FLOOD INSURANCE STUDY

VOLUME 1 OF 3

BEAVER COUNTY, PENNSYLVANIA

(ALL JURISDICTIONS)

COMMUNITY NAME	COMMUNITY NUMBER
ALIQUIPPA, CITY OF	420101
AMBRIDGE, BOROUGH OF	420102
BADEN, BOROUGH OF	420103
BEAVER, BOROUGH OF	420104
BEAVER FALLS, CITY OF	420105
BIG BEAVER, BOROUGH OF	422307
BRIDGEWATER, BOROUGH OF	420106
BRIGHTON, TOWNSHIP OF	422309
CENTER, TOWNSHIP OF	422310
CHIPPEWA, TOWNSHIP OF	422311
CONWAY, BOROUGH OF	420107
DARLINGTON, BOROUGH OF	421319
DARLINGTON, TOWNSHIP OF	422312
DAUGHERTY, TOWNSHIP OF	422313
EAST ROCHESTER, BOROUGH OF	420108
EASTVALE, BOROUGH OF	422314
ECONOMY, BOROUGH OF	420109
FALLSTON, BOROUGH OF	420110
*FRANKFORT SPRINGS, BOROUGH OF	422315
FRANKLIN, TOWNSHIP OF	421065
FREEDOM, BOROUGH OF	420111
GEORGETOWN, BOROUGH OF	422316
GLASGOW, BOROUGH OF	420112
GREENE, TOWNSHIP OF	422317
HANOVER, TOWNSHIP OF	421223
HARMONY, TOWNSHIP OF	421038
HOMEWOOD, BOROUGH OF	422318
HOOKSTOWN, BOROUGH OF	422319
HOPEWELL, TOWNSHIP OF	421321
INDEPENDENCE, TOWNSHIP OF	421323
INDUSTRY, BOROUGH OF	420113
KOPPEL, BOROUGH OF	422320
MARION, TOWNSHIP OF	422249
MIDLAND, BOROUGH OF	422321
MONACA, BOROUGH OF	420114
NEW BRIGHTON, BOROUGH OF	420115
NEW GALILEE, BOROUGH OF	422322
NEW SEWICKLEY, TOWNSHIP OF	422323
NORTH SEWICKLEY, TOWNSHIP OF	421161
OHIOVILLE, BOROUGH OF	422324
PATTERSON, TOWNSHIP OF	422326
PATTERSON HEIGHTS, BOROUGH OF	422325
POTTER, TOWNSHIP OF	422327
PULASKI, TOWNSHIP OF	422328
RACCOON, TOWNSHIP OF	421220
ROCHESTER, BOROUGH OF	420116
ROCHESTER, TOWNSHIP OF	421322
SHIPPINGPORT, BOROUGH OF	420117
SOUTH BEAVER, TOWNSHIP OF	422329
SOUTH HEIGHTS, BOROUGH OF	422330
VANPORT, TOWNSHIP OF	421320
WEST MAYFIELD, BOROUGH OF	422331
WHITE, TOWNSHIP OF	420057

*No Special Flood Hazard Areas Identified

Effective:
August 17, 2015

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
42007CV001A

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) report may not contain all data available within the Community Map Repository. It is advisable to contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS report. It is, therefore, the responsibility of the user to consult with community officials and to check the Community Map Repository to obtain the most current FIS report components.

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

Old Zone(s)	New Zone
Al through A30	AE
B	X
C	X

Initial Countywide FIS Effective Date: August 17, 2015

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FLOOD INSURANCE STUDY
BEAVER COUNTY, PENNSYLVANIA (ALL JURISDICTIONS)

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) report investigates the existence and severity of flood hazards in the geographic area of Beaver County, Pennsylvania, including the Boroughs of Ambridge, Baden, Beaver, Big Beaver, Bridgewater, Conway, Darlington, East Rochester, Eastvale, Economy, Fallston, Frankfort Springs, Freedom, Georgetown, Glasgow, Homewood, Hookstown, Industry, Koppel, Midland, Monaca, New Brighton, New Galilee, Ohioville, Patterson Heights, Rochester, Shippingport, South Heights, and West Mayfield; the Cities of Aliquippa and Beaver Falls; and the Townships of Brighton, Center, Chippewa, Darlington, Daugherty, Franklin, Greene, Hanover, Harmony, Hopewell, Independence, Marion, New Sewickley, North Sewickley, Patterson, Potter, Pulaski, Raccoon, Rochester, South Beaver, Vanport, and White (referred to collectively herein as Beaver County).

This FIS aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Beaver County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

Please note that on the effective date of this study, the Borough of Frankfort Springs has no identified Special Flood Hazard Areas (SFHAs). This does not preclude future determinations of SFHAs that could be necessitated by changed conditions affecting the community (i.e. annexation of new lands) or availability of new scientific or technical data about flood hazards.

Please note that the Borough of Ellwood City is geographically located in both Beaver and Lawrence Counties. However, the borough is included in its' entirety in the Lawrence County FIS report.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State or other jurisdictional agency will be able to explain them.

The Digital Flood Insurance Rate Map (DFIRM) and FIS report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the Federal Emergency Management Agency (FEMA) DFIRM database specifications and Geographic Information System (GIS) format requirements. The flood hazard information was created and is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community.

1.2 Authority and Acknowledgments

The sources of authority for this FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

Information on the authority and acknowledgements for each of the previously printed FISs for communities within Beaver County was compiled, and is shown below.

Aliquippa, City of	The hydrologic and hydraulic analyses for the August 1979 study were prepared by the U.S. Army Corps of Engineers (USACE), Pittsburgh District, for the Federal Insurance Administration (FIA), under Inter-Agency Agreement (IAA) Nos. IAA-H-7-76, and IAA-H-10-77, Project Order Nos. 25 and 4, respectively (Reference 1). This work was completed in March 1978.
Ambridge, Borough of	The hydrologic and hydraulic analyses for the August 1979 study were prepared by the USACE, for the FIA, under IAA Nos. IAA-H-7-76, Project Order No. 24 and IAA-H-10-77, Project Order No. 4 (Reference 2). This work was completed in July 1977.
Baden, Borough of	The hydrologic and hydraulic analyses for the March 1979 study were performed by the USACE, Pittsburgh District, for the FIA, under IAA No. IAA-H-7-76, Project Order No. 25, and IAA-H-10-77, Project Order No. 4 (Reference 3). This work was completed in October 1977.
Beaver, Borough of	The hydrologic and hydraulic analyses for the March 1979 study were prepared by the USACE, Pittsburgh District, for the FIA, under IAA Nos. IAA-H-7-76 and IAA-H-7-76 Amendment No. 2, Project Order No. 17, respectively (Reference 4). This work was completed in February 1978.
Beaver Falls, City of	The hydrologic and hydraulic analyses for the November 17, 1981, study were performed by Green International, Inc., for the Federal Emergency Management Agency (FEMA), under Contract No. H-4759 (Reference 5). This work was completed in December 1979.
Big Beaver, Borough of	The hydrologic and hydraulic analyses for the November 17, 1981, study were performed by Green International, Inc., for FEMA, under Contract No. H-4759 (Reference 6). This work was completed in January 1980.
Bridgewater, Borough of	The hydrologic and hydraulic analyses for the November 1979 study were prepared by the USACE, Pittsburgh District, for the FIA, under IAA Nos. IAA-H-7-76 and IAA-H-7-76, Amendment No. 1, Project Order No. 16, respectively (Reference 7). This work was completed in February 1978.

Center, Township of	The hydrologic and hydraulic analyses for the December 15, 1980, study were prepared by Green International, Inc., for the FIA, under Contract No. H-4759 (Reference 8). This work was completed in October 1979.
Conway, Borough of	The hydrologic and hydraulic analyses for the November 4, 1988, study were prepared by the USACE, Pittsburgh District, for FEMA, under IAA No. EMW-86-E-2226, Project Order No. 2 (Reference 9). This work was completed in October 1986.
Daugherty, Township of	The hydrologic and hydraulic analyses for the December 1, 1981, study were prepared by Green International, Inc., for FEMA, under Contract No. H-4759 (Reference 10). This work was completed in December 1979.
East Rochester, Borough of	The hydrologic and hydraulic analyses for the January 16, 1981, study were prepared by Green International, Inc., for the FIA, under Contract No. H-4759 (Reference 11). This work was completed in October 1979. However, the USACE, Pittsburgh District, provided to Green International, Inc., the hydrologic and hydraulic analyses and elevation data for the Ohio River.
Eastvale, Borough of	The hydrologic and hydraulic analyses for the October 15, 1980, study were prepared by Green International, Inc., for the FIA, under Contract No. H-4759 (Reference 12). This work was completed in December 1979.
Economy, Borough of	The hydrologic and hydraulic analyses for the December 15, 1980, study were prepared by Green International, Inc., for the FIA, under Contract No. H-4759 (Reference 13). This work was completed in October 1979.
Fallston, Borough of	The hydrologic and hydraulic analyses for the March 2, 1981, study were prepared by Green International Inc., for the FIA, under Contract No. H-4759 (Reference 14). This work was completed in December 1979.
Franklin, Township of	The hydrologic and hydraulic analyses for the March 16, 1989, study were prepared by the USACE, Pittsburgh District, for FEMA, under IAA No. EMW-86-E-2226, Project Order No. 2 (Reference 15). This work was completed in July 1986.
Freedom, Borough of	The hydrologic and hydraulic analyses for the August 1979 study were performed by the USACE, for the FIA, under IAA No. IAA-H-7-76, Amendment No. 2 and Project Order No. 17 (Reference 16). This work was completed in February 1978.

Glasgow, Borough of	The hydrologic and hydraulic analyses for the August 4, 1988, study were prepared by the USACE, Pittsburgh District, for FEMA, under IAA No. EMW-86-E-2226, Project Order No. 2 (Reference 17). This work was completed in October 1986.
Harmony, Township of	The hydrologic and hydraulic analyses for the March 1978 study (except the Ohio River) were prepared by Michael Baker, Jr., Inc. for the FIA under Contract No. H-3812. The hydrologic and hydraulic analyses for the Ohio River were performed by the USACE (Reference 18). This work was completed in June 1977.
Hopewell, Township of	The hydrologic and hydraulic analyses for the May 4, 1981, study were prepared by Green International, Inc., for the FIA, under Contract No. H-4759 (Reference 19). This work was completed in September 1979. The hydrologic and hydraulic analyses for the Ohio River were previously performed by the USACE, Pittsburgh District.
Industry, Borough of	The hydrologic and hydraulic analyses for the March 1979 study were prepared by the USACE, Pittsburgh District, for the FIA, under IAA Nos. IAA-H-7-76 and IAA-H-7-76 Amendment No. 2, Project Order No. 16, respectively (Reference 20). This work was completed in February 1978.
Marion, Township of	The hydrologic and hydraulic analyses for the March 2, 1989, study were prepared by the USACE, Pittsburgh District, for FEMA, under IAA No. EMW-86-E-2226, Project Order No. 2 (Reference 21). This work was completed in July 1987.
Midland, Borough of	The hydrologic and hydraulic analyses for the October 18, 1988, study were prepared by the USACE, Pittsburgh District, for FEMA, under IAA No. EMW-86-E-2226, Project Order No. 2 (Reference 22). This work was completed in October 1986.
Monaca, Borough of	The hydrologic and hydraulic analyses for the June 1979 study were prepared by the USACE, Pittsburgh District, for the FIA, under IAA Nos. IAA-H-7-76 and IAA-H-7-76 Amendment No. 1, Project Order No. 16, respectively (Reference 23). This work was completed in February 1978.
New Brighton, Borough of	The hydrologic and hydraulic analyses for the February 15, 1983, study were prepared by Green International, Inc., for FEMA, under Contract No. H-4759 (Reference 24). This work was completed in November 1979.
New Sewickley, Township of	The hydrologic and hydraulic analyses for the March 2, 1989, study were prepared by the USACE, Pittsburgh District, for FEMA, under IAA No. EMW-86-E-2226, Project Order No. 2 (Reference 25). This work was completed in July 1987.

North Sewickley, Township of	The hydrologic and hydraulic analyses for the December 1, 1981, study were performed by Green International, Inc., for FEMA, under Contract No. H-4759 (Reference 26). This work was completed in December 1979.
Patterson Heights, Borough of	The hydrologic and hydraulic analyses for the October 15, 1980, study were prepared by Green International, Inc., for the FIA, under Contract No. H-4759 (Reference 27). This work was completed in December 1979.
Potter, Township of	The hydrologic and hydraulic analyses for the December 2, 1988, study were prepared by the USACE, Pittsburgh District, for FEMA, under IAA No. EMW-86-E-2226, Project Order No. 2 (Reference 28). This work was completed in October 1986.
Pulaski, Township of	The hydrologic and hydraulic analyses for the December 1, 1981, study were prepared by Green International, Inc. for FEMA, under Contract No. H-4759 (Reference 29). This work was completed in December 1979.
Rochester, Borough of	The hydrologic and hydraulic analyses for the August 1979 study were prepared by the USACE, Pittsburgh District, for the FIA, under IAA Nos. IAA-H-7-76 and IAA-H-7-76, Amendment No. 2, Project Order No. 17, respectively (Reference 30). This work was completed in February 1978.
Rochester, Township of	The hydrologic and hydraulic analyses for the December 15, 1980, study were prepared by Green International, Inc., for the FIA, under Contract No. H-4759 (Reference 31). This work was completed in November 1979.
Shippingport, Borough of	The hydrologic and hydraulic analyses for the August 19, 1991, study were prepared by the USACE, Pittsburgh District. This work was completed in June 1977 (Reference 32). Additional information was taken from the the Boroughs of Industry and Midland FISs.
South Heights, Borough of	The hydrologic and hydraulic analyses for the February 15, 1983, study were prepared by the USACE, for FEMA, during the preparation of the FIS for the Borough of Ambridge (Reference 33).
Vanport, Township of	The hydrologic and hydraulic analyses for the August 1979 study were prepared by the USACE, Pittsburgh District for the FIA under IAA Nos. IAA-H-7-76 and IAA-H-7-76, Amendment 1, Project Order No. 18 (Reference 34). This work was completed in February 1978.

West Mayfield, Borough of	The hydrologic and hydraulic analyses for the October 15, 1980, study were prepared by Green International, Inc., for the FIA, under Contract No. H-4759 (Reference 35). This work was completed in December 1979.

No previous FIS reports or Flood Insurance Rate Maps (FIRMs) were prepared for the Boroughs of Darlington, Frankfort Springs, Georgetown, Homewood, and the Township of White. These communities are not included in the Community Map History table (Section 6.0). No previous FIS reports were prepared for the Boroughs of Hookstown, Koppel, New Galilee, and Ohioville; or the Townships of Brighton, Chippewa, Darlington, Greene, Hanover, Independence, Patterson, Raccoon, South Beaver, and White; therefore the previous authority and acknowledgment information for these communities are not included in this FIS.

For this countywide FIS, the DFIRM database and mapping were prepared for FEMA by GG3, a joint venture between Gannett Fleming, Inc., Camp Hill, Pennsylvania, and Greenhorne & O'Mara, Inc., Laurel, Maryland under Joint Venture Contract No. EMP-2003-CO-2606, Task Order No. 6. The new countywide FIS, includes new detailed hydraulic and hydrologic analyses along Connoquenessing Creek, Logtown Run, North Branch Moon Run, Tributary to Walnut Bottom Run and Walnut Bottom Run. Redelineation and digitizing of effective flood hazard information and new approximate analyses was also performed. This work was completed in April 2012.

The orthophotography base mapping was provided by the PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey at a scale of 1:2,400 from photography dated 2005 or later. The digital countywide FIRM was produced in Pennsylvania State Plane South Zone coordinate system with a Lambert Conformal Conic projection, units in feet, and referenced to the North American Datum of 1983, GRS80 spheroid. Differences in datum and spheroid used in the production of the FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of information shown on this FIRM.

1.3 Coordination

The purpose of an initial Consultation Coordination Officer's (CCO) meeting is to discuss the scope of the FIS. The initial and final meeting dates for the previously published FIS reports for Beaver County communities are listed in Table 1, "Initial and Final CCO Meetings".

Table 1 – Initial and Final CCO Meetings

COMMUNITY NAME	INITIAL MEETING	FINAL MEETING
Aliquippa, City of	April 22, 1976	March 1, 1979
Ambridge, Borough of	April 22, 1976	March 2, 1979
Baden, Borough of	April 22, 1976	September 11, 1978

Table 1 - Initial and Final CCO Meetings (continued)

COMMUNITY NAME	INITIAL MEETING	FINAL MEETING
Big Beaver, Borough of	April 19, 1978	July 7, 1981
Beaver, Borough of	November 1975	September 12, 1978
Beaver Falls, City of	April 19, 1978	July 7, 1981
Bridgewater, Borough of	November 17, 1975	April 11, 1979
Center, Township of	April 17, 1978	July 10, 1980
Conway, Borough of	May 22, 1985	December 1, 1987
Daugherty, Township of	April 17, 1978	July 7, 1981
East Rochester, Borough of	April 18, 1978	May 14, 1980
Eastvale, Borough of	April 19, 1978	May 14, 1980
Economy, Borough of	April 17, 1978	July 10, 1980
Fallston, Borough of	April 18, 1978	July 10, 1980
Franklin, Township of	May 22, 1985	March 28, 1988
Freedom, Borough of	November 17, 1975	March 1, 1979
Glasgow, Borough of	May 22, 1985	September 21, 1987
Harmony, Township of	September 16, 1975	August 11, 1977
Hopewell, Township of	April 17, 1978	October 21, 1980
Industry, Borough of	November 17, 1975	September 12, 1978
Marion, Township of	May 22, 1985	March 28, 1988
Midland, Borough of	May 22, 1985	November 27, 1987
Monaca, Borough of	December 1, 1975	October 16, 1978
New Brighton, Borough of	April 18, 1978	August 24, 1981
New Sewickley, Township of	May 22, 1985	March 28, 1988
North Sewickley, Township of	April 19, 1978	July 8, 1981
Patterson Heights, Borough of	April 19, 1978	May 14, 1980
Potter, Township of	May 22, 1985	December 1, 1987

Table 1 - Initial and Final CCO Meetings (continued)

COMMUNITY NAME	INITIAL MEETING	FINAL MEETING
Pulaski, Township of	April 18, 1978	July 8, 1981
Rochester, Borough of	November 17, 1975	March 1, 1979
Rochester, Township of	April 17, 1978	July 10, 1980
Shippingport, Borough of	May 17, 1990	September 20, 1990
South Heights, Borough of	*	October 5, 1982
Vanport, Township of	November 17, 1975	March 1, 1979
West Mayfield, Borough of	April 19, 1978	May 14, 1980

* Data Not Available

A final CCO meeting is held to review the results of the study. These meetings were attended by FEMA, the study contractor, and community officials.

For this countywide revision, the initial CCO meeting was held on August 24, 2010 and was attended by representatives of FEMA, GG3, and the local communities of the City of Beaver Falls; the Boroughs of Beaver, Big Beaver, Economy, Industry, Koppel, Midland, Monaca, New Brighton, Ohioville, and the Townships of Brighton, Chippewa, Franklin, Hopewell, Marion, North Sewickley, Potter, and South Beaver

The results were reviewed at a final CCO meeting held on April 9, 2013, and this meeting was attended by representatives of FEMA, Beaver County, Community officials, and the study contractor.

2.0 AREA STUDIED

2.1 Scope of Study

This initial countywide FIS covers the geographic area of Beaver County, Pennsylvania, including the incorporated communities previously listed in Section 1.1. The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development or proposed construction. Table 2, "Areas Studied by Detailed Methods," lists the streams that were studied by detailed methods.

Table 2 – Areas Studied by Detailed Methods

Stream	Limits of Detailed Study
Beaver River	Confluence with the Ohio River to approximately 1.0 mile upstream of State Route 351.
Big Sewickley Creek	Confluence with the Ohio River to approximately 1.0 mile upstream of Big Sewickley Creek Road.
Big Sewickley Creek Tributary 1	Confluence with Big Sewickley Creek to approximately 0.6 mile upstream of the confluence with Big Sewickley Creek.
Big Sewickley Creek Tributary 2	Confluence with Big Sewickley Creek to approximately 0.3 mile upstream of Cooney Hollow Road.
Blockhouse Run	Confluence with the Beaver River to approximately 0.25 mile downstream of Allegheny Street; and from approximately 190 feet upstream of Blockhouse Road to approximately 0.5 mile downstream of Goehring road.
Blockhouse Run Tributary 1	Confluence with Blockhouse Run to approximately 0.2 mile upstream of Rochester Road.
Blockhouse Run Tributary 2	Confluence with Blockhouse Run to approximately 700 feet upstream of Silver Spring Road.
Brady Run	Confluence with the Beaver River to approximately 0.4 mile upstream of Pittsburgh and Lake Erie Railroad.
Brush Creek	Confluence with Connoquenessing Creek to approximately 1.0 mile upstream of Bilboberry Road and from approximately 0.6 mile downstream of Willomers Park Road to approximately 1.2 miles upstream of Narkinsmill Road.
Connoquenessing Creek	Approximately 2.0 miles downstream of State Route 65 to approximately 0.86 miles downstream of State Route 588.
Dutchman Run	Confluence with the Ohio River to approximately 0.9 mile upstream of Third Avenue.
Elkhorn Run	Confluence with the Ohio River to approximately 0.5 mile upstream of Tank Road; and from approximately 0.2 mile downstream of Vankirk Road to approximately 225 feet upstream of Chapel Road.
Elkhorn Run Tributary 1	Confluence with Elkhorn Run to approximately 180 feet upstream of Temple Road.
Lacock Run	East Washington Street to approximately 0.46 mile from the intersection of Reno Street & Pittsburgh Road.
Legionville Run	Confluence with the Ohio River to approximately 0.3 mile upstream of Legionville Road.
Logtown Run	Approximately 220 feet downstream of Waugaman Street to approximately 0.2 mile upstream of Angela Drive and from the confluence of Logtown Run Tributary 1 to approximately 0.6 mile upstream of Academy Drive.

