

# FLOOD INSURANCE STUDY

## FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 1



## DALLAS COUNTY, TEXAS

### AND INCORPORATED AREAS

COMMUNITY NAME	NUMBER
Lancaster, City of	480182
Lewisville, City of	480195
Mesquite, City of	485490
Ovilla, City of	481155
Richardson, City of	480184
Rowlett, City of	480185
Sachse, City of	480186
Seagoville, City of	480187
Sunnyvale, Town of	480188
University Park, City of	480189
Wilmer, City of	480190
Wylie, City of	480759

COMMUNITY NAME	NUMBER
Dallas County Unincorporated Areas *	480165
Addison, Town of	481089
Balch Springs, City of	480166
Carrollton, City of	480167
Cedar Hill, City of *	480168
Cockrell Hill, City of	480169
Combine, City of	480408
Coppell, City of	480170
Dallas, City of *	480171
Desoto, City of	480172
Duncanville, City of *	480173
Farmers Branch, City of	480174
Ferris, City of	481076
Garland, City of	485471
Glenn Heights, City of	481265
Grand Prairie, City of *	485472
Grapevine, City of	480598
Highland Park, Town of	480178
Hutchins, City of	480179
Irving, City of *	480180

**PRELIMINARY**  
**03/06/2014**

\* This document includes only those communities affected by revisions

## REVISED:

FLOOD INSURANCE STUDY NUMBER  
**48113CV000**

Version Number 2.3.3.2



**FEMA**

This Preliminary FIS report dated March 6, 2015, includes revisions based on detailed studies completed by the City of Grand Prairie as a FEMA Cooperating Technical Partner (CTP). The following document only includes data revised due to the following projects: City of Grand Prairie CTP FY12 Risk MAP Study, West Irving Branch LOMR.

City of Grand Prairie CTP FY12 Risk MAP Study Streams in Dallas County:

- Alspaugh Branch
- Bear Creek
- Dalworth Creek
- Dry Creek
- Gopher Branch
- Johnson Creek
- Turner Branch

Incorporated LOMR Study Streams in Dallas County:

- West Irving Branch (Case Number 15-06-0292P)

**TABLE OF CONTENTS**  
**Volume 1**

	<u>Page</u>
<b>SECTION 1.0 – INTRODUCTION.....</b>	<b>1</b>
1.1 The National Flood Insurance Program.....	1
1.2 Purpose of this Flood Insurance Study Report .....	2
1.3 Jurisdictions Included in the Flood Insurance Study Project .....	2
1.4 Considerations for using this Flood Insurance Study Report.....	2
<b>SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS.....</b>	<b>12</b>
2.1 Floodplain Boundaries.....	12
2.2 Floodways.....	13
2.3 Base Flood Elevations.....	16
2.4 Non-Encroachment Zones.....	16
2.5 Coastal Flood Hazard Areas.....	16
2.5.1 Water Elevations and the Effects of Waves .....	16
2.5.2 Floodplain Boundaries and BFEs for Coastal Areas .....	16
2.5.3 Coastal High Hazard Areas.....	16
2.5.4 Limit of Moderate Wave Action.....	17
<b>SECTION 3.0 – INSURANCE APPLICATIONS.....</b>	<b>17</b>
3.1 National Flood Insurance Program Insurance Zones.....	17
3.2 Coastal Barrier Resources System .....	17
<b>SECTION 4.0 – AREA STUDIED .....</b>	<b>17</b>
4.1 Basin Description.....	17
4.2 Principal Flood Problems.....	18
4.3 Non-Levee Flood Protection Measures .....	18
4.4 Levees .....	19
<b>SECTION 5.0 – ENGINEERING METHODS.....</b>	<b>22</b>
5.1 Hydrologic Analyses .....	22
5.2 Hydraulic Analyses .....	26
5.3 Coastal Analyses.....	28
5.3.1 Total Stillwater Elevations .....	28
5.3.2 Waves .....	28
5.3.3 Coastal Erosion.....	28
5.3.4 Wave Hazard Analyses .....	28
5.4 Alluvial Fan Analyses.....	28
<b>SECTION 6.0 – MAPPING METHODS.....</b>	<b>29</b>
6.1 Vertical and Horizontal Control .....	29
6.2 Base Map.....	29
6.3 Floodplain and Floodway Delineation.....	30
6.4 Coastal Flood Hazard Mapping.....	38
6.5 FIRM Revisions .....	38
6.5.1 Letters of Map Amendment .....	38
6.5.2 Letters of Map Revision Based on Fill.....	38
6.5.3 Letters of Map Revision.....	39
6.5.4 Physical Map Revisions .....	39
6.5.5 Contracted Restudies.....	39
6.5.6 Community Map History.....	40
<b>SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION .....</b>	<b>41</b>
7.1 Contracted Studies.....	41
7.2 Community Meetings.....	41
<b>SECTION 8.0 – ADDITIONAL INFORMATION.....</b>	<b>42</b>
<b>SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES.....</b>	<b>43</b>

