Great Miami River Tributary 5	Logan County	Confluence with North Fork Great Miami River	4700 feet above mouth	05080001	0.9		N	A	December 2012
Otter Creek	Logan County	Confluence with Mill Creek	6500 feet upstream of County Route 10	05060001	3.2		N	A	December 2012

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Otter Creek Tributary 1	Logan County	Confluence with Otter Creek	3000 feet upstream of County Route 142	05060001	0.8		N	A	December 2012
Otter Creek Tributary 1A	Logan County	Confluence with Otter Creek Tributary 1	1200 feet above mouth	05060001	0.2		N	A	December 2012
Otter Creek Tributary 2	Logan County	Confluence with Otter Creek	1400 feet above mouth	05060001	0.3		N	A	December 2012
Peter Ditch	Logan County	Confluence with Mad River	1100 feet upstream of US Route 33	05080001	2.1		Y	AE	November 1984
Possum Run	City of Bellefontaine	Confluence with Blue Jacket Creek	Elm Street	05080001	1.6		Y	AE	September 2013 November 1984 July 1984
Rennick Creek	Logan County	Confluence with Great Miami River	11,400 feet upstream of County Route 91	05080001	4.5		N	A	December 2012
Rennick Creek Tributary 1	Logan County	Confluence with Rennick Creek	State Route 274	05080001	1.1		N	A	December 2012
Rum Creek	Logan County	Confluence with Great Miami River	County Boundary	05080001	7.3		N	A	December 2012
Rum Creek Tributary 2	Logan County	Confluence with Rum Creek	1800 feet upstream of mouth	05080001	0.3		N	A	December 2012
Rush Creek	Logan County	County Boundary	1200 feet upstream of County Route 117	05060001	2.6		N	A	December 2012

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
South Fork Great Miami River	Logan County	Indian Lake	1000 feet upstream of Township Route 51	05080001	13.2		N	A	December 2012
South Fork Great Miami River Tributary 10	Logan County, Village of Belle Center	Confluence with South Fork Great Miami River	2300 feet upstream of State Route 273	05080001	1.8		N	A	December 2012
South Fork Great Miami River Tributary 11	Logan County, Village of Belle Center	Confluence with South Fork Great Miami River	4800 feet upstream of State Route 273	05080001	1.6		N	A	December 2012
South Fork Great Miami River UT01	Logan County	Confluence with South Fork Great Miami River	1100 feet upstream of US Route 68	05080001	5.4		N	A	December 2012
South Fork Great Miami River UT01A	Logan County	Confluence with South Fork Great Miami River UT01	6400 feet upstream of County Route 105	05080001	1.5		N	A	December 2012
South Fork Great Miami River UT01B	Logan County	Confluence with South Fork Great Miami River UT01	Just downstream of State Route 274	05080001	1.6		N	A	December 2012
South Fork Great Miami River UT01C	Logan County	Confluence with South Fork Great Miami River UT01	1600 feet upstream of County Route 113	05080001	1.3		N	A	December 2012
South Fork Great Miami River UT02	Logan County	Confluence with South Fork Great Miami River	3100 feet upstream of County Route 101	05080001	2.7		N	A	December 2012

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
South Fork Great Miami River UT03	Logan County	Confluence with South Fork Great Miami River	1200 feet upstream of County Route 5	05080001	1.1		N	A	December 2012
Stony Creek	Logan County	Mouth of Creek	250 feet upstream of County Route 31	05080001	6.6		Y	AE	November 1984 July 1978
Sugar Creek	Logan County	Confluence with Mad River	4100 feet above mouth	05080001	1.9		N	AE, A	December 2012 November 2012
Tributary A	Logan County	Confluence with Mad River	County Route 5	05080001	0.5		Y	AE	November 1984
Tributary B	Logan County	Confluence with Mad River	County Route 29	05080001	0.8		Y	AE	November 1984
Tributary C	Logan County	Confluence with Mad River	County Route 5	05080001	0.4		Y	AE	November 1984
Tributary D	Logan County	Confluence with Mad River	1900 feet upstream of Private Drive	05080001	0.9		Y	AE	November 1984
Tributary E	Logan County	Confluence with Mad River	5700 feet upstream of mouth	05080001	1.1		Y	AE	November 1984
Tributary F	Logan County	Confluence with Mad River	750 feet upstream of County Route 25	05080001	0.3		Y	AE	November 1984
Tributary G	Logan County	Confluence with Mad River	1800 feet upstream of County Route 25	05080001	0.4		Y	AE	November 1984

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Tributary H	Logan County	Confluence with Peter Ditch	2950 feet upstream of US Route 33	05080001	0.7		Y	AE	November 1984
Tributary I	Logan County	Confluence with Macochee Creek	Township Highway 166	05080001	0.7		Y	AE	November 1984
Tributary J	Logan County	Confluence with Macochee Creek	1650 feet upstream of Township Highway 78	05080001	0.7		Y	AE	November 1984
Tributary K	Logan County	Confluence with Bokengehalas Creek	Bellefontaine City Limits	05080001	1.3		Y	AE	November 1984
Tributary L	Logan County, City of Bellefontaine	Confluence with Blue Jacket Creek	Brennan Road	05080001	0.6		Y	AE	November 1984 July 1984
Tributary M	Logan County	Confluence with Flat Branch	3300 feet upstream of Township Highway 66	05080001	1.6		Y	AE	November 1984
Tributary N	Logan County, City of Bellefontaine	Confluence with Tributary L	950 feet above mouth	05080001	0.2		Y	AE	November 1984 July 1984
Tributary P	Logan County	Graves Creek	County Boundary	05080001	0.4		Y	AE	November 1984
Wheeler Creek	Logan County	Confluence with Rum Creek	Township Route 35	05080001	0.6		Y	A	December 2012
Wheeler Creek Tributary 1	Logan County	Confluence with Wheeler Creek	2500 feet upstream of Township Route 35	05080001	0.7		Y	A	December 2012

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Willow Creek	Logan County	Confluence with Muchinippi Creek	2500 feet upstream of County Route 88	05080001	0.9		Y	A	December 2012
Wissahicken Creek	Logan County, City of Bellefontaine	Confluence with Bokengehalas Creek	Private Drive	05080001	0.6		Y	AE	November 1984 July 1984

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 l% 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.

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 Logan County.

Table 3: Flood Zone Designations by Community

Community	Flood Zone(s)
Logan County, Unincorporated Areas	A, AE, X
City of Bellefontaine	A, AE, X
Village of Belle Center	A, X
Village of DeGraff	A, AE, X
Village of Huntsville	X
Village of Lakeview	A, AE, X
Village of Quincy	A, X
Village of Ridgeway	X
Village of Rushsylvania	X
Village of Russells Point	AE, X
Village of Valley Hi	AE, X
Village of West Liberty	AE, X

Community	Flood Zone(s)
Village of West Mansfield	X
Village of Zanesfield	AE, 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**)
Upper Great Miami	05080001	Great Miami River	Watershed covers portions of Ohio and Indiana, encompasses most of Logan County	2,512
Upper Scioto	05060001	Inundation River	Touches only the eastern most portion of Logan County	3,196

4.2 Principal Flood Problems

Table 6 contains a description of the principal flood problems that have been noted for Logan County by flooding source.

Table 6: Principal Flood Problems

Flooding Source	Description of Flood Problems
Mad River	Major floods of the Upper Mad River watershed have occurred during winter or early spring. Floods at this time of year usually result from heavy rains falling on frozen and sometimes snow-covered ground. Since the frozen ground inhibits infiltration, most of the rainfall turns to runoff. Flowing through the culverts and bridges, the water backs up and is forced to find overland routes not normally used when the ground is more absorbent to rain. Ice jams often form at bridges and culverts and cause backwater conditions higher than would normally be expected. The worst flood on record for Mad River is the flood of March 1913 in which many bridges were seriously weakened. Many homes and businesses were damaged by the 8-inch rain that fell within a 48-hour period. The flood of January 1959 affected some 200 homes in West Liberty and damaged the Village sewage disposal system.
Bokengehalas Creek	According to stream gages located on Bokengehalas Creek, the largest flood occurred in 1959.
Stony Creek	According to stream gages along Stony Creek, the largest flood occurred in 1959 with Stony Creek having the largest flow of 270 cfs. In the Bellefontaine area, major floods occurred in 1972 and 1975.
Possum Run	During the flood of April 1972 the floodwaters of Possum Run caused a devastating gas line explosion in Bellefontaine, destroying one building and damaging others. Basements in homes and businesses in all parts of the community had to be pumped free of water. In 1972 creek banks were topped again, causing property damage. Grain farmers, especially soybean farmers, were affected by this storm due to wet fields and unharvested crops.

Table 7 contains information about historic flood elevations in the communities within **Logan County**.

Table 7: Historic Flooding Elevations

Flooding Source	Location	Historic Peak (**Feet NAVD88**)	Event Date	Approximate Recurrence Interval (years)	Source of Data
Bokengehalas Creek	At DeGraff	7.21	2005	5-10	USGS gage

4.3 Non-Levee Flood Protection Measures

Table 8 contains information about non-levee flood protection measures within **Logan County** 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

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Peter Ditch	N/A	Dike	Along County Route 153 downstream of US Route 33	This structure prevents the flooding of the north overbank by storms of less than or equal to the 10-year frequency.

