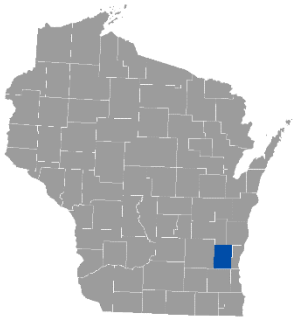
FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 5



WASHINGTON COUNTY, WISCONSIN

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
GERMANTOWN, VILLAGE OF	550472
HARTFORD, CITY OF	550473
JACKSON, VILLAGE OF	550530
KEWASKUM, VILLAGE OF	550474
MILWAUKEE, CITY OF*	550278
NEWBURG, VILLAGE OF	550056
RICHFIELD, VILLAGE OF	550518
SLINGER, VILLAGE OF	550587
WASHINGTON COUNTY, UNINCORPORATED AREAS	550471
WEST BEND, CITY OF	550475

*No Special Flood Hazard Areas Identified

FEMA

EFFECTIVE: TBD

REVISED PRELIMINARY 03/15/2021

FLOOD INSURANCE STUDY NUMBER
55131CV001C

Version Number 2.5.3.0

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Published Separately

FLOOD INSURANCE STUDY REPORT
WASHINGTON COUNTY, WISCONSIN

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 Washington County, Wisconsin and Incorporated Areas.

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
Germantown, Village of	550472	04040003	55131C0268E 55131C0269E 55131C0288E 55131C0289E 55131C0356F 55131C0357D 55131C0358E 55131C0359D 55131C0376D 55131C0377D 55131C0378D 55131C0379D	
Hartford, City of	550473	07090001	55131C0206E 55131C0207E 55131C0208E 55131C0209E 55131C0217E 55131C0228E 55131C0229E 55131C0233E 55131C0236E 55131C0241E	
Jackson, Village of	550530	04040003	55131C0254E 55131C0258E 55131C0259E 55131C0266E 55131C0267E	
Kewaskum, Village of	550474	04040003	55131C0061D 55131C0063D 55131C0064D 55131C0151D 55131C0152D	
Milwaukee, City of[1]	550278	04040003	55131C0379D	
Newburg, Village of	550056	04040003	55131C0183D 55131C0191E	
Richfield, Village of	550518	04040003, 07090001, 07090002, 07120006	55131C0241E 55131C0242E 55131C0243E 55131C0244E 55131C0262E 55131C0263F 55131C0264E 55131C0266E 55131C0268E 55131C0331E 55131C0332E 55131C0333E 55131C0334E 55131C0351E 55131C0352E 55131C0353E 55131C0354E 55131C0356F 55131C0358E	
Slinger, Village of	550587	04040003, 07090001	55131C0227E 55131C0229E 55131C0231F 55131C0232E 55131C0233E 55131C0234E 55131C0253E 55131C0261F	

[1] No Special Flood Hazard Areas Identified

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

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Washington County, Unincorporated Areas	550471	04040003, 07090001	55131C0020E 55131C0040E 55131C0042D 55131C0044D 55131C0045D 55131C0061D 55131C0062D 55131C0063D 55131C0064D 55131C0070D 55131C0086D 55131C0087D 55131C0088D 55131C0089D 55131C0091D 55131C0093D 55131C0110E 55131C0119E 55131C0120E 55131C0127E 55131C0130E 55131C0132D 55131C0135D 55131C0136E 55131C0137E 55131C0138E 55131C0139E 55131C0142E 55131C0144E 55131C0145D 55131C0151D 55131C0152D 55131C0153D 55131C0154D 55131C0156D 55131C0157D 55131C0158D 55131C0159D 55131C0161E 55131C0162D 55131C0163E 55131C0164D 55131C0166D 55131C0167D 55131C0168D 55131C0169D 55131C0176D 55131C0177D 55131C0178E 55131C0179E 55131C0181D 55131C0183D 55131C0186E 55131C0187E 55131C0188D 55131C0189E 55131C0191E 55131C0193E 55131C0206E 55131C0207E 55131C0208E 55131C0209E 55131C0216E 55131C0217E 55131C0218E 55131C0219E 55131C0226E 55131C0227E 55131C0228E 55131C0229E 55131C0231F 55131C0232E 55131C0233E 55131C0234E 55131C0236E 55131C0237E 55131C0238E 55131C0239E 55131C0241E 55131C0242E 55131C0243E 55131C0244E 55131C0251E 55131C0252D 55131C0253E 55131C0254E 55131C0256E 55131C0257E 55131C0258E 55131C0259E 55131C0261F 55131C0262E 55131C0263F 55131C0264E 55131C0266E 55131C0267E 55131C0268E 55131C0269E 55131C0276E 55131C0277E 55131C0278E 55131C0279E 55131C0281E 55131C0286E 55131C0287E 55131C0288E 55131C0289E 55131C0306E 55131C0307E 55131C0308E 55131C0309E 55131C0326E 55131C0327E 55131C0328E 55131C0329E 55131C0331E 55131C0333E	
West Bend, City of	550475	04040003	55131C0153D 55131C0154D 55131C0158D 55131C0159D 55131C0161E 55131C0162D 55131C0164D 55131C0166D 55131C0167D 55131C0168D 55131C0169D 55131C0186D 55131C0256E	

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.

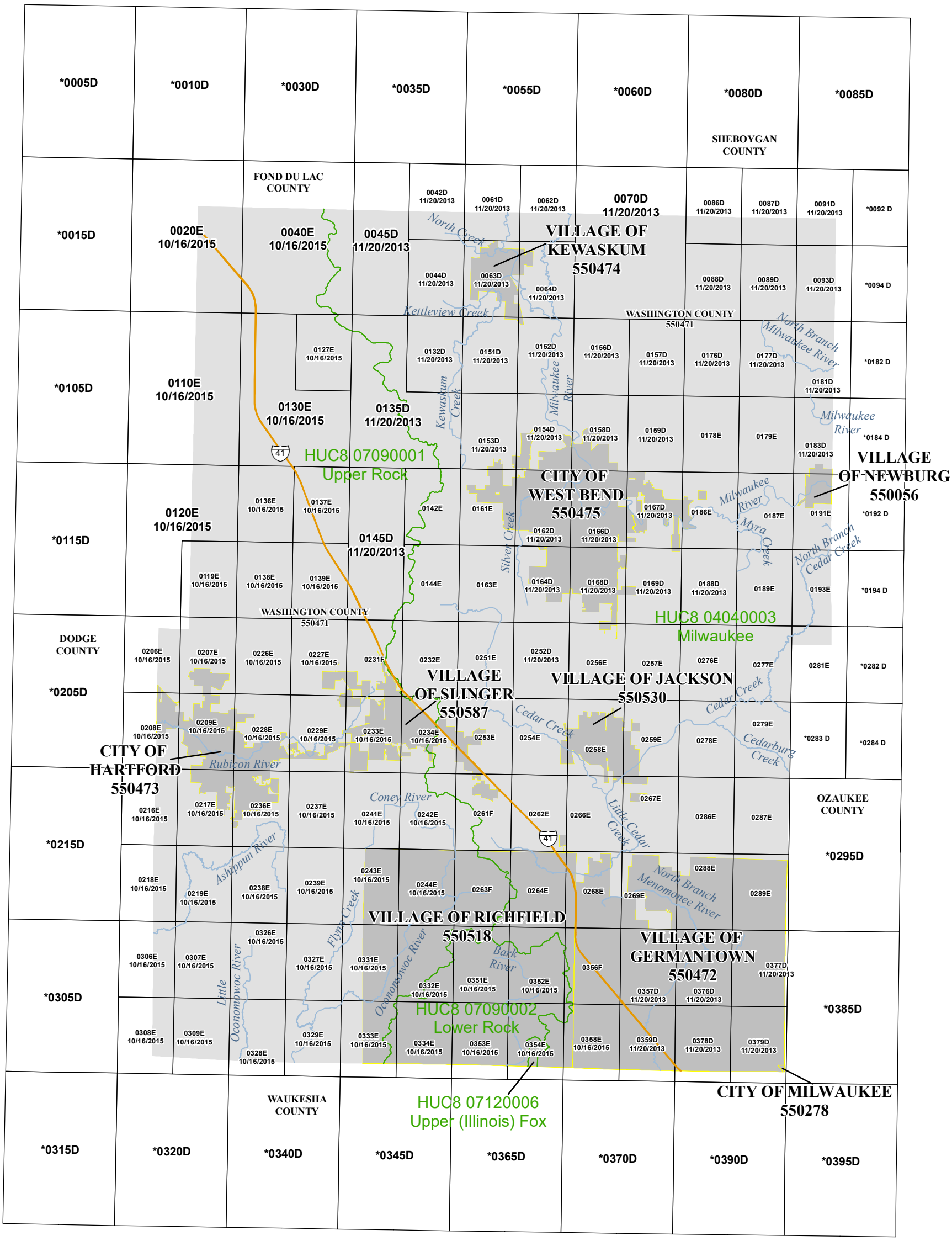
  It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data for floodplain management and flood insurance purposes. Community map repository addresses are provided in Table 30, "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 Washington County became effective on November 20, 2013. Refer to Table 27 for information about subsequent revisions to the FIRMs.

- 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 www.fema.gov/online-tutorials.

Figure 1: FIRM Panel Index



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

N

1 inch = 3 miles 1:190,080

0 4,500 9,000 18,000 27,000 36,000 feet

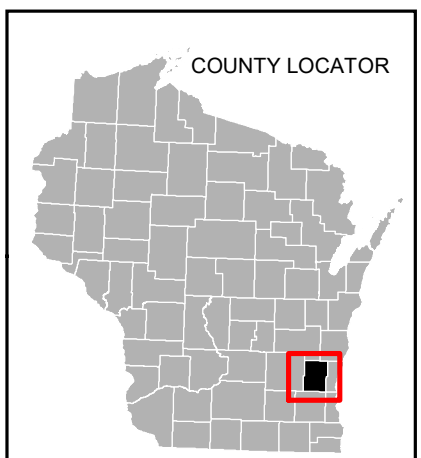
Map Projection:
NAD83 HARN UTM Zone 16N
North American Datum 1983

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

HTTPS://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

* PANEL NOT PRINTED - AREA OUTSIDE COUNTY BOUNDARY



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX

WASHINGTON COUNTY, WISCONSIN and Incorporated Areas

PANELS PRINTED:

0020, 0040, 0042, 0044, 0045, 0061, 0062, 0063, 0064, 0070, 0086, 0087, 0088, 0089, 0091, 0093, 0110, 0119, 0120, 0127, 0130, 0132, 0135, 0136, 0137, 0138,0139, 0142, 0144, 0145, 0151, 0152, 0153, 0154, 0156, 0157, 0158, 0159, 0161, 0162, 0163, 0164, 0166, 0167, 0168, 0169, 0176, 0177, 0178, 0179, 0181, 0183, 0186, 0187, 0188, 0189, 0191, 0193, 0206, 0207, 0208, 0209, 0216, 0217, 0218, 0219, 0226, 0227, 0228, 0229, 0231, 0232, 0233, 0234, 0236, 0237, 0238, 0239, 0241, 0242, 0243, 0244, 0251, 0252, 0253, 0254, 0256, 0257, 0258, 0259, 0261, 0262, 0263, 0264,0266, 0267, 0268, 0269, 0276, 0277, 0278, 0279, 0281, 0286, 0287, 0289, 0288, 0306, 0307, 0308, 0309, 0326, 0327, 0328, 0329, 0331, 0332, 0333, 0334, 0351, 0352, 0353, 0354, 0356, 0357, 0358, 0359, 0376, 0377, 0378, 0379

FEMA

MAP NUMBER
55131CIND0C

MAP REVISED

REVISED PRELIMINARY 03/15/2021

Each FIRM panel may contain specific notes to the user that provide additional information regarding the flood hazard data shown on that map. However, the FIRM panel does not contain enough space to show all the notes that may be relevant in helping to better understand the information on the panel. Figure 2 contains the full list of these notes.

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 Flood Map Service Center website at 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 27 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.

Figure 2: FIRM Notes to Users *(continued)*

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.

PROJECTION INFORMATION: The projection used in the preparation of the map was Universal Transverse Mercator. The horizontal datum was North American Datum 1983. 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 NAVD88. 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 North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov.

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 30 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was provided by . 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.

NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Washington County, Wisconsin, 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 27 of this FIS Report to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

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

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Washington County, effective TBD.

Figure 2: FIRM Notes to Users *(continued)*

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.

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Washington County.

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 *(continued)*

OTHER AREAS OF FLOOD HAZARD

Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.

Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.

Zone X Protected by Accredited Levee: Areas protected by an accredited levee, dike or other flood control structures. See Notes to Users for important information.

Area with Flood Risk due to Levee: Areas where a non-accredited levee, dike, or other flood control structure is shown as providing protection to less than the 1% annual chance flood.

OTHER AREAS

Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible

Unshaded Zone X: Areas of minimal flood hazard.

FLOOD HAZARD AND OTHER BOUNDARY LINES

Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)

Limit of Study

Jurisdiction Boundary

Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet

Figure 3: Map Legend for FIRM *(continued)*

GENERAL STRUCTURES	
Aqueduct *Channel* *Culvert* *Storm Sewer*	Channel, Culvert, Aqueduct, or Storm Sewer
Dam *Jetty* *Weir*	Dam, Jetty, Weir
	Levee, Dike or Floodwall
Bridge	Bridge
REFERENCE MARKERS	
22.0	River mile Markers
CROSS SECTION & TRANSECT INFORMATION	
B 20.2	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
5280 21.1	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
17.5	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
8	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.
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

Figure 3: Map Legend for FIRM *(continued)*

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 Washington 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 22), 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 Washington County, 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 12. 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.

