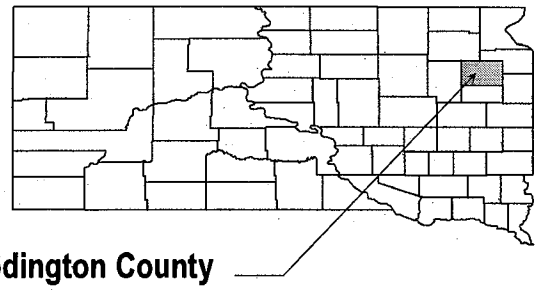
FLOOD INSURANCE STUDY

CODINGTON COUNTY, SOUTH DAKOTA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
CODINGTON COUNTY (UNINCORPORATED AREAS)	460260
FLORENCE, TOWN OF	460306
*HENRY, TOWN OF	460304
KRANZBURG, TOWN OF	460010
SOUTH SHORE, TOWN OF	460188
*WALLACE, TOWN OF	460243
WATERTOWN, CITY OF	460016

*Non-Floodprone area



EFFECTIVE:
JANUARY 16, 2009

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
46029CV000A

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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

Old Zone	New Zone
A1 through A30	AE
V1 through V30	VE
B	X
C	X

Part or all of this Flood Insurance Study may be revised and republished at any time. In addition, part of this Flood Insurance Study may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the Flood Insurance Study. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current Flood Insurance Study components.

Initial Countywide FIS Effective Date: January 16, 2009

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FLOOD INSURANCE STUDY
CODINGTON COUNTY, SOUTH DAKOTA AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of Codington County, South Dakota, including the City of Watertown and the unincorporated areas of Codington County (referred to collectively herein as Codington County) and 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 hazard data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3. 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.

No special flood hazard areas were identified in the Town of Henry or the Town of Wallace.

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.

The hydrologic and hydraulic analyses for the 1989 City of Watertown study was performed by Enviroscience, Inc., for the Federal Emergency Management Agency (FEMA) under Contract EMW-85-G-1967. The study was completed in April 1987. For the 2007 revision to the City of Watertown study, the hydrologic and hydraulic analyses were prepared by the U.S. Army Corps of Engineers (USACE) for FEMA, under Interagency Agreement No. EMW-98-IA-0176, Project Order No. 6. The study was completed in August 2005.

The hydrologic and hydraulic analyses for this revision was performed by Houston Engineering, Inc (HEI), for the South Dakota Office of Emergency Management (OEM) and the Federal Emergency Management Agency (FEMA), under Contract No. EMD-2006-GR-0674. This study was completed in January 2007.

Transportation and Public Land Survey System information was provided by the First District Association of Local Governments, Watertown, South Dakota, June 2006.

1.3 Coordination

A Pre-Scoping Report was prepared on behalf of FEMA by Michael Baker Jr., Inc. in September 2005. As part of the pre-scoping process, communities were contacted by letter with some follow up phone contacts.

The initial Consultation Coordination Officer (CCO) meeting for the county-wide DFIRM project was held on March 6, 2006, and attended by representatives of Codington County, the City of Watertown, the South Dakota Office of Emergency Management (OEM), FEMA, and Houston Engineering, Inc (HEI) to explain the nature and purpose of the county-wide DFIRM project and to identify the streams to be studied by detailed and approximate methods.

The results of this study were reviewed at the final CCO meeting held on December 12, 2007 and attended by representatives of Codington County, the City of Watertown, OEM, FEMA, and HEI. All issues raised at that meeting have been addressed in this study.

For the 2007 City of Watertown study, the initial CCO meeting was held on February 28, 2000 and attended by representatives of the City of Watertown, FEMA, and the U.S. Army Corps of Engineers (USACE). A second CCO meeting was held on August 6, 2001, to discuss revisions to include newly acquired topographic mapping obtained by the City of Watertown. A teleconference was held on October 12, 2004, to discuss the ongoing FIS. A third meeting was held on April 27, 2005, to present the proposed flood boundaries for the 1- and 0.2-percent-annual-chance floodplains and the floodway to the City.

For the 1989 City of Watertown study, the initial CCO meeting was held in March 1985 and attended by representatives from the City of Watertown, FEMA and Enviroscience.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Codington County, South Dakota.

The following flooding sources were studied by detailed methods: Big Sioux River, Roby Creek, Pelican Lake, and Lake Kampeska.

Limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2). The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction

The approximate floodplain for Willow Creek was refined from the confluence with the Big Sioux River to 459th Ave using a study provided by the City of

Watertown. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to and agreed upon by FEMA and Codington County.

The latest study of the Big Sioux River was completed under the authority of FEMA's Limited Map Maintenance Program (LMMP). The studied reach of the Big Sioux River extends from just upstream from the confluence with Willow Creek, which is located downstream from Watertown, to 5.6 river miles upstream, terminating just upstream from the 14th Avenue North Bridge. The study also includes a portion of Pelican Lake on the southwestern edge of the City of Watertown (USACE, 2005).

As part of the county-wide DFIRM project, approximately 4.3 miles of Roby Creek was studied by detailed methods from the confluence with the Big Sioux River to 4th St. NE and 14th Ave NW. Lake Kampeska and Pelican Lake were also mapped in detail using new topographic data provided by the City of Watertown.

2.2 Community Description

Codington County is located in northeastern South Dakota, approximately 100 miles north of Sioux Falls, South Dakota. It is bordered by Grant County to the northeast. Deuel County to the southeast, Hamlin County to the south, Clark County to the west, and Day County to the northwest. The City of Watertown is the county seat. The total land area within the county is approximately 688 square miles. According to U.S. Census Bureau figures, the population in 2000 was 25,897 (U.S. Census Bureau Website, 2007).

The Big Sioux River originates in northeastern South Dakota and flows in a southerly direction to its confluence with the Missouri River just upstream from Sioux City, Iowa. Its drainage area contributing to flow throughout the City of Watertown encompasses 322 square miles. Roby Creek, a tributary that flows southerly to the Big Sioux River through the eastern part of the City of Watertown, is 4.3 miles long and has a drainage area of 3.4 square miles. Willow Creek flows into the Big Sioux River along the eastern edge of the City of Watertown and has a drainage area of approximately 110 square miles.

The climate of Codington County, South Dakota is continental temperate with large daily fluctuations in temperature. The average daily temperature in winter is approximately 15 degrees Fahrenheit (°F), and the average daily temperature in summer is approximately 70°F. Annual average precipitation of the region is 28 inches (Rukstad, L. R. and L. S. Hedges, 1964). Of this, 75%, or about 17 inches, falls in April through September.

Codington County is situated on a glaciated highland called the Coteau des Prairies. The topography varies from gentle to steep slopes. The soils are typical of a cool moist prairie, generally silty and loamy.

2.3 Principal Flood Problems

Most major flooding of the Big Sioux River basin and within Codington County is the result of spring snowmelt and/or rainfall events. Flooding occurring in the middle and late summer months is associated with high intensity rainstorms.

Flood flows from the Big Sioux River are also the source of major problems associated with high lake levels on lakes in the study area; Lake Kampeska and Pelican Lake. Problems include inundation of shoreline homes and erosion of lakefront lands. Additional damage to homes and erosion of shoreline properties occur because of wave action associated with high lake levels and winds (Vallard, Arnold, 1929-1985; USACE, 1977; USACE, 1970; South Dakota Department of Water and Natural Resources, 1981).

Flooding that occurs on Roby Creek is generally shallow and localized at the east end of Watertown. The flooding between Arrow Avenue North and U.S. Highway 212 covers a large area and is difficult to define because of the low relief and undersized storm sewers. There is no defined channel to contain the flood flows along this reach of Roby Creek once the storm sewer capacity is exceeded.

2.4 Flood Protection Measures

There are several projects within Codington County that provide minimal protection to riverside properties from frequent flood events. These projects include a diversion dam and canal system to divert water from the Big Sioux River during low-flow periods in an attempt to maintain the water level in Pelican Lake. Another project consists of a 0.25 mile channelization of the Big Sioux River just south of U.S. Highway 212 in Watertown (USACE, 1986). The City of Watertown has constructed several stormwater detention structures within the Roby Creek watershed to help reduce peak flood discharges.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the county, standard hydrologic and hydraulic study methods were used to determine the flood-hazard data required for this FIS. Flood events of a magnitude that is 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 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 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 peak discharge-frequency relationships for the Big Sioux River and Roby Creek in the City of Watertown that were studied by detailed methods affecting Codington County.