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 * Not **calculated for this FIS project**

Figure 7 for selected flooding sources. A summary of stillwater elevations developed for non-coastal flooding sources is provided in Table 11. 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
Big Darby Creek	At County	26.8	*	*	*	4,700	*
Big Darby Creek	Below Little Darby Creek	26.5	*	*	*	4,690	*
Big Darby Creek	Below Flat Branch	19.5	*	*	*	3,620	*
Big Darby Creek	Above Flat Branch	5.87	*	*	*	1,530	*
Big Darby Creek Trib 3	At Mouth	0.09	*	*	*	101	*
Big Darby Creek Trib 4	At Mouth	0.11	*	*	*	109	*
Big Darby Creek Trib 5	At Mouth	0.11	*	*	*	128	*
Big Darby Creek Trib 6	At Mouth	0.11	*	*	*	122	*
Big Darby Creek Trib 7	At Mouth	0.28	*	*	*	193	*
Black Creek	At Mouth	3.6	*	*	*	952	*
Black Lake	Above Trib1	1.75	*	*	*	608	*
Black Lake	Above Trib 3	1.18	*	*	*	518	*
Black Lake Outlet	At Mouth	N/A	267	*	460	556	820
Black Lake Trib 1	At Mouth	1.83	*	*	*	543	*
Black Lake Trib 2	At Mouth	0.27	*	*	*	131	*
Blue Jacket Creek	At Mouth	N/A	680	*	1,010	1,160	1,530
Blue Jacket Creek	At Troy Road	N/A	577	*	903	1,056	1,440
Bokengehalas Creek	At Mouth	41.4	1,430	*	2,070	2,340	3,040

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
Bokengehalas Creek	At Tidewater Road	N/A	700	*	1,010	1,610	1,510
Bokengehalas Creek	Above County Road 130	3.23	*	*	*	1,050	*
Bokengehalas Creek	At Children's Home Road	N/A	331	*	491	565	745
Brandywine Creek	Below Trib A	7.62	*	*	*	1,530	*
Brandywine Creek at Mouth	At Mouth	9.49	*	*	*	1,730	*
Calico Creek	At Mouth	3.35	*	*	*	858	*
Cherokee Mans Run	At Mouth	17.7	*	*	*	3,160	*
Cherokee Mans Run	Above Trib 18	14.4	*	*	*	2,740	*
Cherokee Mans Run	Above Trib 8	11	*	*	*	2,200	*
Cherokee Mans Run	Above Cherokee Run	4.38	*	*	*	1,300	*
Cherokee Mans Run	Above Trib 14	3.66	*	*	*	1,160	*
Cherokee Mans Run	AboveTrib 15	3.08	*	*	*	1,040	*
Cherokee Mans Run	Above Trib 16	2.05	*	*	*	805	*
Cherokee Mans Run Trib 11	At Mouth	0.01	*	*	*	8	*
Cherokee Mans Run Trib 12	At Mouth	0.9	*	*	*	218	*
Cherokee Mans Run Trib 13	At Mouth	0.01	*	*	*	18	*
Cherokee Mans Run Trib 14	At Mouth	0.5	*	*	*	349	*

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
Cherokee Mans Run Trib 15	At Mouth	0.18	*	*	*	169	*
Cherokee Mans Run Trib 16	At Mouth	0.61	*	*	*	316	*
Cherokee Mans Run Trib 16.1	At Mouth	0.02	*	*	*	20	*
Cherokee Mans Run Trib 16.2	At Mouth	0.53	*	*	*	251	*
Cherokee Mans Run Trib 2	At Mouth	0	*	*	*	0	*
Cherokee Mans Run Trib 3	At Mouth	0.47	*	*	*	233	*
Cherokee Mans Run Trib 4	At Mouth	0.13	*	*	*	82	*
Cherokee Mans Run Trib 6	At Mouth	0.74	*	*	*	310	*
Cherokee Mans Run Trib 7	At Mouth	0.34	*	*	*	207	*
Cherokee Mans Run Trib 8	At Mouth	2.27	*	*	*	881	*
Cherokee Mans Run Trib 9	At Mouth	0.19	*	*	*	100	*
Cherokee Run	At Mouth	3.99	*	*	*	1,300	*
Flat Branch	At Mouth	13.6	*	*	*	1,900	*
Flat Branch	At Mouth	N/A	977	*	1,447	1,634	2,344
Flat Branch	0.2 miles upstream of US Route 33	N/A	624	*	967	1,109	1,549
Flat Branch Trib 1	At Mouth	0.18	*	*	*	156	*
Graves Creek	At Mouth	N/A	970	*	1,500	1,740	2,370
Great Miami River	At County Line	410	*	*	*	18,200	*

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
Great Miami River	Above Bokengehalas Ck	297	*	*	*	14,300	*
Great Miami River	Above Rum Ck	256	*	*	*	12,700	*
Great Miami River	Above Brandywine Ck	235	*	*	*	12,000	*
Great Miami River Trib 10	At Mouth	4.92	*	*	*	1,290	*
Great Miami River Trib 11	At Mouth	0.22	*	*	*	201	*
Great Miami River Trib 12	At Mouth	0.35	*	*	*	223	*
Great Miami River Trib 13	At Mouth	2.49	*	*	*	728	*
Great Miami River Trib 14	At Mouth	1.08	*	*	*	476	*
Great Miami River Trib 15	At Mouth	0.42	*	*	*	223	*
Great Miami River Trib 16	At Mouth	2.59	*	*	*	309	*
Great Miami River Trib 4	At Mouth	0.51	*	*	*	359	*
Great Miami River Trib 5	At Mouth	1.45	*	*	*	669	*
Great Miami River Trib 7	At Mouth	0.12	*	*	*	121	*
Great Miami River Trib 8	At Mouth	0.13	*	*	*	129	*
Great Miami River Trib 9	At Mouth	0.38	*	*	*	268	*
Great Miami River UT01	At Mouth	2.37	*	*	*	869	*

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
Great Miami River UT02	At Mouth	0.48	*	*	*	298	*
Great Miami River UT03	At Mouth	11	*	*	*	1,870	*
Great Miami River UT03	Above UT03a	8.74	*	*	*	1,610	*
Great Miami River UT03	Above Trib 1	2.17	*	*	*	642	*
Great Miami River UT03	At US 33	7.31	*	*	*	638	*
Great Miami River UT03a	At Mouth	0.64	*	*	*	196	*
Great Miami River UT03a	Above A	0.13	*	*	*	76	*
Great Miami River UT03a	Above B	0.08	*	*	*	68	*
Great Miami River UT03a1	At Mouth	0.29	*	*	*	119	*
Great Miami River UT03a1	Above A	0.25	*	*	*	116	*
Great Miami River UT03a1	Above Trib 1	0.05	*	*	*	29	*
Great Miami River UT03a1 Trib 1	Above 1.1	0.03	*	*	*	23	*
Great Miami River UT03a1 Trib 1	Above 1.2.1	0.02	*	*	*	14	*
Great Miami River UT03a1 Trib 1	Above 1.2.1 Abv A	0.01	*	*	*	6	*

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
Great Miami River UT03a1 Trib 1.1	At Mouth	0.01	*	*	*	8	*
Great Miami River UT03a1 Trib 1.1	Above A	0	*	*	*	3	*
Great Miami River UT03a1 Trib 1.2.1	At Mouth	0.01	*	*	*	12	*
Great Miami River UT03b	At Mouth	1.05	*	*	*	239	*
Great Miami River UT03b	Above Trib1	0.21	*	*	*	109	*
Great Miami River UT03b Trib 1	At Mouth	0.46	*	*	*	145	*
Indian Creek	At Mouth	6.63	*	*	*	1,490	*
Jordon Creek	At Mouth	4.87	*	*	*	1,340	*
Jordon Creek	Above Trib 2	3	*	*	*	968	*
Lee Creek	At Mouth	N/A	645	*	1,010	1,180	1,620
Little Darby Creek	At Mouth	6.96	*	*	*	1,880	*
Little Muchinippi Creek	At Mouth	35.5	*	*	*	4,170	*
Macochee Creek	At Mouth	N/A	3,700	*	5,510	6,040	8,750
Macochee Creek	Just downstream of West Liberty corporate limits	N/A	1,620	*	2,520	2,750	3,870
Macochee Creek	At State Route 287	N/A	1,600	*	2,420	2,620	3,630
Macochee Creek	At County Route 28	N/A	980	*	1,450	1,560	2,110

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
Mad River	At downstream County Boundary	61	4,010	*	5,990	6,560	9,460
Mad River	500 feet downstream of US Route 68	N/A	3,700	*	5,510	6,040	8,750
Mad River	500 feet downstream of US Route 68	N/A	3,700	*	5,510	6,040	8,750
Mad River	At US Route 33	N/A	1,810	*	2,450	2,720	4,020
Mad River	At State Route 540	N/A	1,030	*	1,600	1,740	2,370
McKees Creek	At Ludlow Road	N/A	556	*	962	1,180	1,730
McKees Creek	At Mouth	N/A	600	*	935	110	1,500
Mill Creek	At County Line	36.1	*	*	*	5,680	*
Mill Creek	Above Otter Creek	23.1	*	*	*	4,020	*
Mill Creek	Above Trib 8	12.6	*	*	*	2,790	*
Mill Creek	At CR 8	10.7	*	*	*	2,530	*
Mill Creek Trib 1	At Mouth	1.08	*	*	*	405	*
Mill Creek Trib 10	At Mouth	0.16	*	*	*	145	*
Mill Creek Trib 2	At Mouth	0.08	*	*	*	75	*
Mill Creek Trib 3	At Mouth	0.41	*	*	*	219	*
Mill Creek Trib 4	At Mouth	0.06	*	*	*	67	*
Mill Creek Trib 5	At Mouth	0.13	*	*	*	107	*
Mill Creek Trib 6	At Mouth	0.11	*	*	*	107	*
Mill Creek Trib 7	At Mouth	1.44	*	*	*	594	*
Mill Creek Trib 8	At Mouth	5.93	*	*	*	1,690	*
Mill Creek Trib 9	At Mouth	0.6	*	*	*	306	*
Muchinippi Creek	At Mouth	88.5	*	*	*	7,640	*
Muchinippi Creek	Above Little Muchinippi Creek	36.9	*	*	*	3,960	*
Muchinippi Creek	Above Willow Creek	19.7	*	*	*	2,730	*