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
Amy Bell Creek	Richfield, Village of	Mouth at Bark Lake	Amy Bell Lake	07090002	0.6	*	Y	AE	2013
Ashippun River	Washington County, Unincorporated Areas	Washington / Dodge County Boundary	Approximately 1.9 miles upstream of County Highway E	07090001	12.6	*	Y	AE	2013
Ashippun River Overland Flowpath	Washington County, Unincorporated Areas	Convergence with Unnamed Tributary to Ashippun River	Divergence from Ashippun River	07090001	0.6	*	Y	AE	2013
Ashippun River Tributary 2	Washington County, Unincorporated Areas	Confluence with Ashippun River	Approximately 1,500 feet upstream of Riley Road	07090001	2.5	*	Y	AE	2013
Ashippun River Tributary 2.1	Washington County, Unincorporated Areas	Confluence with Ashippun River Tributary 2	Approximately 1,500 feet upstream of Cart Path	07090001	1.0	*	Y	AE	2013
Ashippun River Tributary 2.2	Washington County, Unincorporated Areas	Confluence with Ashippun River Tributary 2	Approximately 0.8 miles upstream	07090001	0.8	*	Y	AE	2013
Ashippun River Tributary 3	Washington County, Unincorporated Areas	Confluence with Ashippun River	Approximately 1,100 feet upstream	07090001	0.2	*	Y	AE	2013

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Ashippun River Tributary 4	Washington County, Unincorporated Areas	Confluence with Ashippun River	Approximately 500 feet upstream of County Highway E	07090001	0.2	*	Y	AE	2013
Ashippun River Tributary 5	Washington County, Unincorporated Areas	Confluence with Ashippun River	Approximately 1,250 feet upstream	07090001	2.5	*	Y	AE	2013
Bark River	Richfield, Village of	Washington / Waukesha County Boundary	Approximately 1,400 feet upstream of Scenic Road	07090002	5.4	*	Y	AE	2013
Bark River Tributary 1	Richfield, Village of	Washington / Waukesha County Boundary	Approximately 1,140 feet upstream	07090002	0.2	*	Y	AE	2013
Bark River Tributary 1.1	Richfield, Village of	Confluence with Bark River Tributary 1	Approximately 1,040 feet upstream	07090002	0.2	*	Y	AE	2013
Bolton Brook	Washington County, Unincorporated Areas	Confluence with Stony Creek	Boltonville Road	04040003	0.6	*	N	AE	1980
Bonniwell Creek	Richfield, Village of; Germantown, Village of	Confluence with Little Cedar Creek	Rockfield Road	04040003	1.6	*	Y	AE	2018
Butler Creek Tributary 1	Washington County, Unincorporated Areas	Washington / Dodge County Boundary	Approximately 1,060 feet upstream	07090001	0.2	*	Y	AE	2013

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Butler Creek Tributary 2	Washington County, Unincorporated Areas	Washington / Dodge County Boundary	Approximately 780 feet upstream	07090001	0.1	*	Y	AE	2013
Cedar Creek	Jackson, Village of; Washington County, Unincorporated Areas	Washington / Ozaukee County Boundary	Cedar Lake	04040003	18.3	*	Y	AE	2018
Cedar Lake	Washington County, Unincorporated Areas	Entire Shoreline	Entire Shoreline	04040003	*	1.8	Y	AE	2018
Cedarburg Creek	Washington County, Unincorporated Areas	Confluence with Cedar Creek	Washington / Ozaukee County Boundary	04040003	3.4	*	Y	AE	2018
Coney River	Richfield, Village of; Washington County, Unincorporated Areas	Confluence with Oconomowoc River	County Highway E	07090001	4.5	*	Y	AE	2013
Coney River	Washington County, Unincorporated Areas	County Highway E	County Highway CC	07090001	3.0	*	Y	AE	2013

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Coney River Overland Flowpath	Washington County, Unincorporated Areas	Convergence with Coney River	Divergence from Coney River	07090001	1.2	*	Y	AE	2013
Deer Creek	Washington County, Unincorporated Areas	Confluence with North Branch Cedar Creek	Approximately 2,500 feet upstream of Church Road	04040003	3.1	*	Y	AE	2018
East Branch Rock River	Washington County, Unincorporated Areas	Approximately 4,500 feet downstream of State Highway 33	Hillcrest Drive	07090001	1.8	*	Y	AE	2013
Edgewood Creek	Kewaskum, Village of	Confluence with North Creek	1,120 feet upstream of Kewaskum City Limits	04040003	0.9	*	Y	AE	1996
Edgewood Creek Overflow Channel	Kewaskum, Village of	Confluence with Edgewood Creek	725 feet upstream of Clinton Street	04040003	0.5	*	Y	AE	1996
Evergreen Bypass	Washington County, Unincorporated Areas	Confluence with Evergreen Creek	Divergence from Evergreen Creek	04040003	0.1	*	Y	AE	2018
Evergreen Creek	West Bend, City of; Washington County, Unincorporated Areas	County Highway G	Approximately 2,400 feet upstream of Hron Road	04040003	5.1	*	Y	AE	2018
Flynn Creek	Washington County, Unincorporated Areas	Confluence with Oconomowoc River	Approximately 700 feet upstream of Shannon Road	07090001	5.9	*	Y	AE	2013

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Frieden's Creek	Jackson, Village of; Washington County, Unincorporated Areas	Confluence with Cedar Creek	State Highway 45	04040003	4.5	*	Y	AE	2018
Green Lake	Washington County, Unincorporated Areas	Entire shoreline	Entire shoreline	04040003	*	0.1	N	AE	1980
Hasmer Creek	Jackson, Village of; Washington County, Unincorporated Areas	Confluence with Cedar Creek	Approximately 2,000 feet upstream of Hasmer Lake	04040003	1.8	*	Y	AE	2018
Hubertus Ditch No. 1	Richfield, Village of	Confluence with Bark River	Approximately 800 feet upstream of Hubertus Road	07090002	0.9	*	Y	AE	2013
Jackson Creek	Jackson, Village of; Washington County, Unincorporated Areas	Confluence with Cedar Creek	Approximately 600 feet upstream of Jackson Drive	04040003	1.0	*	Y	AE	2018
Kettleview Creek	Kewaskum, Village of; Washington County, Unincorporated Areas	Confluence with Kewaskum Creek	County Highway B	04040003	2.2	*	Y	AE	1996

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Kewaskum Creek	Kewaskum, Village of; Washington County, Unincorporated Areas	Confluence with Milwaukee River	Ridge Road	04040003	5.8	*	Y	AE	1996
Kewaskum Creek Overflow Channel	Washington County, Unincorporated Areas	Confluence with Kettleview Creek	800 feet downstream of Badger Road	04040003	0.6	*	Y	AE	1996
Knights Creek	Kewaskum, Village of; Washington County, Unincorporated Areas	Confluence with North Creek	700 feet downstream of Highland Drive	04040003	1.3	*	Y	AE	1996
Kohlsville River	Washington County, Unincorporated Areas	Beechnut Drive	County Highway D	07090001	1.9	*	Y	AE	2013
Kohlsville River – Park Route	Washington County, Unincorporated Areas	Convergence with Kohlsville River	Divergence from Kohlsville River	07090001	0.5	*	Y	AE	2013
Kressen Branch	Germantown, Village of; Washington County, Unincorporated Areas	Confluence with Little Cedar Creek	Approximately 1,800 feet upstream of Pioneer Road	04040003	3.5	*	Y	AE	2018

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Lake Five	Richfield, Village of	Entire shoreline within Washington County	Entire shoreline within Washington County	07090002	*	0.2	N	AE	2013
Lehner Outlet	Washington County, Unincorporated Areas	Confluence with Cedar Creek	Approximately 4,800 feet upstream of Scenic Road	04040003	2.5	*	Y	AE	2018
Little Cedar Creek	Germantown, Village of; Richfield, Village of; Washington County, Unincorporated Areas	Confluence with Cedar Creek	Approximately 2,900 feet upstream of Scenic Road	04040003	8.2	*	Y	AE	2018
Little Cedar Creek Bypass	Germantown, Village of; Richfield, Village of; Washington County, Unincorporated Areas	Confluence with Little Cedar Creek	Divergence from Little Cedar Creek	04040003	0.9	*	Y	AE	2018
Little Oconomowoc River	Washington County, Unincorporated Areas	Confluence with Oconomowoc River	Approximately 1.1. miles upstream of Donegal Road	07090001	4.7	*	Y	AE	2013
Lower Rock River Watershed Zone A studies	Richfield, Village of	N/A	N/A	07090002	1.0	*	N	A	2013
Marsh Creek	Richfield, Village of	Confluence with Bark River	0.5 miles upstream of confluence with Bark River	07090002	0.4	*	N	AE	1980

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Mason Creek	Washington County, Unincorporated Areas	Washington / Waukesha County Boundary	Washington / Dodge County Boundary	07090001	2.2	*	Y	AE	2013
Mason Creek Tributary 1	Washington County, Unincorporated Areas	Washington / Waukesha County Boundary	Approximately 1.3 miles upstream	07090001	1.1	*	Y	AE	2013
Menomonee River	Germantown, Village of	Washington / Waukesha County Boundary	2,800 feet upstream of Lovers Lane	04040003	6.3	*	N	AE	1980
Milwaukee River	Newburg, Village of; Washington County, Unincorporated Areas	Washington / Ozaukee County Boundary	Approximately 5,750 feet upstream of County Highway M	04040003	4.8	*	Y	AE	2015
Milwaukee River	Washington County, Unincorporated Areas	Washington / Ozaukee County Boundary	Washington / Ozaukee County Boundary	04040003	2.2	*	Y	AE	1980
Milwaukee River	Kewaskum, Village of; Washington County, Unincorporated Areas; West Bend, City of	Approximately 5,750 feet upstream of County Highway M	Washington / Fond du Lac County Boundary	04040003	21.0	*	Y	AE	1980

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Milwaukee River Watershed Zone A studies	Germantown, Village of; Jackson, Village of; Washington County, Unincorporated Areas; West Bend, City of	N/A	N/A	04040003	71.6	*	N	A	2013
Mueller Lake	Washington County, Unincorporated Areas	Entire Shoreline	Entire Shoreline	04040003	*	0.2	Y	AE	2018
Myra Creek	Washington County, Unincorporated Areas	Confluence with Milwaukee River	0.18 miles upstream of Knollwood Drive	04040003	2.8	*	N	AE	1980
Nature's Friends Tributary	Washington County, Unincorporated Areas	Confluence with Cedar Creek	Approximately 2,400 feet upstream of confluence with Cedar Creek	04040003	0.5	*	Y	AE	2018
North Branch Cedar Creek	Washington County, Unincorporated Areas	Confluence with Cedar Creek	Approximately 2,000 feet upstream of County Highway Y	04040003	9.0	*	Y	AE	2018
North Branch Menomonee River	Germantown, Village of	Confluence with Menomonee River	2,300 feet upstream of Golden Dale Road	04040003	4.3	*	N	AE	1980
North Branch Milwaukee River	Washington County, Unincorporated Areas	Washington / Ozaukee County Boundary	Washington / Sheboygan County Boundary	04040003	7.6	*	N	AE	1980

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
North Creek	Kewaskum, Village of; Washington County, Unincorporated Areas	Confluence with Milwaukee River	100 feet downstream of Highland Drive	04040003	2.3	*	Y	AE	1996
North Crossway Channel	Germantown, Village of	Washington / Waukesha County Boundary	Washington / Ozaukee County Boundary	04040003	1.9	*	N	AE	1980
Oconomowoc River	Richfield, Village of; Washington County, Unincorporated Areas	Washington / Waukesha County Boundary	Approximately 2,600 feet upstream of Hillside Road	07090001	10.5	*	Y	AE	2013
Oconomowoc Bypass	Richfield, Village of; Washington County, Unincorporated Areas	Pleasant Hill Road	Divergence from Little Cedar Creek	04040003	1.3	*	Y	AE	2018
Polk Springs Creek	Washington County, Unincorporated Areas	Confluence with Cedar Creek	Approximately 300 feet upstream of Mayfield Road	04040003	1.8	*	Y	AE	2018
Putter Creek	Washington County, Unincorporated Areas	Confluence with Coney River	Approximately 4,300 feet upstream	07090001	0.8	*	Y	AE	2013

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Quaas Creek	Washington County, Unincorporated Areas; West Bend, City of	Confluence with Milwaukee River	285 feet downstream of Paradise Drive	04040003	6.0	*	Y	AE	1989
Rubicon River	Hartford, City of; Slinger, Village of; Washington County, Unincorporated Areas	Washington / Dodge County Boundary	Approximately 2,600 feet upstream of State Highway 175	07090001	10.3	*	Y	AE	2013
Rubicon River Overland Flowpath	Hartford, City of; Washington County, Unincorporated Areas	Convergence with Rubicon River	Divergence from Rubicon River	07090001	0.5	*	Y	AE	2013
Rubicon River Tributary 1	Washington County, Unincorporated Areas	Washington / Dodge County Boundary	Approximately 1,600 feet upstream	07090001	0.3	*	Y	AE	2013
Rubicon River Tributary 2	Washington County, Unincorporated Areas	Washington / Dodge County Boundary	Approximately 960 feet upstream	07090001	0.2	*	Y	AE	2013
Scenic Brook	Richfield, Village of	Confluence with Bark River	Approximately 4,700 feet upstream	07090002	0.9	*	Y	AE	2013
Silver Creek	Washington County, Unincorporated Areas; West Bend, City of	Confluence with Milwaukee River	Silver Lake	04040003	5.7	*	Y	AE	1995