Big Sioux River

Discharge-probability relationships for the 10-, 2-, 1-, and 0.2-percent-annual-chance flood events were developed for the Big Sioux River using USGS stream gage records. Flow values were determined from the old U.S. Geological Survey (USGS) gaging station No. 06479500 from 1946 to 1972. At some point old gaging station No. 06479500 was moved 6.5 miles upstream from the inlet-outlet of Lake Kampeska. The new USGS gaging station was assigned the number 06479438 and readings have been recorded there since 1973, while reading from the old gaging station resumed in 1997 and have continued to the present (USGS, 2005; USGS, 2005).

Major recent flooding in Codington County occurred in 1997 and 2001. Peak discharges for the 1997 flood event were 5,800 cubic feet per second (cfs) (old station) and 7,820 cfs (new station). Peak discharges for the 2001 flooding event were 3,730 cfs (old station) and 8,000 cfs (new station), which is also a historical high for either station (USGS, 2005; USGS, 2005).

Roby Creek

A hydrologic model was developed for the Roby Creek watershed using the USACE HEC-HMS computer program. The discharge-probability relationships for the 10-, 2-, 1-, and 0.2-percent-annual-chance flood events were developed using the hydrologic model for a 24-hour rainfall event. The hydrologic model included the detention structures that have been constructed by the City of Watertown in the Roby Creek watershed.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
BIG SIOUX RIVER USGS gage No. 06479438	228	1,420	3,200	4,320	8,040

REVISED TO REFLECT LOMR DATED: March 22, 2016

TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
EAST BRANCH ROBY CREEK					
7th St. NE	0.4	45	74	126	215
ROBY CREEK					
Confluence with Big Sioux River	3.4	499	631	810	985
Downstream from U.S. Highway 212	2.7	242	287	391	486
Downstream from Belmont Park	2.1	66	145	386	515
Downstream from 3rd Ave. NE	2.1	39	99	303	399
4th Ave. NE	1.5	156	209	360	384
Downstream 10th Ave. NE	1.4	145	199	365	469
Upstream 14th Ave. NE	0.7	59	119	205	337

Revised Data

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 Flood Insurance Rate Map (FIRM) represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data table 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 report in conjunction with the data shown on the FIRM.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which a floodway was computed, selected cross section locations are also shown on the FIRM.

The hydraulic analyses for this study 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.

Big Sioux River

Existing river geometry in the form of channel cross-sections along the Big Sioux River were taken from the 1989 FIS for the City of Watertown. Additional cross sections were obtained during May 1999. Over bank cross-sections were taken from 2-foot topographic mapping acquired by the City of Watertown in 2001 (USACE, 2000).

Water-surface profile models of the Big Sioux River were developed using the USACE Hydraulic Engineering Center's River Analysis System (HEC-RAS) backwater computer program (USACE, 1997). The HEC-RAS program, version 3.1.2, was developed for calculating water-surface profiles for steady, gradually varied flow in open-channels. The channels can be natural streams and rivers, or man-made.

The starting water-surface elevations for each water-surface profile analyzed were based upon normal depth calculations for the channel just upstream from the confluence of Willow Creek.

Channel and over bank roughness coefficients (Manning's "n" values) for this study were determined by use of previous studies, field inspection, photographs, and engineering judgment. Assigned values ranged from 0.032 to 0.037 in the channel and from 0.050 to 0.140 in the over bank areas. Higher roughness coefficients are an indication of areas where dense vegetation may exist, such as trees, shrubs, or weeds, or where above-ground structures exist. Lower roughness coefficients tend to indicate areas of homogeneous channel material such as silt and sand, or a thick covering of grass (USACE, 2000).

Additionally, the expansion and contraction coefficients for flow near bridges were accounted for by establishing ineffective conveyance areas that occur on either side of a bridge. The expansion and contraction values ranged from 0.3 to 0.7 and from 0.1 to 0.5, respectively (USACE, 2000).

Prior to flowing through the City of Watertown, the Big Sioux River provides surface flow into Lake Kampeska. At relatively high lake elevations most of the river flows will continue downstream through the city without entering the lake. During low lake elevations, river flows will enter Lake Kampeska until a balance is achieved. Another off-stream storage site occurs where the Big Sioux River flows into Pelican Lake through an inlet channel. The inflows and lake elevations are controlled by a weir located on the inlet channel.

Roby Creek

Channel cross sections for Roby Creek were field surveyed in July, 2006. Over bank cross-sections were taken from 2-foot topographic mapping acquired by the City of Watertown in 2001 (USACE, 2000).

Water-surface profile models of the Big Sioux River were developed using the USACE Hydraulic Engineering Center's River Analysis System (HEC-RAS) backwater computer program (USACE, 1997). The HEC-RAS program, version 3.1.3, was developed for calculating water-surface profiles for steady, gradually varied flow in open-channels. The channels can be natural streams and rivers, or man-made.

The starting water-surface elevations for each water-surface profile analyzed were based upon normal depth calculations for the channel just upstream from the confluence with the Big Sioux River.

Channel and over bank roughness coefficients (Manning's "n" values) for this study were determined by use of previous studies, field inspection, photographs, and engineering judgment. Assigned values were 0.035 in the channel and ranged from 0.045 to 0.12 in the over bank areas.

Additionally, the expansion and contraction coefficients for flow near bridges were accounted for by establishing ineffective conveyance areas that occur on either side of a bridge. The expansion and contraction values ranged from 0.3 to 0.7 and 0.1 to 0.5, respectively.

Near 3rd Ave. NE on Roby Creek, an underground storm sewer system begins to convey the runoff from Roby Creek. The storm sewer system outlets on the south side of 9th Avenue SE (Highway 212). Several storm sewer inlets are located in a park area upstream and downstream from 3rd Avenue North to the west of the High School. The pipes capacity is limited by its physical characteristics. A discharge rating curve was developed for the storm sewer system using the software program StormCAD based on the pipes diameter, length and slope. This rating curve was entered as a lateral rating curve in the HEC-RAS model at Station 11350 near 3rd Ave. NE to subtract the runoff entering the storm sewer pipe. The flood flow that exceeds the capacity of the storm sewer pipe flows overland until it re-enters the defined channel downstream from 9th Avenue SE (Highway 212).

Pelican Lake and Lake Kampeska

The 10-, 2-, 1-, and 0.2 percent-annual-chance still pool lake elevations for Pelican Lake and Lake Kampeska are shown in Table 2. Table 2 also lists the still pool elevations from the 1994 Feasibility Study conducted by the USACE.

Pelican Lake does not have any historic annual peak data available with the exception of the 1997 flood event when the lake experienced an estimated peak elevation of 1,716.8 feet NAVD 88. The stage-probability curve was developed for the 2005 General Re-Evaluation Report for Watertown, SD using the balanced hydrographs routed through the calibrated unsteady HEC-RAS model.

Annual peak stage data for Lake Kampeska were plotted based on the Median plotting position. The Median plotting position is a graphical method of frequency analysis based on the number of years of observed annual maximum stage records. Annual maximum lake levels were available from 1928 through 2001. Peak stages were plotted based on 74 years of record with the ocularly fitted curve. As additional verification of the stage probability curve for the 2005 General Re-Evaluation Report for Watertown, SD, peak stages for Lake Kampeska from the routing of the balanced hydrographs through the calibrated unsteady HEC-RAS model were plotted for different return periods. The 1-percent-annual-chance lake elevations do not include wind/wave effects.

TABLE 2 - 1-PERCENT-ANNUAL-CHANCE STILL POOL ELEVATION

Frequency (percent annual chance)	Pelican Lake (Feet NAVD 88) 1994 Feasibility Study	Pelican Lake (Feet NAVD 88) 2005* General Reevaluation Study	Lake Kampeska (Feet NAVD 88) 1994 Feasibility Study	Lake Kampeska (Feet NAVD 88) 2005* General Reevaluation Study
10	1,714.4	1,713.7	1,721.1	1,721.2
2	1,716.1	1,715.9	1,722.3	1,723.4
1	1,716.7	1,717.0	1,722.7	1,724.8
0.2	1,717.8	1,719.4	1,723.4	1,727.7

*Preliminary data subject to revision

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. Until recently, the standard vertical datum used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the completion of the North American Vertical Datum of 1988 (NAVD 88), many FIS reports and FIRMs, including this one, are now prepared using NAVD 88 as the referenced vertical datum.