Table 2 – Areas Studied by Detailed Methods (Continued)

Stream	Limits of Detailed Study
Logtown Run Tributary 1	Confluence with Logtown Run to approximately 0.3 miles upstream of the confluence with Logtown Run.
North Branch Moon Run	Approximately 0.6 mile downstream of Chapel Road to approximately 0.3 mile upstream of Chapel Road.
North Fork Big Sewickley Creek	Confluence with Big Sewickley Creek to approximately 1.6 miles upstream of the confluence of North Fork Big Sewickley Creek Tributary 1.
North Fork Big Sewickley Creek Tributary 1	Confluence with North Fork Big Sewickley Creek to approximately 760 feet upstream of Hoeing Road.
North Fork Little Beaver Creek	Approximately 0.5 mile upstream of confluence of West Clarks Run to approximately 0.3 mile upstream of North Fork Little Beaver Creek; From confluence of West Clark Run to approximately 0.6 mile downstream of North Folk Little Beaver Creek.
Ohio River	Confluence of Little Beaver Creek to approximately 470 feet downstream of confluence of Upper Dry Run. From approximately 1.8 miles upstream of confluence of Upper Dry Run to the confluence of Big Sewickley Creek.
Raccoon Creek	Approximately 0.7 mile upstream of the confluence with Tributary G to approximately 3.2 miles upstream of Greengarden Road.
Shafers Run	Confluence with Elkhorn Run to approximately 1.1 mile upstream of Chapel Road.
Shafers Run Tributary 1	Confluence with Shafers Run to approximately 120 feet upstream of Woodland Drive.
Shafers Run Tributary 2	Confluence with Shafers Run to approximately 780 feet upstream of the confluence with Shafers Run.
South Branch Legionville Run	North Legionville Road to approximately 1,300 feet upstream of Harmony.
South Branch Legionville Run Tributary 1	Confluence with South Branch Legionville Run to approximately 600 feet upstream of the confluence with South Branch Legionville Run.
South Branch Moon Run	Upstream of Chapel Road to approximately 0.2 mile upstream of Poplar Avenue.
South Branch Moon Run Tributary 1	Confluence with South Branch Moon Run to approximately 0.3 mile upstream of Poplar Avenue.
Stockman Run	Confluence with the Beaver River to approximately 0.3 mile upstream of Conrail; and from approximately 380 feet downstream of Careywood Road to approximately 0.2 miles upstream of Fairlane Boulevard.
Trampmill Run	Confluence with Raccoon Creek to approximately 0.2 miles upstream of Mill Street.
Tributary to Walnut Bottom Run	Confluence with Walnut Bottom Run to approximately 780 feet upstream of Patterson Avenue.

Table 2 – Areas Studied by Detailed Methods (Continued)

Stream	Limits of Detailed Study
Two Mile Run	Confluence with the Ohio River to approximately 0.2 mile upstream of Tuscarawas Road.
Wallace Run	Confluence with the Beaver River to approximately 0.6 mile upstream of Shenango Road.
Wallace Run Tributary 2	Confluence with Wallace Run to 0.4 mile upstream of Wallace Run Road.
Walnut Bottom Run	Confluence with the Beaver River to approximately 755 feet upstream of Patterson Avenue.
West Clarks Run	Confluence with North Fork Little Beaver Creek to approximately 0.4 mile upstream of Conrail.

Approximate analyses were used to study those areas having a low development potential or minimal flooding hazards. The scope and methods of study were proposed to, and agreed upon, by FEMA and the communities.

Table 3, "Stream Name Changes," lists those streams whose names have changed, or differs from those published in the previous FIS for Beaver County, or any of the communities within.

Table 3 – Stream Name Changes

Community	Old Name	New Name
Borough of Big Beaver	Tributary to Wallace Run	Wallace Run Tributary 2
Township of Center	Tributary A	Elkhorn Run Tributary 1
Township of Center	Tributary B	Shafers Run Tributary 2
Township of Center	Tributary C	Shafers Run Tributary 1
Township of Center	Tributary D	South Branch Moon Run Tributary 1
Township of Center	Tributary E	Logtown Run Tributary 1
Township of Daugherty	Tributary to Blockhouse Run	Blockhouse Run Tributary 2
Borough of Economy	Tributary A	Big Sewickley Creek Tributary 2
Borough of Economy	Tributary B	Big Sewickley Creek Tributary 1
Borough of Economy	Tributary C	North Fork Big Sewickley Creek Tributary 1
Borough of Economy	Tributary D	South Branch Legionville Run Tributary 1
Township of Pulaski	Tributary to Blockhouse Run	Blockhouse Run Tributary 1

No Letters of Map Revision (LOMRs) were incorporated as part of this study.

2.2 Community Description

Beaver County is located in western Pennsylvania, northwest of the City of Pittsburgh. The county is bordered on the north by Lawrence County; on the south by Washington County; on the east by Butler and Allegheny Counties; and on the west by the States of Ohio and West Virginia. Major transportation routes that serve Beaver County include Interstate 76, State Routes 18, 51, 60, 65, 151, and 3023, and Conrail. The 2010 population of Beaver County was 170,539 (Reference 36).

The climate for this area is temperate, with normal seasonal variation in temperature. Beaver County is geographically located in a region of both polar and tropical air mass activity, subject to continental and maritime invasion. The weather is usually moderate but may have occasional rapid changes resulting from frontal air mass movements. The average high temperature ranges from 83 degrees Fahrenheit (ºF) in July and the average low is 23ºF in January. The highest recorded temperature was 105ºF in 1983. The lowest recorded temperature was -18ºF in 1985. Monthly precipitation averages approximately 3.09 inches, with the maximum monthly average occurring in July, with 4.11 inches and the minimum monthly average occurring in February, with 2.28 inches, respectively (Reference 37).

The Beaver River is formed by the merging of the Mahoning and Shenango Rivers at New Castle, Pennsylvania, and flows in a southerly direction throughout its length of 21.6 miles to join the Ohio River at Rochester, Pennsylvania. The Upper Beaver River meanders in a wide valley upstream of Wampum, Pennsylvania. From Wampum to its mouth, the course of the river is quite direct with only a few moderate bends. The width of the river varies from approximately 200 feet at the upper reach to approximately 500 feet at the lower reach. The Montgomery Pool of the Ohio River navigation system extends up the Beaver River for a distance of 2.9 miles. The elevation of the river bed at its mouth is approximately 666.0 feet, and 757.0 feet at the head. The average slope of the river bed within the study area is 3.6 feet per mile. Three water supply dams, New Brighton (mile 2.8), crest elevation 699.0 feet; Beaver Falls (mile 3.9), crest elevation 718.0 feet; and Eastvale (mile 5.3), crest elevation 731.0 feet, are located on the steep slope of the river. With the exception of the pools created by these dams, including Montgomery on the Ohio River, the Beaver River is little changed from its natural state.

The Beaver River has a drainage area of 3,153 square miles. Residential, industrial, and commercial developments are present in the floodplain. This development includes an apartment complex and a municipal wastewater treatment plant, and a shopping center. Flooding on the Beaver River occurs mostly from December through April. Most of the floods that occur during this period are the result of heavy rain and snowmelt, however, floods may occur at any time and last several days.

Big Sewickley Creek, with a drainage area of 30.2 square miles, enters the southwestern corner of the Borough of Economy from Allegheny County and flows west to form the southern common boundary with the Boroughs of Bell Acres and Franklin Park of Allegheny County. North Fork Big Sewickley Creek, with a drainage area of 8.5 square miles, is the major tributary. Its source is near the northwestern corner of the borough, and it flows south to the confluence with Big Sewickley Creek near Pinehurst. The combined watersheds drain the western and southern halves of the borough. The meandering pattern causes wide floodplains when out-of-bank flows occur. The floodplain of Big Sewickley Creek contains residential, commercial, and light industrial development. Pinehurst is susceptible to flooding. Only scattered residential development exists within the floodplains of North Fork Big Sewickley Creek, Cooney Hollow, and Big Sewickley Creek Tributary 1. The watershed is covered by forests with areas of urbanization along the stream.

Blockhouse Run, with a drainage area of 7.54 square miles, enters the northeastern portion of New Brighton from the Township of Pulaski and flows south to its confluence with the Beaver River. Blockhouse Run is characterized by V-shaped valleys and steep hillsides. Suburban-residential land use, woodland, and open space predominate in the watershed.

Blockhouse Run Tributary 1 has a drainage area of 0.43 square mile, and flows west to its confluence with Blockhouse Run. Blockhouse Run Tributary 1 is characterized by V-shaped valleys and steep hillsides. Suburban-residential land use, woodland, and open space predominate in the watershed. There is a large industrial plant within the floodplain.

Blockhouse Run Tributary 2 originates in the north-central portion of the Township of Daugherty and flows southward to its confluence with Blockhouse Run. The floodplain has some residential development but no commercial or industrial development exists.

Brady Run, with a total drainage area of 25.8 square miles at its mouth, has its source in several townships in Beaver County. Two distinct types of storms have occurred in the Brady Run Basin. Intense summer storms of comparatively short duration usually develop over relatively small areas. Occasionally such storms become sufficiently widespread as to cover an area as large as or larger than its respective basin. More moderate storms of longer duration have occurred in the fall, winter and spring. Brady Run is in a broad U-shaped valley. Suburban residential land use, woodlands, and open space predominate in the watershed.

Brush Creek, which has its source in the Township of Pine, Allegheny County, flows in a generally northwestern direction through the Townships of Marshall, Cranberry, New Sewickley, Marion, and North Sewickley where it empties into Connoquenessing Creek, a tributary to the Beaver River. The Brush Creek drainage basin at the mouth is roughly rectangular in shape and encompasses a total drainage area of 56.2 square miles. Basin topography varies from an elevation of 1,260 feet at the headwaters to approximately 920 feet at the downstream study limit.

Connoquenessing Creek has a total drainage area of 838 square miles at its mouth. The headwaters of Connoquenessing Creek are near the community of Hooker, Pennsylvania, which is in central Butler County. The stream flows in a southern direction from its source until it reaches the community of Renfrew in southwestern Butler County. It then flows in a generally western direction to its confluence with the Beaver River at Ellwood City, a total distance of 58 miles. The average bed slope of Connoquenessing Creek is approximately 3 feet per mile. Above the stream's valley, the local relief rises from a low of 830 feet to an average hilltop elevation of 1,280 feet. Connoquenessing Creek meanders for 5.1 miles from the Township of Marion to Lawrence County, and forms the northeastern corporate limits of the Township of North Sewickley. It has a drainage area of approximately 420 square miles at State Route 65. Residential development exists within the floodplain along Country Club Drive and in the Village of Hazen. No commercial or industrial development is present along the creek.

Dutchman Run has a total drainage area of 3.12 square miles at its mouth. From its source in the Township of Rochester, Dutchman Run flows generally southwest through the Borough of Freedom for 1.0 mile with a narrow floodplain and steep gradient. Its average slope in Freedom is approximately 130 feet per mile. The floodplain is primarily residential at its mouth. Upstream, it is covered by brush and trees.

Elkhorn Run and its tributaries, North Branch Moon Run, Shafers Run, and South Branch Moon Run have drainage areas of 8.46, 3.48, and 1.54 square miles, respectively. They drain most of the northern two-thirds of the Township of Center and flow northeast to the Ohio River. The lower portion of Elkhorn Run, below the confluence of South Branch Moon Run, forms a corporate boundary with the Borough of Monaca. Logtown Run, with a drainage area of 0.5 square mile, drains a residential area to the north of State Route 51 and flows east into the Township of Hopewell. Single-family residences, open space, and woodland predominate in the Elkhorn Run, Moon Run, Shafers Run, and Logtown Run watersheds (Reference 38).

The only serious flooding on Elkhorn Run occurs in the portion below the confluence of South Branch Moon Run. A number of homes are within the floodplain caused by backwater from the Ohio River.

The floodplains of upper Elkhorn Run, Logtown Run, North and South Branches Moon Run, and Shafers Run have very little residential development affected by floodwaters. The primary residential development is outside of the floodplain. The only major establishment within the floodplain is a municipal wastewater treatment plant.

Fosburg Run has a drainage area of 0.33 square mile. The Fosburg Run floodplain has experienced some residential development.

Lacock Run has a drainage area of 0.79 square mile and drains into a small area in the central portion of the Township of Rochester and flows through the Village of North Rochester into the Borough of East Rochester. There is very little residential development within the floodplain. A shopping plaza has been built over Lacock Run, where the run has been constricted to a conduit beneath the parking lot.

The Legionville Run watershed consists of loamy soil composed of materials weathered from sandstone and shale. The soils are moderately permeable. The upstream portions of the watershed are forested with some developed land on Legionville Run (Reference 39). The drainage pattern of Legionville Run and its numerous tributaries form a dendritic type of pattern producing a well-defined channel and distinct valleys. The lower portion of Legionville Run has no development due to the encroachment on the stream by landfill. The upper portion of Legionville Run consists of sparse residential development with commercial development along the South Branch of Legionville Run. Due to the small floodplains and steep valleys, the upper portion of Legionville Run has minimal space for development.

North Fork Little Beaver Creek meanders along the western corporate limits of the Borough of Big Beaver and only a portion of the floodplain lies within the borough. Scattered homes exist within the floodplain.

The 203,900 square mile drainage area of the Ohio River Basin lies between the Allegheny Mountains to the east and the Mississippi River to the west, and embraces portions of 14 states. Formed at Pittsburgh, Pennsylvania, by the junction of the Allegheny and Monongahela Rivers, the main river descends approximately 429 feet in its 981 mile southwesterly course to the Mississippi River at Cairo, Illinois. The drainage area at Montgomery Locks and Dam is 22,969 square miles and has a 31.7 river mile. The Ohio River, above the study area, has a moderately wide flood floodplain and a relatively flat river gradient. These valley characteristics are modifying and retarding factors that result in prolonged, critical river flood heights. Above the stream's valley the local relief rises from approximately 400 to 500 feet, an average hilltop elevation rises approximately 1,100 to 1,200 feet. In Beaver County, the valley floor area varies from approximately 0.3 to 0.6 mile in width. The average slope of the river from its origin at Pittsburgh through the report reach is approximately 1 foot per mile.

Raccoon Creek has a drainage area of approximately 150 square miles and Trampmill Run has a drainage area of 4.2 square miles and flows northwesterly to its confluence with Raccoon Creek. Raccoon Creek and Trampmill Run floodplains contain primarily agricultural and forest land with several scattered homes. Raccoon Creek floodplain, in addition, has several commercial establishments. Major establishments include a shopping plaza, a trucking firm, and a municipal wastewater treatment plant. Raccoon Creek watershed is located within the Allegheny Plateau physiographic region. The creek is in a broad U-shaped valley, but most tributaries, including Trampmill Run, are characterized by V-shaped valleys and steep hillsides. Agricultural and forest land predominate, but large areas are affected by active and abandoned strip mines. There are no large residential or commercial developments.

South Branch Legionville Run and Tevebaugh Run are small watersheds located in east-central and the northeast corner of the Borough of Economy, respectively, and drain into the Township of Harmony and the Borough of Baden, respectively. A limited amount of residential, commercial, and industrial development is present within the floodplain.

Stockman Run, with a total drainage area of 2.5 square miles, has its source in the north central portion of the City of Big Beaver and flows east to its confluence with the Beaver River. The floodplain has very little residential or commercial development.

Tributary to Walnut Bottom Run flows northward to its confluence with Walnut Bottom Run. Within the floodplain, only scattered residential development exists.

The only tributary entering the Ohio River within the Township of Vanport is Two Mile Run. Two Mile Run, with a drainage area of 6.89 square miles at its mouth, has its source in the Township of Brighton, Beaver County. It flows in a southeasterly direction to the upper corporate limits of Vanport, and then abruptly changes to a southwesterly direction near its mouth, where it again changes to a southerly direction. It covers a distance in Vanport of 1.71 miles. The first half mile is rather steep, with an average slope of approximately 100 feet per mile. From there to the upper corporate limits of Vanport, the gradient is flatter with an average slope of approximately 35 feet per mile.

Two Mile Run has a relatively wide floodplain for most of its distance. The floodplain contains light industry, businesses, and residential areas.

Wallace Run has a total drainage area of 4.7 square miles and flows east to its confluence with the Beaver River. Scattered residential development and an industrial facility are located within the floodplain. Wallace Run is characterized by V-shaped valleys with steep hillsides. Woodland predominates in the drainage basins, but scattered residential development, strip mines, agriculture, and open space are present. Walnut Bottom Run has a drainage area of 4.0 square miles and flows to the confluence with the Beaver River near the State Route 18 bridge. Some residential, commercial and industrial development exists within the floodplain.

Walnut Bottom Run is characterized by V-shaped valleys with steep hillsides. Woodland predominates in the drainage basins, but scattered residential development, strip mines, agriculture, and open space are present.

West Clarks Run, with a total drainage area of 1.8 square miles, has its source in the central portion of the Borough of Beaver and flows west to its confluence with North Fork Little Beaver Creek. Only scattered homes exist within the floodplain.

Soils within Beaver County are generally silt and silty clay loams, exhibit low infiltration capacities, and are slow to moderately permeable (References 40 and 41). Some areas of the watershed are composed of moderately deep red clayey soils underlain by shale bedrock. These soils are unstable and are subject to slips and slides.

2.3 Principal Flood Problems

Minor flooding occurs on the Beaver River when a gage height of 12 feet is reached at the Beaver Falls gage. Major flooding occurs at a gage height of 15 feet. The March 1913 flood exceeded the flood stage, rising to a gage height of 17.4 feet. Flood flows on the Beaver River are generated primarily by low intensity storms of long duration. Floods often result from tropical maritime systems, including hurricanes, or spring snowmelt combined with precipitation. Table 4, “Major Floods on the Beaver River at the City of Beaver Falls,” list the most significant floods of record as recorded at the City of Beaver Falls, 5.5 miles upstream from the mouth of the Beaver River.

Table 4 – Major Floods on the Beaver River at the City of Beaver Falls[1]

Date of Flood	Gage Height (feet)	Discharge (cfs)	Estimated Recurrence Interval (years)
March 27, 1913	17.40	105,000	150
January 22, 1959	14.42	70,100	26
January 25, 1937	13.80	64,500	16
October 16, 1954	13.33	58,800	11
March 10, 1964	13.24	57,900	10.5
January 27, 1952	13.16	57,100	10
December 30, 1942	13.15	57,000	10
May 28, 1946	12.96	56,200	9

[1] Non-recording gage before December 3, 1941

The recurrence intervals estimated in the tabulation are the result of a graph relating known discharges to associated recurrence intervals. For the Beaver River at Beaver Falls, the March 1913 flood is the flood of record with a recurrence interval estimated at 150 years. A major flood, in January 1959, corresponds to an estimated 26-year flood. Additional flooding has occurred in the Borough of New Brighton due to backwater from the Ohio River.

Flood elevations for the Beaver River are generally the result of backwater from the Ohio River. A major flood occurred in June 1972 when backwater from the Ohio River rose to an elevation of 702.0 feet. The highest elevation occurred during the March 1936 flood when the river rose to 712.5 feet (Reference 42). The 1-percent-annual-chance flood elevation is approximately 703.2 feet, which will just pass the under-clearance of the Fallston Bridge.

The most severe flooding on Big Sewickley Creek usually occurs from December through April as a result of heavy rains and snowmelt, from high intensity storms of short duration, flash floods, and by backwater from the Ohio River. As a result of the short period of record, the only flood on record at the Big Sewickley Creek gage occurred in 1975, with a discharge of 2,540 cubic feet per second (cfs). This compares to a 10-percent-annual-chance flood. No other data is available for these areas. Dumping along Big Sewickley Creek has also caused encroachment on the stream and this may cause an increase in flood elevations. The type of soils found in this watershed cause rockslides and mudslides during heavy rains.

Flooding on Blockhouse Run and Blockhouse Run Tributary 2 is mainly the result of high intensity storms of short duration, such as thunderstorms. No record of past flooding is available.

Overbank flooding of Brady Run is the principal flood problem within the study area. No record of past flooding is available.

The highest known flood for Brush Creek occurred in June 1974. At that time, the discharge for Brush Creek at the upstream corporate limits of New Sewickley was estimated from high-water marks to be approximately 4,200 cubic feet per second.

Major floods have occurred in the study reach of Connoquenessing Creek at various times of the year. However, the main flood season is usually December through April. Most of the floods during this period are the result of heavy rain and snow melt. The maximum flood of record along Connoquenessing Creek occurred as a result of heavy rains in June 1924, with an estimated recurrence interval of over 100 years. Table 5, “Major Floods on Connoquenessing Creek at Hazen Road Bridge,” shows major floods of record on Connoquenessing Creek as measured at the USGS gaging station (No. 0310600) located at the Hazen Road bridge with the gage zero elevation at 852.31 feet.

Table 5 – Major Floods on Connoquenessing Creek at Hazen Road Bridge

Date of Crest	Stage (feet)	Discharge (cfs)	Approximate Recurrence Interval (years)
June 29, 1924	16.66	21,500	150
October 16, 1954	15.51	18,000	50
March 10, 1964	14.77	16,000	25
January 27, 1952	14.54	15,200	20
July 1, 1974	13.93	13,900	13
April 20, 1940	13.90	13,900	13
April 5, 1957	13.86	13,500	10
June 24, 1972	13.32	11,800	8

Flooding on Fosburg and Lacock Runs are caused primarily by high intensity storms of short duration, such as thunderstorms. Flooding may be worsened by ice and debris dams or hydraulic structures within the Borough of East Rochester.

Low-lying areas of the Borough of Freedom are subject to periodic flooding caused by minor overflow of Dutchman Run. No record of past flooding is available.

Flooding on Elkhorn Run, Logtown Run, North and South Branches Moon Run, and Shafers Run is primarily caused by high intensity storms of short duration, such as thunderstorms. The lower portion of Elkhorn Run is also flooded by backwater from the Ohio River. Flood records do not exist for these areas.