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Silverbrook Creek	Washington County, Unincorporated Areas; West Bend, City of	Confluence with Silver Creek	0.5 miles upstream of U.S. Highway 45	04040003	1.4	*	Y	AE	1995
Springside Creek	Germantown, Village of; Richfield, Village of; Washington County, Unincorporated Areas	Confluence with Little Cedar Creek	Pioneer Road	04040003	1.2	*	Y	AE	2018
Stony Creek	Washington County, Unincorporated Areas	State Highway 84	North Parkside Road	04040003	2.8	*	N	AE	1980
Tributary No. 1	Germantown, Village of	Confluence with Menomonee River	Butternut Road	04040003	3.3	*	N	AE	1980
Tributary No. 1A	Germantown, Village of	Confluence with Tributary 1	3,950 feet upstream of confluence with Tributary 1	04040003	0.8	*	N	AE	1980
Tributary No. 1B	Germantown, Village of	Confluence with Tributary 1	3,250 feet upstream of confluence with Tributary 1	04040003	0.6	*	N	AE	1980
Tributary No. 2	Germantown, Village of	Confluence with Menomonee River	Mequon Road	04040003	1.2	*	N	AE	1980
Tributary No. 3	Germantown, Village of	Confluence with Menomonee River	3,000 feet above confluence with Menomonee River	04040003	0.6	*	N	AE	1980

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Tributary No. 5	Germantown, Village of	Confluence with Menomonee River	3,100 feet above confluence with Menomonee River	04040003	0.6	*	N	AE	1980
Unnamed Tributary to Ashippun River	Hartford, City of; Washington County, Unincorporated Areas	Confluence with Ashippun River	Approximately 1.0 miles upstream	07090001	0.4	*	Y	AE	2013
Unnamed Tributary to Frieden's Creek	Washington County, Unincorporated Areas	Confluence with Frieden's Creek	Approximately 500 feet upstream of confluence with Frieden's Creek	04040003	0.1	*	N	AE	2005
Unnamed Tributary to Kewaskum Creek	Washington County, Unincorporated Areas	Confluence with Kewaskum Creek	350 feet downstream of Kettleview Drive	04040003	0.9	*	Y	AE	1996
Unnamed Tributary to North Crossway Channel	Germantown, Village of	Confluence with North Crossway Channel	Approximately 2,000 feet upstream of Strawgrass Lane	04040003	0.4	*	N	AE	1980
Upper Rock River Watershed Zone A studies	Richfield, Village of; Washington County, Unincorporated Areas	N/A	N/A	07090001	54.1	*	N	A	2013
UT-1 to Big Cedar Lake	Washington County, Unincorporated Areas	Confluence with Cedar Lake	Arthur Road	04040003	3.2	*	Y	AE	2018

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
UT-1 to Cedar Creek	Washington County, Unincorporated Areas	Washington / Ozaukee County Boundary	Washington Drive	04040003	0.5	*	Y	AE	2018
UT-1 to Coney River	Washington County, Unincorporated Areas	Confluence with Coney River	Approximately 1,100 feet upstream of Slinger Road	07090001	1.4	*	Y	AE	2013
UT-1 to Coney River Overflow	Washington County, Unincorporated Areas	Confluence with Coney River	Divergence from UT-1 to Coney River	07090001	0.3	*	Y	AE	2013
UT-1 to Coney River Overflow West	Washington County, Unincorporated Areas	Confluence with Coney River	Approximately 1,000 feet upstream	07090001	0.2	*	Y	AE	2013
UT-1 to Evergreen Creek	Washington County, Unincorporated Areas	Confluence with Evergreen Creek	Approximately 1,600 feet upstream of County Highway G	04040003	0.5	*	Y	AE	2018
UT-1 to Hasmer Creek	Jackson, Village of; Washington County, Unincorporated Areas	County Highway P	Tilly Lake	04040003	0.6	*	N	AE	2011
UT-1 to Kressen Branch	Washington County, Unincorporated Areas	Confluence with Kressen Branch	Approximately 600 feet upstream of Church Road	04040003	1.5	*	Y	AE	2018

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
UT-1 to Little Cedar Creek	Washington County, Unincorporated Areas	Confluence with Little Cedar Creek	Approximately 2,500 feet upstream of Jackson Drive	04040003	0.6	*	Y	AE	2018
UT-1 to Little Cedar Lake	Washington County, Unincorporated Areas	Confluence with Little Cedar Lake	Approximately 300 feet upstream of Wayne Drive	04040003	0.4	*	Y	AE	2018
UT-1 to Oconomowoc River	Richfield, Village of; Washington County, Unincorporated Areas	Confluence with Oconomowoc River	Divergence from Oconomowoc River	07090001	2.6	*	Y	AE	2013
UT-1 to Polk Springs Creek	Washington County, Unincorporated Areas	Confluence with Polk Springs Creek	State Highway 45	04040003	0.2	*	Y	AE	2018
UT-1 to Rubicon River	Washington County, Unincorporated Areas	Confluence with Rubicon River	Approximately 1,900 feet upstream of County Highway U	07090001	6.1	*	Y	AE	2013
UT-1.1 to Rubicon River	Washington County, Unincorporated Areas	Confluence with UT-1 to Rubicon River	Washington / Dodge County Boundary	07090001	1.6	*	Y	AE	2013
UT-1.1.1 to Rubicon River	Washington County, Unincorporated Areas	Confluence with UT-1.1 to Rubicon River	Approximately 3,200 feet upstream	07090001	0.6	*	Y	AE	2013

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
UT-1.2 to Rubicon River	Washington County, Unincorporated Areas	Confluence with UT-1 to Rubicon River	Approximately 2,800 feet upstream of County Highway K	07090001	1.7	*	Y	AE	2013
UT-1.2.1 to Rubicon River	Washington County, Unincorporated Areas	Confluence with UT-1.2 to Rubicon River	Approximately 2,800 feet upstream of Saint Lawrence Lane	07090001	1.6	*	Y	AE	2013
UT-2 to Cedar Creek	Washington County, Unincorporated Areas	Confluence with Cedar Creek	Center Road	04040003	1.6	*	Y	AE	2018
UT-2 to Coney River	Richfield, Village of; Washington County, Unincorporated Areas	Confluence with Coney River	Approximately 1.4 miles upstream	07090001	1.4	*	Y	AE	2013
UT-2 to Little Cedar Creek	Washington County, Unincorporated Areas	Confluence with Little Cedar Creek	Approximately 1,500 feet upstream of confluence with Little Cedar Creek	04040003	0.3	*	Y	AE	2018
UT-2 to Oconomowoc River	Richfield, Village of	Confluence with Oconomowoc River	State Highway 164	07090001	2.3	*	Y	AE	2013
UT-2 to Rubicon River	Washington County, Unincorporated Areas	Confluence with Rubicon River	Approximately 1,900 feet upstream of County Highway U	07090001	6.1	*	Y	AE	2013

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
UT-2.1 to Rubicon River	Hartford, City of; Washington County, Unincorporated Areas	Confluence with Rubicon River	Approximately 1.0 miles upstream of State Highway 83	07090001	1.7	*	Y	AE	2013
UT-3 to Rubicon River	Hartford, City of; Washington County, Unincorporated Areas	Confluence with Rubicon River	Approximately 3,000 feet upstream of confluence with UT-3.1 to Rubicon River	07090001	2.2	*	Y	AE	2013
UT-3.1 to Rubicon River	Hartford, City of; Washington County, Unincorporated Areas	Confluence with UT-3 to Rubicon River	Arthur Road	07090001	0.7	*	Y	AE	2013
UT-4 to Rubicon River	Slinger, Village of; Washington County, Unincorporated Areas	Confluence with Rubicon River	Approximately 4,200 feet upstream	07090001	0.8	*	Y	AE	2013
UT-5 to Rubicon River	Slinger, Village of; Washington County, Unincorporated Areas	Confluence with Rubicon River	Approximately 2,200 feet upstream of Wisconsin Central Railroad	07090001	1.6	*	Y	AE	2013
Wallace Lake	Washington County, Unincorporated Areas	Entire shoreline	Entire shoreline	04040003	*	0.1	N	AE	1980

* Not calculated for this FIS project

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Washington Creek	Washington County, Unincorporated Areas, West Bend, City of	Confluence with Silver Creek	500 feet upstream of Sheppard's Drive	04040003	1.5	*	Y	AE	1995
West Branch Menomonee River	Germantown, Village of	Confluence with Menomonee River	1,800 feet upstream of U.S. Highway 41 / 45	04040003	3.6	*	N	AE	1980
West Branch Milwaukee River	Washington County, Unincorporated Areas	Confluence with Milwaukee River	Washington / Fond du Lac County Boundary	04040003	0.6	*	N	AE	1980
Willow Creek	Germantown, Village of	Confluence with Menomonee River	Amy Belle Road	04040003	2.7	*	N	AE	1980
Wingate Creek	Washington County, Unincorporated Areas; West Bend, City of	Confluence with Milwaukee River	420 feet downstream of Wallace Lake Road	04040003	2.5	*	Y	AE	1989

* Not calculated for this FIS project

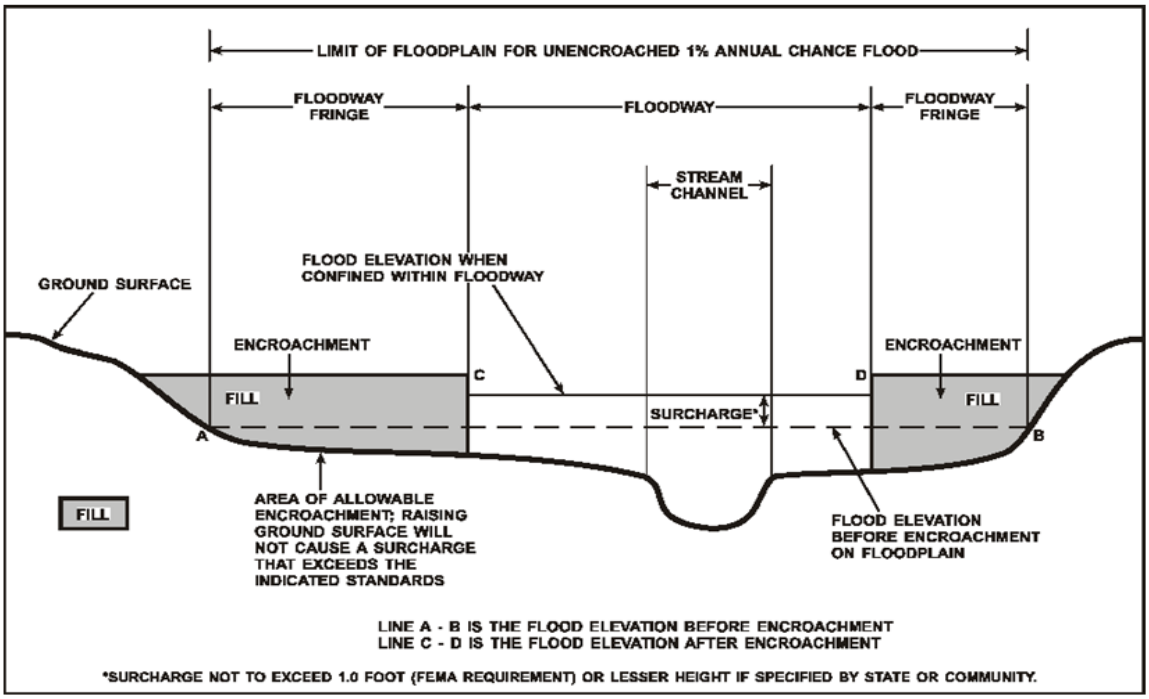
2.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard.

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

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. Regulations for Wisconsin require communities in Washington County to limit increases caused by encroachment to 0.0 feet and several communities have adopted additional restrictions. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

Figure 4: Floodway Schematic



Floodway widths presented in this FIS Report and on the FIRM were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. For certain stream segments, floodways were adjusted so that the amount of floodwaters conveyed on each side of the floodplain would be reduced equally. The results of the floodway computations have been tabulated for selected cross sections and are shown in Table 23, "Floodway Data."

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.

BFEs are primarily intended for flood insurance rating purposes. 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. 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. For example, the user may use the FIRM to determine the stream station of a location of interest and then use the profile to determine the 1-percent annual chance elevation at that location. Because only selected cross sections may be shown on the FIRM for riverine areas, the profile should be used to obtain the flood elevation between mapped cross sections. Additionally, for riverine areas, whole-foot elevations shown on the FIRM may not exactly reflect the elevations derived from the hydraulic analyses; therefore, elevations obtained from the profile may more accurately reflect the results of the hydraulic analysis.

2.4 Non-Encroachment Zones

This section is not applicable to this Flood Risk Project.

2.5 Coastal Flood Hazard Areas

2.5.1 Water Elevations and the Effects of Waves

This section is not applicable to this Flood Risk Project.

Figure 5: Wave Runup Transect Schematic

[Not Applicable to this Flood Risk Project]

2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

This section is not applicable to this Flood Risk Project.

2.5.3 Coastal High Hazard Areas

This section is not applicable to this Flood Risk Project.

Figure 6: Coastal Transect Schematic

[Not Applicable to this Flood Risk Project]

2.5.4 Limit of Moderate Wave Action

This section is not applicable to this Flood Risk 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 Washington County.