Flood elevations shown in this FIS report and on the FIRM are referenced to the NAVD 88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the NGVD 29 and NAVD 88, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

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.

The conversion factor for each stream studied by detailed methods is shown below in Table 3.

TABLE 3 - STREAM CONVERSION FACTOR

Stream Name	Elevation (Feet NAVD above NGVD)
Big Sioux River	+1.0
Roby Creek	+1.0
Lake Kampeska	+1.0
Pelican Lake	+1.0

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages state and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS report provides 1-percent-annual-chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent- annual-chance flood elevations; delineations of the 1- and 0.2-percent-annual-chance floodplains; and a 1-percent-annual-chance floodway. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles and Floodway Data tables. Users should reference the data presented in the FIS report as well as additional information that may be available at the local community 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 in the HEC-RAS computer model. For the Big Sioux River and Roby Creek, the hydraulic model output was exported to a text file that was then imported into ArcView using the GeoRAS (USACE, 2003) version 3.24 and 4.1.1 extensions. GeoRAS was used to delineate the flood boundaries and the boundaries were checked and edited by hand to assure completeness. Lake Kampeska and Pelican Lake were also mapped in detail using new topographic data provided by the City of Watertown. The approximate floodplain boundaries for the updated portion of Willow Creek were mapped using surveyed cross section data and topographic maps that were generated from the field survey data. The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM. On the map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones AE, A, 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.

The unincorporated areas of Codington County were studied by approximate methods and the 1-percent-annual-chance floodplain boundaries mapped. The maps were originally published as Flood Hazard Boundary Maps (FHBMs) dated January 24, 1978. The FHBM was converted to a FIRM by letter dated February 1, 1986.

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 base flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to one (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.

Based on the results of the hydraulic analyses, a floodway was developed for the Big Sioux River and Roby Creek through the City of Watertown. The floodway was first computed on the basis of equal conveyance reduction from the channel and over bank area of the flood plain and then specific encroachment stations were inputted and modified until the desired encroached water surface elevation was achieved. Due to the sensitive nature of the flow balance at the inlet to Lake Kampeska, the floodway was developed so that a 1.0 foot standard encroached profile applied at the lower end of the study reach but the rise was transitioned to 0.23 feet at the upstream study limit. The resultant floodway will assist in maintaining the current balance of flows between the Big Sioux River and Lake Kampeska without adversely affecting the pool levels within the lake. Floodway data are shown in Table 4.

As shown on the FIRM, the floodway boundaries were computed at cross sections. Between cross sections, the boundaries were interpolated. In cases where the floodway and 1-percent annual chance floodplain boundaries are close together or collinear, only the floodway boundary has been shown.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Big Sioux River								
A	0	600	2,930	2.3	1,713.5	1,713.5	1,714.5	1.0
B	1,178	403	2,157	2.9	1,713.8	1,713.8	1,714.8	1.0
C	2,351	305	2,056	3.4	1,714.3	1,714.3	1,715.1	0.8
D	3,160	610	3,349	2.2	1,714.6	1,714.6	1,715.3	0.7
E	4,291	654	3,901	2.1	1,714.7	1,714.7	1,715.5	0.8
F	5,104	562	3,651	2.3	1,714.8	1,714.8	1,715.6	0.8
G	6,308	465	3,035	2.7	1,715.1	1,715.1	1,715.9	0.8
H	7,902	310	2,240	2.9	1,715.6	1,715.6	1,716.3	0.7
I	8,831	400	3,175	2.2	1,716.3	1,716.3	1,716.9	0.6
J	9,872	538	4,235	1.8	1,716.4	1,716.4	1,717.0	0.6
K	10,952	960	6,280	1.3	1,716.5	1,716.5	1,717.1	0.6
L	12,178	1,410	7,407	1.2	1,716.6	1,716.6	1,717.2	0.6
M	13,655	1,490	6,283	1.4	1,717.2	1,717.2	1,717.5	0.3
N	15,091	430	2,657	2.8	1,717.8	1,717.8	1,718.1	0.3
O	16,610	692	3,349	3.1	1,718.4	1,718.4	1,718.7	0.3
P	17,340	795	2,528	3.8	1,718.6	1,718.6	1,718.9	0.3
Q	18,041	646	3,959	2.2	1,718.8	1,718.8	1,719.2	0.4
R	18,891	272	1,634	4.3	1,718.9	1,718.9	1,719.3	0.4
S	19,482	395	2,813	2.5	1,719.4	1,719.4	1,719.8	0.4
T	20,403	480	3,433	2.3	1,720.2	1,720.2	1,720.6	0.4
U	21,492	530	3,881	1.8	1,720.9	1,720.9	1,721.3	0.4
V	22,760	235	1,840	3.7	1,721.1	1,721.1	1,721.4	0.3
W	23,662	685	4,830	1.9	1,721.3	1,721.3	1,721.7	0.4
X	24,666	510	3,628	2.6	1,721.6	1,721.6	1,721.9	0.3
Y	25,601	624	3,595	2.6	1,721.9	1,721.9	1,722.2	0.3
Z	26,586	853	5,046	1.8	1,722.2	1,722.2	1,722.4	0.2
AA	27,899	518	3,694	1.9	1,722.6	1,722.6	1,722.9	0.3
AB	29,352	755	4,289	1.8	1,722.8	1,722.8	1,723.0	0.2

[1]Feet above Limit of Detailed Study

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON COUNTY, SD AND INCORPORATED AREAS

FLOODWAY DATA

BIG SIOUX RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Branch Roby Creek								
A	293	131	363	0.4	1,759.2	1,759.2	1,759.9	0.7
B	697	30	26	4.8	1,760.8	1,760.8	1,760.8	0.0
C	872	129	580	0.2	1,764.4	1,764.4	1,764.6	0.2
D	1,522	140	646	0.4	1,764.5	1,764.5	1,764.6	0.1
E	1,804	104	374	0.6	1,764.5	1,764.5	1,764.6	0.1
F	1,936	108	358	0.7	1,768.9	1,768.9	1,768.9	0.0
G	2,307	190	425	0.6	1,768.9	1,768.9	1,769.0	0.1
H	3,207	140	68	3.6	1,775.5	1,775.5	1,775.6	0.1

[1] Feet above confluence with Roby Creek

REVISED TO
REFLECT LOMR
DATED: March 22, 2016

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON COUNTY, SD
AND INCORPORATED AREAS

FLOODWAY DATA

EAST BRANCH ROBY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Roby Creek								
A	309	46	280	2.9	1,714.6	1,714.6	1,715.4	0.8
B	1,462	30	219	1.8	1,715.4	1,715.4	1,716.2	0.8
C	2,457	37	208	1.9	1,715.7	1,715.7	1,716.5	0.8
D	3,460	39	203	1.9	1,716.2	1,716.2	1,716.8	0.6
E	4,159	66	223	1.8	1,716.4	1,716.4	1,717.0	0.6
F	4,260	15	375	2.6	1,717.1	1,717.1	1,717.7	0.6
G	4,860	160	446	0.9	1,717.3	1,717.3	1,717.9	0.6
H	5,496	180	326	0.8	1,718.3	1,718.3	1,719.2	0.9
I	5,958	175	231	1.2	1,719.0	1,719.0	1,720.0	1.0
J	6,207	110	120	2.3	1,720.5	1,720.5	1,721.4	0.9
K	6,453	100	176	1.6	1,722.0	1,722.0	1,722.7	0.7
L	6,717	60	103	2.7	1,723.3	1,723.3	1,724.0	0.7
M	7,127	60	183	2.1	1,725.1	1,725.1	1,726.1	1.0
N	7,555	130	399	1.0	1,725.7	1,725.7	1,726.7	1.0
O	7,930	70	162	2.4	1,726.2	1,726.2	1,727.1	0.9
P	8,425	70	246	1.6	1,727.7	1,727.7	1,728.4	0.7
Q	9,047	170	250	1.5	1,729.2	1,729.2	1,729.9	0.7
R	9,585	230	214	1.8	1,732.4	1,732.4	1,733.0	0.6
S	10,100	220	619	0.6	1,732.5	1,732.5	1,733.5	1.0
T	10,530	84	73	5.3	1,733.3	1,733.3	1,733.7	0.4
U	11,468	32	79	3.8	1,734.8	1,734.8	1,735.7	0.9
V	11,610	161	671	0.5	1,735.4	1,735.4	1,736.4	1.0
W	11,998	155	262	1.4	1,735.4	1,735.4	1,736.4	1.0
X	12,289	110	144	2.5	1,735.9	1,735.9	1,736.5	0.6
Y	12,406	105	192	1.9	1,736.0	1,736.0	1,736.8	0.8
Z	12,527	80	133	2.7	1,736.2	1,736.2	1,736.9	0.7