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
Muchinippi Creek Trib 1	At Mouth	0.46	*	*	*	230	*
Muchinippi Creek Trib 2	At Mouth	3.4	*	*	*	902	*
Muchinippi Creek Trib 3	At Mouth	1.01	*	*	*	286	*
Muchinippi Creek Trib 4	At Mouth	2.1	*	*	*	521	*
Muchinippi Creek Trib 5	At Mouth	1.04	*	*	*	281	*
Muchinippi Creek Trib 6	At Mouth	1.02	*	*	*	388	*
Mud Run	450 feet downstream of State Route 245	N/A	280	*	430	460	630
Neals Run	At Mouth	2.9	*	*	*	967	*
North Fork	At Mouth	21.4	*	*	*	2,800	*
North Fork	North Fork abv Trib 5	15.8	*	*	*	2,580	*
North Fork Trib 1 B	At Mouth	0.94	*	*	*	345	*
North Fork Trib 2	At Mouth	0.1	*	*	*	71	*
North Fork Trib 3	At Mouth	1.05	*	*	*	376	*
North Fork Trib 4	At Mouth	0.62	*	*	*	246	*
North Fork Trib 5	At Mouth	2.6	*	*	*	664	*
North Fork Trib 5	Above Trib A	2.12	*	*	*	609	*
North Fork Trib 6	At Mouth	0.16	*	*	*	130	*
Otter Creek	At Mouth	11.6	*	*	*	2,790	*
Otter Creek	Above UT01	8.47	*	*	*	2,320	*
Otter Creek	Above Trib 3	4.53	*	*	*	1,600	*
Otter Creek Trib 1	At Mouth	0.04	*	*	*	46	*

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
Otter Creek Trib 2	At Mouth	0.77	*	*	*	112	*
Otter Creek Trib 3	At Mouth	2.3	*	*	*	1,010	*
Otter Creek UT01	At Mouth	2.89	*	*	*	1,120	*
Otter Creek UT01 Trib 1	At Mouth	0.19	*	*	*	145	*
Peter Ditch	At Mouth	N/A	770	*	1,220	1,340	1,920
Possum Run	At Conrail	1.6	461	631	761	904	1,210
Possum Run	At Mouth	N/A	400	*	599	685	931
Rennick Creek	At Mouth	11	*	*	*	2,190	*
Rennick Creek	Above Trib 2	5.96	*	*	*	1,440	*
Rennick Creek	Above Trib 8	4.77	*	*	*	1,210	*
Rennick Creek	Above Trib 6	2.86	*	*	*	871	*
Rennick Creek	Above Trib 1.2	0.2	*	*	*	86	*
Rennick Creek Trib 1	At Mouth	0.75	*	*	*	193	*
Rennick Creek Trib 1.1	At Mouth	0.25	*	*	*	70	*
Rennick Creek Trib 1.2	At Mouth	0.13	*	*	*	175	*
Rennick Creek Trib 2	At Mouth	3.35	*	*	*	1,000	*
Rennick Creek Trib 2	At Mouth	3.35	*	*	*	1,000	*
Rennick Creek Trib 3	At Mouth	0.34	*	*	*	212	*
Rennick Creek Trib 4 A	At Mouth	0	*	*	*	9	*
Rennick Creek Trib 4 B	At Mouth	0	*	*	*	6	*
Rennick Creek Trib 4 C	At Mouth	0	*	*	*	2	*

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
Rennick Creek Trib 5	At Mouth	0.68	*	*	*	363	*
Rennick Creek Trib 6	At Mouth	1.02	*	*	*	506	*
Rennick Creek Trib 7	At Mouth	0.22	*	*	*	134	*
Rum Creek	At Mouth	28.1	*	*	*	3,780	*
Rum Creek	Above Wheeler Ck	19.3	*	*	*	2,930	*
Rum Creek Trib 1	At Mouth	0.46	*	*	*	234	*
Rum Creek Trib 2	At Mouth	0.51	*	*	*	213	*
Rum Creek Trib 2.1	At Mouth	0.33	*	*	*	173	*
Rum Creek Trib 2.2	At Mouth	0.11	*	*	*	52	*
Rum Creek Trib 5	At Mouth	1.43	*	*	*	544	*
Rush Creek	At County Line	25.7	*	*	*	3,880	*
Rush Creek Trib 3	At Mouth	0.21	*	*	*	126	*
Rush Creek Trib 4	At Mouth	0.09	*	*	*	71	*
Rush Creek Trib 5	At Mouth	0.12	*	*	*	89	*
Rush Creek Trib 6	At Mouth	0.06	*	*	*	55	*
Rush Creek Trib 7	At Mouth	0.9	*	*	*	340	*
South Fork	At Mouth	52.3	*	*	*	5,900	*
South Fork	Above Trib UT01	29.7	*	*	*	4,730	*
South Fork	Above Trib 10	21.2	*	*	*	3,680	*
South Fork	Above Trib 11	12.3	*	*	*	2,480	*
South Fork	Above Trib UT02	6.94	*	*	*	1,660	*
South Fork	Above Trib 13	5.46	*	*	*	1,460	*

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
South Fork	Above US 68	4.88	*	*	*	1,330	*
South Fork	Above Trib UT03	2.25	*	*	*	820	*
South Fork	Above Trib A	1.85	*	*	*	753	*
South Fork Trib 10	At Mouth	7.05	*	*	*	1,590	*
South Fork Trib 11	At Mouth	8.42	*	*	*	1,710	*
South Fork Trib 12	At Mouth	0.04	*	*	*	262	*
South Fork Trib 13	At Mouth	0.02	*	*	*	36	*
South Fork Trib 2 A	At Mouth	0.2	*	*	*	110	*
South Fork Trib 2 C	At Mouth	0.11	*	*	*	76	*
South Fork Trib 2 D	At Mouth	0.05	*	*	*	47	*
South Fork Trib 3	At Mouth	0.35	*	*	*	130	*
South Fork Trib 4	At Mouth	0.06	*	*	*	61	*
South Fork Trib 5	At Mouth	0.12	*	*	*	92	*
South Fork Trib 6	At Mouth	0.06	*	*	*	59	*
South Fork Trib 7	At Mouth	0.71	*	*	*	337	*
South Fork Trib 8	At Mouth	4.18	*	*	*	1,450	*
South Fork Trib 9 A	At Mouth	0.11	*	*	*	45	*
South Fork Trib 9 B	At Mouth	0.06	*	*	*	46	*
South Fork UT01	At Mouth	11.8	*	*	*	2,500	*
South Fork UT01	Above Trib UT01a	7.34	*	*	*	1,820	*
South Fork UT01	Above Trib UT01b	4.74	*	*	*	1,240	*

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
South Fork UT01	Above Trib UT01c	1.84	*	*	*	767	*
South Fork UT01 Trib 1	At Mouth	0.09	*	*	*	99	*
South Fork UT01a	At Mouth	3.01	*	*	*	920	*
South Fork UT01a	Above Trib A	2.13	*	*	*	668	*
South Fork UT01b	South Fork UT01b	1.72	*	*	*	724	*
South Fork UT01b	Above Trib 1	1.38	*	*	*	613	*
South Fork UT01b	Above Trib 2	0.94	*	*	*	456	*
South Fork UT01b Trib 1	At Mouth	0.12	*	*	*	110	*
South Fork UT01b Trib 2	At Mouth	0.31	*	*	*	208	*
South Fork UT01c	At Mouth	2.34	*	*	*	645	*
South Fork UT01c Trib 1	At Mouth	0.7	*	*	*	214	*
South Fork UT02	At Mouth	4.28	*	*	*	1,400	*
South Fork UT02	Above Trib 2	3.03	*	*	*	1,070	*
South Fork UT02	Above Trib 3	2.47	*	*	*	945	*
South Fork UT02	Above Trib 4	2.05	*	*	*	805	*
South Fork UT02	Above Trib 5	1.84	*	*	*	749	*
South Fork UT02	Above Trib 6	1.45	*	*	*	602	*
South Fork UT02 Trib 1	At Mouth	0.5	*	*	*	336	*
South Fork UT02 Trib 2	At Mouth	0.69	*	*	*	402	*

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
South Fork UT02 Trib 3	At Mouth	0.25	*	*	*	189	*
South Fork UT02 Trib 4	At Mouth	0.41	*	*	*	260	*
South Fork UT02 Trib 5	At Mouth	0.11	*	*	*	101	*
South Fork UT02 Trib 6	At Mouth	0.38	*	*	*	259	*
South Fork UT03	At Mouth	2.04	*	*	*	694	*
South Fork UT03	Above Trib 1	1.57	*	*	*	594	*
South Fork UT03 Trib 1	At Mouth	0.25	*	*	*	194	*
Stony Creek	At Mouth	62.4	2,460	*	4,000	4,720	6,650
Stony Creek	Just upstream of State Route 508	N/A	1,260	*	1,980	2,300	3,180
Stony Creek	Just upstream of McKees Creek	N/A	780	*	1,260	1,500	2,100
Sugar Creek	At Mouth	N/A	890	*	1,410	1,540	2,140
Sugar Creek	At Mouth	3.12	*	*	*	1,200	*
Sugar Creek	Below Trib 7	2.67	*	*	*	1,120	*
Sugar Creek	Below Trib 8	2.14	*	*	*	967	*
Sugar Creek	Above Trib 9	1.19	*	*	*	635	*
Sugar Creek Trib 6	At Mouth	0.25	*	*	*	256	*
Sugar Creek Trib 7	At Mouth	0.45	*	*	*	384	*
Sugar Creek Trib 8	At Mouth	0.15	*	*	*	173	*
Sugar Creek Trib 9	At Mouth	0.72	*	*	*	540	*
Tributary A	At Mouth	N/A	530	*	830	900	1,220
Tributary B	At Mouth	N/A	170	*	310	340	510
Tributary C	At Mouth	N/A	170	*	310	340	510