Table 3: Flood Zone Designations by Community

Community	Flood Zone(s)
Germantown, Village of	A, AE, X
Hartford, City of	A, AE, X
Jackson, Village of	AE, X
Kewaskum, Village of	A, AE, X
Milwaukee, City of	X
Newburg, Village of	AE, X
Richfield, Village of	A, AE, X
Slinger, Village of	A, AE, X
Washington County, Unincorporated Areas	A, AE, X
West Bend, City of	A, AE, X

SECTION 4.0 – AREA STUDIED

4.1 Basin Description

Table 4 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 4: Basin Characteristics

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (sq mi)
Lower Rock	07090002	Rock River	Drains a small portion of Southern Washington County that includes the headwaters of the Bark River	1,830
Milwaukee	04040003	Milwaukee River	Encompasses the Eastern half of Washington County, including the Milwaukee River, Cedar Creek, and Menomonee River watersheds	879
Upper (Illinois) Fox	07120006	Fox River	Upper portion of the (Illinois) Fox River basin in Wisconsin (no SFHA's in Washington County)	1,544
Upper Rock	07010001	Rock River	Encompasses the Western half of Washington County, including the East Branch Rock River, Rubicon, Ashippun, and Oconomowoc watersheds	1,892

4.2 Principal Flood Problems

Table 5 contains a description of the principal flood problems that have been noted for Washington County by flooding source.

Table 5: Principal Flood Problems

Flooding Source	Description of Flood Problems
Multiple	Washington County is most susceptible to flooding in spring due to a combination of rapid snowmelt, spring rains, and frozen ground. Ice and debris may jam at bridge construction and cause much higher river stages than would normally be expected. The largest and most disastrous flood occurred in August 1924. Almost eight inches of rain fell causing severe flooding of the county's waterways. Most bridges of the county were washed out, dams were destroyed, and a train wreck occurred near the Village of Kewaskum. Other large floods occurred in 1952, 1965, and 1978 (WCHS 1979).
Multiple	On June 8, 2008, heavy rains resulted in flash flooding over much of Washington County. Water depths on road surfaces reached 3 feet or more and there were gravel washouts. Some farm fields would remain flooded into early July.
Rubicon River	Major flooding of the Rubicon River near the City of Hartford occurred in March 1929 and April 1959. These flooding events are estimated to be less than 10-year recurrence interval floods based on comparison of the historic information with the flood profiles. The late winter flood was attributed to the simultaneous occurrence of snowmelt and a light rainfall. The river rose very rapidly, and just east of the Hartford, washed out much of the area that is now Wilson Avenue. Floodwaters overtopped the Rural Street Bridge which is located 1,000 feet downstream of the dam. Flood stages dropped rapidly and the river returned to its banks on the following day. A rainfall-snowmelt combination caused flooding the night of April 2, 1959. This flood was not as severe as the 1929 event because the floodwaters were generally contained by the river banks, although some industries and city parkland did experience flooding (SEWRPC 1974).

Table 6 contains information about historic flood elevations in the communities within Washington County.

Table 6: Historic Flooding Elevations

[Not Applicable to this Flood Risk Project]

4.3 Non-Levee Flood Protection Measures

Table 7 contains information about non-levee flood protection measures within Washington County such as dams, jetties, and or dikes. Levees are addressed in Section 4.4 of this FIS Report.

Table 7: Non-Levee Flood Protection Measures

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Cedar Creek	N/A	Earthen Dike	Mayfield Road to the Mayfield Dam	An earthen dike exists along Cedar Creek from Mayfield Road to the Mayfield Dam. This dike has apparently been constructed to divert water from the natural flood plain which is utilized for agriculture. During the occurrence of a major flood event, this dike would become overtopped and water would occupy the natural floodplain.
Milwaukee River	Woolen Mills Dam, Young America Dam	Dam	West Bend, City of	Two dams on the Milwaukee River have been removed since publication of the 2013 FIS. The Woolen Mills Dam in the City of West Bend was removed in 1988 and this countywide study reflects the removal. The Young America Dam was removed in 1993 but no new hydraulic studies were completed on the Milwaukee River with the dam removed, thus there was no update as part of this countywide study.

4.4 Levees

This section is not applicable to this Flood Risk Project.

Table 8: Levees

[Not Applicable to this Flood Risk 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 26, “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 12. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 9. A summary of stillwater elevations developed for non-coastal flooding sources is provided in Table 10.

Table 9: 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
Amy Bell Creek	At mouth of Amy Bell Lake	0.4	75	100	125	160	215
Ashippun River	At confluence with Ashippun River Tributary 2	15.4	250	340	420	500	740
Ashippun River	Approximately 4,100 feet upstream of County Highway O	11.8	210	260	280	320	470
Ashippun River	At Druid Lake outlet	10.2	200	240	260	290	440
Ashippun River	At confluence with Ashippun River Tributary 3	8.8	310	430	520	600	860
Ashippun River	At State Highway 83	7.0	280	400	480	560	770
Ashippun River	At confluence with Unnamed Tributary to Ashippun River	5.9	270	380	450	520	720
Ashippun River	Downstream of divergence with Ashippun River - Overland Flowpath	3.7	183	266	310	368	490
Ashippun River	At confluence with Ashippun River Tributary 4	3.0	185	275	325	395	550
Ashippun River	At confluence with Ashippun River Tributary 5	1.7	110	190	230	290	415
Ashippun River	Approximately 1.2 miles upstream of County Highway E	0.9	80	110	135	175	240
Ashippun River	Approximately 1.9 miles upstream of County Highway E	0.6	65	90	115	150	210

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Ashippun River - Overland Flowpath	At divergence from Ashippun River	*	2	9	15	27	60
Ashippun River Tributary 2	At confluence with Ashippun River Tributary 2.1	2.1	165	235	290	385	530
Ashippun River Tributary 2	At confluence with Ashippun River Tributary 2.2	0.8	70	95	120	155	215
Ashippun River Tributary 2	At Riley Road	0.4	40	55	70	95	135
Ashippun River Tributary 2	Approximately 1,600 feet upstream of Riley Road	0.4	45	65	85	110	155
Ashippun River Tributary 2.1	Approximately 1,100 feet downstream of cart path	1.3	125	170	205	270	365
Ashippun River Tributary 2.1	At Cart Path	1.2	120	165	200	260	355
Ashippun River Tributary 2.1	Approximately 1,500 feet upstream of cart path	0.1	15	20	25	30	45
Ashippun River Tributary 2.2	Approximately 2,200 feet upstream of mouth	0.2	20	25	30	40	60
Ashippun River Tributary 2.2	Approximately 4,300 feet upstream of mouth	0.1	10	13	16	20	30
Ashippun River Tributary 3	At mouth	0.9	175	230	275	350	465
Ashippun River Tributary 4	Approximately 500 feet upstream of County Highway E	0.7	90	120	150	190	255

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Ashippun River Tributary 4	At County Highway E	0.6	50	50	50	60	80
Ashippun River Tributary 5	At mouth	0.1	25	35	40	55	75
Bark River	At confluence with Scenic Brook	6.4	53	70	85	98	148
Bark River	At Bark Lake Drive	5.3	22	32	41	50	84
Bark River	At Bark Lake Road	3.8	103	138	163	185	258
Bark River	At confluence with Hubertus Ditch No. 1	3.0	73	97	115	131	183
Bark River	Upstream of Hubertus Ditch No. 1	2.1	65	87	103	117	164
Bark River Tributary 1	Approximately 950 feet upstream of County Highway Q	0.7	25	45	75	105	155
Bark River Tributary 1	At County Highway Q	0.6	20	35	65	95	135
Bark River Tributary 1.1	At mouth	0.1	6	9	11	13	19
Bolton Brook	Above the confluence with Stony Creek	1.7	140	*	285	330	440
Bonniwell Creek	At U.S. Highway 41	2.5	651	851	1,011	1,251	1,665
Bonniwell Creek	At U.S. Highway 41	1.3	338	442	526	652	873
Bonniwell Creek	At Rockfield Road	1.0	295	384	455	563	747
Bonniwell Creek	At Holy Hill Road	0.6	171	223	264	327	434
Butler Creek Tributary 1	At Washington / Dodge County Boundary	0.7	95	125	145	185	245

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Butler Creek Tributary 2	At Washington / Dodge County Boundary	0.3	95	125	150	185	245
Cedar Creek	At confluence with North Branch Cedar Creek	92.6	3,002	3,951	4,643	5,227	6,964
Cedar Creek	At confluence approximately 1.2 miles upstream of CTH M	79.2	2,824	3,693	4,327	4,866	6,441
Cedar Creek	At confluence with Cedarburg Creek	77.4	2,984	4,054	4,632	5,415	7,228
Cedar Creek	At confluence with Evergreen Creek	68.0	3,106	4,221	4,808	5,606	7,442
Cedar Creek	At confluence with Frieden's Creek	62.4	3,249	4,459	5,096	5,957	7,907
Cedar Creek	At confluence with UT-2 to Cedar Creek	54.2	2,741	3810	4,401	5,191	7,020
Cedar Creek	At confluence with Jackson Creek	49.5	2,479	3440	3,953	4,639	6,240
Cedar Creek	At Hickory Lane	48.7	2,480	3437	3,951	4,638	6,239
Cedar Creek	At confluence with Little Cedar Creek	47.0	2,445	3421	3,934	4,631	6,245
Cedar Creek	At confluence with Polk Springs Creek	24.1	1,023	1409	1,621	1,870	2,435
Cedar Creek	At confluence with Hasmer Creek	20.4	619	842	957	1,108	1,482
Cedar Creek	At confluence with Nature's Friends Tributary	17.1	266	380	445	537	768
Cedar Creek	At confluence with Lehner Outlet	17.0	255	365	431	521	742

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Cedar Creek	At Lent Dam	14.8	116	175	228	285	488
Cedar Creek	At Cedar Creek Road	13.9	109	165	216	271	468
Cedar Creek	At Little Cedar Lake Dam	12.6	100	151	199	249	438
Cedar Creek	At Little Cedar Lake Inlet	10.8	90	131	176	221	415
Cedar Creek	At Big Cedar Lake Dam	9.7	76	117	157	194	379
Cedarburg Creek	At County Highway M	6.1	278	381	472	610	867
Cedarburg Creek	At Washington / Ozaukee County Boundary	4.9	249	343	418	534	754
Coney River	Approximately 2,100 feet upstream of Pleasant Hill Road	8.3	400	540	650	830	1,150
Coney River	At confluence with Putter Creek	7.2	350	460	550	700	950
Coney River	Downstream of divergence with Coney River - Overland Flowpath	5.3	170	220	250	278	283
Coney River	At County Highway E	5.3	170	220	250	300	350
Coney River	At confluence with UT-1 to Coney River	5.3	175	*	245	270	332
Coney River	At confluence with UT-1 to Coney River Overflow	2.5	138	*	290	386	608
Coney River	At confluence with UT-1 to Coney River Overflow West	2.5	96	*	220	300	464

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Coney River	Approximately 1,500 feet downstream of County Highway E	2.5	54	*	91	113	151
Coney River	At County Highway CC	1.8	38	*	64	80	106
Coney River - Overland Flowpath	At divergence from Coney River	*	0	0	0	22	67
Deer Creek	At County Highway M	3.4	236	316	381	490	695
Deer Creek	At confluence approximately 1,600 feet upstream of Birchwood Trail	3.0	327	432	517	649	891
Deer Creek	At Church Road	0.8	116	152	181	226	307
Deer Creek	At Church Road	0.5	70	93	112	142	195
Deer Creek	Approximately 3,000 feet upstream of Church Road	0.3	31	41	49	66	94
East Branch Rock River	At Hillcrest Drive	26.5	1,290	1770	2,110	2,420	3,340
Edgewood Creek	Above Confluence with North Creek	*	24	*	25	25	*
Edgewood Creek	Approximately 0.4 miles above the confluence with North Creek	*	73	*	145	181	*
Edgewood Creek Overflow Channel	Above confluence with Edgewood Creek	0.4	1	*	10	23	*
Evergreen Bypass	At divergence from Evergreen Creek	*	5	11	16	26	44

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Evergreen Creek	At confluence approximately 1,600 feet upstream of County Highway G	4.7	523	704	846	1,060	1,442
Evergreen Creek	At confluence with UT-1 to Evergreen Creek	4.3	506	683	821	1,030	1,401
Evergreen Creek	At confluence approximately 1,800 feet upstream of Stoney Creek Road	3.6	458	618	748	946	1,286
Evergreen Creek	At County Highway NN	3.5	450	607	736	932	1,268
Evergreen Creek	At Maple Road	1.4	204	279	343	443	591
Evergreen Creek	At confluence approximately 600 feet downstream of Jackson Drive	0.5	118	156	187	235	322
Evergreen Creek	At West Bend Sub Railroad	0.2	55	72	86	109	150
Evergreen Creek	At divergence of Evergreen Bypass	*	12	13	13	13	13
Evergreen Creek	At Hron Road	0.1	17	23	29	39	57
Flynn Creek	At confluence with Oconomowoc River	4.7	487	*	1,126	1,548	2,450
Flynn Creek	At Emerald Drive	4.4	472	*	1,091	1,503	2,381
Flynn Creek	Approximately 4,100 feet downstream of Shamrock Lane	3.8	431	*	1,006	1,378	2,179

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Flynn Creek	Approximately 2,100 feet upstream of Shamrock Lane	3.0	374	*	870	1,188	1,865
Flynn Creek	At Donegal Road	2.6	345	*	802	1,095	1,716
Flynn Creek	At State Highway 167	1.3	221	*	497	656	1,018
Flynn Creek	Approximately 700 feet upstream of Shannon Road	0.7	117	*	264	356	593
Frieden's Creek	Approximately 3,500 feet downstream of Cedar Creek Road	4.8	654	841	992	1,230	1,667
Frieden's Creek	At Jackson Drive	4.0	513	656	771	978	1,344
Frieden's Creek	At Cameros Way	3.7	477	613	737	934	1,280
Frieden's Creek	At confluence approximately 700 feet downstream of County Highway P	2.6	402	506	589	721	961
Frieden's Creek	At U.S. Highway 45	1.5	231	318	387	498	696
Hasmer Creek	At Hasmer Lake Outlet	1.4	174	279	366	500	716
Hasmer Creek	At Hasmer Lake Inlet	1.0	265	342	403	498	663
Hasmer Creek	Approximately 2,000 feet upstream of Hasmer Lake	0.7	176	231	274	341	456
Hubertus Ditch No. 1	Approximately 1,400 feet downstream of Hubertus Road	0.8	130	175	215	280	380
Hubertus Ditch No. 1	At Hubertus Road	0.4	105	140	170	215	285