**TABLE OF CONTENTS (Continued)**  
**Volume 1**

Figures

	<u>Page</u>
Figure 1: FIRM Panel Index .....	5
Figure 2: FIRM Notes to Users .....	6
Figure 3: Map Legend for FIRM .....	9
Figure 4: Floodway Schematic.....	14
Figure 5: Wave Runup Transect Schematic .....	16
Figure 6: Coastal Transect Schematic .....	16
Figure 7: Frequency Discharge-Drainage Area Curves .....	25
Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas.....	28
Figure 9: Transect Location Map.....	28

Tables

	<u>Page</u>
Table 1: Listing of NFIP Jurisdictions .....	2
Table 2: Flooding Sources Included in this FIS Report .....	15
Table 3: Flood Zone Designations by Community .....	17
Table 4: Coastal Barrier Resources System Information .....	17
Table 5: Basin Characteristics .....	18
Table 6: Principal Flood Problems .....	18
Table 7: Historic Flooding Elevations .....	18
Table 8: Non-Levee Flood Protection Measures.....	19
Table 9: Levees.....	21
Table 10: Summary of Discharges .....	23
Table 11: Summary of Non-Coastal Stillwater Elevations .....	26
Table 12: Stream Gage Information used to Determine Discharges .....	26
Table 13: Summary of Hydrologic and Hydraulic Analyses.....	27
Table 14: Roughness Coefficients .....	28
Table 15: Summary of Coastal Analyses.....	28
Table 16: Tide Gage Analysis Specifics .....	28
Table 17: Coastal Transect Parameters.....	28
Table 18: Summary of Alluvial Fan Analyses .....	28
Table 19: Results of Alluvial Fan Analyses.....	29
Table 20: Countywide Vertical Datum Conversion.....	29
Table 21: Stream-Based Vertical Datum Conversion.....	29
Table 22: Base Map Sources.....	30
Table 23: Summary of Topographic Elevation Data used in Mapping .....	30
Table 24: Floodway Data .....	31
Table 25: Flood Hazard and Non-Encroachment Data for Selected Streams.....	38
Table 26: Summary of Coastal Transect Mapping Considerations.....	38
Table 27: Incorporated Letters of Map Change .....	39
Table 28: Community Map History .....	40
Table 29: Summary of Contracted Studies Included in this FIS Report .....	41
Table 30: Community Meetings .....	42
Table 31: Map Repositories .....	42
Table 32: Additional Information.....	43
Table 33: Bibliography and References.....	44

**TABLE OF CONTENTS (Continued)**  
**Volume 1**

Exhibits

<u>Flood Profiles</u>	<u>Panel</u>
Alspaugh Branch.....	01P - 02P
Bear Creek.....	01P - 03P
Dalworth Creek.....	01P - 03P
Dry Creek.....	01P
Gopher Branch.....	01P - 02P
Johnson Creek.....	01P - 02P
Turner Branch.....	01P

\* Panels are not renumbered to match Countywide FIS Report for this submittal.