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
Tributary D	At Mouth	N/A	410	*	700	780	1,110
Tributary E	At Mouth	N/A	420	*	680	740	1,040
Tributary F	At Mouth	N/A	500	*	790	860	1,200
Tributary G	At Mouth	N/A	580	*	870	940	1,270
Tributary H	At Mouth	N/A	860	*	1,400	1,540	2,180
Tributary I	At Mouth	N/A	280	*	490	550	810
Tributary J	At Mouth	N/A	690	*	1,060	1,160	1,580
Tributary K	At Mouth	N/A	87	*	130	150	200
Tributary L	At Ludlow Road	N/A	214	*	360	432	620
Tributary L	At Mouth	N/A	210	*	352	422	606
Tributary M	At Mouth	N/A	370	*	581	656	916
Tributary N	At Mouth	N/A	103	*	164	192	267
Tributary P	At Mouth	N/A	390	*	610	710	980
Wheeler Creek	At Mouth	5.87	*	*	*	1,390	*
Wheeler Creek	Above Wheeler Creek Trib 1	3.13	*	*	*	926	*
Wheeler Creek Trib 1	At Mouth	1.42	*	*	*	514	*
Willow Creek	At Mouth	15.2	*	*	*	2,040	*
Willow Creek	Above Trib 1	10.5	*	*	*	1,550	*
Willow Creek Trib 1	At Mouth	4.33	*	*	*	1,040	*
Wissahicken Creek	At Mouth	N/A	366	*	582	686	954

***** 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

[Not applicable to 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
Great Miami River	03261500	USGS	Great Miami River at Sidney	541	02/1914	Current
Bokengehalas Creek	03260700	USGS	Bokengehalas Creek near DeGraff	36.3	10/1957	09/2002
Bokengehalas Creek	03260706	USGS	Bokengehalas Creek at DeGraff	40.4	06/1992	Current

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					
Big Darby Creek	County Boundary	5500 feet upstream of Township Route 157	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Black Lake Outlet	Confluence with Stony Creek	Private Drive near Black Lake	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Black Lake Unnamed Tributary 01A	Confluence with Black Lake Outlet	1800 feet upstream of Township Route 33	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Black Lake Unnamed Tributary 01B	Confluence with Black Lake Outlet	Just downstream of State Route 508	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Blue Jacket Creek	Confluence with Bokengehalas Creek	Eastern Avenue	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984 July 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.

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					
Bokengehalas Creek	Mouth of Bokengehalas	Approximately 2300 feet upstream of Township Route 36	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965. - Zone AE. USGS Weighted Gage Analysis - Zone A	WSP-2 - Zone AE, HEC-RAS 4.1.0 - Zone A	December 2012 November 1984 July 1978	AE, A	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry for Zone AE. Effects of hydraulic structures were not considered in the model for the Zone A portion
Brandywine Creek	Confluence with Great Miami River	630 feet upstream of Township Route 53	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Calico Creek	Confluence with Muchinippi Creek	2400 feet upstream of State Route 720	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Cherokee Mans Run	Confluence with Great Miami River	4300 feet upstream of Township Route 238	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Flat Branch	Confluence with Bokengehalas Creek	Wish Road	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.

Flooding Source	Study Limits Downstream Limit	Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Flat Branch	Big Darby Creek	3000 feet upstream of mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Graves Creek	Confluence with Lee Creek	County Boundary	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Great Miami River	3,100 feet upstream of upstream County Road 13	Indian Lake Dam	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	AE, A	Effects of hydraulic structures were not considered in the model for the Zone A portion
Great Miami River	3,100 feet upstream of upstream County Road 13	Indian Lake Dam	USGS Weighted Gage Analysis	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model
Great Miami River Tributary 10	Confluence with Great Miami River	4500 feet upstream of Township Route 229	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Great Miami River Tributary 15	Confluence with Great Miami River	750 feet upstream of State Route 235	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Great Miami River Tributary 16	Indian Lake	4850 feet upstream of mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.

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					
Great Miami River UT03	Confluence with Great Miami River	2150 feet upstream of County Route 275	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Great Miami River UT03A	Confluence with Great Miami River UT03	1800 feet upstream of County Route 52	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Great Miami River UT03A1	Confluence with Great Miami River UT03A	630 feet upstream of US Route 33	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Great Miami River UT03A1 Tributary 1	Confluence with Great Miami River UT03A1	1100 feet upstream of mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Great Miami River UT03A1 Tributary 1.2	Confluence with Great Miami River UT03A1 Tributary 1	1050 feet upstream of mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Great Miami River UT03A1 Tributary 1.2.2	Confluence with Great Miami River UT03A1 Tributary 1.2	1050 feet upstream of mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Great Miami River UT03B	Confluence with Great Miami River UT03	4700 feet upstream of State Route 235	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.

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					
Great Miami River UT03B Tributary 1	Confluence with Great Miami River UT03B	1200 feet upstream of Township Route 240	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Indian Creek	Confluence with Great Miami River	Just downstream of County Route 24	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Jordan Creek	Confluence with Great Miami River	560 feet upstream of State Route 274	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Lee Creek	Confluence with Lee Creek	County Boundary	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Little Muchinippi Creek	Confluence with Muchinippi Creek	County Route 23	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Macochee Creek	Confluence with Mad River	6400 feet upstream of County Route 28	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984 September 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.

Flooding Source	Study Limits Downstream Limit	Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Mad River	County Boundary	State Route 540	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984 September 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
McKees Creek	Confluence with Stony Creek	Ludlow Road	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Mill Creek	County Boundary	2800 feet above County Route 8	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Mill Creek Tributary 1	Confluence with Mill Creek	2300 feet above mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Mill Creek Tributary 7	Confluence with Mill Creek	1100 feet upstream of County Route 2	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Mill Creek Tributary 8	Confluence with Mill Creek	2900 feet above mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.

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					
Muchinippi Creek	Confluence with Great Miami River	County Boundary	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Muchinippi Creek Tributary 2	Confluence with Muchinippi Creek	2900 feet above mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Muchinippi Creek Tributary 3	Confluence with Muchinippi Creek	5500 feet upstream of County Route 54	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Muchinippi Creek Tributary 5	Confluence with Muchinippi Creek	2000 feet upstream of County Route 52	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Mud Run	Confluence with Mad River	450 feet upstream of Conrail	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984 September 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Neals Run	Confluence with Great Miami River	2000 feet upstream of Township Route 229	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
North Fork Great Miami River	Indian Lake	2300 feet upstream of County Route 97	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.

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					
North Fork Great Miami River Tributary 3	Confluence with North Fork Great Miami River	1200 feet upstream of State Route 273	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
North Fork Great Miami River Tributary 4	Confluence with North Fork Great Miami River	2600 feet above mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
North Fork Great Miami River Tributary 5	Confluence with North Fork Great Miami River	4700 feet above mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Otter Creek	Confluence with Mill Creek	6500 feet upstream of County Route 10	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Otter Creek Tributary 1	Confluence with Otter Creek	3000 feet upstream of County Route 142	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Otter Creek Tributary 1A	Confluence with Otter Creek Tributary 1	1200 feet above mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Otter Creek Tributary 2	Confluence with Otter Creek	1400 feet above mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.

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					
Peter Ditch	Confluence with Mad River	1100 feet upstream of US Route 33	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Possum Run	Confluence with Blue Jacket Creek	Elm Street	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	September 2013 November 1984 July 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Rennick Creek	Confluence with Great Miami River	11,400 feet upstream of County Route 91	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Rennick Creek Tributary 1	Confluence with Rennick Creek	State Route 274	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Rum Creek	Confluence with Great Miami River	County Boundary	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Rum Creek Tributary 2	Confluence with Rum Creek	1800 feet upstream of mouth	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.

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					
Rush Creek	County Boundary	1200 feet upstream of County Route 117	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
South Fork Great Miami River	Indian Lake	1000 feet upstream of Township Route 51	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
South Fork Great Miami River Tributary 10	Confluence with South Fork Great Miami River	2300 feet upstream of State Route 273	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
South Fork Great Miami River Tributary 11	Confluence with South Fork Great Miami River	4800 feet upstream of State Route 273	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
South Fork Great Miami River UT01	Confluence with South Fork Great Miami River	1100 feet upstream of US Route 68	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
South Fork Great Miami River UT01A	Confluence with South Fork Great Miami River UT01	6400 feet upstream of County Route 105	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
South Fork Great Miami River UT01B	Confluence with South Fork Great Miami River UT01	Just downstream of State Route 274	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.

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					
South Fork Great Miami River UT01C	Confluence with South Fork Great Miami River UT01	1600 feet upstream of County Route 113	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
South Fork Great Miami River UT02	Confluence with South Fork Great Miami River	3100 feet upstream of County Route 101	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
South Fork Great Miami River UT03	Confluence with South Fork Great Miami River	1200 feet upstream of County Route 5	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Stony Creek	Mouth of Creek	250 feet upstream of County Route 31	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984 July 1978	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Sugar Creek	Confluence with Mad River	4100 feet above mouth	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965. Zone AE. 2006 Stream Stats Regression Equations - Region A	WSP-2 - Zone AE, HEC-RAS 4.1.0 - Zone A	December 2012 November 1984	AE, A	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry for Zone AE. Effects of hydraulic structures were not considered in the model for the Zone A portion

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					
Tributary A	Confluence with Mad River	County Route 5	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Tributary B	Confluence with Mad River	County Route 29	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Tributary C	Confluence with Mad River	County Route 5	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Tributary D	Confluence with Mad River	1900 feet upstream of Private Drive	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Tributary E	Confluence with Mad River	5700 feet upstream of mouth	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.

Flooding Source	Study Limits Downstream Limit	Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Tributary F	Confluence with Mad River	750 feet upstream of County Route 25	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Tributary G	Confluence with Mad River	1800 feet upstream of County Route 25	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Tributary H	Confluence with Peter Ditch	2950 feet upstream of US Route 33	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Tributary I	Confluence with Macochee Creek	Township Highway 166	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Tributary J	Confluence with Macochee Creek	1650 feet upstream of Township Highway 78	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.