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Hubertus Ditch No. 1	Approximately 800 feet upstream of Hubertus Road	0.1	20	25	30	35	50
Jackson Creek	At Eagle Drive	0.2	98	130	160	195	277
Jackson Creek	Approximately 1,400 feet downstream of Jackson Drive	0.1	70	92	112	137	187
Jackson Creek	At Jackson Drive	0.1	46	59	71	87	120
Kewaskum Creek	Above confluence with Milwaukee River	11.5	952	*	1,721	2,260	*
Kewaskum Creek	Above County Highway D	5.6	817	*	*	1,470	*
Kohlsville River	At confluence with Kohlsville River - Park Route	8.0	400	570	680	810	1,130
Kohlsville River	At Kohlsville Dam (primary spillway)	8.0	185	276	308	332	483
Kohlsville River	At County Highway D	7.1	380	540	640	770	1,060
Kohlsville River - Park Route	At Kohlsville Dam (Park Route outlet)	*	215	294	372	478	647
Kressen Branch	At County Highway G	7.0	642	849	1,020	1,278	1,734
Kressen Branch	At confluence approximately 3,300 feet upstream of County Highway G	5.2	571	738	876	1,079	1,432
Kressen Branch	At County Highway M	2.7	256	332	396	486	679

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Lehner Outlet	At State Highway 60	1.1	76	101	141	166	269
Lehner Outlet	At Scenic Road	0.7	48	70	110	130	208
Lehner Outlet	At Lehner Lake Outlet	0.5	22	38	70	87	142
Lehner Outlet	At Lehner Lake Inlet	0.2	28	38	48	53	74
Little Cedar Creek	At confluence approximately 850 feet upstream of Cedar Creek	22.7	1,836	2402	2,872	3,603	4,922
Little Cedar Creek	At confluence with Kressen Branch Cedar Creek	19.5	1,791	2322	2,756	3,430	4,655
Little Cedar Creek	At West Bend Sub Railroad	10.7	1,391	1814	2,160	2,697	3,653
Little Cedar Creek	At confluence with UT-1 to Little Cedar Creek	10.0	1,387	1809	2,154	2,688	3,635
Little Cedar Creek	At confluence with Springside and Bonniwell Creeks	9.0	1,535	2030	2,423	3,020	4,085
Little Cedar Creek	At U.S. Highway 45 (includes Boniwell Creek inflow)	7.6	1,297	1711	2,031	2,522	3,422
Little Cedar Creek	At divergence of Little Cedar Creek Bypass	*	647	786	961	1,022	1,048
Little Cedar Creek	At confluence approximately 600 feet upstream of Mayfield Road	4.0	463	599	706	871	1,156
Little Cedar Creek	At Town Line Road	2.1	166	211	248	306	404

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Little Cedar Creek	At Scenic Road	1.6	57	59	59	63	66
Little Cedar Creek	Approximately 3,500 feet upstream of Scenic Road	0.4	45	63	78	101	144
Little Cedar Creek Bypass	At divergence from Little Cedar Creek	*	650	925	1,070	1,500	2,374
Little Oconomowoc River	At County Line Road	8.6	250	360	440	520	780
Little Oconomowoc River	At confluence near Roosevelt Road	5.9	250	350	430	500	730
Little Oconomowoc River	At Donegal Road	3.3	250	340	440	480	650
Little Oconomowoc River	At Dublin Drive	1.9	130	180	250	280	420
Mason Creek	Approximately 2,200 feet downstream of Erin Road	1.1	170	230	280	350	470
Mason Creek	At Erin Road	0.5	130	180	210	270	350
Mason Creek Tributary 1	Approximately 1.2 miles upstream of confluence	0.8	80	110	165	210	300
Mason Creek Tributary 1	Approximately 3,200 feet upstream of confluence	0.2	35	45	55	70	95
Milwaukee River	County Highway A	265.0	5,500	*	8,400	9,800	13,000
Milwaukee River	At the Village of Newburg corporate limits	255.0	5,300	*	8,200	9,500	12,800
Milwaukee River	At County Highway M	251.0	5,200	*	8,000	9,300	12,400

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Milwaukee River	Approximately 2.98 miles downstream of old Woolen Mill Dam	237.0	4,950	*	7,600	9,050	12,200
Milwaukee River	At old Woolen Mill Dam	226.0	4,950	*	7,600	8,800	11,800
Milwaukee River	At West Bend Dam	223.0	4,850	*	7,400	8,600	11,800
Milwaukee River	At the Chicago & Northwestern Railroad	162.5	4,850	*	7,400	8,600	11,800
Milwaukee River	At Woodford Drive	160.5	4,850	*	7,400	8,600	11,600
Milwaukee River	At Newark Drive	159.0	4,650	*	7,000	8,200	11,000
Milwaukee River	At County HWY H	154.5	4,600	*	7,000	8,100	11,000
Milwaukee River	At the Village of Kewaskum corporate limits	134.0	3,400	*	5,200	6,100	8,200
Milwaukee River	Above confluence of the West Branch Milwaukee River	74.6	1,650	*	2,500	2,950	3,900
Myra Creek	Above the confluence with Milwaukee River	3.3	190	*	345	410	590
Nature's Friends Tributary	At Nature’s Friends Dam	0.1	10	13	16	20	35
Nature's Friends Tributary	Approximately 900 feet upstream of Nature’s Friends Lake	0.1	26	33	40	50	68
North Branch Cedar Creek	At confluence with Deer Creek	11.2	399	596	702	851	1,216

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
North Branch Cedar Creek	At St. Augustine Road	6.0	204	294	347	420	605
North Branch Cedar Creek	At Knoll Wood Drive	3.7	120	178	210	254	373
North Branch Cedar Creek	At Washington / Ozaukee County Boundary	1.9	97	143	168	200	289
North Branch Cedar Creek	Upstream of Washington / Ozaukee County Boundary	0.2	16	22	29	33	50
North Branch Menomonee River	Approximately 0.26 mile upstream of Hwy 145	0.7	20	*	25	30	35
North Branch Milwaukee River	Downstream of the county boundary	147.0	4,750	*	7,800	9,100	13,000
North Branch Milwaukee River	At Trading Post Trail	143.2	4,350	*	7,400	8,900	12,600
North Branch Milwaukee River	At County Highway H	133.0	4,650	*	7,400	8,900	12,400
North Branch Milwaukee River	At Kohler Drive	106.5	3,750	*	6,000	7,200	10,000
North Branch Milwaukee River	At Jay Drive	104.0	3,300	*	5,300	6,400	9,000
North Creek	Above the confluence with Milwaukee River	2.4	289	*	574	755	*
North Crossway Channel	Just upstream of County Line Road, at the corporate limits	3.7	212	*	347	415	595

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
North Crossway Channel	Just Upstream of Chicago and North Western Railroad	2.4	*	*	*	135	*
Oconomowoc Bypass	At divergence from Little Cedar Creek	*	20	62	70	80	170
Oconomowoc Bypass	Approximately 2,100 feet downstream of Pioneer Road	*	20	62	106	180	314
Oconomowoc River	At confluence with Flynn Creek	27.5	480	690	820	920	1,290
Oconomowoc River	At confluence with UT-1 to Oconomowoc River	20.3	440	640	730	820	1,130
Oconomowoc River	At Elmwood Road	18.0	420	620	698	731	934
Oconomowoc River	At Hubertus Road	17.2	410	610	688	721	904
Oconomowoc River	Downstream of divergence of UT-1 to Oconomowoc River	17.2	470	640	718	761	964
Oconomowoc River	At Friess Lake Outlet	16.7	470	640	730	810	1,110
Oconomowoc River	At Friess Lake Inlet	15.3	520	660	760	840	1,120
Oconomowoc River	At confluence with UT-2 to Oconomowoc River	14.9	530	670	780	870	1,130
Oconomowoc River	At State Highway 164	11.9	440	560	640	700	930
Oconomowoc River	At confluence with Coney River	11.1	610	780	920	1,140	1,520
Oconomowoc River	At Hillside Road	2.2	310	400	470	580	770

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Oconomowoc River	Approximately 2,700 feet upstream of Hillside Road	1.2	56	64	70	85	139
Polk Springs Creek	At County Highway P	3.5	671	861	1,015	1,253	1,658
Polk Springs Creek	At U.S. Highway 45	2.7	498	645	761	940	1,247
Putter Creek	Approximately 3,000 feet upstream of the mouth	0.5	140	180	210	260	340
Quas Creek	Above confluence with Milwaukee River	8.6	740	*	1,200	1,400	*
Quas Creek	At Chicago & North Western Railroad	7.9	510	*	800	920	*
Rubicon River	At confluence with UT-3 to Rubicon River	30.8	780	1050	1,290	1,540	2,350
Rubicon River	At Wacker Drive	26.8	640	930	1,170	1,400	2,150
Rubicon River	At Steel Craft Drive	25.5	620	900	1,140	1,370	2,070
Rubicon River	At confluence with UT-2 to Rubicon River	24.7	610	890	1,120	1,350	2,030
Rubicon River	At confluence with UT-1 to Rubicon River	20.7	560	830	1,030	1,230	1,820
Rubicon River	At confluence with Rubicon River Overland Flowpath	11.5	150	230	400	500	1,010
Rubicon River	At Pike Lake Outlet	11.0	150	180	210	220	260
Rubicon River	Downstream of divergence from Rubicon River Overland Flowpath	7.4	350	510	636	655	600
Rubicon River	At Kettle Moraine Road	6.8	460	630	820	930	1,380

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Rubicon River	At confluence approximately 1,600 feet downstream of Milwaukee Sub Railroad	6.2	460	630	820	920	1,340
Rubicon River	At confluence with UT-5 to Rubicon River	5.1	410	550	710	800	1,140
Rubicon River	At confluence with UT-4 to Rubicon River	2.1	190	250	320	360	510
Rubicon River	At State Highway 75	1.0	80	101	132	154	250
Rubicon River	Approximately 2,600 feet upstream of State Highway 75	1.0	73	98	127	142	203
Rubicon River Overland Flowpath	At divergence from Rubicon River	*	0	0	53	135	790
Rubicon River Tributary 1	At Washington / Dodge County Boundary	1.3	170	225	275	355	485
Rubicon River Tributary 2	At Washington / Dodge County Boundary	0.4	145	185	220	275	355
Scenic Brook	At mouth	1.1	37	48	55	62	83
Silver Creek	At confluence with the Milwaukee River	6.3	253	*	379	447	628
Silver Creek	At City Park Drive in Regner Park	6.0	184	*	323	399	600
Silver Creek	At West Washington Street, downstream of the confluence of Silverbrook Creek	5.7	184	*	302	366	532

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Silver Creek	At University Drive	5.6	365	*	520	590	740
Silver Creek	At Silverbrook Drive, upstream of the confluence of Silverbrook Creek	4.0	184	*	320	394	590
Silver Creek	At West Washington Street	3.9	141	*	250	305	460
Silver Creek	Above confluence of Washington Creek	2.1	20	*	30	30	40
Silver Creek	Above Lucas Lake	1.5	55	*	85	95	125
Silver Creek	Below Paradise Valley Lake	1.4	30	*	40	45	55
Silver Creek	Above Paradise Valley Lake	1.3	10	*	15	15	20
Silverbrook Creek	At confluence with Silver Creek	1.6	46	*	117	150	276
Silverbrook Creek	At Silverbrook Drive	1.5	196	*	330	398	580
Silverbrook Creek	Just upstream of 15th Avenue	1.4	178	*	310	371	550
Silverbrook Creek	Just upstream of the intersection of 18th Avenue and Chestnut Street	1.1	89	*	200	268	470
Silverbrook Creek	Just downstream of U.S. Highway 45	0.2	40	*	54	62	87
Springside Creek	At Springside Lane	0.7	143	188	224	279	375
Springside Creek	At Shadow Lane	0.3	70	92	109	135	180

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Stony Creek	State Highway 84, downstream of the confluence of Bolton Brook	16.6	720	*	1,300	1,450	2,050
Stony Creek	State Highway 84 at Boltonville	14.3	570	*	1,000	1,200	1,750
Tributary No. 1	Approximately 1.06 miles downstream of Division Road	2.2	85	*	130	160	220
Tributary No. 1	Just upstream of Division Road	2.0	60	*	110	140	200
Tributary No. 1	Just upstream of the confluence with Tributary 1B, approximately 0.42 miles downstream of Donges Bay Road	0.4	22	*	35	50	60
Tributary No. 1	Approximately 0.16 miles downstream of Pilgrim Road	0.1	4	*	7	10	12
Tributary No. 1A	Above the confluence with Tributary 1, approximately 0.17 miles downstream of Division Street	0.2	14	*	25	30	48