Legionville Run is affected by backwater from the Ohio River. Flooding has also been caused by the clogging of a Private Drive bridge with three reinforced concrete pipes upstream of Legionville Road.

Floods on North Fork Big Sewickley Creek are caused primarily by high intensity storms of short duration. Flood records are not available for these areas.

Flooding on North Fork Little Beaver Creek, Stockman Run, and Wallace Run is caused primarily by high intensity storms of short duration. However, no flood records are available for these streams.

The flooding season on the Ohio River is usually December through April. Most of the overflow from the Ohio River is caused by snowmelt and heavy rain. However, floods may occur at any time and their duration may be several days. According to studies of the Ohio River conducted by the USACE, Pittsburgh District, the 1936 flood is the flood of record with a recurrence interval of greater than the 0.2-percent-annual-chance flood (Reference 43). This flood occurred prior to the operation of all the upstream dams. A major flood occurred in June 1972.

During the flood of 1936, the water reached a stage of 44.4 feet on the upper gage at Dashfields Locks and Dam. The latest major flood occurred June 23, 1972, and had a gage reading of 34.4 feet also on the upper gage at Dashfields Locks and Dam. Below is a list of the highest floods of record on the Ohio River in Beaver County since 1936, as recorded at Dashfield Locks and Dam upper gage (river mile 13.3). In order of magnitude, floods of record on the Ohio River as recorded at Dashields Locks and Dam (2.2 miles upstream of the borough) are shown in Table 6, “Flood of Record at Dashield Lock and Dam Upper Gage Ohio River Mile 13.3."

Table 6 – Flood of Record at Dashield Lock and Dam Upper Gage Ohio River Mile 13.3

Date of Crest	Stage (feet)	Elevation (feet)	Discharge (cfs)
March 19, 1936	44.4	723.0	557,000
December 31, 1942	37.3	715.9	396,000
June 23, 1972	34.4	713.0	372,000
April 27, 1937	34.0	712.6	351,000
March 7, 1945	33.5	712.1	343,000
January 26, 1937	32.9	711.5	338,000
October 16, 1954	32.8	711.4	327,000
March 11, 1964	31.4	710.0	313,000
January 23, 1937	31.0	709.6	310,000
January 28, 1952	30.4	709.0	283,000
January 23, 1959	30.2	708.8	275,000

Note: Upper Gage Zero Elevation = 678.6 feet ; Flood Stage (Upper Gage) = 26.0 feet

A gage height of 32.0 feet on the lower gage at Montgomery Locks and Dam is considered to be flood stage. Numerous floods have occurred in this area since continuous gage readings have been observed. The flood waters of 1936 reached a stage of 41.5 feet on the upper gage at Montgomery Locks and Dam. Table 7, “Highest Floods at Montgomery Locks and Dam Upper Gage Ohio River Mile 31.7,” lists the highest floods of record on the Ohio River in Beaver County since 1936.

Table 7 – Highest Floods at Montgomery Locks and Dam Upper Gage Ohio River Mile 31.7

Date of Crest	Stage (feet)	Elevation (feet)	Discharge (cfs)
March 19, 1936	41.54	707.6	565,000
December 31, 1942	35.54	701.6[1]	457,000
April 27, 1937	32.74	698.8	412,000
January 26, 1937	31.84	697.9	398,000
October 17,1954	30.94	697.0[1]	383,000
March 8, 1945	30.84	696.9[1]	382,000
June 24, 1972	30.64	696.7[1]	380,000
March 10, 1964	29.34	695.4[1]	360,000
January 23, 1959	28.74	694.8[1]	351,000

[1]Includes partial or full reduction from the flood control projects.

Note: Prior to June 1979 gage zero = 666.6 feet. As of June 1979, gage zero has been changed to elevation 670.0 feet.

Table 8, "Floods of Record on the Ohio River at Sewickley, Pennsylvania," lists the 9 most significant annual flood peaks, as recorded at Sewickley, Pennsylvania (References 43 through 46).

Table 8 – Floods of Record on the Ohio River at Sewickley, Pennsylvania

Date of Flood	Gage Height (ft.)	Discharge (cfs)	Recurrence Intervals (years)
March 18, 1936	34.75	574,000	500+
December 31, 1942	27.39	400,000	115
June 24, 1972	24.42	370,000	65
April 27, 1937	23.93	334,000	29
March 7, 1945	23.61	331,000	27
October 16, 1954	22.76	318,000	19
March 10, 1964	21.20	295,000	11
January 28, 1952	20.27	282,000	8.5
April 15, 1948	19.89	277,000	7

Table 9, "Record Floods on Raccoon Creek at Moffats Mills," lists the 9 floods of record for Raccoon Creek at Moffats Mills, 5.5 miles downstream of Hopewell (References 44 and 45). Data on Raccoon Creek at Moffats Mills between 1933 and 1941 were not available.

Table 9 – Record Floods on Raccoon Creek at Moffats Mills

Date of Flood	Gage Height (ft.)	Discharge (cfs)	Recurrence Intervals (years)
August 15, 1922	9.80	10,000	67
June 29, 1924	9.40	9,120	46
January 27, 1922	7.90	8,590	37
March 5, 1963	9.00	7,490	22
May 13, 1923	8.60	7,440	21
March 30, 1928	8.50	7,240	20
March 7, 1945	8.23	6,660	14
February 24, 1975	8.50	6,500	13
August 6, 1956	8.52	6,430	12

The recurrence intervals estimated in Table 9 are the result of a graph made by the study contractor which relates known discharges versus associated recurrence intervals. The 1922 flood is the flood of record with a recurrence interval estimated to be approximately 67 years. A major flood, in 1975, corresponds to approximately a 13-year flood. Generally, the major floods will occur in the late winter-early spring season when rains melt the snow pack and produce large amounts of runoff. An occasional storm which can produce extremely large flood flows can be expected at any time of the year. An example of this occurred in August 1956 when a tropical storm produced runoff the equivalent of a 12-year flood. The elevation of the February 1975 flood, a 13-year flood, was recorded at 769.5 feet at the Raccoon Creek Water Pollution Control Plant. Upstream at the Green Garden Road bridge the recorded elevation was 772.75 feet. A 1-percent-annual-chance flood at this bridge would yield an elevation of 773.7 feet.

Flooding on Trampmill Run is caused primarily by backwater from Raccoon Creek and/or high intensity storms of short duration.

Flooding on the Tributary to Walnut Bottom Run is caused primarily by high intensity storms of short duration, such as thunderstorms, and may be intensified by hydraulic structures within the community. No record of past flooding is available.

Low-lying areas of the Township of Vanport are subject to periodic flooding from the overflow of the Ohio River and Two Mile Run. No flooding records are available for Two Mile Run.

Flooding on Walnut Bottom Run and Wallace Run is caused primarily by high intensity storms of short duration. However, no flood records are available for these streams.

2.4 Flood Protection Measures

There are 12 flood-control projects, operated by the USACE, which are effective in reducing flood levels an average of 5 to 8 feet on the Ohio River upstream of the confluence of the Beaver River (References 42, 43, and 47). Four flood-control projects on the Beaver River watershed, also operated by the USACE, are effective in further reducing flood levels an additional 1 to 2 feet on the Ohio River downstream of the confluence of the Beaver River. In addition, Sandy Creek and Pymaturing Reservoir also include flood-control projects. These are not operated by the USACE. If all 18 projects had been in operation at the time of the March 1936 flood, the flood level on the Ohio River at the upper gage of Montgomery Locks and Dam would have been reduced by 10.4 feet, the December 1942 flood by 4.1 feet, and the March 1964 flood by 2.0 feet. Table 10, “Flood Control Dams and Reservoirs Affecting Beaver County,” presents pertinent data for these projects.

Table 10 – Flood Control Dams and Reservoirs Affecting Beaver County

Dam and Reservoir	Drainage Area (sq. miles)	Date Placed in Operation	Flood Storage Capacity (1,000 acre-feet)
ALLEGHENY RIVER BASIN			
Crooked Creek Dam, Crooked Creek Lake	277	June 1940	89.4
Tionesta Dam, Tionesta Lake	478	December 1940	125.6
Mahoning Dam, Mahoning Creek Lake	340	June 1941	69.7
Loyalhanna Dam, Loyalhanna Lake	290	June 1942	93.3
East Branch Dam, East Branch Clarion River Lake	72	June 1952	38.7
Conemaugh River Dam, Conemaugh River Lake	1,351	November 1953	270.0
Kinzua Dam, Allegheny Reservoir	2,180	January 1967	940.0
Union City Dam, Union City Reservoir	222	October 1970	46.2
Woodcock Dam, Woodcock Creek Lake	46	February 1974	18.9
BEAVER RIVER BASIN			
Berlin Dam, Berlin Lake	249	July 1943	55.8
Mosquito Creek Dam, Mosquito Creek Lake	97	April 1944	33.0
Shenango River Dam, Shenango River Lake	589	February 1967	180.9
Michael J. Kirwan Dam and Reservoir	80	February 1967	33.2
Pymatuning Reservoir [1]	160 [2]	September 1933	188.0
MONONGAHELA RIVER BASIN			
Deep Creek Reservoir, Youghiogheny River	65	1925	*
Tygart Dam, Tygart Lake	1,184	February 1938	278.0
Youghiogheny River Dam, Youghiogheny River Lake	434	March 1948	151.0
Stonewall Jackson Dam, Stonewall Jackson Lake	102	January 1988	*
SANDY CREEK			
Sandy Creek Dam [1]	68	March 1971	8.2

[1] Not operated by the USACE
[2] Flood control is in conjunction with Shenango River Lake
* Data not available

There are no flood control structures in the Raccoon Creek watershed. However, two large impoundments, the J.C. Bacon Dam on Service Creek for water supply and the Raccoon Creek Park Dam on Traverse Creek for recreation, may partially control 34.8 square miles of the watershed (Reference 42).

At this time, there are no other flood protection measures existing or planned that affect flooding within Beaver County.

Flood warnings and flood crest forecasts are issued by the National Oceanic and Atmospheric Administration's National Weather Service Forecast Office in Pittsburgh, Pennsylvania.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods 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 once on the average during any 10-, 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-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent-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 1-percent-annual-chance (100-year) flood in any 50-year period is approximately 40 percent (4 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.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the communities within Beaver County.

Pre-countywide Analysis

For the Beaver River flood flow, frequency data were based on statistical analysis of stage and discharge records at the Beaver Falls gaging station. The gage, located 5.3 miles upstream from the mouth of the Beaver River and 0.04 miles upstream from the water supply dam, has been in continuous operation since 1908. From 1908 to 1935, daily gage readings were taken by the National Weather Service. Since 1935, the gage has been operated by the USGS in cooperation with the USACE. The drainage area of the Beaver River is 3,103 square miles at the gage, and 3,153 square miles at the mouth. Records are filed in the Pittsburgh District Office of the USGS. The reductions by Berlin-Milton, M.J. Kirwan and Mosquito Creek Dams at Beaver Falls were added to actual peak flows to obtain natural peak flows. The entire period of record from 1908 to 1935 was used to compute the natural flow frequency. The modified flows were obtained from an average reduction curve at Beaver Falls. The natural frequency analysis followed the standard log-Pearson Type III method (Reference 48).

Within the Borough of Ambridge, the drainage area for Big Sewickley Creek at the mouth is 30.2 square miles. A USGS gage on this stream, 5.8 miles upstream from the mouth, has a period of record from October 1967. Because of this relatively short period of record and the small drainage area at the gage compared to that at the mouth, the record was not used to determine frequency flows. Flows for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods were computed by a multiple regression formula developed by the USACE. The formula is based on factors determined from a study of frequencies of small streams in the Pittsburgh District, using drainage area, stream slope, and basin shape.

Within the Borough of Economy, Big Sewickley Creek has a gage approximately 2.3 miles upstream from the confluence with the Ohio River. However, the 15 years of data are a minimum amount of historic data for application of the log Pearson Type III analysis (Reference 49). The results obtained from this method were unreasonably high in comparison to other methods and historic floods. Therefore, Big Sewickley Creek and North Fork Big Sewickley Creek flood flows were estimated using a set of regression equations developed by the USACE, Pittsburgh District, for rural watersheds with drainage areas between 0 and 25 square miles (Reference 50). Regression analysis of data from 12 sites with 25 or more years of record in southwestern Pennsylvania was used to develop these equations. The choice of this set of regression equations for the use of flood prediction was the result of a hydrologic investigation in which various methods were used to predict flows on watersheds of various sizes and characteristics.

Within the Township of Harmony, the flows for Big Sewickley Creek were obtained by estimating a mean annual flood using a log-Pearson Type III distribution of annual peak flow data employing a regionalized skew coefficient on the gaged watershed area (Reference 48). Big Sewickley Creek has been gaged since 1961 at a point located 4.5 miles upstream from the confluence with the Ohio River. The drainage area at the gage is 15.2 square miles. The length of record is too short for the log-Pearson Type III method to give accurate peak discharges for large magnitude floods, so the mean annual flood discharge was used with coefficients from the PSU III method to determine a set of discharges for the gaged portion of the watershed (Reference 51).

Flood flows for Big Sewickley Creek Tributary 1, Big Sewickley Creek Tributary 2, North Fork Big Sewickley Creek Tributary 1, South Branch Legionville Run, and South Branch Legionville Run Tributary 1, were estimated using a standard set of peak rate of discharge curves developed by the Soil Conservation Service for small watersheds of less than 3 square miles (Reference 52). The curves relate discharge to drainage area, slope, duration and intensity of storm, and runoff. Type II storms and moderate slopes prevail in southwestern Pennsylvania. The amount of runoff and peak discharges are based on a curve number, which accounts for topography, soil and vegetation conditions, and land-use parameters. During preliminary investigations, several watersheds were examined in Beaver County, and an average curve number was computed to be 75 for the area. The peak discharges are based on this value. The 0.2-percent-annual-chance flood was predicted from a log plot of flow versus return period for the 10-, 2-, and 1- percent-annual-chance floods.

Flows for Legionville Run were developed from a comparison with a similar watershed, Green Lick Run. The Green Lick Run watershed has an area of 3.07 square miles, compared to the 2.84 square miles watershed area of Legionville Run, has gage records since 1929, and is located approximately 60 miles from Legionville Run in the same hydrologic area. The Green Lick Run watershed was used because of its comparable size and number of years of records. A log-Pearson Type III distribution of annual peak flow data employing a regionalized skew coefficient was used to estimate flows (References 48 and 53).

The urbanization of the lower portion of Big Sewickley Creek and Legionville Run watersheds was judged to play a relatively minor role in increasing the flows and no account of it was made.

The peak flows downstream of the culvert located in the industrial area on Legionville Run were reduced, from those determined by the comparison method with Green Lick Run, due to the regulating effect of the culvert. The methodology used in determining this regulation is outlined in the hydraulic analyses (Section 3.2) of this report.

The following standard equation was used to transform the flows from the Green Lick Run watershed to the flows for Legionville Run and to increase the gaged flows for Big Sewickley Creek from the 15.2 square miles area to the 30.2 square miles watershed:

$$Q_1 = Q_2 (A_1/A_2)^a$$

where Q = peak discharge
A = drainage area
a = exponent

The exponent in the above equation was determined by regional relationships of peak discharge and drainage area in the same hydrologic area. The comparison of the Raccoon Creek watershed with the Big Sewickley Creek watershed determined a value for the exponent as 0.8. The Raccoon Creek watershed, located approximately 15 miles from Big Sewickley Creek, has 178 square miles of drainage area and 49 years of gage records. Employing sound engineering judgment, the value of the exponent was determined to be 0.8 for both watershed comparisons.

Flood flows for the lower portion of Blockhouse Run from the Township of Pulaski corporate limits to the confluence of Blockhouse Run Tributary 2, were estimated using a set of regression equations developed by the USACE, Pittsburgh District, for rural watersheds with drainage areas between 0 and 25 square miles (Reference 50). Regression analysis of data from 12 sites with 25 or more years of record in southwestern Pennsylvania was used to develop these equations. The choice of this set of regression equations was the result of a hydrologic investigation in which alternative methods were used to predict flows on watersheds of various sizes and characteristics.

Flood flows for the remaining portion of Blockhouse Run and Blockhouse Run Tributaries 1 and 2, and Lacock Run were estimated using a standard set of Peak Rate of Discharge Curves developed by the NRCS for small watersheds of less than three square miles (Reference 52). These curves relate discharge to drainage area, slope, duration and intensity of storm, and runoff. Amount of runoff and peak discharges are based on a curve number (CN) which accounts for topography, soil and vegetation conditions, and land use parameters. Several watersheds were examined in Beaver County, and an average curve number on which peak discharges are based was computed to be 75 for the area. The 0.2-percent-annual-chance storm was predicted from a log plot of flow versus return period for the 10-, 2-, and 1- percent-annual-chance floods.

The upper reach of Blockhouse Run was evaluated by approximate methods. The 1-percent-annual-chance floodplain, as shown on the previously published Flood Hazard Boundary Map and Flood-Prone Area Maps (References 54 and 55), was examined to determine if a potentially serious flood hazard existed which would warrant detailed study. The existing floodplain maps were considered adequate, therefore, detailed study was not recommended for this reach of Blockhouse Run.

The drainage area of Brady Run is 25.8 square miles. There are no records on this stream. Flows for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods were computed by a multiple regression formula developed by the USACE, Pittsburgh District. This formula is based on factors determined from a study of frequencies of small streams in the Pittsburgh District, using drainage area, stream slope and basin shape.

Flood flows for Brush Creek were estimated using a set of regression equations developed by the USACE, Pittsburgh District (Reference 50). These are essentially a set of regional flood flow frequency equations for estimating peak discharges in southwestern Pennsylvania. They relate discharge to drainage area, channel slope and watershed shape, and were developed from natural flow frequencies for 2 rural watersheds with drainage areas between 25 and 90 square miles. The choice of this set of regression equations was the result of a hydrologic investigation in which alternative methods were used to predict flows on watersheds of various sizes and characteristics.

Within the Townships of Franklin and Marion, flows for the 1-percent-annual-chance flood on Connoquenessing Creek from the downstream study limit to stream mile 11.65 were obtained using the Township of North Sewickley FIS (Reference 26). Natural discharge-frequency curves on Connoquenessing Creek from stream mile 11.65 to the upstream corporate limits were developed following the standard log-Pearson Type III analysis as outlined by Bulletin 17B (Reference 56). Stage-discharge records used in the analysis were obtained at the USGS recording gage located at the Hazen Road bridge. The gage has been in operation since October 1919. From June 1915 to October 1919, it was a non-recording gage. Flood flow frequencies developed at the gaging station were modified to reflect any significant changes in the drainage area of Connoquenessing Creek.

Gage readings have been obtained at Dashields Locks and Dam, which is located 2.2 miles upstream of the Borough of Ambridge, since August 1929. Records are maintained by the USACE. Natural discharge-frequency curves on the Ohio River were developed in accordance with methods presented in a USACE document (Reference 57). Modified discharge-frequency curves on the Ohio River resulted from routing 12 representative floods for the river, as modified by an upstream reservoir system. Data were plotted opposite original flood data on a grid containing a reference flow reduction of natural flow, and a new best-fit curve was drawn. Total reductions were read from the new curve at selected natural flow frequencies and subtracted from natural flows at those frequencies to obtain new modified-flow values.

The drainage area of Dutchman Run at its mouth is 3.12 square miles. There are no records available for this stream. Flows for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods were computed by a multiple regression formula developed by the USACE, Pittsburgh District. The formula is based on factors determined from a study of frequencies of small streams in the Pittsburgh District, using drainage area, stream slope, and basin shape.

Flood flows for Elkhorn Run were estimated using a set of regression equations developed by the USACE, Pittsburgh District, for rural watersheds with drainage areas between 0 and 25 square miles (Reference 50). Regression analyses of data from 12 sites with 25 or more years of record in southwestern Pennsylvania were used to develop these equations. The choice of this set of regression equations for the use of flood prediction was the result of a hydrologic investigation in which alternative methods were used to predict flows on watersheds of various sizes and characteristics.

Within the Township of Center, flood flows for Elkhorn Run Tributary 1, Logtown Run, Logtown Run Tributary 1, North and South Branches Moon Run, Shafers Run, Shafers Run Tributary 1, Shafers Run Tributary 2, and South Branch Moon Run Tributary 1 were estimated using a standard set of peak rate of discharge curves developed by the Soil Conservation Service for small watersheds less than 3 square miles (Reference 52). These curves relate discharge to drainage area, slope, duration and intensity of storm, and runoff. Type II storms and moderate slopes prevail in southwestern Pennsylvania. A Type II storm is a twenty-four hour storm in which the greatest intensity of rainfall occurs between the eleventh and thirteenth hours. The amount of runoff and peak discharges is based on a curve number which accounts for topography, soil and vegetation conditions, and land-use parameters. During preliminary investigations, several watersheds were examined in Beaver County, and an average curve number was computed to be 75 for the area. The peak discharges are based on this value. The 0.2-percent-annual-chance flood was predicted from a log plot of flow versus return period for the 10-, 2-, and 1-percent-annual-chance floods.

Flood flows for Lacock Run were estimated using a standard set of Peak Rate of Discharge Curves developed by the Soil Conservation Service for watersheds of less than 3 square miles. These curves relate discharge to drainage area, slope, duration and intensity of storm, and runoff. Type II storms and moderate slopes prevail in southwestern Pennsylvania. The amount of runoff and peak discharges is based on a curve number which accounts for topography, soil and vegetation conditions, and land-use parameters. Several watersheds were examined in Beaver County, and an average curve number of 75 was computed for the area. The peak discharge is based on this value. The 0.2-percent-annual-chance discharge was estimated from a log plot of flow versus return period for the 10-, 2-, and 1-percent-annual-chance floods.