Flooding Source	Study Limits Downstream Limit	Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Tributary K	Confluence with Bokengehalas Creek	Bellefontaine City Limits	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Tributary L	Confluence with Blue Jacket Creek	Brennan Road	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984 July 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Tributary M	Confluence with Flat Branch	3300 feet upstream of Township Highway 66	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Tributary N	Confluence with Tributary L	950 feet above mouth	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984 July 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.
Tributary P	Graves Creek	County Boundary	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.

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					
Wheeler Creek	Confluence with Rum Creek	Township Route 35	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Wheeler Creek Tributary 1	Confluence with Wheeler Creek	2500 feet upstream of Township Route 35	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Willow Creek	Confluence with Muchinippi Creek	2500 feet upstream of County Route 88	2006 Stream Stats Regression Equations - Region A	HEC-RAS 4.1.0	December 2012	A	Effects of hydraulic structures were not considered in the model.
Wissahicken Creek	Confluence with Bokengehalas Creek	Private Drive	SCS TR-20, Computer Program for Project Formulation, Hydrology. 1965.	WSP-2	November 1984 July 1984	AE	Cross-section data were obtained by field survey and aerial photography. All bridges were field surveyed to provide geometry.

Table 14: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Blue Jacket Creek	0.029-0.056	0.05-0.15
Possum Run	0.037-0.079	0.06-0.16
Tributary L	0.057-0.07	0.075-0.085
Tributary N	0.062	0.085
Wissahicken Creek	0.029-0.064	0.05-0.095

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, 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.

The datum conversion locations and values that were calculated for Logan County are provided in Table 20.

Table 20: Countywide Vertical Datum Conversion

Quadrangle Name	Quadrangle Corner	Latitude	Longitude	Conversion from **NGVD29** to **NAVD88** (**feet**)
Unionpolis	SE	40.500	-84.000	-0.61
Waynesfield	SE	40.500	-83.875	-0.61
Roundhead	SE	40.500	-83.750	-0.55
Silver Creek	SE	40.500	-83.625	-0.55
Mount Victory	SE	40.500	-83.500	-0.6

Quadrangle Name	Quadrangle Corner	Latitude	Longitude	Conversion from **NGVD29** to **NAVD88** (**feet**)
West Mansfield	SE	40.375	-83.500	-0.62
Rushsylvania	SE	40.375	-83.625	-0.61
Huntsville	SE	40.375	-83.750	-0.63
Russells Point	SE	40.375	-83.875	-0.68
Jackson Center	SE	40.375	-83.878	-0.66
Port Jefferson	SE	40.250	-84.000	-0.66
De Graff	SE	40.250	-83.875	-0.66
Bellefontaine	SE	40.250	-83.750	-0.67
Zanesfield	SE	40.250	-83.625	-0.62
Average Conversion from NGVD29 to NAVD88 = -0.622 feet				

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
Transportation, Political Boundaries	Logan County Engineer's Office	2012	1:24,000	Roads, Corporate Boundaries provided by County
PLSS, Datum conversion points	Ohio Division of Natural Resources	2012	1:24,000	Public Land Survery System Data provided by County
Hydrography	National Hydrography Dataset	2012	1:24,000	Streams, rivers, and lakes were derived from NHD data
Orthophoto Imagery Base Index	FEMA	2012	1:24,000	Orthophoto Imagery Base Index provided by County

Data Type	Data Provider	Data Date	Data Scale	Data Description
FIRM Panel Layout	Michael Baker Jr, Inc.	2012	1:24,000	Panel Layout created by Michael Baker Jr., Inc.
Floodplain mapping created for flood hazard areas, flood harzard lines, station start, BFEs, cross sections, and profile baseline	Michael Baker Jr, Inc.	2013	1:24,000	Floodplain mapping created by Michael Baker Jr., Inc that includes locations of flood hazard areas, flood hazard lines, station start, BFEs, cross sections, and profile baselines
Stantec Leverage	Stantec	2012	1:24,000	Floodplain mapping created by Stantec that include locations of flood hazard areas, BFEs, cross sections, and profile baselines
Flood Insurance Rate Map	FEMA	11/15/1984	1:24,000	Flood Insurance Rate Map
Flood Insurance Study, Logan County,OH, USA	FEMA	5/15/1985	1:24,000	Flood Insurance Study, Logan County,OH, USA

* Not available

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.”

Certain flooding sources may have been studied that do not have published BFEs on the FIRMs, or for which there is a need to report the 1% annual chance flood elevations at selected cross sections because a published Flood Profile does not exist in this FIS Report. These streams may have also been studied using methods to determine non-encroachment zones rather than

floodways. For these flooding sources, the 1% annual chance floodplain boundaries 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. All topographic data used for modeling or mapping has been converted as necessary to NAVD 88. The 1% annual chance elevations for selected cross sections along these flooding sources, along with their non-encroachment widths, if calculated, are shown in Table 25, "Flood Hazard and Non-Encroachment Data for Selected Streams."

Table 23: Summary of Topographic Elevation Data used in Mapping

Community	Flooding Source	Source for Topographic Elevation Data			
		Description	Scale	Contour Interval	Citation
Logan County	Tributary H	Aerial Photographs	1:9600		
Logan County, City of Bellefontaine	Wissahicken Creek	Aerial Photographs	1:9600		
Logan County and Incorporated Areas	All remaining within Study Area	LiDAR	NA	4	OGRIP 2007

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.

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY[2]	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BLACK LAKE OUTLET A	1,000	146	986	0.6	982.6	982.6	983.1	0.5

[1] Feet above mouth

[2] Stony Creek backwater

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: BLACK LAKE OUTLET

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BLUE JACKET CREEK								
A	3,180	164	517	2.2	1058.2	1058.2	1058.7	0.5
B	4,390	205	592	2.0	1062.3	1062.3	1062.8	0.5
C	6,290	176	549	2.1	1067.0	1067.0	1067.5	0.5
D	8,980	63	341	3.8	1076.0	1076.0	1076.5	0.5
E	10,100	160	537	2.4	1079.4	1079.4	1079.9	0.5
F	10,600	57	378	3.5	1080.7	1080.7	1081.2	0.5
G	12,050	159	572	2.3	1082.9	1082.9	1083.4	0.5
H	14,160	215	576	2.3	1086.1	1086.1	1086.6	0.5
I	16,130	217	676	1.9	1089.6	1089.6	1090.1	0.5
J	17,380	280	965	1.4	1091.0	1091.0	1091.5	0.5
K	20,080	1408	2048	0.6	1092.5	1092.5	1093.0	0.5
L	21,530	121	281	4.0	1100.4	1100.4	1100.9	0.5
M	22,850	32	183	7.2	1109.2	1109.2	1109.7	0.5
N	24,820	84	271	4.1	1122.7	1122.7	1123.2	0.5
O	25,370	212	801	1.6	1129.1	1129.1	1129.6	0.5
P	26,460	72	287	4.5	1136.3	1136.3	1136.8	0.5
Q	28,490	51	316	4.1	1148.0	1148.0	1148.5	0.5
R	30,490	410[2]	600	3.5	1162.4	1162.4	1162.9	0.5
S	31,370	231	508	2.1	1166.9	1166.9	1167.4	0.5
T	31,990	153	362	2.9	1173.4	1173.4	1173.9	0.5
U	32,790	416	492	2.0	1179.2	1179.2	1179.7	0.5
V	34,460	197	511	1.9	1189.8	1189.8	1190.3	0.5

[1] Feet above mouth

[2] Combined floodway width of Blue Jacket and Possum Run

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: BLUE JACKET CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BLUE JACKET CREEK continued								
W	35,270	198	501	1.9	1195.5	1195.5	1196.0	0.5
X	35,780	175	407	2.2	1200.8	1200.8	1201.3	0.5
Y	36,370	48	180	4.8	1208.2	1208.2	1208.7	0.5
Z	37,060	17	95	8.9	1215.0	1215.0	1215.5	0.5
AA	37,500	19	110	7.6	1219.0	1219.0	1219.5	0.5
AB	37,880	63	489	1.7	1229.8	1229.8	1230.3	0.5
AC	38,560	64	266	3.0	1231.5	1231.5	1232.0	0.5
AD	39,860	10	56	12.8	1243.4	1243.4	1243.9	0.5
AE	41,150	25	94	7.2	1262.1	1262.1	1262.6	0.5

[1] Feet above mouth

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: BLUE JACKET CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BOKENGEHALAS CREEK								
A	1,110	361[2]	1077	2.2	973.8	973.8	974.3	0.5
B	2,550	341	1218	1.9	977.5	977.5	978.0	0.5
C	4,440	83	477	4.9	981.9	981.9	982.4	0.5
D	4,920	57	434	5.4	984.1	984.1	984.6	0.5
E	6,580	304	1578	1.5	989.3	989.3	989.8	0.5
F	9,300	126	696	3.4	993.8	993.8	994.3	0.5
G	12,530	944	2760	0.9	996.8	996.8	997.3	0.5
H	14,610	639	1793	1.3	998.7	998.7	999.2	0.5
I	16,300	311	873	2.7	1001.7	1001.7	1002.2	0.5
J	21,000	202	680	3.5	1010.6	1010.6	1011.1	0.5
K	23,880	59	462	5.2	1016.7	1016.7	1017.2	0.5
L	26,130	172	855	2.8	1023.5	1023.5	1024.0	0.5
M	27,760	197	638	3.8	1029.7	1029.7	1030.2	0.5
N	31,910	251	780	3.1	1041.4	1041.4	1041.9	0.5
O	34,390	545	1823	1.4	1046.4	1046.4	1046.9	0.5
P	38,750	130	599	2.5	1054.1	1054.1	1054.6	0.5
Q	42,040	404	2068	0.7	1055.9	1055.9	1056.4	0.5
R	44,400	375	728	1.9	1061.5	1061.5	1062.0	0.5
S	48,000	300	713	1.9	1067.2	1067.2	1067.7	0.5
T	49,640	293	671	1.7	1069.6	1069.6	1070.1	0.5
U	51,490	68	319	3.6	1073.0	1073.0	1073.5	0.5
V	53,390	842	2554	0.4	1073.5	1073.5	1074.0	0.5