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Tributary No. 1B	Above the confluence with Tributary 1, approximately 0.26 miles downstream of Pilgrim Road	0.4	18	*	32	40	60
Tributary No. 2	Just downstream of Western Ave	0.8	30	*	60	70	110
Tributary No. 3	Mouth at Menomonee River	0.2	13	*	25	30	48
Tributary No. 5	Mouth at Menomonee River	1.8	40	*	61	72	100
Unnamed Tributary to Ashippun River	Approximately 2,100 feet upstream of confluence with Ashippun River	2.0	102	149	185	227	350
Unnamed Tributary to Ashippun River	At convergence with Ashippun River - Overland Flowpath	0.7	62	89	105	137	210
Unnamed Tributary to Ashippun River	Approximately 1.0 miles upstream of confluence with Ashippun River	0.7	60	80	90	110	150
Unnamed Tributary to Frieden's Creek	Just downstream of County Highway P	0.9	8	*	*	581	*
Unnamed Tributary to Kewaskum Creek	Above Confluence with Kewaskum Creek	0.6	94	*	193	258	*
Unnamed Tributary to North Crossway Channel	Just upstream of confluence with North Crossway Channel	0.1	*	*	*	113	*
UT-1 to Big Cedar Lake	At County Highway NN	1.4	172	234	285	371	519

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
UT-1 to Big Cedar Lake	At detention pond downstream of Arthur Road	0.6	91	122	146	185	253
UT-1 to Cedar Creek	At County Highway Y	0.7	92	124	150	190	266
UT-1 to Cedar Creek	At Cedar Sauk Road	0.4	48	63	75	94	129
UT-1 to Cedar Creek	At Washington Drive	0.2	17	23	29	41	65
UT-1 to Coney River	At mouth	0.9	86	*	125	142	143
UT-1 to Coney River	Downstream of divergence with UT-1 to Coney River Overflow	0.6	52	*	56	58	60
UT-1 to Coney River	At Sherman Road	0.6	137	*	256	332	518
UT-1 to Coney River	Approximately 1,100 feet upstream of Slinger Road	0.4	110	*	223	289	453
UT-1 to Coney River Overflow	At divergence from UT-1 to Coney River	*	85	*	200	274	458
UT-1 to Coney River Overflow	At divergence with UT-1 to Coney River Overflow West	*	42	*	71	88	145
UT-1 to Coney River Overflow West	At divergence from UT-1 to Coney River Overflow	*	43	*	130	188	314
UT-1 to Evergreen Creek	Approximately 900 feet upstream of County Highway G	0.4	125	160	187	227	302
UT-1 to Evergreen Creek	Approximately 1,700 feet upstream of County Highway G	0.1	44	56	66	81	108

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
UT-1 to Hasmer Creek	Hasmer Lake inlet upstream of U.S. Highway 45	0.4	50	*	80	100	130
UT-1 to Kressen Branch	At Church Road	0.7	47	70	89	119	176
UT-1 to Little Cedar Creek	At Jackson Drive	0.3	84	110	130	162	216
UT-1 to Little Cedar Creek	Approximately 2,200 feet upstream of Jackson Drive	0.1	37	48	56	70	93
UT-1 to Little Cedar Lake	At Lake Drive	0.2	30	43	53	70	99
UT-1 to Oconomowoc River	At divergence from Oconomowoc River	*	0	0	12	49	146
UT-1 to Oconomowoc River	Approximately 3,100 feet upstream of Hogsback Road	1.0	44	66	92	150	276
UT-1 to Polk Springs Creek	At U.S. Highway 45	0.7	178	225	261	316	410
UT-1 to Rubicon River	At Clover Road	8.6	260	350	420	540	740
UT-1 to Rubicon River	At confluence with UT-1.2 to Rubicon River	6.8	470	600	700	870	1,130
UT-1 to Rubicon River	At confluence with UT-1.1 to Rubicon River	2.1	140	190	200	220	260
UT-1 to Rubicon River	Approximately 2,400 feet upstream of County Highway U	0.3	80	110	130	160	210

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
UT-1.1 to Rubicon River	At confluence with UT-1.1.1 to Rubicon River	0.8	100	130	160	210	280
UT-1.1 to Rubicon River	At County Highway U	0.3	80	100	120	140	190
UT-1.1.1 to Rubicon River	Approximately 3,100 feet upstream of the mouth	0.2	33	41	47	57	74
UT-1.2 to Rubicon River	At confluence with UT-1.2.1 to Rubicon River	2.6	400	510	600	730	950
UT-1.2 to Rubicon River	Approximately 2,800 feet upstream of County Highway K	0.3	130	160	190	240	310
UT-1.2.1 to Rubicon River	At confluence approximately 1,300 feet downstream of Saint Lawrence Lane	1.6	200	260	310	390	520
UT-1.2.1 to Rubicon River	Approximately 2,900 feet upstream of Saint Lawrence Lane	0.5	60	80	100	130	170
UT-2 to Cedar Creek	At County Highway G	3.2	459	597	707	874	1,182
UT-2 to Cedar Creek	At Center Road	2.2	318	414	490	608	822
UT-2 to Coney River	Approximately 1.4 miles upstream of mouth	0.8	16	*	27	33	45
UT-2 to Little Cedar Creek	At Scenic Road	0.7	83	108	127	166	232

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
UT-2 to Oconomowoc River	Approximately 1,300 feet downstream of Pleasant Hill Road	1.6	284	*	599	790	1,233
UT-2 to Oconomowoc River	Approximately 1,700 feet downstream of State Highway 164	0.5	106	*	212	274	427
UT-2 to Oconomowoc River	Downstream of State Highway 164	0.3	79	*	159	205	320
UT-2 to Oconomowoc River	Upstream of State Highway 164	0.1	13	*	26	34	53
UT-2 to Rubicon River	Approximately 1,400 feet upstream of Main Street	0.9	90	120	150	190	260
UT-2 to Rubicon River	Approximately 2,900 feet downstream of Arthur Road	0.3	110	140	160	200	260
UT-2 to Rubicon River	At Arthur Road	0.1	28	36	42	52	67
UT-2.1 to Rubicon River	Approximately 5,000 feet upstream of State Highway 83	0.9	60	90	110	140	190
UT-3 to Rubicon River	At County Highway N	2.0	500	650	770	950	1,250
UT-3 to Rubicon River	At confluence with UT-3.1 to Rubicon River	1.1	230	300	360	440	580
UT-3 to Rubicon River	Approximately 3,000 feet upstream of confluence with UT-3.1 to Rubicon River	0.3	110	140	170	200	260

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
UT-3.1 to Rubicon River	At Arthur Road	0.8	180	230	270	340	450
UT-4 to Rubicon River	Approximately 4,000 feet upstream of the mouth	1.0	120	160	200	260	370
UT-5 to Rubicon River	At confluence approximately 2,200 feet upstream of the mouth	2.6	400	530	640	820	1,110
UT-5 to Rubicon River	At State Highway 175	0.5	14	28	40	41	42
UT-5 to Rubicon River	Approximately 2,200 feet upstream of Chicago Sub Railroad	0.5	21	31	45	52	88
Washington Creek	Above confluence with Silver Creek	3.5	260	*	540	600	900
Washington Creek	At confluence with Silver Creek	2.5	166	*	260	296	400
Washington Creek	Just upstream of confluence of an unnamed tributary	1.6	82	*	120	136	180
Washington Creek	Just downstream of West Washington Street	1.6	56	*	80	91	120
Washington Creek	At West Washington Street	1.5	30	*	38	42	50
Washington Creek	Just upstream of West Washington Street	0.9	53	*	98	120	170
Washington Creek	Upstream of Villa Park Drive	0.6	112	*	208	242	360

*Not calculated for this FIS project

Table 9: Summary of Discharges *(continued)*

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Washington Creek	Downstream of City of West Bend corporate limits	0.6	112	*	208	239	360
Washington Creek	Just downstream of City of West Bend corporate limits	0.6	79	*	147	170	255
West Branch Menomonee River	Above confluence with Menomonee River about 0.32 miles upstream of Friestadt Road	4.6	193	*	284	325	427
West Branch Menomonee River	Just upstream of Maple Road	3.9	*	*	*	425	*
West Branch Menomonee River	Just upstream of Chicago Milwaukee St. Paul and North Western Railroad	2.0	44	*	60	195	81
West Branch Menomonee River	Just downstream of U.S. Highway 41	0.9	22	*	30	33	40
West Branch Milwaukee River	Above confluence with Milwaukee River	56.5	2,250	*	3,900	4,750	7,100
Willow Creek	About 0.6 miles downstream of Lanon Lane	6.2	113	*	161	182	231
Willow Creek	About 0.38 miles upstream of State Highway 75	2.5	67	*	120	150	225
Wingate Creek	Above confluence with Milwaukee River	1.5	412	*	604	697	*

*Not calculated for this FIS project

Figure 7: Frequency Discharge-Drainage Area Curves

[Not Applicable to this FIS Project]

Table 10: Summary of Non-Coastal Stillwater Elevations

Flooding Source	Location	Elevations (feet NAVD88)				
		10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Amy Bell Lake	Richfield, Village of	975.1	975.2	975.5[1]	976.2[1]	979.2[1]
Cedar Lake	Entire shoreline	1032.0	1032.3	1032.5	1032.7	1033.2
Green Lake	Washington County, Unincorporated Areas	868.2	*	868.8	869.0	869.8
Lake Five	Richfield, Village of	975.5	975.8	976.1	976.3	976.9
Mueller Lake	Entire shoreline	1035.4	1035.8	1036.1	1036.3	1036.9
Northeast Pond	Germantown, Village of	*	*	*	792.5	*
Southwest Pond	Germantown, Village of	*	*	*	790.2	*
Wallace Lake	Washington County, Unincorporated Areas	900.0	*	900.2	900.4	900.7

[1]Elevations reflect backwater effects from Bark River

*Not calculated for this FIS project

Table 11: Stream Gage Information used to Determine Discharges

[Not Applicable to this FIS Project]

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 23, “Floodway Data.”

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 12. Roughness coefficients are provided in Table 13. 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 12: Summary of Hydrologic and Hydraulic Analyses

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Amy Bell Creek	Mouth at Bark Lake	Amy Bell Lake	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Ashippun River	Washington / Dodge County Boundary	Approximately 1.9 miles upstream of County Highway E	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	For the Ashippun River watershed, flood storage was taken into account through permanent water bodies and areas covered by the regulated Wisconsin Wetland Inventory where significant flood attenuation may occur. WDNR revised the 2013 study on the Ashippun River to account for breakout flow on the northwest side of Druid Lake, which reduced discharges and flood elevations from Druid Lake to the Washington / Dodge County Boundary. Study performed in NAVD88(2007).
Ashippun River Overland Flowpath	Convergence with Unnamed Tributary to Ashippun River	Divergence from Ashippun River	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Ashippun River Tributary 2	Confluence with Ashippun River	Approximately 1,500 feet upstream of Riley Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Ashippun River Tributary 2.1	Confluence with Ashippun River Tributary 2	Approximately 1,500 feet upstream of Cart Path	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Ashippun River Tributary 2.2	Confluence with Ashippun River Tributary 2	Approximately 0.8 miles upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Ashippun River Tributary 3	Confluence with Ashippun River	Approximately 1,100 feet upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Ashippun River Tributary 4	Confluence with Ashippun River	Approximately 1,250 feet upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Ashippun River Tributary 5	Confluence with Ashippun River	Approximately 1,500 feet upstream of Riley Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Bark River	Washington / Waukesha County Boundary	Approximately 1,400 feet upstream of Scenic Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	For the Bark River watershed, flood storage was taken into account through permanent water bodies and areas covered by the regulated Wisconsin Wetland Inventory where significant flood attenuation may occur. The hydrologic model was calibrated using the lake stages of the dams in Waukesha County for the flood of June, 2008. Study performed in NAVD88(2007).
Bark River Tributary 1	Washington / Waukesha County Boundary	Approximately 1,140 feet upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Bark River Tributary 1.1	Confluence with Bark River Tributary 1.1	Approximately 1,040 feet upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Bolton Brook	Confluence with Stony Creek	Boltonville Road	USGS Conger Equations 1971	Information Unavailable	1980	AE	Study performed in NGVD29.
Bonniwell Creek	Confluence with Little Cedar Creek	Approximately 500 feet upstream of Holy Hill Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
Butler Creek Tributary 1	Washington / Dodge County Boundary	Approximately 1,060 feet upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Butler Creek Tributary 2	Washington / Dodge County Boundary	Approximately 780 feet upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Cedar Creek	Washington / Ozaukee County Boundary	Cedar Lake	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	For the Cedar Creek watershed, flood storage was taken into account through permanent water bodies and areas covered by the regulated Wisconsin Wetland Inventory where significant flood attenuation may occur. The May 24, 2004 flood event at USGS streamgage 04086500 was modeled in HEC-HMS. Without any calibration, the resulting modeled peak discharge matched the observed discharge within 4%. Study performed in NAVD88(2012).
Cedar Lake	Entire Shoreline	Entire Shoreline	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE	Study performed in NAVD88(2012).
Cedarburg Creek	Confluence with Cedar Creek	Washington / Ozaukee County Boundary	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
Coney River	Confluence with Oconomowoc River	County Highway E	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Coney River	County Highway E	County Highway CC	HEC-HMS 2.2.2	HEC-RAS 3.1.3	2013	AE w/ Floodway	Planned land use information was taken from SEWRPC 2020 planning report. The impacts of floodwater storage were accounted for by routing flood hydrographs computed for individual subbasins where there is considerable floodwater storage which would significantly affect flood flows and stages. Study performed in NGVD29.
Coney River Overland Flowpath	Convergence with Coney River	Divergence from Coney River	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Deer Creek	Confluence with North Branch Cedar Creek	Approximately 2,500 feet upstream of Church Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
East Branch Rock River	Approximately 4,500 feet downstream of State Highway 33	Hillcrest Drive	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	For the East Branch Rock River watershed, flood storage was taken into account through permanent water bodies and areas covered by the regulated Wisconsin Wetland Inventory where significant flood attenuation may occur. Study performed in NAVD88(2007).
Edgewood Creek	Confluence with North Creek	1,120 feet upstream of Kewaskum City Limits	HEC-1	HEC-2 / HEC-RAS	1996	AE w/ Floodway	The hydrology represented 2010 projected land use data. Study performed in NGVD29.
Edgewood Creek Overflow Channel	Confluence with Edgewood Creek	725 feet upstream of Clinton Street	HEC-1	HEC-2 / HEC-RAS	1996	AE w/ Floodway	Study performed in NGVD29.
Evergreen Bypass	Confluence with Evergreen Creek	Divergence from Evergreen Creek	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
Evergreen Creek	County Highway G	Approximately 2,400 feet upstream of Hron Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
Flynn Creek	Confluence with Oconomowoc River	Approximately 700 feet upstream of Shannon Road	HEC-HMS 2.2.2	HEC-RAS 3.1.3	2013	AE w/ Floodway	Planned land use information was taken from SEWRPC 2020 planning report. The impacts of floodwater storage were accounted for by routing flood hydrographs computed for individual subbasins where there is considerable floodwater storage which would significantly affect flood flows and stages. Study performed in NGVD29.
Frieden's Creek	Confluence with Cedar Creek	State Highway 45	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
Green Lake	Entire shoreline	Entire shoreline	Information Unavailable	N/A	1980	AE	Flood stages were developed in using the hydrology performed in the unincorporated areas of Washington County. Study performed in NGVD29.