[1] Feet above confluence with Big Sioux River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON COUNTY, SD
AND INCORPORATED AREAS

FLOODWAY DATA

REVISED TO
REFLECT LOMR
DATED: March 22, 2015

ROBY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Roby Creek (continued)								
AA	12,980	61	90	4.1	1,737.4	1,737.4	1,738.0	0.6
AB	13,098	52	84	4.5	1,738.4	1,738.4	1,738.6	0.2
AC	13,179	100	215	1.7	1,738.5	1,738.5	1,739.5	1.0
AD	13,484	75	215	1.7	1,739.0	1,739.0	1,739.9	0.9
AE	13,760	45	93	3.9	1,739.3	1,739.3	1,740.0	0.7
AF	13,894	40	109	3.4	1,740.5	1,740.5	1,741.4	0.9
AG	14,115	35	141	2.6	1,741.4	1,741.4	1,742.1	0.7
AH	14,239	115	399	0.9	1,742.0	1,742.0	1,742.9	0.9
AI	14,472	63	228	1.6	1,742.4	1,742.4	1,743.0	0.6
AJ	14,596	70	358	1.0	1,743.9	1,743.9	1,744.8	0.9
AK	14,814	50	687	1.5	1,743.9	1,743.9	1,744.8	0.9
AL	14,965	221	1,577	0.4	1,746.8	1,746.8	1,747.7	0.9
AM	15,625	101	371	0.4	1,746.8	1,746.8	1,747.7	0.9
AN	16,152	95	206	0.8	1,746.9	1,746.9	1,747.7	0.8
AO	16,663	47	34	4.6	1,748.4	1,748.4	1,748.7	0.3
AP	16,805	283	1,402	0.2	1,754.4	1,754.4	1,754.5	0.1
AQ	17,396	293	1,548	0.1	1,756.2	1,756.2	1,756.2	0.0
AR	18,054	52	381	0.5	1,759.2	1,759.2	1,759.9	0.7
AS	18,402	171	304	0.1	1,759.2	1,759.2	1,759.9	0.7
AT	18,494	229	855	0.1	1,763.2	1,763.2	1,763.3	0.1
AU	18,877	139	181	1.2	1,763.2	1,763.2	1,763.3	0.1
AV	18,984	144	625	0.3	1,767.2	1,767.2	1,767.5	0.3
AW	19,421	72	150	1.0	1,767.2	1,767.2	1,767.5	0.3
AX	19,725	61	36	4.4	1,769.8	1,769.8	1,769.9	0.1

[1] Stream distance in feet above Town of Gypsum downstream corporate limits

REVISED TO
REFLECT LOMR
DATED: March 22, 2016

TABLE 4

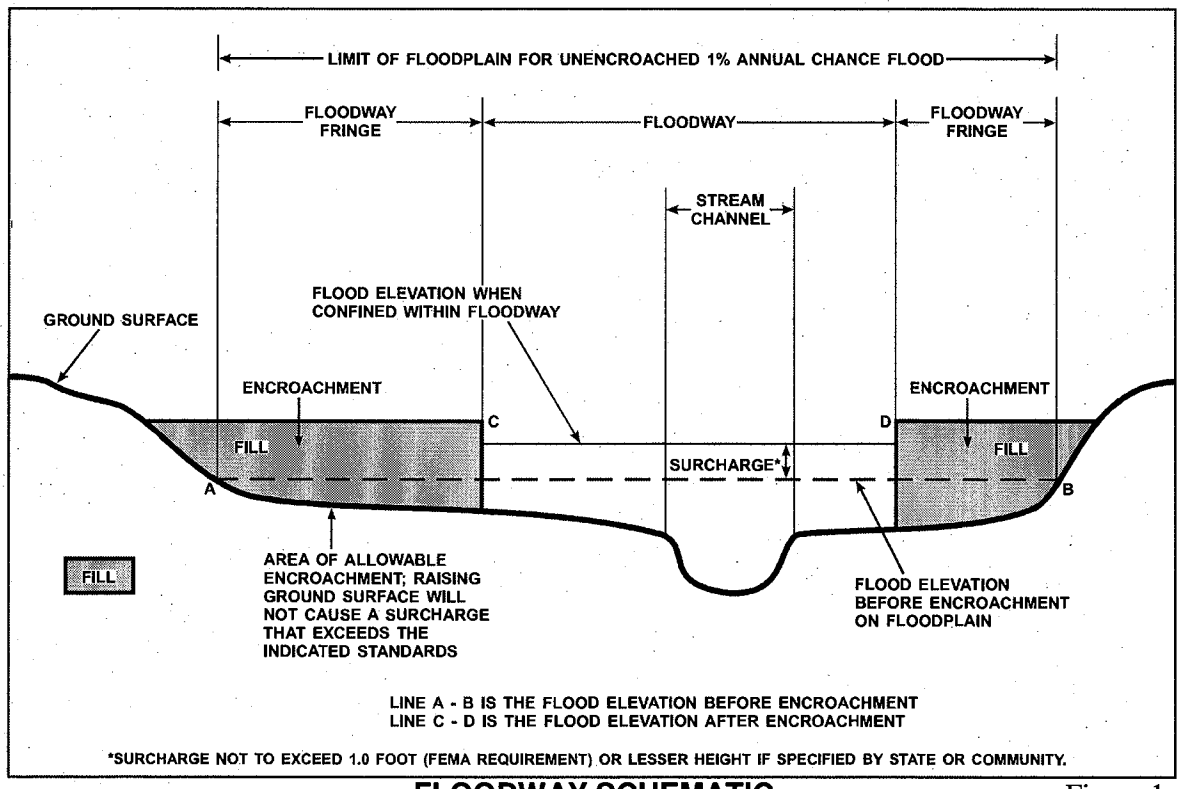
FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON COUNTY, SD
AND INCORPORATED AREAS

FLOODWAY DATA

ROBY CREEK

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 water-surface elevation of the 1-percent annual chance flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1, "Floodway Schematic."



FLOODWAY SCHEMATIC Figure 1

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations 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 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, and areas protected from the 1-percent-annual-chance flood by levees. No base flood elevations or depths are shown within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to areas where flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities are also determined.

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 rate 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 base flood elevations or average depths. Insurance agents use the zones and base flood elevations 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 are shown where applicable.

The current FIRM presents flooding information for the entire geographic area of Codington County. Previously, separate Flood Hazard Boundary Maps and/or FIRMs were prepared for each identified flood-prone incorporated community and the unincorporated areas of the county. 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, up to and including this countywide FIS, are presented in Table 5, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Codington County (Unincorporated Areas)	January 24, 1978	January 24, 1978	February 1, 1986	January 16, 2009
Florence, Town of	January 16, 2009	None	January 16, 2009	
Kranzburg, Town of	January 16, 2009	None	January 16, 2009	
South Shore, Town of	January 16, 2009	None	January 16, 2009	
Watertown, City of	June 28, 1974	December 26, 1975	July 4, 1989	September 28, 2007 January 16, 2009

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON COUNTY, SD AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

This FIS was prepared by compiling existing hydrologic and hydraulic technical and scientific data prepared by other organizations originally for purposes other than the NFIP. The data were identified as the best available at the time of compilation of this FIS and should depict the general conditions of the flooding sources with relative accuracy.

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Codington County has been compiled into this FIS. Therefore, this FIS supersedes all previously printed FIS Reports, FHBMs, FBFMs, and FIRMs for all of the incorporated and unincorporated jurisdictions within Codington County.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this FIS can be obtained by contacting FEMA, Federal Insurance and Mitigation Division, Denver Federal Center, Building 710, Box 25267, Denver, Colorado 80225-0267.