[1] Feet above mouth

[2] Width shown is total floodway width, including a portion outside the study

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: BOKENGEHALAS CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BOKENGEHALAS CREEK continued								
W	54,490	346	861	1.4	1074.4	1074.4	1074.9	0.5
X	56,600	468	1101	1.0	1076.8	1076.8	1077.3	0.5
Y	59,000	30	110	5.5	1077.9	1077.9	1078.4	0.5
Z	60,220	80	160	3.5	1079.4	1079.4	1079.9	0.5
AA	62,110	160	300	2.0	1086.4	1086.4	1086.9	0.5
AB	63,710	20	94	6.0	1093.8	1093.8	1094.3	0.5
AC	65,890	19	85	6.6	1107.6	1107.6	1108.1	0.5
AD	69,720	23	96	5.9	1140.3	1140.3	1140.8	0.5
AE	70,910	31	103	5.5	1152.2	1152.2	1152.7	0.5
AF	71,820	22	95	5.1	1159.8	1159.8	1160.3	0.5
AG	73,780	62	140	3.5	1187.4	1187.4	1187.9	0.5

[1] Feet above mouth

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: BOKENGEHALAS CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
FLAT BRANCH								
A	1,300	480	2028	0.8	1077.1	1077.1	1077.6	0.5
B	2,730	78	295	5.5	1085.2	1085.2	1085.7	0.5
C	4,750	91	335	4.9	1102.0	1102.0	1102.5	0.5
D	6,850	841	4148	0.4	1111.1	1111.1	1111.6	0.5
E	7,430	498	2352	0.7	1111.2	1111.2	1111.7	0.5
F	9,150	286	823	2.0	1114.4	1114.4	1114.9	0.5
G	15,520	42	186	6.0	1150.4	1150.4	1150.9	0.5
H	16,470	47	156	7.1	1175.9	1175.9	1176.4	0.5
I	20,290	65	282	3.9	1217.3	1217.3	1217.8	0.5
J	23,120	327	375	1.9	1232.5	1232.5	1233.0	0.5
GRAVES CREEK								
A	1,900	778	2332	0.8	983.4	983.4	983.9	0.5
B	2,950	334	1036	1.7	984.5	984.5	985.0	0.5
C	3,450	106	453	3.8	985.9	985.9	986.4	0.5
D	4,890	215	708	1.6	987.8	987.8	988.3	0.5
E	7,530	94[2]	405	2.7	992.4	992.4	992.9	0.5

[1] Feet above mouth

[2] Width shown is total floodway width, including a portion outside the study

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: FLAT BRANCH - GRAVES CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Great Miami River								
A	3,999	972	8,586	1.0	985.0	985.0	985.1	0.1
B	4,836	556	5,119	1.6	986.1	986.1	986.2	0.1
C	6,118	359	2,606	3.1	986.2	986.2	986.2	0.1
D	7,498	702	6,008	1.4	986.3	986.3	987.0	0.8
E	8,560	1,132	7,903	1.0	986.4	986.4	987.1	0.8
F	9,933	1,360	9,081	0.9	986.5	986.5	987.3	0.8
G	11,013	928	7,023	1.2	986.6	986.6	987.4	0.8
H	12,356	1,063	9,151	0.9	987.4	987.4	988.1	0.7
I	13,517	760	6,136	1.3	987.4	987.4	988.1	0.7
J	15,008	1,313	10,217	0.8	987.6	987.6	988.3	0.8
K	16,628	713	5,616	1.5	987.7	987.7	988.5	0.7
L	16,878	694	6,602	1.2	988.4	988.4	989.2	0.8
M	17,489	723	6,213	1.3	988.5	988.5	989.2	0.8
N	19,068	362	2,812	2.5	988.6	988.6	989.4	0.8
O	20,302	455	4,120	1.7	989.2	989.2	990.1	0.9
P	21,238	1,040	7,301	1.0	989.8	989.8	990.6	0.8
Q	22,685	1,409	7,013	1.0	989.9	989.9	990.7	0.8
R	24,778	2,294	16,220	0.4	990.0	990.0	990.8	0.8
S	26,606	2,959	17,000	0.4	990.0	990.0	990.9	0.8
T	28,911	102	905	7.7	989.4	989.4	990.4	0.9
U	29,270	265	3,278	1.8	992.7	992.7	993.5	0.8
V	30,260	120	1,552	3.9	992.8	992.8	993.7	0.9
W	30,364	418	3,510	1.7	993.2	993.2	994.0	0.8

[1] Feet above a point approximately 3,100 feeet upstream of County Road 13

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: GREAT MIAMI RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
LEE CREEK								
A	4,560	220	991	1.2	983.6	983.6	984.1	0.5
B	5,760	679	1040	1.1	985.2	985.2	985.7	0.5
C	6,670	327	570	2.1	988.1	988.1	988.6	0.5
D	7,820	60	230	5.1	1000.6	1000.6	1001.1	0.5
E	10,830	34	191	6.2	1020.8	1020.8	1021.3	0.5
F	13,380	198[2]	696	1.7	1030.6	1030.6	1031.1	0.5

[1] Feet above mouth

[2] Width shown is total floodway width, including a portion outside the study

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: LEE CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MACOCHEE CREEK								
A	2,126	583	2603	2.3	1088.1	1088.1	1088.6	0.5
B	6,221	1250	1238	2.2	1093.8	1093.8	1094.3	0.5
C	8,621	344	847	3.2	1101.9	1101.9	1102.4	0.5
D	10,771	454	1158	2.4	1108.8	1108.8	1109.3	0.5
E	11,381	251	730	3.8	1111.7	1111.7	1112.2	0.5
F	12,836	340	1057	2.6	1117.0	1117.0	1117.5	0.5
G	14,196	457	728	3.8	1121.4	1121.4	1121.9	0.5
H	16,796	400	1400	2.0	1131.0	1131.0	1131.5	0.5
I	17,936	789	1423	1.8	1133.9	1133.9	1134.4	0.5
J	20,076	448	1238	2.1	1138.3	1138.3	1138.8	0.5
K	24,046	377	849	3.1	1155.5	1155.5	1156.0	0.5
L	25,096	539	1032	2.5	1159.5	1159.5	1160.0	0.5
M	26,066	59	283	5.4	1163.5	1163.5	1164.0	0.5
N	27,536	55	241	6.3	1169.2	1169.2	1169.7	0.5
O	29,956	47	330	4.6	1176.0	1176.0	1176.5	0.5
P	31,506	199	608	2.5	1180.8	1180.8	1181.3	0.5
Q	32,976	168	481	3.2	1185.2	1185.2	1185.7	0.5
R	33,731	227	104	1.4	1189.5	1189.5	1190.0	0.5
S	34,261	60	315	4.9	1190.4	1190.4	1190.9	0.5
T	36,586	389	1343	1.2	1191.8	1191.8	1192.3	0.5
U	37,936	307	790	2.0	1193.6	1193.6	1194.1	0.5
V	39,776	313	573	2.0	1196.8	1196.8	1197.3	0.5

[1] Feet above mouth

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: MACOCHEE CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MAD RIVER								
A	0	169	2058	3.2	1078.1	1078.1	1078.6	0.5
B	3,010	878	4719	1.3	1085.2	1085.2	1085.7	0.5
C	3,785	1200[2]	7612	0.8	1087.1	1087.1	1087.6	0.5
D	5,245	312[2]	1411	4.3	1088.1	1088.1	1088.6	0.5
E	6,275	320[2]	835	4.7	1090.8	1090.8	1091.3	0.5
F	7,585	1040	2533	1.6	1092.1	1092.1	1092.6	0.5
G	11,385	624	2260	1.7	1095.3	1095.3	1094.8	-0.5
H	13,290	416	1408	2.8	1099.0	1099.0	1099.5	0.5
I	15,900	484	1400	2.0	1101.7	1101.7	1102.2	0.5
J	18,640	469	1393	2.8	1106.6	1106.6	1107.1	0.5
K	20,340	369	1409	2.7	1108.7	1108.7	1109.2	0.5
L	22,660	688	2229	1.7	1110.9	1110.9	1111.4	0.5
M	25,060	1207	2335	1.6	1113.7	1113.7	1114.2	0.5
N	28,445	469	1639	2.3	1119.2	1119.2	1119.7	0.5
O	30,490	950	2727	1.4	1121.1	1121.1	1121.6	0.5
P	33,570	470[3]	1540	2.4	1131.3	1131.3	1131.8	0.5
Q	37,250	863	2388	1.5	1136.4	1136.4	1136.9	0.5
R	37,850	938	2449	1.5	1137.1	1137.1	1137.6	0.5
S	38,240	653[2]	1565	2.3	1137.9	1137.9	1138.4	0.5
T	40,130	406[2]	1405	2.6	1143.6	1143.6	1144.1	0.5
U	42,380	675[2]	1770	2.1	1147.8	1147.8	1148.3	0.5
V	43,250	384[3]	1136	2.6	1151.4	1151.4	1151.9	0.5