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Hasmer Creek	Confluence with Cedar Creek	Approximately 2,000 feet upstream of Hasmer Lake	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
Hubertus Ditch No. 1	Confluence with Bark River	Approximately 800 feet upstream of Hubertus Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Jackson Creek	Confluence with Cedar Creek	Approximately 600 feet upstream of Jackson Drive	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
Kettleview Creek	Confluence with Kewaskum Creek	County Highway B	HEC-1	HEC-2 / HEC-RAS	1996	AE w/ Floodway	The hydrology represented 2010 projected land use data. Study performed in NGVD29.
Kewaskum Creek	Confluence with Milwaukee River	Ridge Road	HEC-1	HEC-2 / HEC-RAS	1996	AE w/ Floodway	The hydrology represented 2010 projected land use data. Study performed in NGVD29.
Kewaskum Creek Overflow Channel	Confluence with Kettleview Creek	800 feet downstream of Highland Drive	HEC-1	HEC-2 / HEC-RAS	1996	AE w/ Floodway	Study performed in NGVD29.
Knights Creek	Confluence with North Creek	700 feet downstream of Highland Drive	HEC-1	HEC-2 / HEC-RAS	1996	AE w/ Floodway	The hydrology represented 2010 projected land use data. Study performed in NGVD29.
Kohlsville River	Beechnut Drive	County Highway D	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Kohlsville River – Park Route	Convergence with Kohlsville River	Divergence from Kohlsville River	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Kressen Branch	Confluence with Little Cedar Creek	Approximately 1,800 feet upstream of Pioneer Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Lake Five	Entire shoreline within Washington County	Entire shoreline within Washington County	HEC-HMS 3.5	N/A	2013	AE	Lake Five is an internally drained lake. Spillways representing low-lying areas surrounding the lake were simulated for the studied durations and frequencies; however, water never rose to the level to show spillover from the lake. The initial lake elevation was determined by examining local stage gage data from 1974 to 2012, and utilizing the maximum measured elevation. Study performed in NAVD88(2007).
Lehner Outlet	Confluence with Cedar Creek	Approximately 4,800 feet upstream of Scenic Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
Little Cedar Creek	Confluence with Cedar Creek	Approximately 2,900 feet upstream of Scenic Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Upon development of the Little Cedar Creek hydraulic model, it was determined that some discharge would leave the watershed and flow into the headwaters of the main stem of the Oconomowoc River. This occurs where water backs up behind the Railroad culvert (near Pioneer / Scenic Roads), and eventually spills over the divide on the southern end into Oconomowoc Bypass. Study performed in NAVD88(2012).
Little Cedar Creek Bypass	Confluence with Little Cedar Creek	Divergence from Little Cedar Creek	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
Little Oconomowoc River	Washington / Waukesha County Boundary	Approximately 1.1. miles upstream of Donegal Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Lower Rock River Watershed Zone A studies	N/A	N/A	Information Unavailable	Information Unavailable	2013	A	
Marsh Creek	Confluence with Bark River	0.5 miles upstream of confluence with Bark River	TR-20	Information Unavailable	1980	AE	Study performed in NGVD29.
Mason Creek	Washington / Waukesha County Boundary	Washington / Dodge County Boundary	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Mason Creek Tributary 1	Washington / Waukesha County Boundary	Approximately 1.3 miles upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Menomonee River	Washington / Waukesha County Boundary	2,800 feet upstream of Lovers Lane	HSP	Information Unavailable	1980	AE	Study performed in NGVD29.
Milwaukee River	Washington / Ozaukee County Boundary	Washington / Ozaukee County Boundary	TR-20	HEC-2 / HEC-RAS	1980	AE	The hydrology represented 2000 projected land use data. Study performed in NGVD29.
Milwaukee River	Washington / Ozaukee County Boundary	Approximately 5,750 feet upstream of County Highway M	TR-20	HEC-RAS 4.1.0	2015	AE	LOMR 15-05-0254P. Village of Newburg dam removal.
Milwaukee River	Approximately 5,750 feet upstream of County Highway M	Washington / Fond du Lac County Boundary	TR-20	HEC-2 / HEC-RAS	1980	AE w/ Floodway	The hydrology represented 2000 projected land use data. Study performed in NGVD29.
Milwaukee River Watershed Zone A Studies	N/A	N/A	Information Unavailable	Information Unavailable	2013	A	
Mueller Lake	Entire Shoreline	Entire Shoreline	HEC-HMS 3.5	N/A	2018	AE w/ Floodway	Elevations determined by the hydrologic analysis. Study performed in NAVD88(2012).
Myra Creek	Confluence with Milwaukee River	0.18 miles upstream of Knollwood Drive	USGS Conger Equations 1971	Information Unavailable	1980	AE	Study performed in NGVD29.
Nature's Friends Tributary	Confluence with Cedar Creek	Approximately 2,400 feet upstream of confluence with Cedar Creek	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
North Branch Cedar Creek	Confluence with Cedar Creek	Approximately 2,000 feet upstream of County Highway Y	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
North Branch Menomonee River	Confluence with Menomonee River	2,300 feet upstream of Golden Dale Road	HSP	Information Unavailable	1980	AE	Study performed in NGVD29.

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
North Branch Milwaukee River	Washington / Ozaukee County Boundary	Washington / Sheboygan County Boundary	TR-20	Information Unavailable	1980	AE	The hydrology represented 2000 projected land use data. Study performed in NGVD29.
North Creek	Confluence with Milwaukee River	100 feet downstream of Highland Drive	HEC-1	HEC-2 / HEC-RAS	1996	AE w/ Floodway	The hydrology represented 2010 projected land use data. Study performed in NGVD29.
North Crossway Channel	Washington / Waukesha County Boundary	Washington / Ozaukee County Boundary	HSP	Information Unavailable	1980	AE	Study performed in NGVD29.
Oconomowoc River	Washington / Waukesha County Boundary	Approximately 2,600 feet upstream of Hillside Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	For the Oconomowoc River watershed, flood storage was taken into account through permanent water bodies and areas covered by the regulated Wisconsin Wetland Inventory where significant flood attenuation may occur. A breakout flow occurs from the Oconomowoc River at the west side of Little Friess Lake near Lake Drive. This flow heads west (over Friess Lake Road) until it enters UT-1 to Oconomowoc River. For this revision, WDNR combined the Oconomowoc River and UT-1 to Oconomowoc River models into a single split flow HEC-RAS v4.1.0 model. This accounts for the amount of flow leaving the Oconomowoc River, which reduces discharges below Lower Friess Lake and increases discharges on UT-1 to Oconomowoc River by 49 cfs for the 1% annual chance event. Study performed in NAVD88(2007).

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Oconomowoc Bypass	Pleasant Hill Road	Divergence from Little Cedar Creek	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Upon development of the Little Cedar Creek hydraulic model, it was determined that some discharge would leave the watershed and flow into the headwaters of the main stem of the Oconomowoc River. This occurs where water backs up behind the Railroad culvert (near Pioneer / Scenic Roads), and eventually spills over the divide on the southern end into Oconomowoc Bypass. Study performed in NAVD88(2012).
Polk Springs Creek	Confluence with Cedar Creek	Approximately 300 feet upstream of Mayfield Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
Putter Creek	Confluence with Coney River	Approximately 4,300 feet upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Quaas Creek	Confluence with Milwaukee River	285 feet downstream of Paradise Drive	HEC-1	HEC-2	1989	AE w/ Floodway	The hydrology represented 2010 projected land use data. Study performed in NGVD29.
Rubicon River	Washington / Dodge County Boundary	Approximately 2,600 feet upstream of State Highway 75	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	For the Rubicon River watershed, flood storage was taken into account through permanent water bodies and areas covered by the regulated Wisconsin Wetland Inventory where significant flood attenuation may occur. Study performed in NAVD88(1991).
Rubicon River Overland Flowpath	Convergence with Rubicon River	Divergence from Rubicon River	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(1991).
Rubicon River Tributary 1	Washington / Dodge County Boundary	Approximately 1,600 feet upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Rubicon River Tributary 2	Washington / Dodge County Boundary	Approximately 960 feet upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Scenic Brook	Confluence with Bark River	Approximately 4,700 feet upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Silver Creek	Confluence with Milwaukee River	Silver Lake	TR-20	HEC-2	1995	AE w/ Floodway	Study performed in NGVD29.
Silverbrook Creek	Confluence with Silver Creek	0.5 miles upstream of U.S. Highway 45	HEC-1	Information Unavailable	1995	AE w/ Floodway	The hydrology represented 2010 projected land use data. Study performed in NGVD29.
Springside Creek	Confluence with Little Cedar Creek	Pioneer Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
Stony Creek	State Highway 84	North Parkside Road	USGS Conger Equations 1971	Information Unavailable	1980	AE	Study performed in NGVD29.
Tributary No. 1	Confluence with Menomonee River	Butternut Road	HSP	HEC-2	1980	AE	Study performed in NGVD29.
Tributary No. 1A	Confluence with Tributary 1	3,950 feet upstream of confluence with Tributary 1	HSP	HEC-2	1980	AE	Study performed in NGVD29.
Tributary No. 1B	Confluence with Tributary 1	3,250 feet upstream of confluence with Tributary 1	HSP	HEC-2	1980	AE	Study performed in NGVD29.
Tributary No. 2	Confluence with Menomonee River	Mequon Road	HSP	HEC-2	1980	AE	Study performed in NGVD29.
Tributary No. 3	Confluence with Menomonee River	3,000 feet above confluence with Menomonee River	HSP	HEC-2	1980	AE	Study performed in NGVD29.
Tributary No. 5	Confluence with Menomonee River	3,100 feet above confluence with Menomonee River	HSP	HEC-2	1980	AE	Study performed in NGVD29.
Unnamed Tributary to Ashippun River	Confluence with Ashippun River	Approximately 1,0 miles upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(2007).
Unnamed Tributary to Frieden's Creek	Confluence with Frieden's Creek	Approximately 500 feet upstream of confluence with Frieden's Creek	Information Unavailable	Information Unavailable	2005	AE	Previously referred to as Frieden's Creek in the 2015 FIS, when it was incorporated as LOMR 05-05-1018P.
Unnamed Tributary to Kewaskum Creek	Confluence with Kewaskum Creek	350 feet downstream of Kettleview Drive	HEC-1	HEC-2 / HEC-RAS	1996	AE w/ Floodway	Study performed in NGVD29.

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Unnamed Tributary to North Crossway Channel	Confluence with North Crossway Channel	Approximately 2,000 feet upstream of Strawgrass Lane	HSP	Information Unavailable	1980	AE	Study performed in NGVD29.
Upper Rock River Watershed Zone A Studies	N/A	N/A	Information Unavailable	Information Unavailable	2013	A	
UT-1 to Big Cedar Lake	Confluence with Cedar Lake	Arthur Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
UT-1 to Cedar Creek	Washington / Ozaukee County Boundary	Washington Drive	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
UT-1 to Coney River	Confluence with Coney River	Approximately 1,100 feet upstream of Slinger Road	HEC-HMS 2.2.2	HEC-RAS 3.1.3	2013	AE w/ Floodway	Study performed in NGVD29.
UT-1 to Coney River Overflow	Confluence with Coney River	Divergence from UT-1 to Coney River	HEC-HMS 2.2.2	HEC-RAS 3.1.3	2013	AE w/ Floodway	Study performed in NGVD29.
UT-1 to Coney River Overflow West	Confluence with Coney River	Approximately 1,000 feet upstream	HEC-HMS 2.2.2	HEC-RAS 3.1.3	2013	AE w/ Floodway	Study performed in NGVD29.
UT-1 to Evergreen Creek	Confluence with Evergreen Creek	Approximately 1,600 feet upstream of County Highway G	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
UT-1 to Hasmer Creek	County Highway P	Tilly Lake	Information Unavailable	Information Unavailable	2011	AE	Previously referred to as Hasmer Creek in the 2015 FIS, when it was incorporated as LOMR 10-05-2489P. The portion of that study from Hasmer Lake down to the mouth has been superseded by the 2018 study.
UT-1 to Kressen Branch	Confluence with Kressen Branch	Approximately 600 feet upstream of Church Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
UT-1 to Little Cedar Creek	Confluence with Little Cedar Creek	Approximately 2,500 feet upstream of Jackson Drive	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UT-1 to Little Cedar Lake	Confluence with Little Cedar Lake	Approximately 300 feet upstream of Wayne Drive	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
UT-1 to Oconomowoc River	Confluence with Oconomowoc River	Divergence from Oconomowoc River	HEC-HMS 2.2.2	HEC-RAS 4.1.0	2013	AE w/ Floodway	Planned land use information was taken from SEWRPC 2020 planning report. A breakout flow occurs from the Oconomowoc River at the west side of Little Friess Lake near Lake Drive. This flow heads west (over Friess Lake Road) until it enters UT-1 to Oconomowoc River. For the 2015 FIS, WDNR combined the Oconomowoc River and UT-1 to Oconomowoc River models into a single split flow HEC-RAS v4.1.0 model. This accounts for the amount of flow leaving the Oconomowoc River, which reduces discharges below Lower Friess Lake and increases discharges on UT-1 to Oconomowoc River by 49 cfs for the 1% annual chance event. Study performed in NAVD88(2007).
UT-1 to Polk Springs Creek	Confluence with Polk Springs Creek	State Highway 45	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
UT-1 to Rubicon River	Confluence with Rubicon River	Approximately 1,900 feet upstream of County Highway U	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(1991).
UT-1.1 to Rubicon River	Confluence with UT-1 to Rubicon River	Washington / Dodge County Boundary	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(1991).
UT-1.1.1 to Rubicon River	Confluence with UT-1.1 to Rubicon River	Approximately 3,200 feet upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(1991).
UT-1.2 to Rubicon River	Confluence with UT-1 to Rubicon River	Approximately 2,800 feet upstream of County Highway K	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(1991).