Flood flows for North Fork Little Beaver Creek were estimated using a set of regression equations developed by the USACE, Pittsburgh District (Reference 50). These are essentially a set of regional flood flow frequency equations for estimating peak discharges in southwestern Pennsylvania. They relate discharge to drainage area, channel slope and watershed shape, and were developed from natural flow frequencies for two rural watersheds with drainage areas between 25 and 90 square miles. The choice of this set of regression equations was the result of a hydrologic investigation in which alternative methods were used to predict flows on watersheds of various sizes and characteristics.

Gage readings have been maintained by the USACE at Montgomery Locks and Dam since June 1936 and at New Cumberland Locks and Dam since October 1959. Gage readings from September 1911 to April 1960 were also obtained at Lock and Dam 8, which was 8 miles upstream from New Cumberland Locks and Dam. That dam has since been removed. Natural discharge-frequency curves on the Ohio River were developed in accordance with methods presented in Bulletin 17A (Reference 49) and in Statistical Methods in Hydrology (Reference 57). Modified discharge-frequency curves on the Ohio River resulted from routing holdouts from 12 representative floods for the Ohio River modified by an upstream reservoir system. This includes reservoirs completed and under construction by 1976. Data were plotted opposite original flood data on a grid containing a reference (1965) flow reduction of natural flow and a new best-fit curve was drawn. Total reductions were read from the new curve at selected natural flow frequencies and subtracted from natural flows at those frequencies in order to obtain new modified-flow values.

Ohio River stream mileages as depicted in this study are "Official Stream Mileages" as agreed upon between Federal, State, and local agencies, which have jurisdiction within the community. Therefore, measurable map distances between consecutive mile points may not scale exactly.

Within the Township of Harmony, the hydrologic analysis of the Ohio River was obtained from the USACE. The flood flow frequency data were based on a statistical analysis of stage-discharge records covering a 118-year record at the gaging station in Pittsburgh. This gaging station is operated jointly by the USACE and the USGS (Reference 43).

Within the Boroughs of East Rochester and Economy and the Townships of Center and Hopewell, the Ohio River was studied in detail 1974 by the USACE, Pittsburgh District (References 43 and 58). Flood flows were estimated by a log Pearson Type III frequency analysis of stage-discharge records covering a period from 1904 to 1974 (Reference 49). These flows were adjusted to reflect the effects of upstream flood control reservoirs. These estimates were substantiated by comparison to estimates provided by the discharge-profile model for regulated streams in Pennsylvania (Reference 59).

Raccoon Creek is gaged at Moffats Mills, which is located 4.2 miles upstream from the mouth. Historical records at this site date from 1916 to 1932 and 1942 to 1975 (References 44 and 45). Flood flows on Raccoon Creek were estimated by the log-Pearson Type III frequency method based on the 50 years of data available at the site (Reference 49). A station skew of -0.452 was used in the analysis (Reference 59). In addition, the flows were adjusted, as described in Water Resources Bulletin 13 to account for the aerial difference between the gaging station and the area of study (Reference 59).

Flood flows for Stockman Run, Wallace Run, Wallace Run Tributary 2 Walnut Bottom Run, and West Clarks Run were estimated using a standard set of Peak Rate of Discharge Curves developed by the Soil Conservation Service (SCS) for small watersheds of less than three square miles (Reference 52). These curves relate discharge to drainage area, slope, duration and intensity of storm, and runoff. Amount of runoff and peak discharges are based on a curve number (CN) which accounts for topography, soil and vegetation conditions and land use parameters. During preliminary investigations several watersheds were examined in Beaver County and an average curve number was computed to be 75 for the area. Peak discharge is based on this value. The 0.2-percent-annual-chance flood was predicted from a log plot of flow versus return period for the 10-, 2-, and 1- percent-annual-chance floods.

Flood flows for the lower 0.5 mile reach of Trampmill Run were estimated using a set of regression equations developed by the USACE, Pittsburgh District, for rural watersheds with drainage areas of up to 25 square miles (Reference 50). Regression analyses of data from 12 sites with 25 or more years of record in southwestern Pennsylvania were used to develop these equations. The choice of this set of regression equations was the result of a hydrologic investigation in which alternative methods were used to predict flows on watersheds of various sizes and characteristics (References 44 and 57).

The drainage area of Two Mile Run is 6.89 square miles. Although no records exist for this stream, flows for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods were computed by a multiple regression formula developed by the USACE, Pittsburgh District. The formula is based on factors determined from a study of frequencies of small streams in the Pittsburgh District, using drainage area, stream slope, and basin shape.

Regression equations which were developed cooperatively by the Pennsylvania Department of Environmental Resources and the USGS for estimating flood flows in watersheds larger than 2 square miles were evaluated. The equations, which are based on records for 128 gaging stations, relate discharge to drainage area, channel slope, watershed shape, and precipitation in excess of evapotranspiration (Reference 58). During preliminary investigations, the equations were evaluated using historical records. Although the results agreed reasonably well, the USACE regression equations were considered more representative of actual events.

Based on historical data, a set of flood-frequency curves was developed by the USGS for various hydrologic areas and flood regions in Pennsylvania (Reference 44). Flood flows were estimated from watershed drainage area. During preliminary investigations, the curves were used to predict flows on the sample watersheds. Although the results agreed, the curves were not site specific and 1- and 0.2-percent-annual-chance floods required extrapolation of the frequency curve. Because they use specific watershed information to predict flows, the USACE regression equations were considered more representative of specific watersheds.

Countywide Analyses

For this countywide FIS, new hydrologic analyses were performed by GG3, a joint venture between Greenhorne & O'Mara, Inc. and Gannett Fleming, Inc., along Connoquenessing Creek, Logtown Run, Moon Run North Branch, Tributary to Walnut Bottom Run, and Walnut Bottom Run. The peak discharges for these flooding sources, except for Connoquenessing Creek, were computed using regression equations published in the USGS Scientific Investigations Report 2008-5102 (Reference 60).

The arithmetic equation for discharge in USGS SIR 2008-5102 is:

$$Q_T = 10^A (DA)^b (El)^c (1+0.01C)^d (1+0.01U)^e (1+0.1Sto)^f$$

Where Qt is the T-year predicted flood flow, in cubic feet per second (cfs); *A* is the intercept (estimated by Generalized Least Squares (GLS)); *DA* is the drainage area, in square miles; *El* is mean elevation, in feet; *C* is basin underlain by carbonate bedrock, in percent; *U* is urban area in the basin, in percent; *Sto* is storage in the basin, in percent; and *b*, *c*, *d*, *e*, and *f* are basin regression characteristic coefficients estimated by GLS.

The publication divides the state of Pennsylvania into four flood-flow regions and hydrologic unit code boundaries. Beaver County resides in Region 3. In Region 3, the basin characteristic coefficients of regression for urban area in the basic are not applicable, resulting in the equation being reduced to:

$$Q_T = 10^A\,(DA)^b\,(El)^c\,(1{+}0.01C)^d\,(1{+}0.1Sto)^f$$

Coefficients for intercept, drainage area, mean elevation, percent carbonate bedrock and storage in the basin can be found in the publication; determinations of the *DA*, *El*, *C* and *Sto* coefficients were calculated using ArcHydro. Elevation data derived from LiDAR was used to compute mean watershed elevation and data derived from the Bedrock Geology of Pennsylvania layer available from http://www.pasda.psu.edu to compute percentage of carbonate bedrock. The data used to calculate the *Sto* coefficient was the NHD High- Res Waterbody Polygons; extracted from high-res 1:24k at http://viewer.nationalmap.gov/viewer/nhd.html?p=nhd.

Drainage areas for Logtown Run, Moon Run North Branch, Walnut Bottom Run and the Tributary to Walnut Bottom Run were all found to be urbanized. Regression equations used to estimate urban peak discharges for ungaged sites were used from the 1984 USGS publication; *"Flood Characteristic of Urban Watersheds in the United Stations"* (Reference 61). These equations were utilized in conjunction with the aforementioned rural equations to account for increased runoff due to urbanization.

The three-parameter estimating equations for urban discharge are:

$$UQ(10) = 9.51\ Area^{0.21}\ (13\text{-}BDF)^{-0.36}\ RQ(10)^{0.79}$$
$$UQ(50) = 8.04\ Area^{0.15}\ (13\text{-}BDF)^{-0.32}\ RQ(50)^{0.81}$$
$$UQ(100) = 7.70\ Area^{0.15}\ (13\text{-}BDF)^{-0.32}\ RQ(100)^{0.82}$$
$$UQ(500) = 7.47\ Area^{0.16}\ (13\text{-}BDF)^{-0.30}\ RQ(500)^{0.82}$$

Where *UQ(n)* is the discharge in cfs for the n-year recurrence interval; *Area*, contributing drainage area, in square miles; *BDF* is a basin development factor; and *RQ(n)* is the discharge in cfs for the n-year recurrence interval of the rural discharge calculated above. *BDF* was computed by first dividing each basin into thirds. Then within each third, the drainage system is evaluated and each assigned a value according to four aspects:

- Channel improvements
- Channel linings
- Storm drains, or storm sewers
- Curb-and-gutter streets

Peak discharges for Connoquenessing Creek were determined through statistical analysis of 95 years of gage data from USGS Gage No. 03106000 (Connoquenessing Creek near Zelienople, PA) using the Statistical Software Package (HEC-SSP) (Reference 62) following Bulleting 17-B Guidelines. Peak flows at various locations along Connoquenessing Creek were computed using a drainage area relationship to the peak flow computed at the gage location.

Additionally, new hydrologic analyses were performed by GG3 for all flooding sources with base level analyses (Zone A). Peak flows were computed for the1-percent-annual-chance-flood events as required for Zone-A base study areas using USGS Scientific Investigations Report 2008-5102. The impacts of urbanization were not evaluated for base level analyses.

Peak discharge-drainage area relationships for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods for each stream studied by detailed methods are presented in Table 11, "Summary of Discharges."

Table 11 – Summary of Discharges

		PEAK DISCHARGES (cfs)			
FLOODING SOURCE AND LOCATION	**DRAINAGE AREA (sq. miles)**	**10-Percent-Annual-Chance**	**2-Percent-Annual-Chance**	**1-Percent-Annual-Chance**	**0.2-Percent-Annual-Chance**
BEAVER RIVER					
At the confluence with the Ohio River	3,153	57,000	83,000	97,000	137,000
At Patterson Dam	3,153	57,000	83,000	97,000	137,000
At gaging station in City of Beaver Falls	3,110	57,000	83,000	97,000	137,000
At the Township of North Sewickley corporate limits	3,100	57,000	83,000	97,000	137,000
BIG SEWICKLEY CREEK					
At downstream Township of Harmony corporate limits	30.2	2,150	3,150	3,600	4,700
At mouth	30.2	2,670	4,570	5,630	8,780
At downstream Borough of Economy corporate limits	29.8	2,590	4,325	5,360	8,575
At Big Sewickley Creek Road bridge	13.2	1,400	2,560	3,365	5,950
BIG SEWICKLEY CREEK TRIBUTARY 1					
At the confluence with Big Sewickley Creek	0.55	205	305	320	460

Table 11 – Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
BIG SEWICKLEY CREEK TRIBUTARY 2					
At the confluence with Big Sewickley Creek	0.59	220	325	340	520
BLOCKHOUSE RUN					
At 13th Street	7.2	1,010	1,830	2,300	3,755
At downstream Township of Daugherty corporate limits	5.6	830	1,615	2,105	3,725
At Blockhouse Run Road	3.3	640	960	1,000	1,450
BLOCKHOUSE RUN TRIBUTARY 1					
At private road at Borough of New Brighton corporate limits	0.43	180	270	280	395
At downstream Township of Pulaski corporate limits	0.44	180	270	280	395
At the confluence with Blockhouse Run	2.11	480	720	755	1,100
BRADY RUN					
At confluence with the Beaver River	25.8	3,340	5,560	6,720	10,010
BRUSH CREEK					
At the confluence with Connoquenessing Creek	55.1	2,390	3,975	4,795	7,110
At downstream Township of New Sewickley study limit	40.9	*	*	5,130	*
At State Route 68 bridge	39.4	*	*	5,040	*
Upstream of the confluence with unnamed tributary	35.4	*	*	4,850	*
Upstream of the confluence with unnamed tributary	31.7	*	*	4,660	*
At upstream Township of New Sewickley corporate limits	26.3	*	*	4,260	*

* Data Not Available

Table 11 – Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
CONNOQUENESSING CREEK					
Upstream of the confluence with Pine Run	416.3	14, 948	21,700	25,020	33.966
Upstream of the confluence with Hazen Run	356.1	13,230	19,276	22,252	30,281
At State Route 65	329.7	12,458	18,184	21,004	28,617
DUTCHMAN RUN					
At mouth	3.12	630	1,150	1,430	2,220
ELKHORN RUN					
At the confluence with the Ohio River	8.4	1,100	2,030	2,595	4,380
At 150 feet upstream of treatment plant	4.4	730	1,280	1,570	2,400
Approximately 1,400 feet upstream of the confluence of Shafers Run	0.25	165	248	259	380
ELKHORN RUN TRIBUTARY 1					
At confluence with Elkhorn Run	0.4	165	248	259	380
LACOCK RUN					
At the downstream Township of Rochester corporate limits	0.55	215	320	334	500
LEGIONVILLE RUN					
At mouth[1]	2.8	216	257	273	304
Upstream side of culvert	2.7	600	1,040	1,270	1,900
LOGTOWN RUN					
At confluence with Ohio River	6.89	1,430	2,200	2,640	3,670
Upstream of Logtown Run Tributary 2	2.57	660	1,040	1,240	1,730
1,960 feet downstream of Sheffield Road	1.51	400	640	760	1,060
1,500 feet upstream of Grant Street	0.86	240	390	460	650

[1] Discharges lowered due to regulation by culvert

Table 11 – Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
LOGTOWN RUN TRIBUTARY 1					
At the confluence with Logtown Run	0.1	60	90	95	130
NORTH BRANCH MOON RUN					
At 980 feet downstream of Shads Hollow Road	1.37	340	550	650	910
At Chapel Road	1.01	280	440	530	730
NORTH FORK BIG SEWICKLEY CREEK					
At the confluence with Big Sewickley Creek	8.35	1,120	1,915	2,340	3,600
NORTH FORK BIG SEWICKLEY CREEK TRIBUTARY 1					
At the confluence with North Fork Big Sewickley Creek	0.41	165	250	260	380
NORTH FORK LITTLE BEAVER CREEK					
At confluence of West Clarks Run	75.3	3,705	5,900	7,090	10,385
At Lawrence County boundary	63.6	3,645	5,755	6,905	10,070
OHIO RIVER					
At the downstream Borough of Glasgow corporate limits	23,487	314,000	392,000	424,000	502,000
At Montgomery Locks and Dam	22,969	314,000	392,000	424,000	502,000
At downstream limits of Borough of Midland	22,990	314,000	392,000	424,000	502,000
At River Mile 27	22,800	315,000	392,000	424,000	502,000
At the upstream confluence with the Beaver River	19,620	284,000	362,000	394,000	480,000
At Dashield Lock and Dam	19,522	284,000	362,000	394,000	480,000
At the downstream Township of Hopewell corporate limits	19,500	284,000	362,000	394,000	480,000
At River Mile 22.5	19,500	284,000	362,000	394,000	480,000
At Sewickley gaging station	19,400	284,000	362,000	394,000	480,000

Table 11 – Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
RACCOON CREEK					
At the Township of Raccoon corporate limits	167	6,795	8,950	9,765	11,475
At the downstream Township of Hopewell corporate limits	150	6,793	8,949	9,765	11,475
SHAFERS RUN					
At the confluence with Elkhorn Run	1.5	390	585	610	900
SHAFERS RUN TRIBUTARY 1					
At the confluence with Shafers Run	0.16	90	135	140	205
SHAFERS RUN TRIBUTARY 2					
At the confluence with Shafers Run	0.17	95	140	150	215
SOUTH BRANCH LEGIONVILLE RUN					
At the downstream Borough of Economy corporate limits	1.08	310	460	480	680
At the crossing of Hillsdale Avenue	0.35	150	225	235	315
SOUTH BRANCH LEGIONVILLE RUN TRIBUTARY 1					
At the confluence with South Branch Legionville Run	0.57	210	315	330	450
SOUTH BRANCH MOON RUN					
At the confluence with Shads Hollow	1.3	330	530	550	930
SOUTH BRANCH MOON RUN TRIBUTARY 1					
At the confluence with South Branch Moon Run	0.17	95	140	150	215

Table 11 – Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
STOCKMAN RUN					
At the confluence with the Beaver River	2.5	540	810	845	1,200
700 feet upstream of Careywood Road	1.8	450	675	705	925
TRAMPMILL RUN					
At confluence with Raccoon Creek	4.2	660	1,180	1,450	2,240
TRIBUTARY TO WALNUT BOTTOM RUN					
At the confluence with Walnut Bottom Run	0.32	110	180	210	300
TWO MILE RUN					
At mouth	6.89	1,000	1,770	2,200	3,470
WALLACE RUN					
At the confluence with the Beaver River	4.6	780	1,495	1,915	3,235
At Wallace Run Road	1.1	195	295	305	430
WALLACE RUN TRIBUTARY 2					
At the confluence with Wallace Run	0.5	300	450	470	675
WALNUT BOTTOM RUN					
At the confluence with Beaver River	3.85	436	539	597	748
850 feet upstream of 15th Street	3.08	306	349	436	438
Upstream of 25th Street	2.95	640	1,000	1,190	1,670
Upstream of 31st Street	2.25	500	790	940	1,310
Above the confluence with Tributary to Walnut Bottom Run	1.40	320	510	610	860
WEST CLARKS RUN					
At the confluence with Little Beaver Creek	1.75	420	630	660	925
At McKinley Road	0.5	195	295	305	440

3.2 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. Users should be aware that flood elevations shown on the FIRM represent rounded whole foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. 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 in conjunction with the data shown on the FIRM.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross section locations are also shown on the FIRM (Exhibit 2). Unless specified otherwise, the hydraulic analyses for these studies 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.

All elevations shown on the Flood Profiles and FIRM (Exhibits 1 and 2) are referenced to the North American Vertical Datum of 1988 (NAVD).

Pre-countywide Analyses

Unless otherwise noted, cross sections for streams were field surveyed and located at close intervals above and below bridges and culverts in order to compute the significant backwater effects of these structures. All bridges and culverts in the community were field surveyed to obtain elevation data and structural geometry.

Cross sections for Beaver Creek, Big Sewickley Creek, Blockhouse Run, Blockhouse Run Tributary 1, Brush Creek, Connoquenessing Creek, Elkhorn Run, Lacock Run, Logtown Run, North and South Branches Moon Run, North Fork Little Beaver Creek, Raccoon Creek, Shafers Run, Stockman Creek, Tributary to Walnut Bottom Run, Wallace Run, Wallace Run Tributary 2, Walnut Bottom Run, and West Clarks Run were obtained from contour maps with 4-foot contour intervals and scales of 1:2,400 and 1” = 200’ were developed by aerial photogrammetry (References 63-69, 70, and 71). Cross sections were located during field inspections and were based on physical changes along the stream such as meanders, flood plain width, and roughness coefficients. Underwater features, elevations at the cross sections, and dimensions of the hydraulic structures were obtained during field inspections.

Cross sections for the Big Sewickley Creek, Brady Run, Dutchman Run, and Trampmill Run backwater analyses were field-surveyed. All bridges and culverts were surveyed to obtain elevation data and structural geometry.

Cross-sectional data for the Ohio River were taken from soundings and USACE topographic maps at scales of 1:2,400 and 1:7,200 with a contour interval of 5 feet (References 72-76). Further field checks were made where any information was questionable or when an area required specific roughness inspection and evaluation. The

Ohio River includes the Montgomery Navigation Pool the upper New Cumberland Pool. Starting water-surface elevations on the Ohio River were determined by stage-discharge relationships and by high-water marks.

Cross-sectional data for Two Mile Run was obtained by field measurement and supplemented by local maps (Reference 76).

For the Beaver River, the HEC-2 water-surface profiles computer program was used to estimate elevations of the selected floods and to compute and plot the water-surface profiles at various channel cross sections (Reference 77). The model considers the effect of various hydraulic structures such as bridges, culverts, and dams. For the Beaver River, the information was obtained from soundings and topography given on USACE maps entitled, "Lake Erie-Ohio River Canal", dated December 1964 (Reference 78).

Water-surface profiles for Big Sewickley Creek, Blockhouse Run, Blockhouse Run Tributary 2, Brady Run, Brush Creek, Connoquenessing Creek, Dutchman Run, Elkhorn Run, Legionville Run, Logtown Run, North and South Branches Moon Run, North Fork Little Beaver Creek, Raccoon Creek, Shafers Run, Stockman Creek, Trampmill Run, Tributary to Walnut Bottom Run, Two Mile Run, Wallace Run, Wallace Run Tributary 2, Walnut Bottom Run, and West Clarks Run were developed using the USACE HEC-2 step-backwater program (References 77 and 79).

Within the Townships of Center and Hopewell, the hydraulic analysis for the Ohio River was performed by the Pittsburgh District of the USACE in 1974 using the HEC-2 model (Reference 79). The HEC-2 model results were reviewed and used in this study. Base maps showing topographic features of the streambed and floodplain were obtained from the USACE and were used for flood delineations (Reference 74). Within the Borough of Economy, the hydraulic analysis for the Ohio River was performed by the USACE, Pittsburgh District, in 1974 for an FIA study using the HEC-2 model (Reference 80). Within the Boroughs of Glasgow, Midland, and Shippingport, starting water-surface elevations on the Ohio River were obtained by a continuation of profile computations that were started at Pike Island Locks and Dam.

Starting water-surface elevations for Big Sewickley Creek Tributary 1, Big Sewickley Creek Tributary 2, North Fork Big Sewickley Creek, North Fork Big Sewickley Creek Tributary 1, and South Branch Legionville Run Tributary 1 were based on backwater elevations established in the main channel.

Starting water-surface elevations for Blockhouse Run Tributary 1 were established from Blockhouse Run backwater.