**Published Separately**

Flood Insurance Rate Map (FIRM)

# FLOOD INSURANCE STUDY REPORT DALLAS COUNTY, TEXAS

## SECTION 1.0 – INTRODUCTION

### 1.1 The National Flood Insurance Program

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

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

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

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

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

SFHAs are delineated on the community's Flood Insurance Rate Maps (FIRMs). Under the NFIP, buildings that were built before the flood hazard was identified on the community's FIRMs are generally referred to as "Pre-FIRM" buildings. When the NFIP was created, the U.S. Congress recognized that insurance for Pre-FIRM buildings would be prohibitively expensive if the premiums were not subsidized by the Federal Government. Congress also recognized that most of these floodprone buildings were built by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. The NFIP requires that full actuarial rates reflecting the complete flood risk be charged on all buildings constructed or substantially improved on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later. These buildings are generally referred to as "Post-FIRM" buildings.

## 1.2 Purpose of this Flood Insurance Study Report

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

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

## 1.3 Jurisdictions Included in the Flood Insurance Study Project

This FIS Report covers the entire geographic area of Dallas County, Texas.

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

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

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

**Table 1: Listing of NFIP Jurisdictions**

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s) (48113C-)	If Not Included, Location of Flood Hazard Data
Dallas County, Unincorporated Areas	480165	12030102	0315L, 0455M, 0465L	*
City of Cedar Hill	480168	12030102, 12030105	0465L	*
City of Dallas	480171	12030102, 12030105	0455M, 0465L	*
City of Duncanville	480173	12030102, 12030105	0465L	*
City of Grand Prairie	485472	12030102	0285L, 0295L, 0305L, 0315L, 0435M, 0445L, 0455M, 0465L	*
City of Irving	480180	12030102, 12030103	0285L, 0295L, 0305L, 0315L	*

\* Data for all communities in this report is included in the accompanying FIRM Database.

## 1.4 Considerations for using this Flood Insurance Study Report

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1% annual chance flood elevation is also referred to as the Base Flood Elevation

(BFE)); delineations of the 1% annual chance and 0.2% annual chance floodplains; and 1% annual chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal Stillwater Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

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

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

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

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

The initial Countywide FIS Report for Dallas County became effective on August 23, 2001. Refer to Table 28 for information about subsequent revisions to the FIRMs.