9.0 BIBLIOGRAPHY AND REFERENCES

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THE 2% ANNUAL CHANCE FLOOD PROFILE IS TOO CLOSE TO THE 1% ANNUAL CHANCE ELEVATION TO BE SHOWN SEPARATELY

LIMIT OF DETAILED STUDY

20TH AVENUE SOUTH

CONFLUENCE OF ROBY CREEK

HIGHWAY 81

20TH AVENUE SOUTH

ELEVATION IN FEET (NAVD 88)

1735
1730
1725
1720
1715
1710
1705
1700
1695
1690

0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 11000 12000 13000

STREAM DISTANCE IN FEET ABOVE LIMIT OF DETAILED STUDY

A B C D E F G H I J K L

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

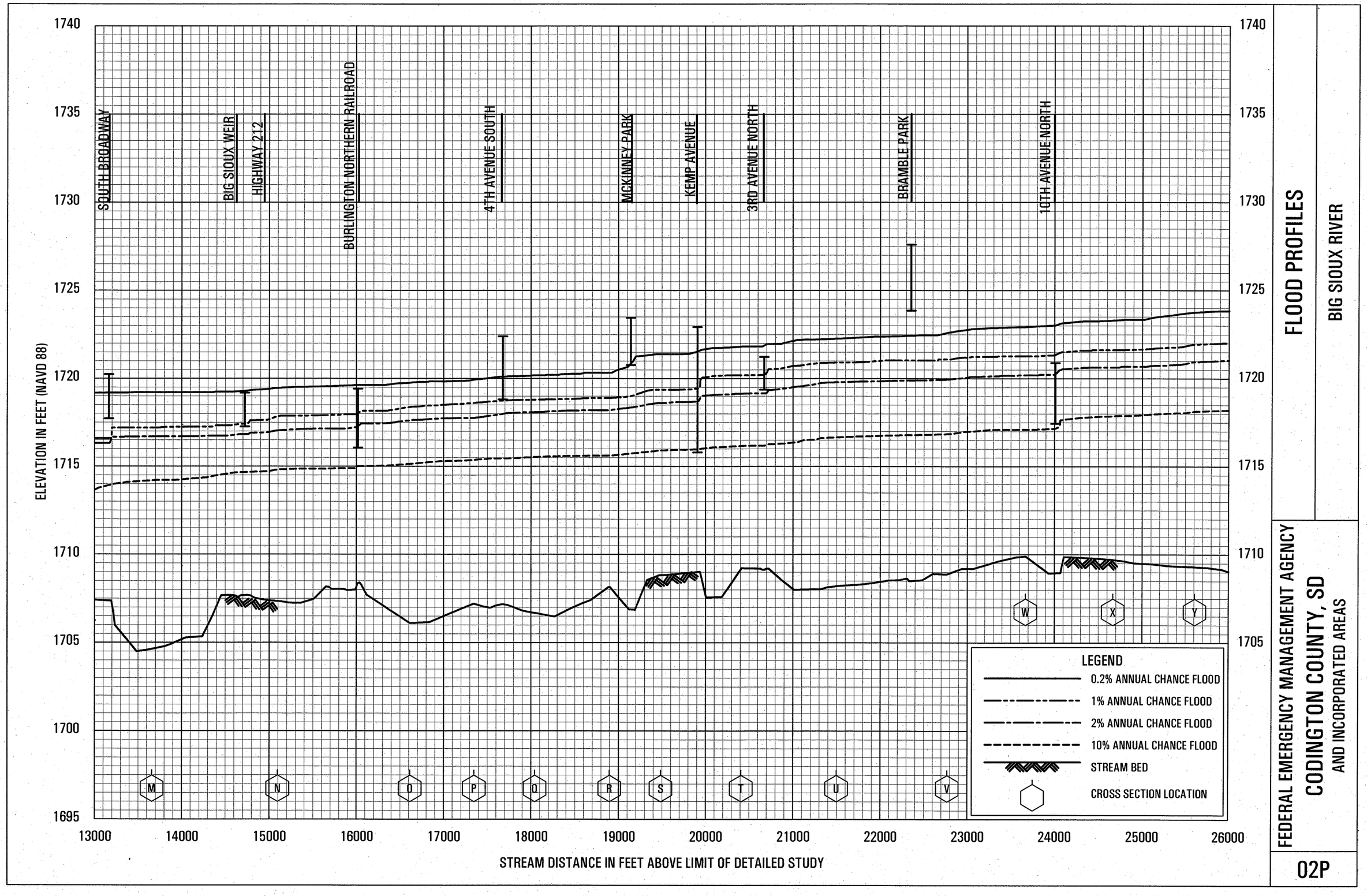
BIG SIOUX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON COUNTY, SD

AND INCORPORATED AREAS

01P



FLOOD PROFILES

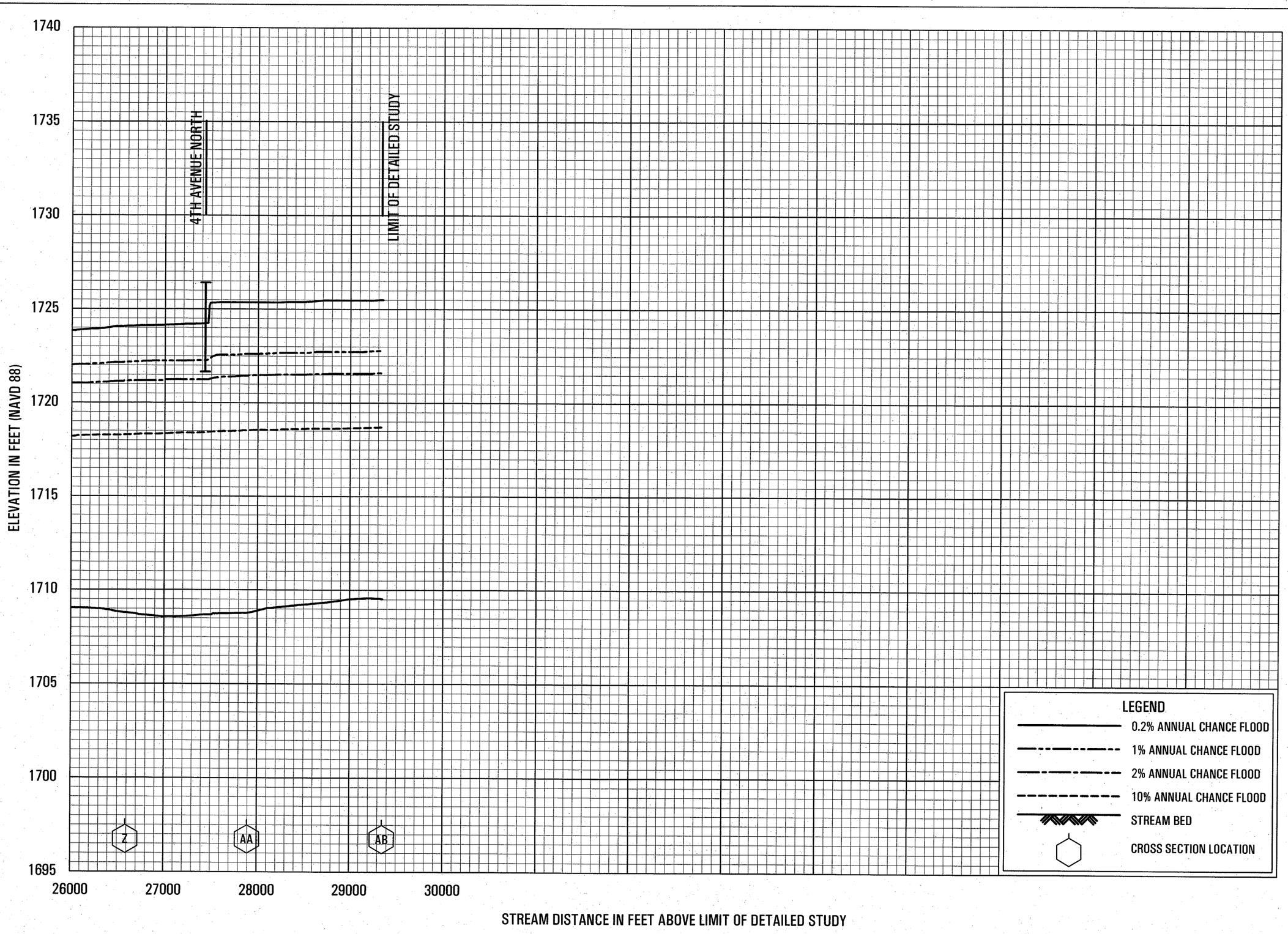
BIG SIOUX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON COUNTY, SD