Starting water-surface elevations on Brady Run were assumed to be coincidental with those of the Beaver River opposite the mouth of the run. For Brady Run the information was obtained by field measurement. Further field checks were made when any information was questionable or when a reach required specific roughness inspection and evaluation.

Starting water-surface elevations for Brush and Connoquenessing Creeks were obtained by calculating an approximate depth for each return period. This was a simple hydraulic computation relating the channel cross section to the slope of the channel. By knowing the flood flow it was possible to determine an approximate flood elevation. These elevations were used as input into the HEC-2 program and the output was analyzed by comparing the profile at the starting cross section with the upstream profile, and with the entire profile in general. If it appeared that the profile was consistent, the starting water-surface elevations were then considered valid. If, however, there appeared to be a convergence or divergence of the water-surface profiles, a new starting water-surface elevation was calculated and utilized in a revised analysis. This procedure then led to an accurate establishment of the starting water-surface elevations.

Dutchman Run starting elevations for the flood profiles were based on coincidental flooding with the Ohio River.

Starting water-surface elevations for Elkhorn Run, Logtown Run, the Ohio River, North and South Branches Moon Run, Raccoon Creek, and Shafers Run were determined by the slope/area method. Since they are small and have steep slopes, Elkhorn Run Tributary 1, Logtown Run Tributary 1, Shafers Run Tributary 1, Shafers Run Tributary 2, and South Branch Moon Run Tributary 1 starting water-surface elevations were determined using the elevations of their main streams.

The embankments above the culvert on the west, north and south and the natural topography of the stream upstream form a natural storage reservoir for Legionville Run. As the flows enter this reservoir the constrictive nature of the culvert will not allow all of the flow to pass immediately through it. Some of the flow is backed up into the reservoir and temporarily stored there. The amount of flow that the culvert will allow to pass through it is dependent upon its geometry and the elevations of the water surfaces both upstream and downstream of the culvert. Through the use of a standard engineering procedure called "flood routing," an iterative process was performed on the culvert and the reservoir. The ultimate goal of this process was to balance the discharge through the culvert that produces a certain water surface elevation on the downstream side of the culvert with the discharge through the culvert produced by a certain water-surface elevation upstream of the culvert. Since the storage capacity of the reservoir played an important role in the elevation of the flood upstream of the culvert that too was considered in the routing procedure. One of the effects of routing the floods through this culvert was that water-surface elevations on the upstream side of the culvert were calculated that were lower than the ones determined when the floods were not routed. Another effect was that the peak discharges downstream of the culvert were decreased due to the regulating characteristics of the reservoir storage.

Flood flows in the smaller watersheds (Stockman Run (Upper), Wallace Run and Wallace Run Tributary 2) are affected by various hydraulic structures such as bridges and culverts. Many structures are designed for only 2-percent-annual-chance, 4-percent-annual-chance, or smaller floods. Thus, many structures become inundated and increase water surface elevations by forming dams. These structures were considered in the hydraulic model.

Starting water-surface elevations for Trampmill Run were based on backwater elevations established from Raccoon Creek.

Roughness coefficients (Manning's "n") used in the hydraulic computations were chosen using information provided by the Bureau of Public Roads, and were based on field inspection of the channel and overbank areas (Reference 81).

Countywide Analyses

As part of this countywide FIS, new detailed hydraulic analyses were performed along Connoquenessing Creek, Logtown Run, North Branch Moon Run, Tributary to Walnut Bottom Run and Walnut Bottom Run by GG3 partner, Greenhorne & O'Mara, Inc.

The new detailed analyses along Connoquenessing Creek extended from the downstream county boundary with Lawrence County near the Borough of Ellwood City up to the upstream county boundary with Butler County in the Township of Marion. The new detailed analyses along Logtown Run extended from its confluence with the Ohio River in the City of Aliquippa up to a point approximately 0.7 miles upstream of Academy Road in the Township of Center. The new detailed analyses along North Branch Moon Run extended from just downstream of Shads Hollow Road up to a point approximately 0.3 miles upstream of Chapel Road in the Township of Center.

The new detailed analyses along Tributary to Walnut Bottom Run extended from its confluence with Walnut Bottom Run in the Borough of West Mayfield up to a point approximately 0.1 miles upstream of Patterson Avenue in the Township of White. The new detailed analyses along Walnut Bottom Run extended from its confluence with Beaver River in the City of Beaver Falls up to a point just upstream of Patterson Avenue in the Borough of West Mayfield.

The hydraulic analyses for these studies were steady flow models based on unobstructed flow. Flood elevations and floodway determination was calculated using the USACE HEC-RAS River Analysis System computer program (Reference 82). Hydraulic structures are assumed to remain unobstructed, operating properly, and do not fail.

Walnut Bottom Run passes through the City of Beaver Falls. In the area between 25th Street and 22nd Street, the left overbank of Walnut Bottom Run slopes away from the stream down towards Beaver River. Therefore, during high flow events, when the water surface elevation in the channel of Walnut Bottom Run exceeds the elevation of the left bank, flow leaves Walnut Bottom Run and flows through the city down to Beaver River. In order to account for this, lateral structures where modeled in the HEC-RAS hydraulic model for Walnut Bottom Run. PAMAP LiDAR data (Reference 83) was used as the source of information for the geometry of the lateral structures.

The starting water surface elevations (WSEL) for the streams in this countywide FIS were all calculated using the normal depth method. Connoquenessing Creek and Connoquenessing Creek Bypass were modeled in a single HEC-RAS model and the starting water surface elevations for the Bypass were based upon the computed elevations in the main creek using a Junction in HEC-RAS.

The cross sections for these new hydraulic analyses had channel surveys performed by GG3 partner Gannett Fleming, Inc. Surveyed points captured some area of the overbank on each side of the stream, the top of banks, toe of slopes, channels bottom, and stream centerline. Points were taken along the stream centerline between cross sections.

Studied structures had cross sections surveyed up and downstream of the structure and detailed measurements taken of the structure dimensions. Surveyed points were taken at guard rails, edges of bridges, inverts of culverts, top of crowns of culverts, and other necessary aspects of the structures for proper modeling. Extended overbank topography was developed from PAMAP LiDAR.

The HEC-RAS models for all streams were not calibrated to historic events because high-water elevation information was not available.

A streamline was derived using PAMAP orthoimagery. This serves as a base line to define distances along the stream channel as indicated on the Flood Profile and the Floodway Data tables. Selected cross sections used in the hydraulic analysis are located on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2) relative to distances along this base line.

Manning's values used for the analysis were estimated based on field observations and supplemented by aerial photography and 2006 National Land Use Dataset (Reference 84) in extended overbank areas of cross sections. Overbank manning's values range from paved area with "n" equaling 0.016 to dense brush areas with "n" equaling 0.16. Typical channel manning's "n" values range from 0.03 to 0.05 with some exceptions.

For flooding sources studied with approximate methods, the 1-percent-annual-chance flood elevations were determined using USGS Regression Equations (Reference 60) and the USACE HEC-RAS computer program (Reference 82). The peak flood discharges from the regression equations were input into a HEC-RAS model that included cross sections extracted from PAMAP LiDAR data collected in 2006. Because this cross section information was not supplemented with field survey data and the models did not include bridge and culvert information, the resulting floodplain boundaries are considered approximate. Approximately 234 stream miles in the County were analyzed using this approach.

Table 12, "Manning's "n" Values", shows the channel and overbank "n" values for the streams studied by detailed methods.

Table 12 – Manning's "n" Values

Stream	Channel "n" Value	Overbank "n" Value
Beaver River	0.028 – 0.045	0.050 – 0.090
Big Sewickley Creek	0.035 – 0.080	0.045 – 0.120
Big Sewickley Creek Tributary 1	0.012 – 0.045	0.060 – 0.110
Big Sewickley Creek Tributary 2	0.040 – 0.045	0.050 – 0.160
Blockhouse Run	0.020 – 0.045	0.060 – 0.110
Blockhouse Run Tributary 1	0.040	0.090 – 0.105
Blockhouse Run Tributary 2	0.040 – 0.045	0.085 – 0.110
Brady Run	0.035 – 0.050	0.080 – 0.110
Brush Creek	0.040 – 0.047	0.080 – 0.087
Connoquenessing Creek	0.035	0.070 – 0.085
Dutchman Run	0.018 – 0.035	0.050 – 0.080

Table 12 – Manning's "n" Values (continued)

Stream	Channel "n" Value	Overbank "n" Value
Elkhorn Run	0.012 – 0.045	0.080 – 0.200
Elkhorn Run Tributary 1	0.012 – 0.045	0.080 – 0.200
Lacock Run	0.040 – 0.080	0.030 – 0.100
Legionville Run	0.050	0.090
Logtown Run	0.012 – 0.045	0.080 – 0.100
Logtown Run Tributary 1	0.012 – 0.045	0.080 – 0.100
North Branch Moon Run	0.012 – 0.045	0.045 – 0.100
North Fork Big Sewickley Creek	0.040 – 0.045	0.045 – 0.120
North Fork Big Sewickley Creek Tributary 1	0.024 – 0.035	0.050 – 0.110
North Fork Little Beaver Creek	0.035	0.070 – 0.090
Ohio River	0.026 – 0.035	0.070
Raccoon Creek	0.030 – 0.045	0.050 – 0.110
Shafers Run	0.012 – 0.040	0.080 – 0.100
Shafers Run Tributary 1	0.012 – 0.040	0.080 – 0.100
Shafers Run Tributary 2	0.012 – 0.040	0.080 – 0.100
South Branch Legionville Run	0.012 – 0.045	0.070 – 0.100
South Branch Legionville Run Tributary 1	0.045	0.050 – 0.090
South Branch Moon Run	0.012 – 0.045	0.045 – 0.100
South Branch Moon Run Tributary 1	0.012 – 0.045	0.045 – 0.100
Stockman Run	0.035 – 0.040	0.070 – 0.100
Trampmill Run	0.030 – 0.045	0.050 – 0.110
Tributary to Walnut Bottom Run	0.040	0.070
Two Mile Run	0.020 – 0.040	0.050 – 0.080
Wallace Run	0.015 – 0.045	0.015 – 0.090
Wallace Run Tributary 2	0.030 – 0.040	0.070 – 0.100
Walnut Bottom Run	0.020 – 0.040	0.070 – 0.090
West Clarks Run	0.040	0.055 – 0.100

3.3 Vertical Datum

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

Flood elevations shown in this FIS report and on the FIRM are referenced to the NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. Some of the data used in this revision were taken from the prior effective FIS reports and FIRMs and adjusted to NAVD88. The datum conversion factor from NGVD29 to NAVD88 in Beaver County is -0.44 feet. A differing adjustment factors were used in several communities and are denoted in Table 13, "Vertical Datum Conversion."

Table 13 – Vertical Datum Conversion

Quad Name	Corner	Longitude	Latitude	Conversion from NGVD29 to NAVD88
New Middletown	SE	80.500	40.875	-0.463 feet
Bessemer	SE	80.375	40.875	-0.436 feet
New Castle South	SE	80.250	40.875	-0.436 feet
Portersville	SE	80.125	40.875	-0.446 feet
East Palestine	SE	80.500	40.750	-0.407 feet
New Galilee	SE	80.375	40.750	-0.377 feet
Beaver Falls	SE	80.250	40.750	-0.413 feet
Zelienople	SE	80.125	40.750	-0.472 feet
East Liverpool North	SE	80.500	40.625	-0.423 feet
Midland	SE	80.375	40.625	-0.397 feet
Beaver	SE	80.250	40.625	-0.413 feet
Baden	SE	80.125	40.625	-0.472 feet
East Liverpool South	SE	80.500	40.500	-0.495 feet
Hookstown	SE	80.375	40.500	-0.466 feet
			AVERAGE	**-0.437 feet**

For additional information regarding conversion between the NGVD29 and NAVD88, visit the National Geodetic Survey website at http://www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

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

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

To obtain current elevation, description, and/or location information for benchmarks shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at http://www.ngs.noaa.gov.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance (100-year) flood elevations and delineations of the 1- and 0.2-percent-annual-chance (500-year) floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles and Floodway Data Table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section.

For the Beaver River (within the City of Beaver Falls), Blockhouse Run (within the Township of Daugherty), Elkhorn Run (within the Township of Center), Lacock Run (within the Township and Borough of Rochester), North Fork Big Sewickley Creek (within the Borough of Economy), South Branch Legionville Run (within the Township of Harmony), and West Clarks Run (within the Borough of Big Beaver); the floodplain boundaries between cross sections were interpolated using topographic maps compiled from aerial photographs at a scale of 1:2,400 with a contour interval of 4 feet (References 64, 65, 67, 69, and 70).

For Brady Run, within the Borough of Bridgewater, and Connoquenessing Creek, within the Township of Daugherty, cross sections' were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 20 feet (Reference 85).

For Connoquenessing Creek, Logtown Run, North Branch Moon Run, Tributary to Walnut Bottom Run, and Walnut Bottom Run; the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Floodplain boundaries were interpolated between cross sections using digital terrain models developed from PAMAP LiDAR data collected in 2006 (Reference 83).

Within the Township of Harmony, Legionville Run cross sections were interpolated using standard 7.5 Minute USGS Quadrangles enlarged to a scale of 1:6,000 with a contour interval of 20 feet, and topographic maps of the Ohio River at a scale of 1:24,000 with a contour interval of 5.0 feet (References 78 and 86).

Within the Township of Hopewell, Raccoon Creek Run cross sections were interpolated using topographic maps at a scale of 1:2,400 with a contour interval of 4 and 5 feet (Reference 74).

Flood boundaries for the shallow flooding area between Walnut Bottom Run and the Beaver River were delineated on topographic maps using elevations determined from the hydraulic analyses (Reference 65).

For the streams studied by approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 2). The boundary of the 1-percent-annual-chance floodplain was delineated using digital terrain models developed from PAMAP LiDAR data collected in 2006.

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, and AO), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 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 this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this FIS report and on the FIRM were computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations have been tabulated for selected cross sections (Table 14, "Floodway Data"). The computed floodways are shown on the FIRM. In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the WSEL of the 1-percent-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 1.

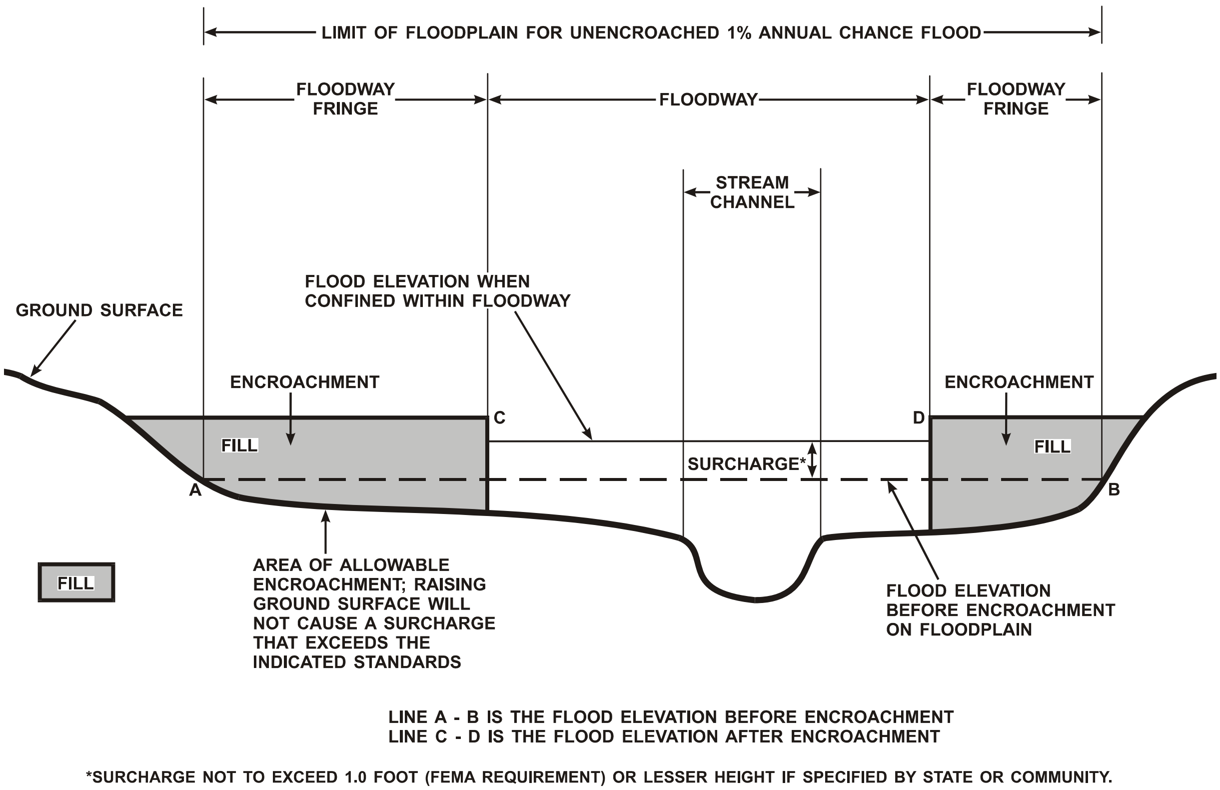

Figure 1 - Floodway Schematic

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
BEAVER RIVER								
A	1,056	560	8,784	11.0	703.2	685.3[2]	685.5	0.2
B	1,690	490	7,331	13.2	703.2	685.3[2]	685.5	0.2
C	3,127	475	7,982	12.2	703.2	688.1[2]	688.1	0.0
D	3,238	540	17,913	5.4	703.2	*	*	*
E	4,052	565	17,908	5.4	703.2	703.2	704.1	0.9
F	4,612	410	*	*	703.2	*	*	*
G	5,102	475	15,631	6.2	703.4	703.4	704.3	0.9
H	5,302	410	*	*	703.4	*	*	*
I	5,777	455	*	*	703.7	*	*	*
J	6,217	619	18,707	5.2	703.8	703.8	704.7	0.9
K	7,107	619	17,580	5.5	703.9	703.9	704.8	0.9
L	8,312	467	14,486	6.7	704.1	704.1	704.9	0.8
M	9,622	539	15,585	6.2	704.5	704.5	705.3	0.8
N	10,862	468	13,607	7.1	704.7	704.7	705.6	0.9
O	12,093	447	13,489	7.2	705.1	705.1	706.0	0.9
P	12,272	447	13,499	7.2	705.1	705.1	706.0	0.9
Q	13,817	450	13,081	7.4	705.7	705.7	706.5	0.8
R	14,902	436	12,804	7.2	706.3	706.3	707.2	0.9
S	14,910	431	15,941	5.0	713.6	713.6	714.5	0.9
T	17,210	485	9,665	8.3	715.6	715.6	716.3	0.7

[1] Feet above confluence with Ohio River

* Data Not Available

[2] Computed without consideration of backwater effects from the Ohio River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

BEAVER RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
BEAVER RIVER (Continued)								
U	17,960	515	10,446	8.0	716.9	716.9	717.8	0.9
V	18,610	622	13,447	6.3	718.2	718.2	719.0	0.8
W	19,635	773	13,793	7.0	718.8	718.8	719.5	0.7
X	19,943	735	16,882	5.7	733.1	733.1	734.0	0.9
Y	20,177	740	15,338	6.3	733.1	*	*	*
Z	21,053	567	13,569	7.1	733.2	733.2	734.1	0.9
AA	24,448	541	13,370	7.3	733.7	733.7	734.5	0.8
AB	25,448	497	13,134	7.4	734.1	734.1	734.9	0.8
AC	26,298	428	9,561	10.1	734.1	734.1	734.9	0.8
AD	27,468	424	9,939	9.8	735.4	735.4	736.1	0.7
AE	28,548	475	10,015	9.7	736.4	736.4	737.1	0.7
AF	29,278	489	10,680	9.1	737.3	737.3	737.9	0.6
AG	29,716	485	16,059	6.0	752.1	752.1	752.7	0.6
AH	30,006	484	16,013	6.1	752.2	752.2	752.8	0.6
AI	31,086	491	15,897	6.1	752.4	752.4	753.0	0.6
AJ	31,213	545	18,411	5.3	752.5	752.5	753.1	0.6
AK	32,413	674	19,390	5.0	753.0	753.0	753.6	0.6
AL	33,528	656	18,928	5.1	753.2	753.2	753.9	0.7
AM	34,668	643	16,258	6.0	753.2	753.2	753.8	0.6
AN	36,888	486	14,501	6.7	753.8	753.8	754.5	0.7

[1] Feet above confluence with Ohio River

* Data Not Available

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

BEAVER RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
BEAVER RIVER (Continued)								
AO	37,898	604	18,094	5.4	754.3	754.3	755.0	0.7
AP	40,008	509	14,767	6.6	754.6	754.6	755.4	0.8
AQ	42,213	437	14,885	6.5	755.1	755.1	755.9	0.8
AR	43,213	481	17,005	5.7	755.4	755.4	756.2	0.8
AS	43,963	542	18,075	5.4	755.6	755.6	756.4	0.8
AT	45,263	589	18,143	5.3	755.8	755.8	756.6	0.8
AU	46,388	677	21,670	4.5	756.1	756.1	757.0	0.9
AV	48,593	511	17,876	5.4	756.3	756.3	757.2	0.9
AW	49,533	557	18,434	5.3	756.4	756.4	757.3	0.9
AX	50,513	675	21,495	4.5	756.7	756.7	757.7	1.0
AY	52,613	761	23,295	4.2	756.9	756.9	757.9	1.0
AZ	53,723	650	20,528	4.7	757.0	757.0	758.0	1.0
BA	56,738	545	17,921	5.4	757.5	757.5	758.5	1.0
BB	57,938	506	16,398	5.9	757.7	757.7	758.6	0.9
BC	58,978	624	19,420	5.0	758.0	758.0	758.9	0.9
BD	60,778	650	20,731	4.7	758.3	758.3	759.2	0.9
BE	61,404	660	22,129	4.4	758.4	758.4	759.3	0.9
BF	62,749	532	17,321	5.6	758.5	758.5	759.4	0.9
BG	64,752	498	15,370	6.3	758.9	758.9	759.8	0.9
BH	65,802	521	15,278	6.3	759.2	759.2	760.2	1.0