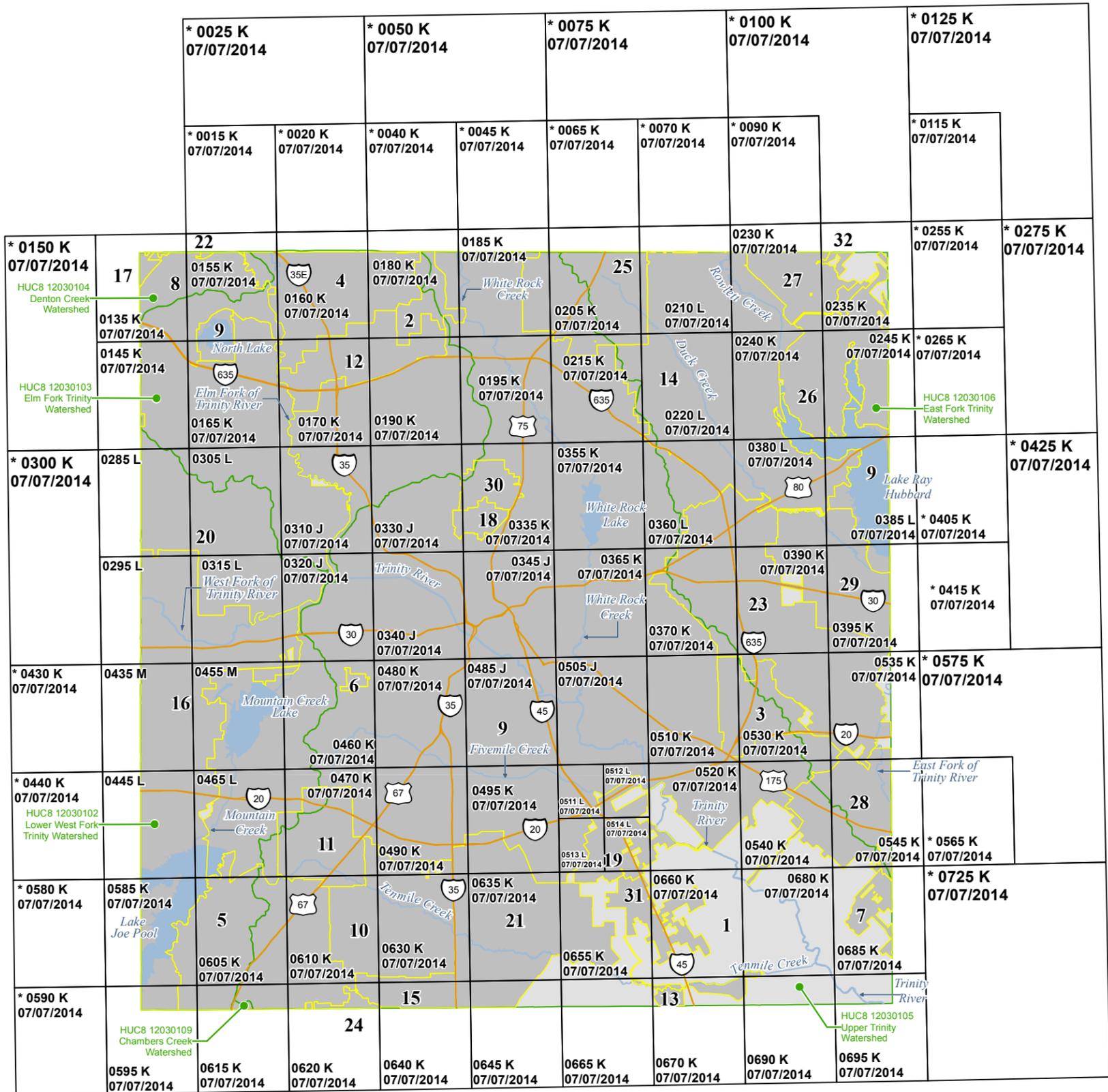
- FEMA does not impose floodplain management requirements or special insurance ratings based on Limit of Moderate Wave Action (LiMWA) delineations at this time. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. If the LiMWA is shown on the FIRM, it is being provided by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

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

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

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

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



KEY TO COMMUNITY NAMES AND CIDS

KEY NUMBER	COMMUNITY NAME	CID	KEY NUMBER	COMMUNITY NAME	CID
1	DALLAS COUNTY, UNINCORPORATED AREAS	480165	17	GRAPEVINE, CITY OF	480598
2	ADDISON, TOWN OF	481089	18	HIGHLAND PARK, TOWN OF	480178
3	BALCH SPRINGS, CITY OF	480166	19	HUTCHINS, CITY OF	480179
4	CARROLLTON, CITY OF	480167	20	IRVING, CITY OF	480180
5	CEDAR HILL, CITY OF	480168	21	LANCASTER, CITY OF	480182
6	COCKRELL HILL, CITY OF	480169	22	LEWISVILLE, CITY OF	480195
7	COMBINE, CITY OF	480408	23	MESQUITE, CITY OF	485490
8	COPPELL, CITY OF	480170	24	OVILLA, CITY OF	481155
9	DALLAS, CITY OF	480171	25	RICHARDSON, CITY OF	480184
10	DESOTO, CITY OF	480172	26	ROWLETT, CITY OF	480185
11	DUNCANVILLE, CITY OF	480173	27	SACHSE, CITY OF	480186
12	FARMERS BRANCH, CITY OF	480174	28	SEAGOVILLE, CITY OF	480187
13	FERRIS, CITY OF	481076	29	SUNNYVALE, TOWN OF	480188
14	GARLAND, CITY OF	485471	30	UNIVERSITY PARK, CITY OF	480189
15	GLENN HEIGHTS, CITY OF	481265	31	WILMER, CITY OF	480190
16	GRAND PRAIRIE, CITY OF	485472	32	WYLIE, CITY OF	480759