AND INCORPORATED AREAS

02P



FLOOD PROFILES

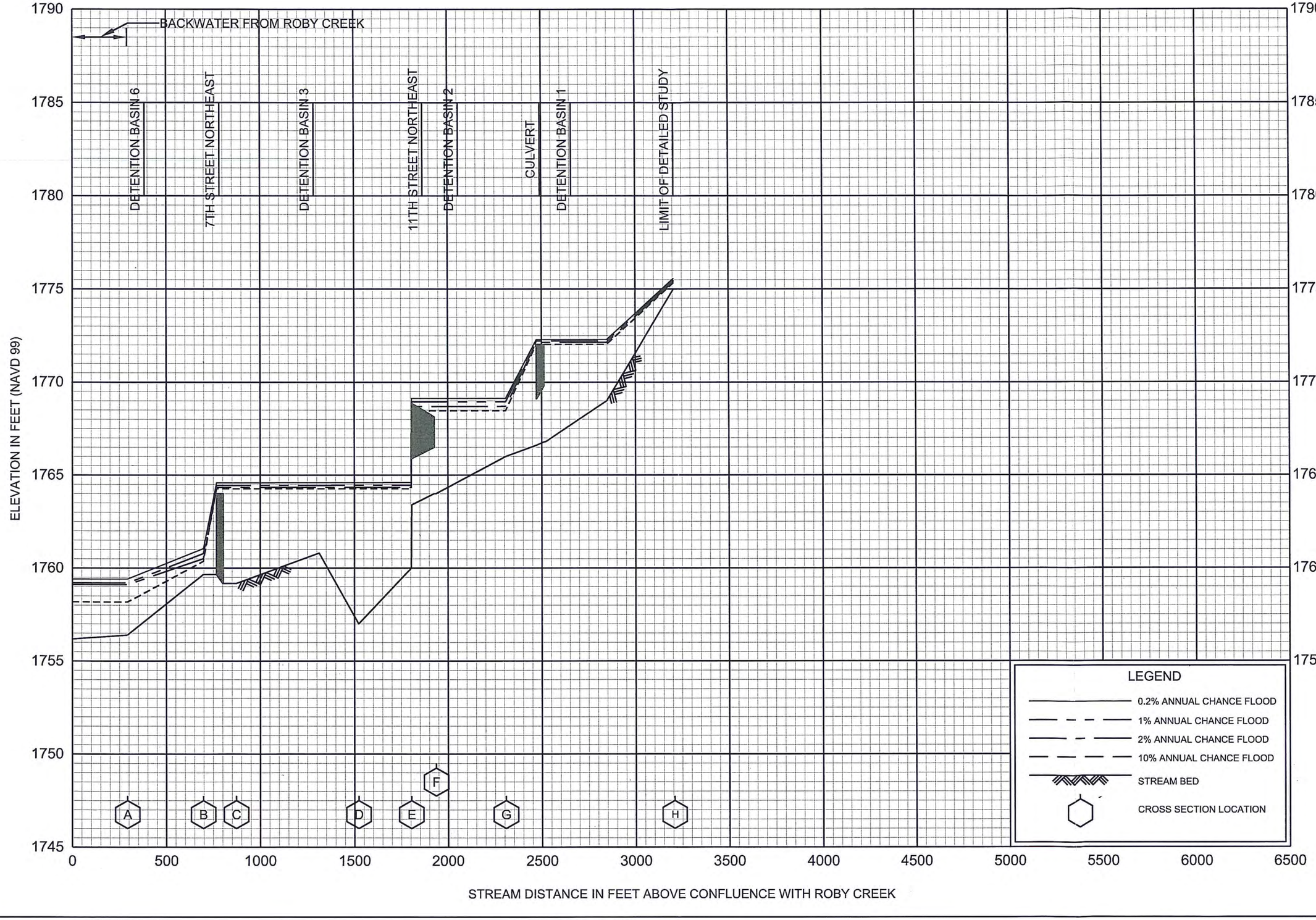
BIG SIOUX RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON COUNTY, SD

AND INCORPORATED AREAS

03P



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FLOOD PROFILES

EAST BRANCH ROBY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON COUNTY, SD

AND INCORPORATED AREAS

04P

PORTIONS OF 10%, 2%, 1% AND 0.2% ANNUAL CHANCE FLOODS CONTAINED IN STORM SEWER

CONFLUENCE WITH BIG SIOUX RIVER
ACCESS ROAD
10TH AVENUE SOUTH
U.S. HIGHWAY 212
5TH AVENUE SOUTHEAST
4TH AVENUE SOUTHEAST
3RD AVENUE SOUTHEAST

ELEVATION IN FEET (NAVD 88)

1735
1730
1725
1720
1715
1710
1705
1700
1695
1690

0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 6000 6500

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH BIG SIOUX RIVER

A B C D E F G H I J K

LEGEND
- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

REVISED TO REFLECT LOMR
DATED: March 22, 2016

ROBY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON COUNTY, SD
AND INCORPORATED AREAS

05P

PORTIONS OF 10%, 2%, 1% AND 0.2% ANNUAL CHANCE FLOODS CONTAINED IN STORM SEWER

2ND AVENUE SOUTHEAST
1ST AVENUE SOUTHEAST
KEMP AVENUE EAST
1ST AVENUE NORTHEAST
CHICAGO AND NORTH WESTERN RAILROAD
ARROW AVENUE NORTHEAST
B AVENUE NORTHEAST
C AVENUE NORTHEAST
3RD AVENUE NORTHEAST
4TH AVENUE NORTHEAST
8TH STREET NORTHEAST
7 1/2 STREET NORTHEAST

ELEVATION IN FEET (NAVD 88)