[1] Feet above confluence with Ohio River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

BEAVER RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[3] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
BIG SEWICKLEY CREEK								
A	2,217	170/109	974	5.8	713.0	702.1[2]	702.3	0.2
B	2,692	125/69	1,026	5.5	713.0	702.7[2]	702.8	0.1
C	3,696	100/53	803	7.0	715.0	707.8[2]	707.8	0.0
D	4,329	100/47	876	6.4	715.3	708.7[2]	708.7	0.0
E	5,736	102/34	459	7.8	715.3	708.3[2]	708.7	0.4
F	6,236	65/64	409	8.8	715.3	710.7[2]	710.7	0.0
G	7,026	59/40	393	9.2	715.3	714.0[2]	714.4	0.4
H	7,716	83/19	530	6.8	716.9	716.9	717.9	1.0
I	8,554	73/0	500	7.2	720.0	720.0	720.5	0.5
J	9,077	86/68	474	7.6	721.9	721.9	722.5	0.6
K	9,607	79/40	444	8.1	724.8	724.8	725.1	0.3
L	9,681	360/67	1,997	2.7	726.3	726.3	726.3	0.0
M	9,981	160/75	557	9.6	728.5	728.5	728.6	0.1
N	10,206	57/26	412	13.0	730.5	730.5	730.6	0.1
O	10,218	57/28	449	11.9	731.2	731.2	731.6	0.0
P	10,428	57/20	464	11.6	733.2	733.2	733.2	0.0
Q	11,103	293/33	1,292	4.1	736.3	736.3	737.1	0.8
R	11,713	131/18	515	10.4	740.2	740.2	740.2	0.0
S	11,873	55/5	376	14.3	740.9	740.9	741.1	0.2
T	11,898	55/7	380	14.1	740.9	740.9	741.1	0.2

[1] Feet above confluence with Ohio River

[3] Width/width within county limits

[2] Elevations computed without consideration of coincident flooding effects with Ohio River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

BIG SEWICKLEY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
BIG SEWICKLEY CREEK (Continued)								
U	12,768	93/41	928	5.8	747.6	747.6	747.6	0.0
V	15,438	146/99	611	8.8	754.7	754.7	755.0	0.3
W	15,538	94/38	502	10.7	755.3	755.3	755.9	0.6
X	15,593	94/18	500	10.7	755.9	755.9	755.9	0.0
Y	15,793	98/5	669	8.0	758.0	758.0	758.0	0.0
Z	18,248	44/0	339	15.8	769.3	769.3	769.3	0.0
AA	18,258	44/0	345	15.5	769.5	769.5	769.5	0.0
AB	18,318	98/0	1,045	5.1	773.4	773.4	773.4	0.0
AC	19,718	198/50	954	5.6	774.4	774.4	775.4	1.0
AD	20,918	128/39	807	6.6	779.7	779.7	779.9	0.2
AE	21,038	199/42	702	7.6	781.0	781.0	781.3	0.3
AF	21,051	225/42	832	6.4	781.2	781.2	781.5	0.3
AG	21,331	120/91	1,171	4.6	783.3	783.3	782.8	0.2
AH	21,571	243/240	1,587	3.4	783.4	783.4	783.9	0.5
AI	21,582	658/291	3,007	1.8	783.4	783.4	783.9	0.5
AJ	21,612	274/270	1,032	5.2	783.4	783.4	783.9	0.5
AK	21,667	226/225	952	5.6	783.4	783.4	783.9	0.5
AL	21,684	318/237	1,318	4.1	783.4	783.4	783.9	0.5
AM	23,399	86/5	534	10.0	788.7	788.7	788.7	0.0

[1] Feet above confluence with Ohio River

[2] Width/width within county limits

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

BIG SEWICKLEY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
BIG SEWICKLEY CREEK (Continued)								
AN	23,449	86/63[2]	466	11.5	788.7	788.7	788.7	0.0
AO	24,249	326/65[2]	1,649	2.0	792.7	792.7	793.2	0.5
AP	25,049	397/75[2]	1,519	2.2	793.6	793.6	794.2	0.6
AQ	26,049	193/114[2]	588	5.7	797.3	797.3	797.4	0.1
AR	27,149	118/89[2]	578	5.8	803.3	803.3	803.8	0.5
AS	28,309	201/115[2]	695	4.8	807.9	807.9	808.3	0.4
AT	29,309	284/232[2]	957	3.5	812.4	812.4	813.0	0.6
AU	30,449	124/90[2]	518	6.5	818.2	818.2	818.4	0.2
AV	30,499	134/92[2]	445	7.6	820.7	820.7	820.7	0.0
AW	30,510	276/131[2]	633	5.3	820.8	820.8	820.8	0.0
AX	30,810	132/79[2]	504	6.7	822.2	822.2	822.2	0.0
AY	31,610	134/61[2]	724	4.6	824.7	824.7	825.4	0.7
AZ	32,110	37	234	14.4	827.9	827.9	827.9	0.0
BA	32,126	37	235	14.3	827.9	827.9	827.9	0.0
BB	32,355	54/36[2]	495	6.8	831.6	831.6	831.6	0.0
BC	32,636	153/47[2]	720	4.7	831.7	831.7	832.6	0.9
BD	34,136	113/34[2]	409	8.2	838.6	838.6	838.6	0.0
BE	35,136	221/185[2]	997	3.4	845.8	845.8	846.5	0.7
BF	36,336	131/77[2]	477	7.1	852.3	852.3	852.4	0.1

[1] Feet above confluence with Ohio River

[2] Width/width within county limits

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

BIG SEWICKLEY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
BIG SEWICKLEY CREEK TRIBUTARY 1								
A	80	15	83	3.9	740.5	740.5	741.3	0.8
B	147	45	132	2.4	742.0	742.0	742.8	0.8
C	227	18	40	8.0	748.2	748.2	748.8	0.6
D	507	19	39	8.2	754.0	754.0	754.0	0.0
E	547	7	28	11.4	755.0	755.0	755.1	0.1
F	558	7	29	11.1	755.5	755.5	755.6	0.1
G	608	8	29	10.9	758.0	758.0	758.1	0.1
H	619	8	30	10.6	758.1	758.1	758.2	0.1
I	819	25	43	7.5	765.0	765.0	765.0	0.0
J	1,039	7	33	9.8	776.5	776.5	776.5	0.0
K	1,054	11	41	7.7	776.7	776.7	776.7	0.0
L	1,204	8	33	9.7	779.5	779.5	779.5	0.0
M	2,104	27	44	7.3	827.9	827.9	827.9	0.0
N	3,404	27	44	7.3	921.8	921.8	921.8	0.0

[1] Feet above confluence with Big Sewickley Creek

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

BIG SEWICKLEY CREEK TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
BIG SEWICKLEY CREEK TRIBUTARY 2								
A	135[1]	12	35	9.7	806.0	806.0	806.0	0.0
B	150[1]	12	40	8.5	806.4	806.4	806.4	0.0
C	420[1]	25	44	7.7	813.4	813.4	813.4	0.0
D	970[1]	19	62	5.5	828.9	828.9	829.4	0.5
E	1,620[1]	17	39	8.7	852.1	852.1	852.1	0.0
BLOCKHOUSE RUN								
A	220[2]	28	514	4.5	704.4	704.4	705.0	0.6
B	420[2]	199	3,141	0.7	704.8	704.8	705.4	0.6
C	928[2]	39	416	5.5	704.9	704.9	705.5	0.6
D	1,453[2]	40	230	10.0	705.5	705.5	706.4	0.9
E	1,588[2]	40	255	9.0	707.1	707.1	708.0	0.9
F	1,738[2]	55	265	8.7	710.3	710.3	710.3	0.0
G	1,818[2]	34	176	13.1	710.9	710.9	710.9	0.0
H	1,891[2]	28	165	13.9	715.2	715.2	715.2	0.0
I	2,055[2]	39	305	7.6	718.5	718.5	718.5	0.0
J	2,805[2]	45	247	9.3	727.1	727.1	727.1	0.0
K	3,545[2]	91	504	4.6	736.2	736.2	736.8	0.6
L	4,345[2]	48	465	8.7	743.6	743.6	744.0	0.4

[1] Feet above confluence with Big Sewickley Creek

[2] Feet above confluence with Beaver River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

BIG SEWICKLEY CREEK TRIBUTARY 2 AND BLOCKHOUSE RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
BLOCKHOUSE RUN (Continued)								
M	4,685[1]	129	410	5.6	749.0	749.0	749.5	0.5
N	4,975[1]	42	226	10.2	750.3	750.3	751.0	0.7
O	5,205[1]	32	223	10.3	755.3	755.3	755.3	0.0
P	2,100[2]	43	265	7.9	809.2	809.2	809.2	0.0
Q	2,372[2]	50	258	8.2	812.0	812.0	812.2	0.2
R	2,472[2]	140	732	2.9	813.8	813.8	814.2	0.4
S	3,222[2]	60	222	9.5	822.6	822.6	822.6	0.0
T	3,888[2]	82	252	8.3	830.6	830.6	830.6	0.0
U	4,100[2]	35	249	8.4	833.4	833.4	833.4	0.0
V	4,157[2]	59	338	6.2	833.8	833.8	833.8	0.0
W	4,388[2]	18	126	7.9	834.5	834.5	835.4	0.9
X	4,953[2]	31	104	9.6	841.4	841.4	841.8	0.4
Y	5,084[2]	48	260	3.8	849.8	849.8	849.8	0.0
Z	5,334[2]	13	74	13.6	850.0	850.0	850.1	0.1
AA	5,546[2]	13	81	12.3	852.5	852.5	852.5	0.0
AB	6,111[2]	60	200	5.0	860.0	860.0	860.4	0.4
AC	7,611[2]	33	130	7.7	879.3	879.3	879.3	0.0
AD	8,561[2]	105	290	3.5	893.4	893.4	893.9	0.5
AE	10,191[2]	76	210	4.8	917.9	917.9	918.4	0.5

[1] Feet above confluence with Beaver River

[2] Feet above Valley Avenue

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

BLOCKHOUSE RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
BLOCKHOUSE RUN TRIBUTARY 1								
A	50	6	32	8.8	720.1	720.1	721.0	0.9
B	109	6	27	10.7	721.3	721.3	722.0	0.7
C	259	7	30	9.5	734.0	734.0	734.4	0.4
D	309	4	23	12.5	738.7	738.7	738.7	0.0
E	375	9	36	7.9	740.7	740.7	740.7	0.0
F	650	8	27	10.5	754.2	754.2	754.4	0.2
G	975	8	27	10.5	775.2	775.2	775.4	0.2
H	1,875	6	27	10.4	834.5	834.5	835.3	0.8
I	2,650	5	23	12.3	893.4	893.4	893.4	0.0
J	2,731	5	33	8.8	898.1	898.1	898.1	0.0
K	3,152	7	26	11.0	912.3	912.3	913.0	0.7
BLOCKHOUSE RUN TRIBUTARY 2								
A	450	44	120	6.3	840.3	840.3	840.3	0.0
B	625	16	75	10.1	842.5	842.5	843.1	0.6
C	680	18	83	9.1	844.3	844.3	844.3	0.0
D	754	13	69	11.0	844.6	844.6	845.2	0.6
E	884	23	147	5.2	847.2	847.2	847.6	0.4
F	2,264	35	102	7.4	873.8	873.8	874.2	0.4

[1] Feet above confluence with Blockhouse Run

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

BLOCKHOUSE RUN TRIBUTARY 1 AND BLOCKHOUSE RUN TRIBUTARY 2

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
BLOCKHOUSE RUN TRIBUTARY 2 (Continued)								
G	3,289[1]	27	113	6.7	888.9	888.9	889.3	0.4
H	3,344[1]	27	95	8.0	888.9	888.9	889.5	0.6
I	3,464[1]	14	64	11.9	890.9	890.9	891.6	0.7
J	4,482[1]	35	254	3.0	915.9	915.9	915.9	0.0
K	4,737[1]	20	85	8.9	916.6	916.6	916.9	0.3
L	5,757[1]	16	75	10.0	938.6	938.6	939.1	0.5
M	6,907[1]	14	71	10.6	969.7	969.7	969.8	0.1
N	7,167[1]	16	70	10.8	977.8	977.8	978.1	0.3
O	7,218[1]	16	73	10.4	980.7	980.7	981.0	0.3
P	7,898[1]	27	100	7.6	1,030.3	1,030.3	1,038.4	0.1
BRADY RUN								
A	150[2]	42	594	10.8	704.1	704.1	704.2	0.9
B	285[2]	42	594	10.8	704.1	704.1	704.8	0.9
C	355[2]	70	1,612	4.2	705.7	705.7	706.4	0.7
D	435[2]	70	2,292	2.9	705.9	705.9	706.4	0.5
E	504[2]	70	2,292	2.9	706.1	706.1	706.4	0.3
F	754[2]	65	1,371	4.9	706.1	706.1	706.4	0.3

[1] Feet above confluence with Blockhouse Run

[2] Feet above confluence with Beaver River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

BLOCKHOUSE RUN TRIBUTARY 2 AND BRADY RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
BRADY RUN (Continued)								
G	2,054[1]	150	1,848	3.6	706.4	706.4	707.2	0.8
H	3,054[1]	279	2,630	2.6	707.0	707.0	708.0	1.0
I	3,774[1]	206	1,542	4.4	707.8	707.8	708.8	1.0
J	4,154[1]	67	499	13.5	708.8	708.8	709.6	0.8
K	4,247[1]	107	693	9.7	712.8	712.8	712.8	0.0
L	4,627[1]	85	587	11.4	714.6	714.6	714.6	0.0
M	4,947[1]	75	982	6.8	719.3	719.3	719.5	0.2
N	5,370[1]	95	709	9.5	720.1	720.1	720.2	0.1
O	6,290[1]	68	601	11.2	727.5	727.5	727.5	0.0
P	7,110[1]	81	808	8.3	732.2	732.2	733.2	1.0
BRUSH CREEK								
A	880[2]	529	3,218	1.5	867.7	866.1[3]	867.0	0.9
B	1,859[2]	82	592	8.3	867.7	866.6[3]	867.3	0.7
C	2,809[2]	72	611	8.1	870.7	870.7	871.7	1.0
D	3,959[2]	83	706	7.0	874.5	874.5	875.5	1.0
E	5,239[2]	117	711	6.9	878.3	878.3	879.0	0.7
F	6,374[2]	220	1,454	3.4	880.6	880.6	881.6	1.0
G	6,974[2]	223	1,473	3.3	881.2	881.2	882.2	1.0
H-T*								

[1] Feet above confluence with Beaver River

[2] Feet above confluence with Connoquenessing Creek

[3] Computed without consideration of backwater effects from Connoquenessing Creek

* No floodways were computed

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

BRADY RUN AND BRUSH CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
CONNOQUENESSING CREEK								
A	41,396	146	1,811	14.6	841.4	841.4	841.4	0.0
B	42,286	146	2,237	11.2	846.6	846.6	846.9	0.3
C	42,976	185	2,527	10.4	848.8	848.8	849.3	0.5
D	44,276	180	2,624	10.1	853.5	853.5	853.8	0.3
E	44,902	190	2,852	9.8	855.2	855.2	855.6	0.4
F	46,336	243	3,882	7.3	857.7	857.7	858.0	0.3
G	48,532	308	4,406	7.1	859.6	859.6	859.8	0.2
H	50,006	376	5,412	5.5	861.3	861.3	861.6	0.3
I	51,588	730	8,401	3.2	862.0	862.0	862.5	0.5
J	52,838	736	8,634	4.6	862.2	862.2	862.7	0.5
K	54,561	329	3,608	7.7	862.3	862.3	863.1	0.7
L	56,763	755	9,306	3.4	864.4	864.4	865.0	0.6
M	58,647	748	8,519	5.3	864.5	864.5	865.1	0.6
N	60,272	856	8,238	5.1	865.1	865.1	865.6	0.6
O	61,910	671	7,313	5.3	865.4	865.4	866.0	0.6
P	63,959	675	6,326	5.6	865.9	865.9	866.5	0.6
Q	65,686	750	6,833	7.6	866.3	866.3	867.2	0.9
R	66,439	940	8,414	5.3	867.0	867.0	868.0	1.0
S	67,395	664	5,488	7.7	867.1	867.1	868.0	0.9

[1] Feet above confluence with Beaver River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

CONNOQUENESSING CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
CONNOQUENESSING CREEK (Continued)								
T	67,963	479/819[2]	4,553	8.5	867.5	867.5	868.4	0.9
U	69,550	618	5,562	7.9	869.8	869.8	870.3	0.5
V	71,483	349	3,971	6.5	871.7	871.7	872.0	0.3
W	73,018	465	5,008	6.1	872.8	872.8	873.0	0.2
X	74,331	512	6,723	6.7	873.4	873.4	873.8	0.4
Y	75,525	303	3,677	7.5	874.0	874.0	874.4	0.4
Z	77,300	306	4,228	5.4	875.3	875.3	875.7	0.4
AA	79,072	713	7,131	5.5	876.0	876.0	876.5	0.5
AB	80,140	522	5,638	5.6	876.3	876.3	876.9	0.6
AC	81,477	717	7,249	4.0	877.0	877.0	877.7	0.7
AD	82,847	1,036	8,553	3.5	877.3	877.3	878.0	0.7
AE	84,524	1,010	8,335	3.8	877.6	877.6	878.3	0.7
AF	86,010	1,558	10,238	3.4	877.9	877.9	878.7	0.8
AG	88,207	1,565	7,138	5.2	878.7	878.7	879.4	0.7
AH	90,769	305	2,485	9.4	880.0	880.0	880.4	0.4
AI	92,484	235	2,533	9.6	883.1	883.1	883.2	0.1
AJ	93,558	189	2,663	8.6	884.2	884.2	884.9	0.7
AK	94,662	378	4,034	6.6	885.8	885.8	886.5	0.7
AL	96,694	352	3,784	6.8	887.0	887.0	887.9	0.9

[1] Feet above confluence with Beaver River
[2] Width for Connoquenessing Creek is 479 feet/total width including Brush Creek is 819 feet

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

CONNOQUENESSING CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
CONNOQUENESSING CREEK (Continued)								
AM	98,111[1]	257	3,176	7.8	888.3	888.3	889.1	0.8
AN	99,579[1]	125	1,966	9.1	890.4	890.4	891.2	0.8
AO	100,913[1]	98	1,849	8.8	891.8	891.8	892.5	0.7
AP	101,756[1]	200	3,411	5.7	893.2	893.2	893.8	0.6
AQ	103,290[1]	213	2,879	8.0	893.6	893.6	894.4	0.8
AR	104,746[1]	175	2,728	8.2	895.1	895.1	895.6	0.5
AS	107,148[1]	280	4,256	5.9	898.6	898.6	899.3	0.7
AT	108,620[1]	340	4,949	6.0	899.2	899.2	900.1	0.9
AU	109,450[1]	451	4,766	6.9	899.9	899.9	900.7	0.8
AV	109,634[1]	451[3]	4,467	4.9	899.9	899.9	900.7	0.8
CONNOQUENESSING CREEK BYPASS								
A	163[2]	153	2,193	4.0	890.6	890.6	891.4	0.8
B	2,107[2]	411	4,763	1.8	891.2	891.2	891.9	0.7
C	3,270[2]	440	5,405	1.6	891.4	891.4	892.0	0.6
D	4,193[2]	342	3,826	1.2	891.5	891.5	892.1	0.6
E	5,927[2]	227	2,687	1.4	891.5	891.5	892.2	0.7
F	7,509[2]	226	2,976	3.6	891.9	891.9	892.5	0.6
G	8,081[2]	213	2,644	4.4	892.0	892.0	892.6	0.6

[1] Feet above confluence with Beaver River

[2] Feet above confluence with Connoquenessing Creek

[3] Width outside county

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

CONNOQUENESSING CREEK AND CONNOQUENESSING CREEK BYPASS

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
CONNOQUENESSING CREEK BYPASS (Continued)								
H	8,882[1]	283	2,934	2.1	892.2	892.2	893.0	0.8
I	9,524[1]	248	2,477	3.4	892.5	892.5	893.2	0.7
J	10,322[1]	267	2,975	2.8	892.9	892.9	893.7	0.8
K	11,153[1]	287	3,288	2.2	893.1	893.1	894.0	0.9
L	12,197[1]	353	4,125	2.4	893.5	893.5	894.2	0.7
DUTCHMAN RUN								
A	1,214[2]	43	165	8.7	705.5	704.4[3]	704.4	0.0
B	2,746[2]	51	142	10.1	741.4	741.4	741.4	0.0
C	3,960[2]	51	147	9.7	769.3	769.3	769.3	0.0
D	4,646[2]	47	142	10.1	784.0	784.0	784.0	0.0
E	5,280[2]	59	155	9.3	805.4	805.4	805.4	0.0

[1] Feet above confluence with Connoquenessing Creek

[2] Feet above confluence with Ohio River

[3] Computed without consideration of backwater effects from the Ohio River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