[1] Feet above County boundary

[2] Width shown is total floodway width, including a portion outside the study

[3] Combined floodway width of Mad River and Tributary B

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE : MAD RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MAD RIVER continued								
W	45,330	869	3293	0.8	1154.4	1154.4	1154.9	0.5
X	46,135	480	990	2.7	1156.5	1156.5	1157.0	0.5
Y	47,305	770	1914	1.4	1157.5	1157.5	1158.0	0.5
Z	49,145	690	1980	1.4	1163.1	1163.1	1163.6	0.5
AA	49,965	754	1980	1.4	1167.8	1167.8	1168.3	0.5
AB	51,255	61	318	8.6	1172.0	1172.0	1172.5	0.5
AC	55,035	408	959	2.9	1195.2	1195.2	1195.7	0.5
AD	56,075	127	808	3.5	1219.0	1219.0	1219.5	0.5
AE	56,825	150	888	3.2	1220.6	1220.6	1221.1	0.5
AF	59,155	139	673	4.2	1228.1	1228.1	1228.6	0.5
AG	60,535	277	917	3.1	1234.3	1234.3	1234.8	0.5
AH	61,605	267	584	3.9	1239.8	1239.8	1240.3	0.5
AI	63,240	147	455	5.0	1250.8	1250.8	1251.3	0.5
AJ	64,295	209	614	2.8	1254.2	1254.2	1254.7	0.5
AK	65,555	120	510	2.8	1259.1	1259.1	1259.6	0.5
AL	66,895	171	420	4.1	1264.8	1264.8	1265.3	0.5

[1] Feet above County boundary

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE : MAD RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
McKEES CREEK								
A	1,700	55	310	3.6	1003.5	1003.5	1004.0	0.5
B	3,030	282	1150	1.0	1013.9	1013.9	1014.4	0.5
C	4,210	156	459	2.4	1017.2	1017.2	1017.7	0.5
D	4,750	146	508	2.2	1020.0	1020.0	1020.5	0.5
E	5,440	161	462	2.4	1021.4	1021.4	1021.9	0.5
F	6,690	185	398	2.8	1025.4	1025.4	1025.9	0.5
G	9,050	62	265	3.7	1035.6	1035.6	1036.1	0.5
H	9,980	45	229	4.3	1040.8	1040.8	1041.3	0.5
I	11,020	60	302	3.7	1044.2	1044.2	1044.7	0.5
J	12,350	30	210	5.3	1050.6	1050.6	1051.1	0.5
K	14,630	58	256	4.4	1058.9	1058.9	1059.4	0.5
L	15,210	263	2651	0.4	1069.2	1069.2	1069.7	0.5
M	16,520	166	1048	1.1	1069.5	1069.5	1070.0	0.5
N	18,290	64	395	2.8	1072.6	1072.6	1073.1	0.5
O	20,380	190	598	1.9	1076.2	1076.2	1076.7	0.5
P	21,600	74	292	3.8	1080.5	1080.5	1081.0	0.5
Q	22,620	84	303	3.7	1084.3	1084.3	1084.8	0.5
R	25,020	92	317	3.5	1092.4	1092.4	1092.9	0.5
S	25,720	114	472	2.4	1098.2	1098.2	1098.7	0.5
T	26,320	54	256	4.4	1099.9	1099.9	1100.4	0.5
U	28,280	145	459	2.4	1105.1	1105.1	1105.6	0.5
V	29,670	128	514	2.5	1108.8	1108.8	1109.3	0.5
W	31,850	176	448	2.9	1118.4	1118.4	1118.9	0.5

[1] Feet above mouth

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: McKEES CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
McKEES CREEK continued								
X	33,370	120	343	3.8	1128.4	1128.4	1128.9	0.5
Y	34,670	90	332	3.9	1138.6	1138.6	1139.1	0.5
Z	36,390	46	280	4.6	1156.2	1156.2	1156.7	0.5
AA	37,900	53	270	4.8	1168.2	1168.2	1168.7	0.5
AB	38,930	198	388	3.3	1178.6	1178.6	1179.1	0.5
AC	40,940	468	1092	1.2	1181.8	1181.8	1182.3	0.5
AD	42,040	142	428	3.0	1187.0	1187.0	1187.5	0.5
AE	43,190	508	2149	0.7	1190.8	1190.8	1191.3	0.5
AF	44,930	449	796	1.9	1194.2	1194.2	1194.7	0.5
AG	47,190	252	674	1.8	1205.6	1205.6	1206.1	0.5
AH	48,790	106	466	2.5	1214.6	1214.6	1215.1	0.5
AI	50,130	308	673	1.8	1225.9	1225.9	1226.4	0.5
AJ	51,590	202	486	2.4	1239.7	1239.7	1240.2	0.5

[1] Feet above mouth

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: McKEES CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MUD RUN								
A	1,506	221	498	0.9	1079.9	1079.9	1080.4	0.5
B	2,760	211	700	0.7	1083.5	1083.5	1084.0	0.5
C	4,976	401	1340	0.3	1088.9	1088.9	1089.4	0.5
D	8,291	99	364	1.3	1096.8	1096.8	1097.3	0.5
PETER DITCH								
A	2,986	368	696	1.9	1154.7	1154.7	1155.2	0.5
B	5,321	276	569	2.3	1165.5	1165.5	1166.0	0.5
C	6,446	360[2]	2000	0.7	1172.2	1172.2	1172.7	0.5
D	7,156	177	475	3.2	1177.1	1177.1	1177.6	0.5
E	8,891	358	902	1.7	1184.3	1184.3	1184.8	0.5
F	9,906	77	309	5.0	1189.6	1189.6	1190.1	0.5
G	11,086	114	239	3.1	1193.8	1193.8	1194.3	0.5

[1] Feet above mouth

[2] Combined floodway width of Peter Ditch and Tributary H

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: MUD RUN - PETER DITCH

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
POSSUM RUN								
A	4,066	69	199	4.6	1180.4	1180.4	1181.4	1.0
B	4,713	89	237	3.8	1183.8	1183.8	1184.6	0.8
C	5,081	40	133	6.8	1186.1	1186.1	1187.1	1.0
D	5,213	93	273	3.3	1188.9	1188.9	1189.4	0.5
E	5,513	24	126	7.2	1189.5	1189.5	1190.4	0.8
F	5,580	33	193	4.7	1191.1	1191.1	1191.9	0.4
G	5,841	39	182	5.0	1191.7	1191.7	1192.7	1.0
H	6,097	38	157	5.8	1193.2	1193.2	1193.6	0.7
I	6,174	44	246	3.7	1196.4	1196.4	1197.0	0.8
J	6,625	59	253	3.6	1197.0	1197.0	1197.8	0.8
K	6,912	25	125	7.2	1197.8	1197.8	1198.5	1.0
L	7,054	50	292	3.1	1201.0	1201.0	1201.8	0.8
M	7,265	78	267	3.4	1201.7	1201.7	1202.4	0.7
N	7,389	36	146	6.2	1202.1	1202.1	1202.8	0.7
O	7,466	48	204	4.4	1203.4	1203.4	1204.4	1.0
P	7,698	46	207	4.4	1204.3	1204.3	1205.1	0.8
Q	8,186	214[2]	372	2.3	1207.1	1207.1	1207.6	0.5

[1] Feet above mouth

[2] Width reduced from previous study due to redelineation

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: POSSUM RUN

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
STONY CREEK								
A	900	377	3038	1.6	976.4	976.4	976.9	0.5
B	1,640	333	2780	1.7	976.9	976.9	977.4	0.5
C	2,220	359	3071	1.5	977.4	977.4	977.9	0.5
D	4,730	995	4990	1.0	978.8	978.8	979.3	0.5
E	6,670	946	7392	0.6	979.0	979.0	979.5	0.5
F	10,260	948	7226	0.6	981.3	981.3	981.8	0.5
G	12,620	196	1374	2.0	982.3	982.3	982.8	0.5
H	13,020	240	1613	1.4	982.8	982.8	983.3	0.5
I	14,710	204	1179	2.0	983.6	983.6	984.1	0.5
J	15,990	207	1231	1.9	984.3	984.3	984.8	0.5
K	18,730	302	1584	1.4	985.7	985.7	986.2	0.5
L	20,500	796	4087	0.6	985.9	985.9	986.4	0.5
M	23,020	702	2739	0.7	987.3	987.3	987.8	0.5
N	23,420	798	2367	0.8	987.3	987.3	987.8	0.5
O	27,150	817	1950	0.8	989.4	989.4	989.9	0.5
P	30,660	558	1223	1.2	996.2	996.2	996.7	0.5
Q	32,480	66	222	3.2	1003.8	1003.8	1004.3	0.5
R	34,080	62	450	1.6	1010.6	1010.6	1011.1	0.5

[1] Feet above mouth

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: STONY CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
SUGAR CREEK								
A	1,731	206	508	3.0	1182.3	1182.3	1182.8	0.5
B	3,681	206	508	3.0	1182.8	1182.8	1183.3	0.5
C	4,911	196	495	3.1	1186.1	1186.1	1186.6	0.5
D	5,996	211	515	3.0	1192.1	1192.1	1192.6	0.5

[1] Feet above mouth

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: SUGAR CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TRIBUTARY A								
A	2,016	101	276	3.3	1117.8	1117.8	1118.3	0.5
TRIBUTARY B								
A	2,016	35	71	4.8	1147.3	1147.3	1147.8	0.5
B	3,826	45	70	4.9	1181.0	1181.0	1181.5	0.5
TRIBUTARY C								
A	1,800	35	64	5.3	1163.2	1163.2	1163.7	0.5
TRIBUTARY D								
A	80	384[2]	1136	2.6	1151.4	1151.4	1151.9	0.5
B	2,571	36	110	7.0	1172.0	1172.0	1172.5	0.5
C	3,326	42	147	5.5	1182.3	1182.3	1182.8	0.5
D	5,061	67	147	5.3	1206.0	1206.0	1206.5	0.5

[1] Feet above mouth

[2] Combined floodway width of Mad River and Tributary D

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: TRIBUTARY A - TRIBUTARY B - TRIBUTARY C -TRIBUTARY D

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TRIBUTARY E								
A	966	132	288	2.6	1243.0	1243.0	1243.5	0.5
B	3,561	79	193	3.8	1272.0	1272.0	1272.5	0.5
C	5,676	67	167	4.5	1299.3	1299.3	1299.8	0.5
TRIBUTARY F								
A	1,151	33	147	5.9	1263.7	1263.7	1264.2	0.5
B	1,751	65	196	4.4	1269.6	1269.6	1270.1	0.5
TRIBUTARY G								
A	1,081	43	155	6.1	1265.6	1265.6	1266.1	0.5
B	2,016	61	219	4.3	1271.4	1271.4	1271.9	0.5
TRIBUTARY H								
A	1,386	183	455	3.4	1185.0	1185.0	1185.5	0.5
B	3,496	72	208	7.4	1212.2	1212.2	1212.7	0.5
TRIBUTARY I								
A	1,886	67	122	4.5	1147.1	1147.1	1147.6	0.5
B	3,771	78	144	3.8	1168.4	1168.4	1168.9	0.5