1755
1750
1745
1740
1735
1730
1725
1720
1715
1710

6500 7000 7500 8000 8500 9000 9500 10000 10500 11000 11500 12000 12500 13000

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH BIG SIOUX RIVER

L M N O P Q R S T U V W X Y Z AA

LEGEND
- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

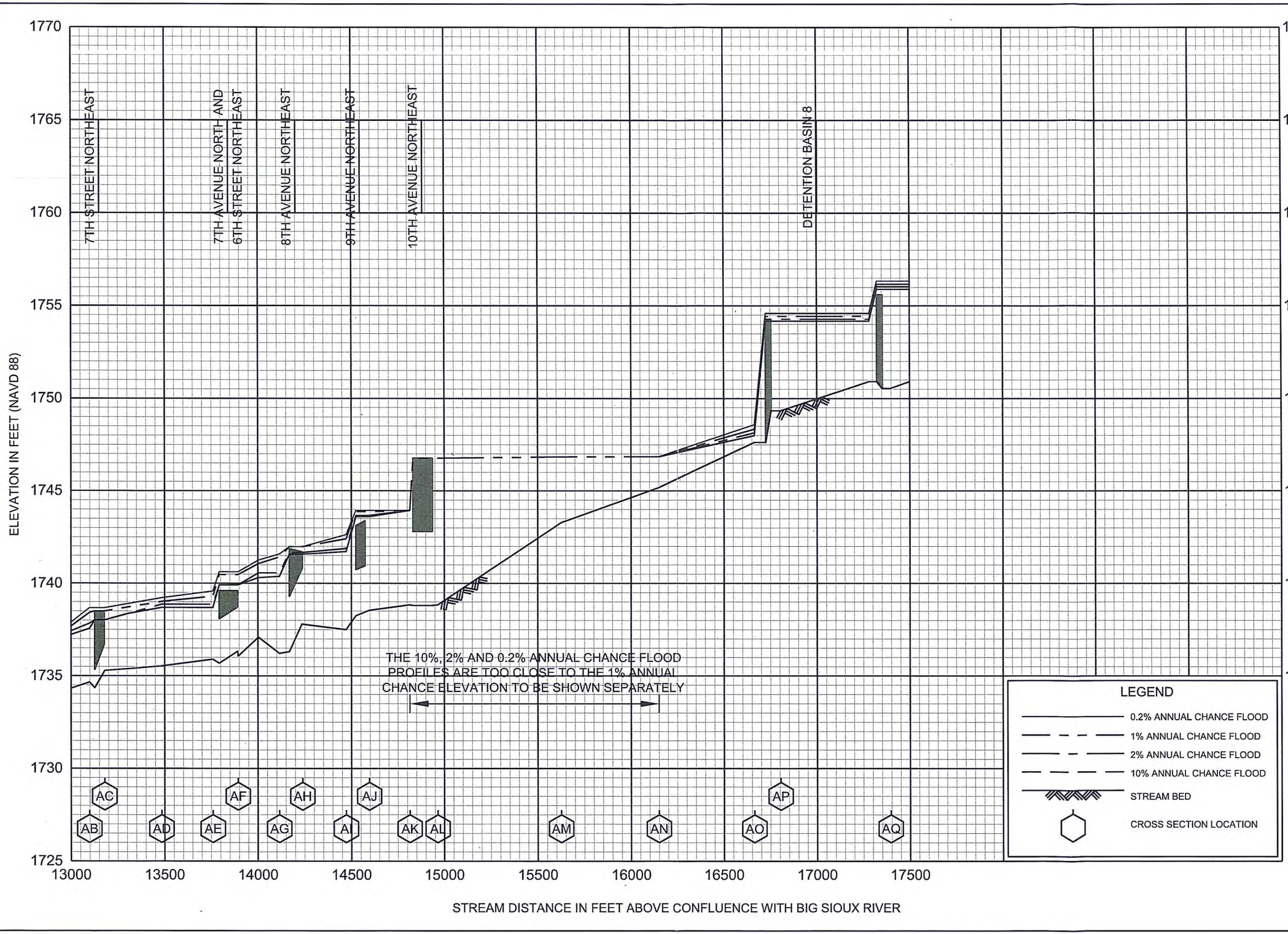
FLOOD PROFILES

REVISED TO REFLECT LOMR DATED: March 22, 2016

ROBY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON COUNTY, SD
AND INCORPORATED AREAS



FLOOD PROFILES

REVISED TO REFLECT LOMR DATED: March 22, 2016

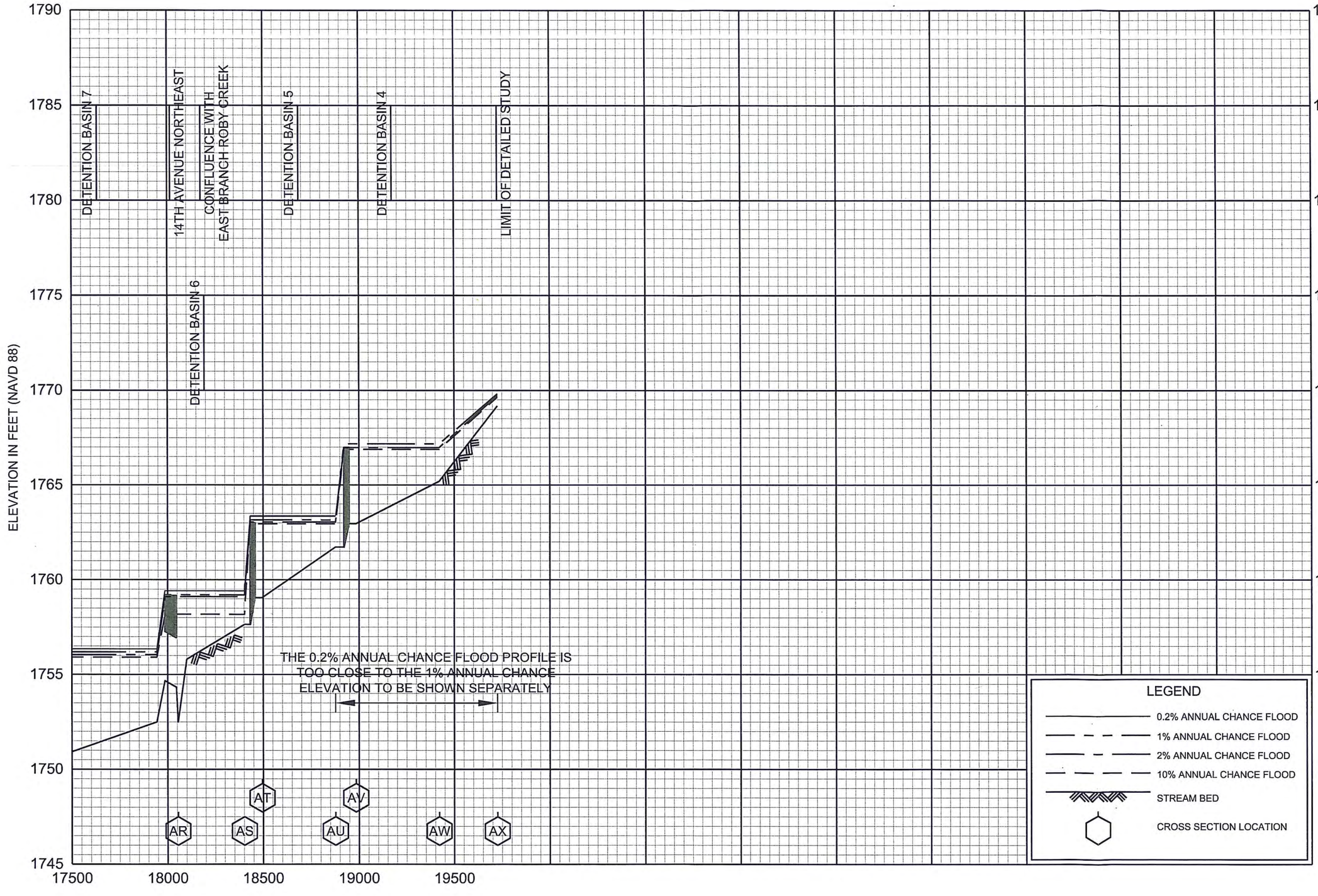
ROBY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON COUNTY, SD

AND INCORPORATED AREAS

07P



FLOOD PROFILES

ROBY CREEK

REVISED TO REFLECT LOMR DATED: March 22, 2016

FEDERAL EMERGENCY MANAGEMENT AGENCY

CODINGTON, SD

AND INCORPORATED AREAS

08P

East Branch Roby Creek

ZONE AE (EL 1772.2')

Detention Basin No. 1

Revised Area

THIS AREA SHOWN AT A SCALE OF 1' = 500' ON MAP NUMBER 46029C0336

THIS AREA SHOWN AT A SCALE OF 1' = 500' ON MAP NUMBER 46029C0338

FLOODING EFFECTS FROM ROBY CREEK

ZONE AE

1773 1775 1775.5 H

20 21 22 28 29 32 33 34 27

WASHINGTON DRIVE

18TH STREET NE

13TH STREET NE

15TH ST CIRCLE NE

19TH STREET NE

7TH AVENUE NE

3RD AVENUE NE

458TH AVENUE

457TH AVENUE

PARK VIEW TRAIL

HIDEWOOD CIRCLE

LITTLE MOREAL CIRCLE

SHADE HILL CIRCLE

LEWIS AND CLARK AVENUE

PALISADES LANE

CHICAGO AND NORTHWESTERN RAILROAD

WESTMINSTER AVENUE

KEMP AVENUE E

1ST AVENUE NE

1ST AVENUE SE

15TH STREET SE

16TH STREET SE

2ND AVENUE SE

3RD AVENUE SE

14TH STREET SE

4TH AVENUE SE

19TH STREET SE

T. 117 N.

T. 116 N.

212

SERVICE ROAD

10TH AVENUE SE

12TH AVENUE SE

15TH STREET SE

17TH STREET SE

1716.2 D

13TH AVENUE SE

15TH AVENUE SE

14TH AVENUE SE

16TH AVENUE SE

20TH AVENUE SE

1716

ZONE A

ZONE AE

Willow Creek

CHICAGO AND NORTHWESTERN RAILROAD

Joins Panel 0345

Codington County Unincorporated Areas 460260

City of Watertown 460016

Revised Area

5 4 8 9

SPECIAL FLOOD HAZARD AREAS	
	Without Base Flood Elevation (BFE) *Zone A, V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2 % Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes. *Zone X*