DUTCHMAN RUN AND CONNOQUENESSING CREEK BYPASS

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
ELKHORN RUN								
A	750	56	489	5.3	705.3	697.6[2]	698.6	1.0
B	1,310	56	276	9.4	705.3	701.3[2]	701.8	0.5
C	1,510	36	196	13.2	705.3	705.0[2]	705.0	0.0
D	1,535	36	275	9.4	707.2	707.2[2]	707.2	0.0
E	1,770	45	279	9.3	709.5	709.5	709.5	0.0
F	2,515	87	311	8.3	719.6	719.8	719.8	0.0
G	3,125	128	662	3.9	726.8	726.8	727.4	0.6
H	3,300	24	172	15.1	728.4	728.4	728.5	0.1
I	3,313	24	283	9.2	732.6	732.6	733.4	0.8
J	3,453	43	206	12.6	736.2	736.2	736.2	0.0
K	4,243	57	269	9.7	749.5	749.5	750.2	0.7
L	8,290	64	494	3.2	841.1	841.1	842.1	1.0
M	8,790	25	124	12.7	847.1	847.1	847.3	0.2
N	10,030	55	242	6.5	860.1	860.1	860.8	0.7
O	11,135	40	220	7.1	866.3	866.3	866.6	0.3
P	12,190	32	134	11.7	874.7	874.7	874.8	0.1
Q	13,250	65	235	6.7	885.8	885.8	886.3	0.5
R	14,180	38	199	7.9	892.5	892.5	893.2	0.7
S	15,120	54	152	10.3	903.3	903.3	903.3	0.0

[1] Feet above confluence with Ohio River

[2] Computed without consideration of backwater effects from Ohio River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

ELKHORN RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
ELKHORN RUN (Continued)								
T	15,260	66	166	9.5	905.4	905.4	905.5	0.1
U	15,375	13	101	15.6	908.1	908.1	908.1	0.0
V	15,423	13	105	15.0	909.3	909.3	909.9	0.6
W	15,598	52	374	4.2	913.8	913.8	914.1	0.3
X	16,098	28	158	9.9	914.2	914.2	915.0	0.8
Y	16,718	28	153	10.3	920.6	920.6	921.3	0.7
Z	16,893	56	195	8.0	923.8	923.8	923.9	0.1
AA	16,953	74	351	4.5	926.2	926.2	926.2	0.0
AB	17,118	191	595	2.6	927.2	927.2	927.2	0.0
AC	17,833	29	160	9.8	938.5	938.5	938.5	0.0
AD	17,978	100	271	5.8	943.0	943.0	943.0	0.0
AE	18,056	100	42	3.7	944.6	944.6	944.6	0.0
AF	18,146	30	214	7.3	944.7	944.7	944.7	0.0
AG	19,006	57	230	6.8	950.9	950.9	951.5	0.6
AH	19,876	107	404	3.9	958.3	958.3	958.7	0.4
AI	20,356	20	34	7.5	973.5	973.5	973.5	0.0
AJ	20,491	26	136	1.9	974.4	974.4	974.8	0.4
AK	20,558	26	194	1.3	976.5	976.5	977.1	0.6
AL	20,708	82	34	7.6	977.2	977.2	977.2	0.0

[1] Feet above confluence with Ohio River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

ELKHORN RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
ELKHORN RUN (Continued)								
AM	21,158[1]	20	41	6.3	984.2	984.2	984.4	0.2
AN	21,268[1]	40	60	4.3	998.8	998.8	998.9	0.1
AO	21,515[1]	40	60	4.3	1,003.9	1,003.9	1,004.0	0.1
AP	21,615[1]	44	191	1.4	1,004.3	1,004.3	1,004.8	0.5
ELKHORN RUN TRIBUTARY 1								
A	370[2]	7	32	8.0	998.8	998.8	998.8	0.0
B	470[2]	2	16	16.2	1,004.4	1,004.4	1,004.4	0.0
C	510[2]	51	158	1.6	1,009.9	1,009.9	1,009.9	0.0
D	860[2]	15	31	8.3	1,015.9	1,015.9	1,015.9	0.0
E	1,745[2]	10	27	9.5	1,044.1	1,044.1	1,044.1	0.0
F	1,775[2]	11	55	4.7	1,050.2	1,050.2	1,050.2	0.0
G	1,814[2]	30	157	1.7	1,050.9	1,050.9	1,051.1	0.2
H	1,984[2]	19	45	5.8	1,053.7	1,053.7	1,053.7	0.0

[1] Feet above confluence with Ohio River

[2] Feet above confluence with Elkhorn Run

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

ELKHORN RUN AND ELKHORN RUN TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
LACOCK RUN								
A	2,670	9	51	6.6	797.3	797.3	797.3	0.8
B	2,700	9	51	6.6	797.3	797.3	797.3	0.8
C	2,735	22	96	3.5	798.2	798.2	798.2	0.6
D	3,535	22	42	7.9	824.4	824.4	824.4	0.0
E	3,615	20	41	8.1	829.2	829.2	829.2	0.0
F	3,652	22	58	5.8	829.2	829.2	829.2	0.8
G	3,702	26	45	7.5	833.0	833.0	833.0	0.1
H	4,302	12	35	9.7	853.7	853.7	853.7	0.2
I	4,392	11	51	6.6	861.2	861.2	861.2	0.1
J	4,405	14	64	5.2	861.6	861.6	861.6	0.1
K	4,445	6	31	11.0	862.4	862.4	862.4	0.9
L	4,485	6	27	12.2	865.2	865.2	865.2	0.0
M	4,545	6	43	7.9	867.7	867.7	867.7	0.0
N	4,855	20	51	6.5	878.3	878.3	878.7	1.0
O	5,575	9	32	10.6	902.8	902.8	903.6	0.9
P	5,725	8	30	11.1	909.1	909.1	909.1	0.0
Q	5,756	8	35	9.6	909.7	909.7	909.7	0.0
R	5,886	9	41	8.1	918.1	918.1	918.7	0.6
S	5,906	5	26	13.0	920.6	920.6	920.6	0.0
T	5,916	13	78	4.3	922.9	922.9	922.9	0.0

[1] Feet above Ohio River Boulevard

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

LACOCK RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
LACOCK RUN (Continued)								
U	6,076[1]	12	34	9.8	926.9	926.9	927.1	0.2
V	6,301[1]	11	43	7.8	935.7	935.7	936.3	0.6
W	6,311[1]	21	88	3.8	936.8	936.8	937.4	0.6
X	6,461[1]	11	37	9.0	938.9	938.9	939.3	0.4
Y	6,581[1]	14	41	8.1	947.9	947.9	947.9	0.0
Z	6,591[1]	16	45	7.4	948.0	948.0	948.0	0.0
AA	6,771[1]	19	40	8.3	953.4	953.4	953.4	0.0
AB	7,321[1]	19	40	8.3	986.4	986.4	986.4	0.0
AC	7,521[1]	4	24	14.0	1,002.2	1,002.2	1,002.2	0.0
AD	7,601[1]	4	49	6.8	1,019.0	1,019.0	1,019.0	0.0
AE	7,676[1]	26	101	3.3	1,019.8	1,019.8	1,019.6	0.1
LEGIONVILLE RUN								
A	803[2]	30	41	6.7	707.8	706.3[3]	706.3	0.0
B	1,302[2]	114	2,773	0.5	739.6	739.6	740.6	1.0
C	1,658[2]	126	3,331	0.4	739.6	739.6	740.6	1.0
D	2,195[2]	92	1,706	0.8	739.6	739.6	740.6	1.0
E	2,934[2]	71	967	1.4	745.0	745.0	746.0	1.0
F	3,368[2]	50	317	4.0	745.5	745.5	746.5	1.0
G	3,981[2]	34	125	10.2	754.2	754.2	754.3	0.1

[1] Feet above Ohio River Boulevard

[2] Feet above confluence with Ohio River

[3] Computed without consideration of backwater effects from Ohio River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

LACOCK RUN AND LEGIONVILLE RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
LOGTOWN RUN								
A	835	44	254	10.4	708.0	687.9[3]	687.9	0.0
B	1,537	53	601	4.4	708.0	703.4[3]	703.4	0.0
C	8,529	47	263	10.0	771.8	771.8	771.9	0.1
D	9,154	25	150	8.3	779.9	779.9	780.4	0.5
E	9,726	--[2]	84	14.8	788.3	788.3	788.3	0.0
F	10,549	149	352	3.5	803.4	803.4	803.4	0.0
G	11,184	29	157	7.9	811.4	811.4	812.2	0.8
H	11,927	58	309	2.5	821.1	821.1	821.6	0.5
I	12,689	28	156	4.9	830.9	830.9	831.2	0.3
J	13,531	40	90	8.5	845.2	845.2	845.1	0.0
K	14,065	18	69	11.2	854.3	854.3	854.3	0.0
L	14,676	28	80	9.5	871.3	871.3	871.3	0.0
M	15,437	54	166	4.6	876.2	876.2	876.7	0.5
N	16,348	43	91	8.3	888.6	888.6	888.6	0.0
O	16,944	13	62	12.5	900.7	900.7	900.7	0.0
P	17,624	30	133	5.7	909.7	909.7	910.5	0.8
Q	18,477	49	113	6.8	920.8	920.8	921.1	0.3
R	19,206	20	69	6.7	933.0	933.0	933.2	0.2
S	19,952	21	52	8.8	942.8	942.8	942.9	0.1
T	20,647	24	78	5.9	953.8	953.8	954.1	0.3

[1] Feet above confluence with Ohio River

[3] Computed without consideration of backwater effects from Ohio River

[2]1-percent-annual-chance discharge contained in culvert therefore no width exists for cross section

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

LOGTOWN RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
LOGTOWN RUN (Continued)								
U	21,505[1]	26	72	6.4	967.2	967.2	967.5	0.3
V	22,534[1]	13	44	10.4	986.5	986.5	986.4	0.0
W	23,241[1]	20	64	7.2	1,003.7	1,003.7	1,004.2	0.5
X	23,943[1]	70	546	0.8	1,026.0	1,026.0	1,027.0	1.0
Y	24,723[1]	17	52	8.8	1,040.1	1,040.1	1,040.7	0.6
Z	25,353[1]	22	57	8.1	1,057.8	1,057.8	1,058.1	0.3
AA	26,241[1]	31	69	6.7	1,083.7	1,083.7	1,083.7	0.0
AB	26,729[1]	39	82	5.6	1,101.3	1,101.3	1,101.3	0.0
LOGTOWN RUN TRIBUTARY 1								
A	250[2]	9	13	7.2	974.4	974.4	974.4	0.0
B	350[2]	1	7	13.7	987.7	987.7	987.7	0.0
C	400[2]	39	419	0.2	1,010.3	1,010.3	1,010.3	0.0
D	480[2]	88	1,181	0.1	1,010.4	1,010.4	1,010.4	0.0
E	685[2]	52	495	0.2	1,010.4	1,010.4	1,010.4	0.0
F	930[2]	11	16	5.9	1,010.4	1,010.4	1,010.4	0.0
G	980[2]	6	12	8.0	1,017.7	1,017.7	1,017.7	0.0
H	1,060[2]	49	545	0.2	1,036.1	1,036.1	1,036.1	0.0
I	1,490[2]	23	18	5.2	1,040.0	1,040.0	1,040.0	0.0

[1] Feet above confluence with Ohio River

[2] Feet above confluence with Logtown Run

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

LOGTOWN RUN AND LOGTOWN RUN TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
NORTH BRANCH MOON RUN								
A	5,386	39	137	4.7	884.1	884.1	884.5	0.4
B	6,160	17	72	9.1	899.3	899.3	899.3	0.0
C	6,566	45	92	6.0	908.7	908.7	909.3	0.6
D	7,121	23	71	7.7	920.8	920.8	921.0	0.2
E	7,929	29	79	6.9	935.6	935.6	935.7	0.1
F	8,546	16	52	10.1	944.9	944.9	944.9	0.0
G	9,177	16	51	10.3	955.2	955.2	955.2	0.0
H	9,239	16	93	5.8	959.4	959.4	959.9	0.5
I	9,358	28	70	10.1	963.3	963.3	963.3	0.0
J	9,445	22	59	10.6	965.8	965.8	965.8	0.0
K	10,172	24	78	6.8	974.5	974.5	974.7	0.2

[1] Feet above confluence with Elkhorn Run

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

NORTH BRANCH MOON RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
NORTH FORK BIG SEWICKLEY CREEK								
A	600	55	373	6.3	794.6	794.6	795.4	0.8
B	800	32	175	13.4	795.9	795.9	795.9	0.0
C	825	32	201	11.7	795.9	795.9	796.7	0.8
D	1,025	78	405	5.8	799.4	799.4	799.4	0.0
E	1,525	38	205	11.4	801.2	801.2	801.5	0.3
F	2,725	55	313	7.5	810.7	710.7	811.4	0.7
G	3,700	42	190	12.3	817.6	717.6	817.7	0.1
H	3,710	42	245	9.6	818.9	718.9	819.0	0.1
I	3,880	64	448	5.2	820.2	820.2	820.6	0.4
J	4,190	73	343	6.8	820.9	820.9	821.3	0.4
K	5,140	69	348	6.7	827.2	827.2	828.0	0.8
L	5,915	88	379	6.2	832.8	832.8	833.0	0.2
M	6,415	35	247	9.5	835.0	835.0	835.9	0.9
N	6,433	35	247	9.5	835.0	835.0	835.9	0.9
O	6,518	35	281	8.3	836.4	836.4	836.8	0.4
P	6,993	39	251	9.3	838.8	838.8	839.7	0.9
Q	8,443	43	286	8.2	848.5	848.5	849.5	1.0
R	9,643	80	330	7.1	856.3	856.3	856.5	0.2
S	9,743	21	157	14.9	859.0	859.0	859.0	0.0
T	9,752	23	165	14.1	859.3	859.3	859.3	0.0

[1] Feet above confluence with Big Sewickley Creek

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

NORTH FORK BIG SEWICKLEY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
NORTH FORK BIG SEWICKLEY (Continued)								
U	10,027	153	985	2.4	861.4	861.4	861.9	0.5
V	10,627	48	236	9.9	861.5	861.5	861.9	0.4
W	12,527	95	434	5.4	874.6	874.6	875.4	0.8
X	13,227	65	284	8.2	879.6	879.6	879.6	0.0
Y	14,827	100	483	4.8	891.0	891.0	892.0	1.0
Z	15,677	45	203	11.5	899.2	899.2	900.2	1.0
AA	17,377	190	498	4.7	915.7	915.7	916.6	0.9

[1] Feet above confluence with Big Sewickley Creek

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

NORTH FORK BIG SEWICKLEY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
NORTH FORK BIG SEWICKLEY CREEK TRIBUTARY 1								
A	200[1]	20	47	5.5	855.6	855.6	856.4	0.8
B	320[1]	7	40	6.5	862.5	862.5	862.5	0.0
C	358[1]	10	65	4.0	864.6	864.6	864.6	0.0
D	493[1]	60	86	3.0	864.7	864.7	865.0	0.3
E	1,103[1]	35	43	6.0	885.9	885.9	885.9	0.0
NORTH FORK LITTLE BEAVER CREEK								
A	4,093[2]	60	611	11.6	900.1	900.1	901.0	0.9
B	5,493[2]	160	884	8.0	907.6	907.6	908.0	0.2
C	7,093[2]	503	2,685	2.6	911.3	911.3	912.2	0.9
D	10,457[2]	435	3,097	2.3	916.3	916.3	917.0	0.7
E	11,387[2]	317	2,376	3.0	916.5	916.5	917.3	0.8
F	25,779[2]	677	5,015	1.4	940.5	940.5	941.4	0.9
G	26,229[2]	673	4,299	1.6	940.6	940.6	941.5	0.9
H	27,129[2]	901	5,030	1.4	941.0	941.0	941.9	0.9

[1] Feet above confluence with North Fork Big Sewickley Creek

[2] Feet above confluence with McCaughtry Run

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

N. FORK BIG SEWICKLEY CREEK TRIBUTARY 1 AND NORTH FORK LITTLE BEAVER CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
OHIO RIVER								
A	207,715	1,190	52,122	8.1	690.1	690.1	690.6	0.5
B	196,680	1,700	79,318	5.3	692.5	692.5	692.9	0.4
C	195,360	1,290	59,390	7.1	692.5	692.5	692.9	0.4
D	192,720	1,160	50,853	8.3	692.5	692.5	693.0	0.5
E	191,506	1,045	49,905	8.5	692.8	692.8	693.2	0.4
F	188,760	1,270	54,984	7.7	693.5	693.5	693.9	0.4
G	187,440	1,759	61,309	6.9	693.9	693.9	694.4	0.5
H	184,800	1,830	71,875	5.9	694.7	694.7	695.6	0.9
I	181,210	1,120	54,325	7.6	694.9	694.9	695.8	0.9
J	178,200	1,190	59,474	7.1	695.5	695.5	696.4	0.9
K	175,560	1,060	53,880	7.9	695.7	695.7	696.6	0.9
L	172,762	1,440	69,594	6.1	696.5	696.5	697.4	0.9
M	168,663	1,700	82,674	5.1	697.1	697.1	698.0	0.9
N	168,036	1,630	82,212	5.2	697.2	697.2	697.6	0.4
O	165,000	2,170	71,350	5.9	698.6	698.6	699.6	1.0
P	163,680	1,355	57,142	7.4	698.6	698.6	699.6	1.0
Q	161,060	1,493	67,834	6.3	699.2	699.2	700.1	0.9
R	158,600	1,370	62,969	6.7	699.4	699.4	700.3	0.9
S	156,660	1,240	54,214	7.8	699.6	699.6	700.6	1.0
T	151,800	1,460	63,577	6.7	700.3	700.3	701.2	0.9

[1] Feet below confluence of Monongahela and Allegheny Rivers

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

OHIO RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
OHIO RIVER (Continued)								
U	150,480	1,520	68,362	6.2	700.5	700.5	701.4	0.9
V	149,160	1,480	65,750	6.4	700.6	700.6	701.5	0.9
W	146,414	1,453	63,631	6.7	701.0	701.0	701.8	0.8
X	144,936	1,540	65,411	6.5	701.2	701.2	702.1	0.9
Y	142,061	1,420	59,088	7.2	701.5	701.5	702.3	0.8
Z	139,421	1,500	54,322	7.8	701.9	701.9	702.7	0.8
AA	138,101	1,340	51,444	8.2	702.1	702.1	702.9	0.8
AB	135,748	1,550	60,050	7.1	703.1	703.1	704.1	1.0
AC	133,214	1,420	58,696	6.7	703.5	703.5	704.4	0.9
AD	132,000	1,480	66,330	5.9	703.9	703.9	704.7	0.8
AE	129,360	1,440	63,966	6.2	704.1	704.1	705.0	0.9
AF	126,720	1,360	58,470	6.7	704.3	704.3	705.2	0.9
AG	125,400	1,385	57,377	6.9	704.5	704.5	705.5	1.0
AH	122,760	1,334	62,130	6.3	705.0	705.0	705.9	0.9
AI	121,440	1,390	61,057	6.5	705.1	705.1	706.0	0.9
AJ	118,800	1,500	67,869	5.8	705.5	705.5	706.1	0.6
AK	116,166	1,660	71,249	5.5	705.8	705.8	706.4	0.6
AL	113,520	1,480	68,703	5.7	705.9	705.9	706.6	0.7
AM	112,411	1,529	69,126	5.7	706.0	706.0	706.6	0.6
AN	109,137	1,420	58,028	6.8	706.3	706.3	706.8	0.5

[1] Feet below confluence of Monongahela and Allegheny Rivers

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

OHIO RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
OHIO RIVER (Continued)								
AO	107,131	1,395	55,738	7.1	706.5	706.5	707.5	1.0
AP	106,286	1,379	55,406	7.1	706.6	706.6	707.6	1.0
AQ	104,280	1,530	57,155	6.9	706.9	706.9	707.9	1.0
AR	101,482	1,183	41,009	8.0	707.2	707.2	708.2	1.0
AS	99,175	1,510	55,969	7.3	707.8	707.8	708.4	0.6
AT	97,486	1,400	55,280	7.4	708.0	708.0	708.6	0.6
AU	96,007	1,320	54,048	7.5	708.2	708.2	708.8	0.6
AV	95,990	1,304	54,485	7.2	708.2	708.2	709.1	0.9
AW	94,634	1,410	58,103	7.1	708.5	708.5	709.4	0.9
AX	92,506	1,330	53,807	7.3	708.7	708.7	709.7	1.0
AY	91,661	1,240	53,576	7.4	708.9	708.9	709.9	1.0
AZ	89,760	1,171	50,871	7.7	709.1	709.1	710.1	1.0
BA	87,226	1,300	61,804	6.4	709.8	709.8	710.6	0.8
BB	87,120	1,300	61,953	6.4	709.8	709.8	710.7	0.9
BC	85,800	1,280	56,155	7.0	709.8	709.8	710.8	1.0
BD	84,480	1,220	54,536	7.2	710.0	710.0	710.9	0.9
BE	81,916	1,360	56,471	6.9	710.4	710.4	711.3	0.9

[1] Feet below confluence of Monongahela and Allegheny Rivers

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

OHIO RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
RACCOON CREEK								
A	12,782	258	2,343	4.2	757.0	757.0	757.9	0.9
B	14,082	524	4,333	2.3	758.0	758.0	758.9	0.9
C	14,882	130	1,459	6.7	758.4	758.4	759.3	0.9
D	14,921	99	1,226	8.0	758.5	758.5	759.3	0.8
E	15,171	154	2,051	4.8	759.6	759.6	760.1	0.5
F	16,071	335	3,310	2.9	760.4	760.4	761.0	0.6
G	17,021	431	4,486	2.2	760.9	760.9	761.6	0.7
H	18,521	314	2,808	3.5	761.5	761.5	762.2	0.7
I	19,221	226	1,869	5.2	762.1	762.1	762.8	0.7
J	19,921	350	3,889	2.5	763.3	763.3	764.2	0.9
K	20,821	384	2,719	3.6	763.8	763.8	764.7	0.9
L	22,321	439	3,820	2.6	764.9	764.9	765.9	1.0
M	23,471	789	5,669	1.7	765.5	765.5	766.5	1.0
N	24,561	179	1,665	5.9	765.9	765.9	766.8	0.9
O	25,772	693	5,241	1.6	767.6	767.6	768.4	0.8
P	27,472	1,475	7,426	1.3	768.1	768.1	768.9	0.8
Q	29,972	810	4,302	2.2	769.2	769.2	770.0	0.8
R	30,772	430	2,733	3.5	769.4	769.4	770.4	1.0
S	31,751	95	989	9.8	771.1	771.1	771.8	0.7
T	32,551	230	2,325	4.2	773.3	773.3	774.1	0.8