[1] Feet above mouth

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE:TRIBUTARY E - TRIBUTARY F - TRIBUTARY G-TRIBUTARY H - TRIBUTARY I

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TRIBUTARY J								
A	1,236	82	203	5.7	1168.9	1168.9	1169.4	0.5
B	3,066	150	403	2.8	1184.7	1184.7	1185.2	0.5
C	3,881	66	217	5.3	1192.9	1192.9	1193.4	0.5
TRIBUTARY K								
A	3,400	45	106	1.4	1078.7	1078.7	1079.2	0.5
B	6,430	15	65	2.3	1096.9	1096.9	1097.4	0.5
TRIBUTARY L								
A	350	89	324	1.0	1240.9	1240.9	1241.4	0.5
B	2,100	15	63	4.3	1249.2	1249.2	1249.7	0.5
C	2,710	12	37	5.2	1265.2	1265.2	1265.7	0.5
D	2,980	26	72	2.3	1276.1	1276.1	1276.6	0.5
TRIBUTARY M								
A	2,950	65	85	3.5	1164.2	1164.2	1164.7	0.5
B	5,660	35	154	4.3	1190.4	1190.4	1190.9	0.5
C	8,420	110	265	2.5	1223.8	1223.8	1224.3	0.5
TRIBUTARY N								
A	950	14	44	4.4	1245.8	1245.8	1246.3	0.5

[1] Feet above mouth

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE: TRIBUTARY J - TRIBUTARY K - TRIBUTARY L - TRIBUTARY M - TRIBUTARY N

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
WISSAHICKEN CREEK								
A	750	25	136	5.0	1167.0	1167.0	1167.5	0.5
B	1,650	153	257	2.6	1174.3	1174.3	1174.8	0.5
C	2,650	118	277	2.4	1178.8	1178.8	1179.3	0.5

[1] Feet above mouth

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOGAN COUNTY, OH

AND INCORPORATED AREAS

FLOODWAY DATA

FLOODING SOURCE : WISSAHICKEN 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.

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.

6.5.4 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 Logan County FIRM are listed in Table 27.

Table 27: Incorporated Letters of Map Change

Case Number	Effective Date	Flooding Source	FIRM Panel(s)
06-05-B075P	03/31/2006	Blue Jacket Creek	39091C0282D 39091C0301D

6.5.3 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.

6.5.4 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 to learn more about the CNMS or contact the FEMA Regional Office listed in Section 8 of this FIS Report.

6.5.5 Community Map History

The current FIRM presents flooding information for the entire geographic area of Logan County. Previously, separate FIRMs, Flood Hazard Boundary Maps (FHBMs) and/or Flood Boundary and Floodway Maps (FBFMs) 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 Logan County FIRMs in countywide format was TBD.

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)
Belle Center, Village of	TBD	N/A	N/A	TBD	N/A
Bellefontaine, City of	6/7/1974	6/7/1974	3/30/1979 5/21/1976	7/16/1984	TBD
DeGraff, Village of	7/18/1975	7/18/1975	8/25/1978	1/17/1985	TBD
Huntsville, Village of[1]	N/A	N/A	N/A	N/A	N/A
Lakeview, Village of	5/3/1974	5/3/1974	7/27/1979 5/21/1976	9/1/1987	TBD
Logan County, Unincorporated Areas	2/3/1978	2/3/1978	7/13/1979	5/15/1985	TBD
Quincy, Village of	10/6/1978	10/6/1978	N/A	N/A	TBD
Ridgeway, Village of[1]	N/A	N/A	N/A	N/A	N/A
Rushsylvania, Village of[1]	N/A	N/A	N/A	N/A	N/A
Russells Point, Village of	4/5/1974	4/5/1974	8/27/1976	8/4/1987	TBD
Valley Hi, Village of	TBD	N/A	N/A	TBD	N/A
West Liberty, Village of	4/12/1974	4/12/1974	12/5/1980 12/24/1976 7/30/1976	3/4/1985	TBD
West Mansfield, Village of[1]	N/A	N/A	N/A	N/A	N/A
Zanesfield, Village of	TBD	N/A	N/A	TBD	N/A

[1] No Special Flood Hazard Areas Identified

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
Upper Mad River Watershed	11/15/1984	USDA - SCS	NA	September 1979	Logan County, Village of West Liberty

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Stony Creek, Bokengehalas Creek, and Tributaries	11/15/1984	USDA - SCS	NA	July 1978	Logan County, City of Bellefontaine, Village of DeGraff
Great Miami River	TBD	Stantec	NA	3/27/2013	Logan County
Possum Run	TBD	Michael Baker Jr., Inc.	DNR-110020-11	12/21/2012	City of Bellefontaine
Remaining Approximate Reaches	TBD	Michael Baker Jr., Inc.	DNR-110020-11	12/21/2012	All communities

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
Logan County and Incorporated Areas	TBD	5/5/2011	Scoping	TBD
		TBD	CCO Open House	TBD
Logan County, Unincorporated	9/15/1984	6/1/1984	Final CCO	FEMA, this community
Village of West Liberty	9/4/1984	4/9/1984	Final CCO	FEMA, this community
Village of DeGraff	7/17/1984	1/24/1984	Final CCO	FEMA, this community
City of Bellefontaine	7/16/1984	8/23/1983	Final CCO	FEMA, this community

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

Table 31: Map Repositories

Community	Address	City	State	Zip Code
Belle Center	104 West Buckeye Street	Belle Center	OH	43310
Bellefontaine	135 North Detroit Street	Bellefontaine	OH	43311
Lakeview	126 North Main Street	Lakeview	OH	43331
Russells Point	433 State Route 708	Russells Point	OH	43348
West Liberty	201 North Detroit Street	West Liberty	OH	43357
West Mansfield	127 North Main Street	West Mansfield	OH	43358
Zanesfield	Sandusky Street, Box 62	Zanesfield	OH	43360
DeGraff	107 South Main Street	DeGraff	OH	43318
Logan County	1365 County Road 32 N, Suite 2	Bellefontaine	OH	43311
Quincy	115 North Miami Street	Quincy	OH	43343
Huntsville	6740 Wishart Street	Huntsville	OH	43324
Rushsylvania	113 Stewart Street	Rushsylvania	OH	43347
Ridgeway	103 South Main Street	Ridgeway	OH	43345
Zanesfield	10 Snow Valley Road	Zanesfield	OH	43360

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	http://www.fema.gov
NFIP website	http://www.fema.gov/business/nfip

NFHL Dataset	http://msc.fema.gov
FEMA Region V	FEMA Region V 536 South Clark Street, 6th Floor Chicago, Il 60605 (312) 408-4469
Other Federal Agencies	
USGS website	http://www.usgs.gov
Hydraulic Engineering Center website	http://www.hec.usace.army.mil
State Agencies and Organizations	
State NFIP Coordinator	Christopher M. Thoms, CFM, Program Manager Ohio Department of Natural Resources Division of Soil & Water Resources Floodplain Management Program 2045 Morse Road Building B-2 Columbus, OH 43229-6693 (614) 265-6752
State GIS Coordinator	Jeff Smith, Spatial Data Infrastructure Manager Ohio Geographically Referenced Information Program Office of Information Technology 77 S. High St. - 19th Floor Columbus, OH 43215 (614) 466-8862
State Floodmapping Coordinator	Katherine M. Skalak, EIT, Environmental Specialist Ohio Department of Natural Resources Division of Soil & Water Resources Floodplain Management Program 2045 Morse Road Building B-2 Columbus, OH 43229-6693 (614) 265-6709

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
USDA – SCS, 1979	U.S. Department of Agriculture, Soil Conservation Service	*Flood Hazard Study, Upper Mad River, Logan County, Ohio*		Columbus, OH	September 1979	
USDA – SCS, 1978	U.S. Department of Agriculture, Soil Conservation Service	*Flood Hazard Analyses Report, Stony and Bokengehalas Creeks and Tributaries, Champaign and Logan Counties, Ohio*		Columbus, OH	July 1978	
USWRC, 1976	U.S. Water Resources Council, Bulletin No. 17	*Guidelines for Determining Flow Frequency*			March 1976	
Ohio, 1977	State of Ohio, Department of Natural Resouces, Bulletin 45	*Floods in Ohio*		Columbus, OH	May 1977	
FEMA 1984	Federal Emergency Management Agency	*Flood Insurance Study, Logan County, Ohio, and Unincorporated Areas*		Washington, D.C.	1984	FEMA Map Service Center http://msc.fema.gov
FEMA 1984	Federal Emergency Management Agency	*Flood Insurance Study, City of Bellefontaine, Logan County, Ohio*		Washington, D.C.	1984	FEMA Map Service Center http://msc.fema.gov
FEMA 1984	Federal Emergency Management Agency	*Flood Insurance Study, Village of DeGraff, Logan County, Ohio*		Washington, D.C.	1984	FEMA Map Service Center http://msc.fema.gov

Citation in this FIS	Publisher/ Issuer	*Publication Title,* "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
FEMA 1984	Federal Emergency Management Agency	*Flood Insurance Study, Village of West Liberty, Logan County, Ohio*		Washington, D.C.	1984	FEMA Map Service Center http://msc.fema.gov
USGS 2006	U.S. Department of the Interior, U.S. Geological Survey	*USGS Scientific Investigations Report (SIR) 2006-5312*	G.F. Koltun, Stephanie P. Kula, and Barry M. Puskas	Reston, Virginia	2006	