SCALE

Map Projection:

Universal Transverse MercatorNAD 1983 UTM Zone 14N

Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 1,000 feet 1:12,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

CODINGTON COUNTY, SOUTH DAKOTA

and Incorporated Areas

PANEL 340 OF 500

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CODINGTON COUNTY	460260	0340	D
WATERTOWN, CITY OF	460016	0340	D

REVISED TO REFLECT LOMR DATED: March 22, 2016

VERSION NUMBER 1.1.1.0

MAP NUMBER 46029C0340D

EFFECTIVE DATE JANUARY 16, 2009

Codington County Unincorporated Areas 460260

19

20

29

30

19TH AVENUE NE

5TH STREET NE

NORTHRIDGE DRIVE NE

6TH STREET NE

7TH STREET NE

8TH STREET NE

1769.8 AX

Detention Basin No. 4

1769 1768

1767.2 AV

1763.2 AU

B 1760.8

C 1764.4

LIMIT OF STUDY

ZONE AE (EL1767.2')

1767.2

AW 1764

1760

Detention Basin No. 5

AT 1763.2

ZONE AE (EL 1763.2')

AS 1759.2

1760

AR 1759.2

1759

Culvert

1757

Detention Basin No. 7

ZONE AE (EL 1756.2')

1756.2 AQ

Culvert

1755

Roby Creek

81

12TH AVENUE NE

3RD STREET NE

HIGHLAND BOULEVARD E

2ND STREET NE

11TH AVENUE NE

Revised Area

ZONE AE (EL 1764.4')

1764.5 E

1768.9 F

ZONE AE (EL 1768.9')

East Branch Roby Creek

1769

1772

Detention Basin No. 1

ZONE AE (EL 1772.2')

1764.5 D

1765

Culvert

1761

14TH AVENUE NE

1759.2 A

Detention Basin No. 6

ZONE AE (EL 1759.2')

Detention Basin No. 3

1768.9 G

Detention Basin No. 2

11TH STREET NE

City of Watertown 460016

Joins Panel 0340

1754.4 AP

1748.4 AO

1749

1748

AN 1746.9

1747

AM 1746.8

ZONE AE

1746.8 AL

Culvert

1744

1743.9 AK

1743.9 AJ

Culvert

1743

1742.4 AI

AH 1742.0

Culvert

1741.4 AG

8TH AVENUE NE

9TH STREET NE

10TH AVENUE NE

9TH AVENUE NE

8TH AVENUE NE

7TH STREET NE

1740.5 AF

1740

Culvert

AE 1739.3

1738.5 AC

9TH STREET NE

AD 1739.0

1738

1737.4 AA

1737.5 Z

7 1/2 STREET NORTHEAST

7TH AVENUE NE

6TH AVENUE NE

Roby Creek

ZONE AE

1736.0 Y

Culvert

5TH AVENUE NE

1737

1736

1735.9 X

6TH STREET NE

Culvert

4TH AVENUE NE

Joins Panel 0338

AB 1738.4

1738

Culvert

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2 % Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

SCALE

N

Map Projection:
Universal Transverse MercatorNAD 1983 UTM Zone 14N
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 1,000 Feet

0 62.5 125 250 Meters

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CODINGTON COUNTY, SOUTH DAKOTA
and Incorporated Areas

PANEL 336 OF 500

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CODINGTON COUNTY	460260	0336	D
WATERTOWN, CITY OF	460016	0336	D

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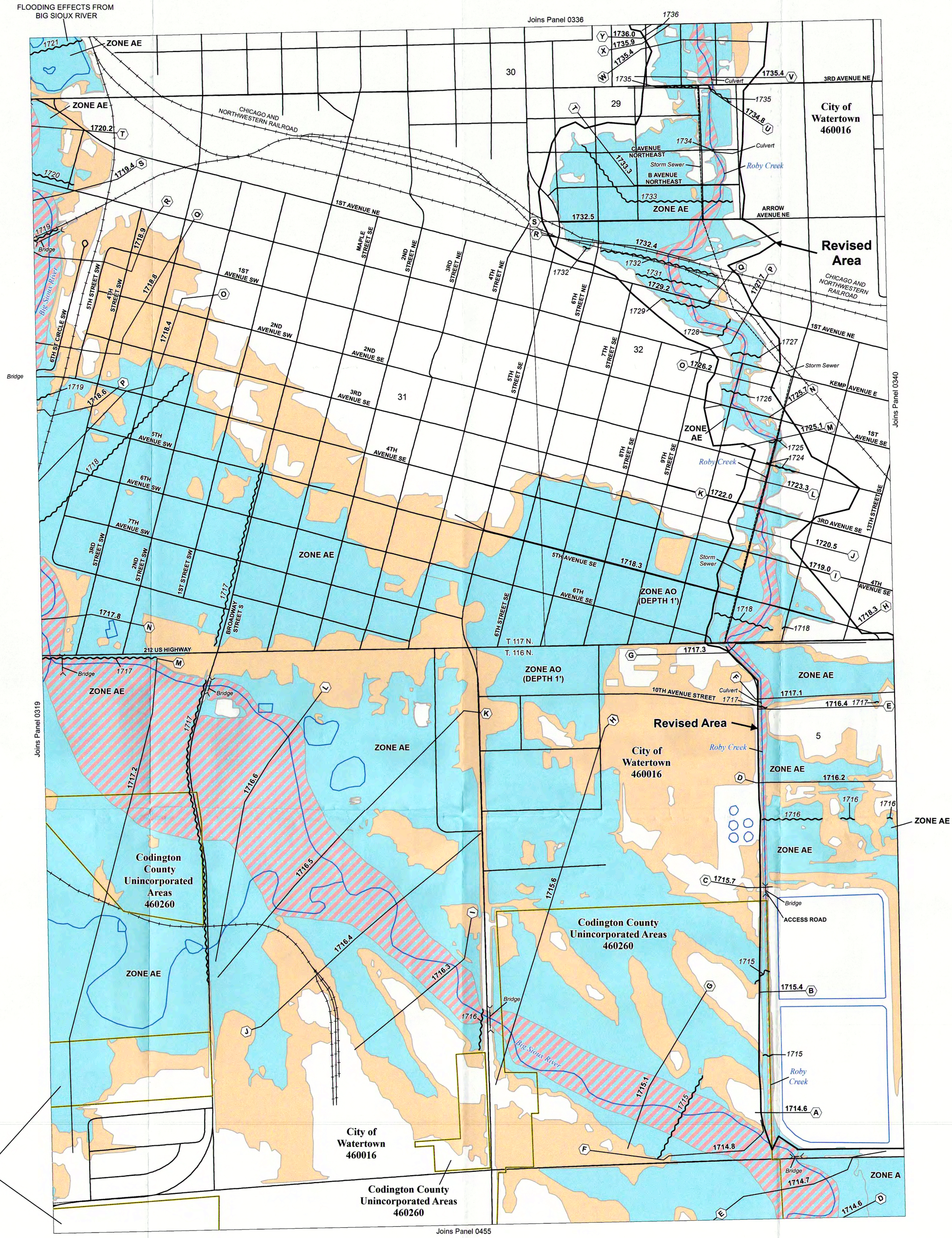
MAP NUMBER
46029C0336D

EFFECTIVE DATE
JANUARY 16, 2009

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 117 NORTH, RANGE 52 WEST



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

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

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2 % Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes. *Zone X*

OTHER AREAS
- NO SCREEN Areas of Minimal Flood Hazard *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert or Storm Sewer
- Accredited or Provisionally Acredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike or Floodwall
- E 18.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevations (BFE)
- 8 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

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

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

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

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

ACCREDITED LEVEE NOTES TO USERS: Check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at http://www.fema.gov/business/nfip/index.shtm.

SCALE

N

Map Projection:
Universal Transverse MercatorNAD 1983 UTM Zone 14N
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

CODINGTON COUNTY, SOUTH DAKOTA

PANEL 338 OF 500

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CODINGTON COUNTY	460260	0338	D
WATERTOWN, CITY OF	460016	0338	D

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