[1] Feet above confluence with Gum Run

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

RACCOON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
RACCOON CREEK (Continued)								
U	32,873	242	1,604	6.0	773.4	773.4	774.2	0.8
V	34,073	483	3,229	3.0	774.7	774.7	775.5	0.8
W	35,173	637	5,272	1.8	775.5	775.5	776.3	0.8
X	36,573	529	2,303	4.2	776.0	776.0	776.7	0.7
Y	41,223	483	2,743	3.5	781.5	781.5	782.3	0.8
Z	42,523	970	4,812	2.0	782.6	782.6	783.5	0.9
AA	44,023	415	2,245	4.3	783.9	783.9	784.7	0.8
AB	45,073	531	2,985	3.2	785.9	785.9	786.7	0.8
AC	46,223	684	5,032	1.9	787.0	787.0	787.9	0.9
AD	47,523	361	2,583	3.7	787.6	787.6	788.4	0.8
AE	48,423	846	4,404	2.2	788.5	788.5	789.4	0.9

[1] Feet above confluence with Gum Run

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

RACCOON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
SHAFERS RUN								
A	350[1]	7	49	12.4	959.9	959.9	960.8	0.9
B	390[1]	7	45	13.5	960.0	960.0	960.8	0.8
C	850[1]	40	127	4.8	966.7	966.7	967.1	0.4
D	2,350[1]	45	98	6.2	982.4	982.4	982.6	0.2
E	3,170[1]	24	100	6.1	990.5	990.5	991.0	0.5
F	3,270[1]	24	78	7.8	995.1	995.1	995.1	0.0
G	3,367[1]	25	162	3.8	998.0	998.0	998.0	0.0
H	4,117[1]	25	66	9.3	1,000.6	1,000.6	1,000.6	0.0
I	5,247[1]	43	130	4.7	1,014.8	1,014.8	1,015.4	0.6
J	5,427[1]	34	100	6.1	1,016.7	1,016.7	1,017.0	0.3
K	5,727[1]	39	89	6.0	1,022.2	1,022.2	1,022.5	0.3
L	6,397[1]	38	132	4.6	1,030.1	1,030.1	1,030.6	0.5
SHAFERS RUN TRIBUTARY 1								
A	599[2]	21	24	6.1	1,026.4	1,026.4	1,026.4	0.0
B	1,399[2]	26	26	5.8	1,054.9	1,054.9	1,054.9	0.0
C	1,529[2]	3	12	12.5	1,063.8	1,063.8	1,063.8	0.0
D	1,590[2]	27	112	1.3	1,068.1	1,068.1	1,068.1	0.0
E	1,690[2]	30	182	0.8	1,068.1	1,068.1	1,068.1	0.0

[1] Feet above confluence with Elkhorn Run

[2] Feet above confluence with Shafers Run

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

SHAFERS RUN AND SHAFERS RUN TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
SHAFERS RUN TRIBUTARY 2								
A	250[1]	13	20	7.1	1,021.2	1,021.2	1,021.2	0.0
B	785[1]	13	20	7.1	1,037.2	1,037.2	1,037.2	0.0
SOUTH BRANCH LEGIONVILLE RUN								
A	3,331[2]	109	603	0.8	843.4	843.4	844.0	0.6
B	4,301[2]	12	69	6.9	859.1	859.1	859.1	0.0
C	4,334[2]	47	171	2.8	860.4	860.4	860.9	0.5
D	4,659[2]	21	32	7.2	864.3	864.3	864.3	0.0
E	5,009[2]	3	17	13.7	882.9	882.9	883.0	0.1
F	5,039[2]	55	21	1.1	885.8	885.8	885.8	0.0
G	5,699[2]	23	34	6.9	907.4	907.4	907.4	0.0
H	6,489[2]	10	26	9.1	937.9	937.9	938.0	0.1
I	6,609[2]	3	17	13.6	947.0	947.0	947.0	0.0
J	6,684[2]	22	148	1.6	951.6	951.6	951.6	0.0
K	6,994[2]	20	32	7.3	956.7	956.7	956.7	0.0

[1] Feet above confluence with Shafers Run

[2] Feet above confluence with Legionville Run

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

SHAFERS RUN TRIBUTARY 2 AND SOUTH BRANCH LEGIONVILLE RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
SOUTH BRANCH LEGIONVILLE RUN TRIBUTARY 1								
A	150[1]	16	38	8.8	860.5	860.5	861.4	0.9
B	600[1]	16	44	7.4	870.5	870.5	871.2	0.7
SOUTH BRANCH MOON RUN								
A	8,785[2]	12	40	10.2	1,000.5	1,000.5	1,000.5	0.0
B	8,875[2]	23	64	6.4	1,002.6	1,002.6	1,002.6	0.0
C	9,845[2]	22	48	8.5	1,015.7	1,015.7	1,015.7	0.0
D	10,945[2]	17	44	9.3	1,038.6	1,038.6	1,038.6	0.0
E	11,345[2]	17	45	9.1	1,045.7	1,045.7	1,045.7	0.0
F	11,505[2]	14	42	9.8	1,050.6	1,050.6	1,050.6	0.0
G	11,576[2]	14	48	8.5	1,053.2	1,053.2	1,053.3	0.1
H	11,766[2]	17	52	7.8	1,056.5	1,056.5	1,056.8	0.3
I	11,956[2]	9	45	9.1	1,061.4	1,061.4	1,061.4	0.0
J	12,043[2]	23	158	2.6	1,065.4	1,065.4	1,065.4	0.0
K	12,243[2]	44	136	3.0	1,065.7	1,065.7	1,065.7	0.0
L	12,493[2]	13	41	10.1	1,068.5	1,068.5	1,068.8	0.3
M	13,073[2]	15	43	9.6	1,082.3	1,082.3	1,082.3	0.0

[1] Feet above confluence with South Branch Legionville Run

[2] Feet above confluence with Moon Run

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

SOUTH BRANCH LEGIONVILLE RUN TRIBUTARY 1 AND SOUTH BRANCH MOON RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
SOUTH BRANCH MOON RUN TRIBUTARY 1								
A	360	14	21	7.0	1,052.1	1,052.1	1,052.1	0.0
B	510	14	21	7.0	1,057.1	1,057.1	1,057.1	0.0
C	660	3	13	11.4	1,061.7	1,061.7	1,061.7	0.0
D	808	3	22	6.8	1,068.4	1,068.4	1,068.4	0.0
E	898	24	81	1.8	1,069.2	1,069.2	1,069.2	0.0
F	978	13	39	3.9	1,072.7	1,072.7	1,072.7	0.0
G	1,068	34	140	1.1	1,074.7	1,074.7	1,074.7	0.0
H	1,178	20	66	2.3	1,074.9	1,074.9	1,074.9	0.0
I	1,308	20	49	3.0	1,075.1	1,075.1	1,075.1	0.0
J	2,038	19	24	6.3	1,100.4	1,100.4	1,100.4	0.0

[1] Feet above confluence with South Branch Moon Run

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

SOUTH BRANCH MOON RUN TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
STOCKMAN RUN								
A	471[1]	15	70	12.1	757.6	747.3[3]	747.9	0.6
B	1,271[1]	16	70	12.0	807.3	807.3	807.7	0.4
C	1,921[1]	91	138	6.1	843.0	843.0	843.9	0.9
D	-385[2]	114	210	3.4	940.6	940.6	941.2	0.6
E	38[2]	115	226	3.1	948.9	948.9	949.3	0.4
F	348[2]	104	195	3.6	950.1	950.1	950.3	0.2
G	1,148[2]	45	164	4.3	954.5	954.5	955.3	0.8
H	2,223[2]	28	76	9.3	968.6	968.6	968.7	0.1
I	3,423[2]	51	132	5.3	986.2	986.2	986.9	0.7
J	4,398[2]	33	79	8.9	998.0	998.0	998.0	0.0
K	4,753[2]	118	437	1.1	1,018.8	1,018.8	1,018.8	0.0
L	5,453[2]	65	98	5.0	1,022.6	1,022.6	1,023.3	0.7
M	6,528[2]	28	66	7.5	1,049.7	1,049.7	1,050.2	0.5
N	7,011[2]	50	295	1.7	1,063.7	1,063.7	1,063.7	0.0
O	7,356[2]	86	872	0.6	1,092.8	1,092.8	1,092.8	0.0
P	7,458[2]	63	308	1.6	1,093.5	1,093.5	1,093.7	0.2
Q	7,633[2]	18	51	9.6	1,093.9	1,093.9	1,094.1	0.2

[1] Feet above confluence with Beaver River

[2] Feet from Careywood Road

[3] Computed without consideration of backwater effects from Beaver River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

STOCKMAN RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
TRAMPMILL RUN								
A	790[1]	29	180	8.0	770.6	770.6	771.6	1.0
B	1,090[1]	29	161	9.0	772.7	772.7	773.4	0.7
C	1,390[1]	17	133	10.9	774.8	774.8	775.7	0.9
D	1,935[1]	120	769	1.0	783.2	783.2	783.2	0.0
E	2,040[1]	103	579	2.5	783.2	783.2	783.2	0.0
F	2,600[1]	28	128	11.4	786.0	786.0	786.6	0.6
TRIBUTARY TO WALNUT BOTTOM RUN								
A	0[2]	21	26	8.2	870.2	870.2	870.2	0.0
B	330[2]	28	84	2.5	881.2	881.2	881.7	0.5
C	808[2]	12	25	8.4	892.7	892.7	892.7	0.0
D	1,143[2]	21	30	6.9	902.6	902.6	902.6	0.0
TWO MILE RUN								
A	2,218[3]	85	185	12.0	726.2	726.2	726.3	0.1
B	5,016[3]	305	733	3.0	748.9	748.9	749.9	1.0
C	7,075[3]	58	217	10.1	760.6	760.6	760.9	0.3

[1] Feet above confluence with Raccoon Creek
[2] Feet above confluence with Walnut Bottom Run
[3] Feet above confluence with Ohio River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

TRAMPMILL RUN, TRIBUTARY TO WALNUT BOTTOM RUN AND TWO MILE RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
WALLACE RUN								
A	261	280	2,726	0.7	754.8	749.1[2]	749.8	0.7
B	911	33	154	12.4	757.2	757.2	757.2	0.0
C	1,361	17	144	13.3	784.4	784.4	784.9	0.5
D	1,863	13	124	15.4	825.7	825.7	825.7	0.0
E	1,983	46	272	7.0	829.7	829.7	829.9	0.2
F	2,698	127	126	15.2	854.2	854.2	854.2	0.0
G	2,820	18	196	9.8	857.6	857.6	858.2	0.6
H	3,240	34	147	13.0	869.5	869.5	869.5	0.0
I	4,390	40	211	9.1	896.6	896.6	896.6	0.0
J	4,740	20	172	11.1	900.0	900.0	900.4	0.4
K	5,300	20	143	13.4	909.0	909.0	909.6	0.6
L	5,476	25	284	6.7	916.6	916.6	917.1	0.5
M	5,715	23	188	10.2	918.5	918.5	919.1	0.6
N	6,435	82	322	6.0	925.3	925.3	925.7	0.4
O	7,335	28	147	13.0	937.8	937.8	937.9	0.1
P	8,335	77	236	8.1	955.4	955.4	955.6	0.2
Q	8,691	166	492	3.9	965.3	965.3	965.7	0.4
R	9,191	41	165	11.6	972.2	972.2	972.2	0.0
S	9,347	203	1,162	1.6	984.5	984.5	984.5	0.0
T	9,778	92	305	6.3	985.4	985.4	985.7	0.3

[1] Feet above confluence with Beaver River

[2] Completed without consideration of backwater effects from Beaver River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA
(ALL JURISDICTIONS)

FLOODWAY DATA

WALLACE RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
WALLACE RUN (Continued)								
U	10,078	235	2,364	0.8	987.8	987.8	988.4	0.6
V	11,028	35	158	12.1	1,002.2	1,002.2	1,002.4	0.2
W	11,448	20	51	6.0	1,010.4	1,010.4	1,011.1	0.7
X	12,370	40	106	2.9	1,035.7	1,035.7	1,035.7	0.0
Y	13,845	34	46	6.7	1,047.6	1,047.6	1,047.6	0.0
Z	14,209	50	130	2.3	1,055.3	1,055.3	1,055.3	0.0
AA	15,209	20	37	8.3	1,060.2	1,060.2	1,060.6	0.4
AB	15,815	8	34	8.9	1,072.4	1,072.4	1,072.4	0.0
AC	16,495	30	86	3.6	1,077.0	1,077.0	1,077.5	0.5
AD	17,595	18	37	8.2	1,086.7	1,086.7	1,086.7	0.0
AE	18,793	27	55	5.6	1,109.4	1,109.4	1,110.4	1.0

[1] Feet above confluence with Beaver River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

WALLACE RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
WALLACE RUN TRIBUTARY 2								
A	217	50	96	4.9	1,010.7	1,010.7	1,010.7	0.0
B	467	24	55	8.6	1,015.5	1,015.5	1,015.5	0.0
C	1,717	31	59	7.9	1,052.8	1,052.8	1,052.8	0.0
D	1,883	80	226	2.1	1,064.3	1,064.3	1,064.3	0.0
E	2,758	39	65	7.3	1,071.9	1,071.9	1,071.9	0.0
F	2,828	50	134	3.5	1,076.7	1,076.7	1,076.7	0.0
G	3,128	60	164	2.9	1,079.3	1,079.3	1,080.2	0.9
H	4,128	26	56	8.4	1,104.8	1,104.8	1,104.8	0.0

[1] Feet above confluence with Wallace Run

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

WALLACE RUN TRIBUTARY 2

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
WALNUT BOTTOM RUN								
A	3,075	28	67	8.9	750.2	750.2	750.2	0.0
B	3,828	35	183	3.3	761.2	761.2	761.6	0.4
C	4,984	25	122	3.6	768.2	768.2	768.4	0.2
D	6,139	85	277	1.6	771.8	771.8	772.7	0.9
E	7,624	40	68	3.2	779.4	779.4	779.8	0.4
F	8,688	10	34	6.4	784.5	784.5	784.6	0.1
G	9,354	35	207	3.6	791.4	791.4	791.4	0.0
H	10,443	116	308	3.9	803.4	803.4	803.4	0.0
I	11,401	47	135	8.8	811.9	811.9	811.9	0.0
J	12,470	31	225	4.2	826.7	826.7	826.7	0.0
K	13,373	27	90	10.4	837.7	837.7	837.7	0.0
L	14,705	32	193	4.6	859.5	859.5	860.5	1.0
M	15,862	20	76	8.0	874.2	874.2	874.6	0.4
N	16,566	23	65	9.3	886.8	886.8	886.8	0.0
O	17,600	21	70	11.6	902.9	902.9	902.9	0.0
P	17,984	19	61	10.1	912.1	912.1	912.1	0.0

[1] Feet above confluence with Beaver River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

WALNUT BOTTOM RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
WEST CLARKS RUN								
A	1,122	34	79	8.4	915.4	915.4	916.0	0.6
B	1,455	119	537	1.2	931.5	931.5	931.5	0.0
C	2,115	61	334	2.0	931.5	931.5	931.5	0.0
D	3,210	201	1,000	0.7	942.3	942.3	942.4	0.1
E	3,985	125	168	3.9	946.0	946.0	946.0	0.0
F	5,247	109	399	0.8	958.7	958.7	958.7	0.0
G	6,527	20	38	7.9	972.8	972.8	973.2	0.4
H	8,137	45	77	4.0	996.3	996.3	996.9	0.6
I	9,087	11	32	9.7	1,017.9	1,017.9	1,018.1	0.2
J	10,176	30	94	3.3	1,044.7	1,044.7	1,044.7	0.0
K	12,101	8	28	10.8	1,108.4	1,108.4	1,108.6	0.2

[1] Feet above confluence with North Fork Little Beaver Creek

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

FLOODWAY DATA

WEST CLARKS RUN

5.0 INSURANCE APPLICATIONS

Zone A

Zone A is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base (1-percent-annual-chance) flood elevations (BFEs) or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report by detailed methods. Whole foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to areas of 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to areas of 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone AR

Zone AR is the flood insurance risk zone that corresponds to an area of special flood hazard formerly protected from the base flood event 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-percent-annual-chance or greater flood event.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 1-percent-annual-chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No BFEs or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no BFEs are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Whole foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile (sq. mi.), and areas protected from the base flood by levees. No BFEs or depths are shown within this zone.

Zone X (Future Base Flood)

Zone X (Future Base Flood) is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined based on future-conditions hydrology. No BFEs or base flood depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance risk zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The countywide FIRM presents flooding information for the geographic area of Beaver County. Previously, FIRMs were prepared for each incorporated community of the County identified as flood-prone. No previous FIRMs were prepared for the Boroughs of Darlington, Frankfort Springs, Georgetown, Homewood, and the Township of White. This countywide FIRM also includes flood hazard information that was presented separately on Flood Boundary and Floodway Maps (FBFMs), where applicable. Historical data relating to the maps prepared for each community are presented in Table 15, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Aliquippa, City of	May 31, 1974	May 28, 1976	February 1, 1980	
Ambridge, Borough of	February 22, 1974	May 28, 1976	February 1, 1980	
Baden, Borough of	March 22, 1974	May 28, 1976	September 28, 1979	
Beaver, Borough of	March 15, 1974	June 4, 1976	September 5, 1979	
Beaver Falls, City of	February 22, 1974	February 20, 1976	May 17, 1982	
Big Beaver, Borough of	January 31, 1975	December 26, 1975	May 17, 1982	
Bridgewater, Borough of	February 22, 1974	April 9, 1976	May 1, 1980	
Brighton, Township of	January 3, 1975	None	September 1, 1986	
Center, Township of	January 17, 1975	None	June 15, 1981	
Chippewa, Township of	December 27, 1974	None	September 1, 1986	
Conway, Borough of	February 1, 1974	May 28, 1976	November 4, 1988	
Darlington, Borough of[1]	N/A	N/A	N/A	
Darlington, Township of	December 13, 1974	None	September 1, 1986	
Daugherty, Township of	December 27, 1974	None	June 1, 1982	
East Rochester, Borough of	February 1, 1974	April 16, 1976	July 16, 1981	
Eastvale, Borough of	January 31, 1975	None	April 15, 1981	
Economy, Borough of	April 5, 1974	June 4, 1976	June 15, 1981	

[1] This community did not have a FIRM prior to the first countywide FIRM for Beaver County

TABLE 15

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Fallston, Borough of	February 8, 1974	May 28, 1976	September 2, 1981	
Frankfort Springs, Borough of[1,2]	N/A	N/A	N/A	
Franklin, Township of	June 28, 1974	July 23, 1976	March 16, 1989	
Freedom, Borough of	February 1, 1974	April 30, 1976, December 10, 1976	February 1, 1980	
Georgetown, Borough of [1]	N/A	N/A	N/A	
Glasgow, Borough of	August 16, 1974	April 30, 1976	August 4, 1988	
Greene, Township of	December 13, 1974	None	September 10, 1984	
Hanover, Township of	September 6, 1974	October 1, 1976	September 1, 1986	
Harmony, Township of	March 22, 1974	None	January 3, 1979	
Homewood, Borough of [1]	January 3, 1975	None	N/A	
Hookstown, Borough of	January 31, 1975	December 12, 1980	May 1, 1986	
Hopewell, Township of	March 8, 1974	June 18, 1976	November 4, 1981	
Independence, Township of	August 30, 1974	June 18, 1976, June 24, 1977	September 1, 1986	
Industry, Borough of	February 8, 1974	May 14, 1976	September 5, 1979	
Koppel, Borough of	January 31, 1975	None	September 24, 1984	
Marion, Township of	January 10, 1975	None	March 2, 1989	

[1] This community did not have a FIRM prior to the first countywide FIRM for Beaver County
[2] No Special Flood Hazard Areas Identified

TABLE 15

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Midland, Borough of	January 31, 1975	None	October 18, 1988	
Monaca, Borough of	March 29, 1974	May 28, 1976	December 4, 1979	
New Brighton, Borough of	March 1, 1974	June 11, 1976	August 15, 1983	
New Galilee, Borough of	January 31, 1975	None	September 24, 1984	
New Sewickley, Township of	January 3, 1975	None	March 2, 1989	
North Sewickley, Township of	October 18, 1974	May 7, 1976	June 1, 1982	
Ohioville, Borough of	January 24, 1975	February 15, 1980	September 24, 1984	
Patterson Heights, Borough of	January 17, 1975	None	April 15, 1981	October 30, 1981
Patterson, Township of	December 13, 1974	None	December 1, 1987	
Potter, Township of	December 13, 1974	None	December 2, 1988	
Pulaski, Township of	December 20, 1974	None	June 1, 1982	
Raccoon, Township of	August 2, 1974	August 20, 1976	October 1, 1986	
Rochester, Borough of	February 1, 1974	May 28, 1976	February 1, 1980	
Rochester, Township of	December 27, 1974	None	June 15, 1981	
Shippingport, Borough of	February 1, 1974	May 14, 1976	August 19, 1991	
South Beaver, Township of	January 10, 1975	None	September 1, 1986	

TABLE 15

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA

(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
South Heights, Borough of	January 31, 1975	None	August 15, 1983	
Vanport, Township of	March 22, 1974	September 24, 1976	February 1, 1980	
West Mayfield, Borough of	March 28, 1975	None	April 15, 1981	
White, Township of[1]	N/A	N/A	N/A	

[1] This community did not have a FIRM prior to the first countywide FIRM for Beaver County

TABLE 15

FEDERAL EMERGENCY MANAGEMENT AGENCY

BEAVER COUNTY, PA
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

This FIS report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the NFIP.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, Federal Insurance and Mitigation Division, One Independence Mall, Sixth Floor, 615 Chestnut Street, Philadelphia, Pennsylvania 19106-4404.

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