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UT-1.2.1 to Rubicon River	Confluence with UT-1.2 to Rubicon River	Approximately 2,800 feet upstream of Saint Lawrence Lane	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(1991).
UT-2 to Cedar Creek	Confluence with Cedar Creek	Center Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
UT-2 to Coney River	Confluence with Coney River	Approximately 1.4 miles upstream	HEC-HMS 2.2.2	HEC-RAS 3.1.3	2013	AE w/ Floodway	Study performed in NGVD29.
UT-2 to Little Cedar Creek	Confluence with Little Cedar Creek	Approximately 1,500 feet upstream of confluence with Little Cedar Creek	HEC-HMS 3.5	HEC-RAS 4.1.0	2018	AE w/ Floodway	Study performed in NAVD88(2012).
UT-2 to Oconomowoc River	Confluence with Oconomowoc River	State Highway 164	HEC-HMS 2.2.2	HEC-RAS 3.1.3	2013	AE w/ Floodway	Planned land use information was taken from SEWRPC 2020 planning report. The impacts of floodwater storage were accounted for by routing flood hydrographs computed for individual subbasins where there is considerable floodwater storage which would significantly affect flood flows and stages. Study performed in NGVD29.
UT-2 to Rubicon River	Confluence with Rubicon River	Approximately 1,900 feet upstream of County Highway U	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(1991).
UT-2.1 to Rubicon River	Confluence with Rubicon River	Approximately 1.0 miles upstream of State Highway 83	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(1991).
UT-3 to Rubicon River	Confluence with Rubicon River	Approximately 3,000 feet upstream of confluence with UT-3.1 to Rubicon River	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(1991).
UT-3.1 to Rubicon River	Confluence with UT-3 to Rubicon River	Arthur Road	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(1991).

Table 12: Summary of Hydrologic and Hydraulic Analyses *(continued)*

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UT-4 to Rubicon River	Confluence with Rubicon River	Approximately 4,200 feet upstream	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(1991).
UT-5 to Rubicon River	Confluence with Rubicon River	Approximately 2,200 feet upstream of Wisconsin Central Railroad	HEC-HMS 3.5	HEC-RAS 4.1.0	2013	AE w/ Floodway	Study performed in NAVD88(1991).
Wallace Lake	Entire shoreline	Entire shoreline	Information Unavailable	N/A	1980	AE	Flood stages were developed in using the hydrology performed in the unincorporated areas of Washington County. Study performed in NGVD29.
Washington Creek	Confluence with Silver Creek	500 feet upstream of Sheppard's Drive	HEC-1	Information Unavailable	1995	AE w/ Floodway	Study performed in NGVD29.
West Branch Menomonee River	Confluence with Menomonee River	1,800 feet upstream of U.S. Highway 41 / 45	HSP	Information Unavailable	1980	AE	Study performed in NGVD29.
West Branch Milwaukee River	Confluence with Milwaukee River	Washington / Fond du Lac County Boundary	TR-20	Information Unavailable	1980	AE	The hydrology represented 2000 projected land use data. Study performed in NGVD29.
Willow Creek	Confluence with Menomonee River	Amy Belle Road	HSP	Information Unavailable	1980	AE	Study performed in NGVD29.
Wingate Creek	Confluence with Milwaukee River	420 feet downstream of Wallace Lake Road	HEC-1	HEC-2	1989	AE w/ Floodway	The hydrology represented 2010 projected land use data. Study performed in NGVD29.

Table 13: Roughness Coefficients

Flooding Source	Channel "n"	Overbank "n"
Amy Bell Creek	0.045 – 0.055	0.045 – 0.100
Ashippun River	0.030 – 0.055	0.040 – 0.120
Ashippun River – Overland Flowpath	0.040 – 0.045	0.040 – 0.080
Ashippun River Tributary 2	0.040 – 0.050	0.040 – 0.100
Ashippun River Tributary 2.1	0.040 – 0.055	0.040 – 0.120
Ashippun River Tributary 2.2	0.040 – 0.050	0.045 – 0.100
Ashippun River Tributary 3	0.045 – 0.050	0.050 – 0.120
Ashippun River Tributary 4	0.040 – 0.055	0.040 – 0.120
Ashippun River Tributary 5	0.040 – 0.045	0.045 – 0.080
Bark River	0.030 – 0.060	0.045 – 0.120
Bark River Tributary 1	0.040 – 0.045	0.045 – 0.100
Bark River Tributary 1.1	0.04	0.045 – 0.100
Bolton Brook	0.020 – 0.100	0.025 – 0.120
Bonniwell Creek	0.035	0.060 – 0.100
Butler Creek Tributary 1	0.040 – 0.050	0.045 – 0.120
Butler Creek Tributary 2	0.04	0.050 – 0.100
Cedar Creek	0.035 – 0.040	0.060 – 0.110
Cedarburg Creek	0.035	0.060 – 0.100
Coney River	0.020 – 0.050	0.020 – 0.120
Coney River – Overland Flowpath	0.045 – 0.055	0.045 – 0.100
Deer Creek	0.035	0.060 – 0.100
East Branch Rock River	0.035 – 0.060	0.040 – 0.150
Edgewood Creek	0.020 – 0.080	0.030 – 0.120
Evergreen Bypass	0.060	0.060 – 0.100
Evergreen Creek	0.035 – 0.060	0.060 – 0.100
Flynn Creek	0.020 – 0.070	0.020 – 0.100
Frieden's Creek	0.035	0.060 – 0.100
Hasmer Creek	0.035	0.060 – 0.100
Hubertus Ditch No. 1	0.040 – 0.045	0.040 – 0.100
Jackson Creek	0.035	0.060 – 0.100
Kettleview Creek	0.043 – 0.080	0.040 – 0.120

Table 13: Roughness Coefficients *(continued)*

Flooding Source	Channel "n"	Overbank "n"
Kewaskum Creek	0.030 – 0.120	0.040 – 0.120
Knights Creek	0.050 – 0.120	0.040 – 0.120
Kohlsville River	0.035 – 0.055	0.040 – 0.150
Kohlsville River – Park Route	0.035 – 0.055	0.045 – 0.120
Kressen Branch	0.035	0.060 – 0.100
Lehner Outlet	0.035	0.080 – 0.100
Little Cedar Creek	0.035	0.060 – 0.100
Little Cedar Creek Bypass	0.035	0.060
Little Oconomowoc River	0.035 – 0.050	0.030 – 0.120
Marsh Creek	0.020 – 0.100	0.025 – 0.120
Mason Creek	0.04	0.040 – 0.100
Mason Creek Tributary 1	0.040 – 0.050	0.045 – 0.120
Menomonee River	0.017 – 0.068	0.035 – 0.160
Milwaukee River	0.025 – 0.085	0.030 – 0.120
Myra Creek	0.020 – 0.100	0.025 – 0.120
Nature's Friends Tributary	0.035	0.100
North Branch Cedar Creek	0.035	0.060 – 0.100
North Branch Menomonee River	0.020 – 0.100	0.025 – 0.120
North Branch Milwaukee River	0.020 – 0.100	0.025 – 0.120
North Creek	0.040 – 0.080	0.035 – 0.120
Oconomowoc Bypass	0.035	0.060 – 0.100
Oconomowoc River	0.030 – 0.060	0.030 – 0.150
Polk Springs Creek	0.035	0.060 – 0.100
Putter Creek	0.040 – 0.045	0.050 – 0.120
Quaas Creek	0.024 – 0.095	0.035 – 0.150
Rubicon River	0.035 – 0.045	0.040 – 0.100
Rubicon River Overland Flowpath	0.05	0.055 – 0.100
Rubicon River Tributary 1	0.040 – 0.045	0.045 – 0.120
Rubicon River Tributary 2	0.040 – 0.045	0.040 – 0.080
Scenic Brook	0.05	0.080 – 0.120
Silver Creek	0.015 – 0.090	0.040 – 0.095
Silverbrook Creek	0.015 – 0.070	0.030 – 0.120
Springside Creek	0.035	0.060 – 0.100
Stony Creek	0.020 – 0.100	0.025 – 0.120

Table 13: Roughness Coefficients *(continued)*

Flooding Source	Channel "n"	Overbank "n"
Tributary No. 1	0.030 – 0.040	0.030 – 0.070
Tributary No. 1A	0.012 – 0.040	0.030 – 0.070
Tributary No. 1B	0.030 – 0.040	0.030 – 0.040
Tributary No. 2	0.04	0.025 – 0.030
Tributary No. 3	0.040 – 0.060	0.04
Unnamed Tributary to Ashippun River	0.040 – 0.050	0.035 – 0.120
Unnamed Tributary to Kewaskum Creek	0.050 – 0.120	0.060 – 0.120
UT-1 to Big Cedar Lake	0.035	0.060 – 0.100
UT-1 to Cedar Creek	0.035	0.100
UT-1 to Coney River	0.020 – 0.060	0.020 – 0.100
UT-1 to Coney River Overflow	0.020 – 0.070	0.020 – 0.070
UT-1 to Coney River Overflow West	0.035 – 0.070	0.035 – 0.070
UT-1 to Evergreen Creek	0.035	0.060
UT-1 to Kressen Branch	0.035	0.060-0.100
UT-1 to Little Cedar Creek	0.035	0.100
UT-1 to Little Cedar Lake	0.035	0.080
UT-1 to Oconomowoc River	0.040 – 0.070	0.020 – 0.100
UT-1 to Polk Springs Creek	0.035	0.060
UT-1 to Rubicon River	0.030 – 0.045	0.040 – 0.100
UT-1.1 to Rubicon River	0.030 – 0.040	0.040 – 0.090
UT-1.1.1 to Rubicon River	0.035	0.060 – 0.080
UT-1.2 to Rubicon River	0.035 – 0.040	0.045 – 0.080
UT-1.2.1 to Rubicon River	0.035 – 0.040	0.040 – 0.080
UT-2 to Cedar Creek	0.035	0.080-0.100
UT-2 to Coney River	0.035 – 0.070	0.020 – 0.070
UT-2 to Little Cedar Creek	0.035	0.060
UT-2 to Oconomowoc River	0.035 – 0.070	0.020 – 0.070
UT-2 to Rubicon River	0.030 – 0.045	0.040 – 0.100
UT-2.1 to Rubicon River	0.035 – 0.040	0.045 – 0.080
UT-3 to Rubicon River	0.030 – 0.045	0.040 – 0.100
UT-3.1 to Rubicon River	0.03	0.04
UT-4 to Rubicon River	0.035	0.050 – 0.100
UT-5 to Rubicon River	0.030 – 0.040	0.045 – 0.100

Table 13: Roughness Coefficients *(continued)*

Flooding Source	Channel "n"	Overbank "n"
Washington Creek	0.013 – 0.150	0.013 – 0.150
West Branch Milwaukee River	0.020 – 0.100	0.025 – 0.120
Wingate Creek	0.024 – 0.090	0.035 – 0.120

5.3 Coastal Analyses

This section is not applicable to this Flood Risk Project.

Table 14: Summary of Coastal Analyses
[Not Applicable to this Flood Risk Project]

5.3.1 Total Stillwater Elevations

This section is not applicable to this Flood Risk Project.

Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas
[Not Applicable to this Flood Risk Project]

Table 15: Tide Gage Analysis Specifics
[Not Applicable to this Flood Risk Project]

5.3.2 Waves

This section is not applicable to this Flood Risk Project.

5.3.3 Coastal Erosion

This section is not applicable to this Flood Risk Project.

5.3.4 Wave Hazard Analyses

This section is not applicable to this Flood Risk Project.

Table 16: Coastal Transect Parameters
[Not Applicable to this Flood Risk Project]

Figure 9: Transect Location Map
[Not Applicable in this FIS Report]

5.4 Alluvial Fan Analyses

This section is not applicable to this Flood Risk Project.

Table 17: Summary of Alluvial Fan Analyses
[Not Applicable to this Flood Risk Project]

Table 18: Results of Alluvial Fan Analyses
[Not Applicable to this Flood Risk Project]