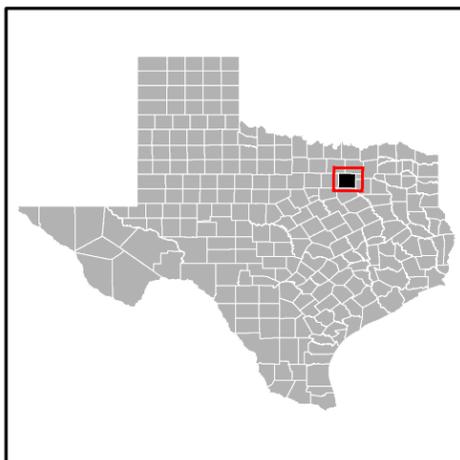
**1 inch = 5 miles**

Map Projection:  
State Plane Texas North Central FIPS Zone 4202;  
North American Datum of 1983 (NSRS 2007)

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

**HTTP://MSC.FEMA.GOV**

SEE FLOOD INSURANCE STUDY REPORT FOR ADDITIONAL INFORMATION



**NATIONAL FLOOD INSURANCE PROGRAM**

FLOOD INSURANCE RATE MAP INDEX

DALLAS COUNTY, TEXAS AND INCORPORATED AREAS

PANELS PRINTED:

0135, 0145, 0155, 0160, 0165, 0170, 0180, 0185, 0190, 0195, 0205, 0210, 0215, 0220, 0230, 0235, 0240, 0245, 0285, 0295, 0305, 0310, 0315, 0320, 0330, 0335, 0340, 0345, 0355, 0360, 0365, 0370, 0380, 0385, 0390, 0395, 0435, 0445, 0455, 0460, 0465, 0470, 0480, 0485, 0490, 0495, 0505, 0510, 0511, 0512, 0513, 0514, 0520, 0530, 0535, 0540, 0545, 0585, 0595, 0605, 0610, 0615, 0620, 0630, 0635, 0640, 0645, 0655, 0660, 0665, 0670, 0680, 0685, 0690, 0695



FEMA

PRELIMINARY

MAP NUMBER  
48113CIND0E

MAP REVISED  
DATE

\* PANEL NOT PRINTED - AREA OUTSIDE COUNTY BOUNDARY

**Figure 2: FIRM Notes to Users**

## **NOTES TO USERS**

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

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

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

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

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

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

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

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

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

PROJECTION INFORMATION: The projection used in the preparation of the map was State Plane Texas North Central FIPS 4202 (Feet). The horizontal datum was NAD83 (NSRS – 2007), GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

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

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

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

**BASE MAP INFORMATION:** Base Map information shown on this FIRM was derived from multiple sources. The FEMA National Flood Hazard Layer (NFHL) data provided base transportation and city limit information, 2014. The North Central Texas Council of Governments (NCTCOG) provided base map data, 2005 - 2010. The Texas Natural Resources (TNRIS) provided the Texas Strategic Mapping Program (StratMap) GIS data for city and corporate boundaries, and transportation layers dated 2014. The City of Grand Prairie provided road files dated 2014. Additional information was photogrammetrically compiled at a scale of at least 1:24000 from aerial photography dated 2013.

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

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

### **NOTES FOR FIRM INDEX**

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

### **SPECIAL NOTES FOR SPECIFIC FIRM PANELS**

This Notes to Users section was created specifically for Dallas County, Texas, effective July 7, 2014.

**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>.

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

**Figure 3: Map Legend for FIRM**

**SPECIAL FLOOD HAZARD AREAS:** *The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. See note for specific types. If the floodway is too narrow to be shown, a note is shown.*



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

- Zone A The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.
- Zone AE The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone, either at cross section locations or as static whole-foot elevations that apply throughout the zone.
- Zone AH The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.
- Zone AO The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the hydraulic analyses are shown within this zone.
- Zone AR The flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- Zone A99 The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone.
- Zone V The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.
- Zone VE Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.



Regulatory Floodway determined in Zone AE.

**OTHER AREAS OF FLOOD HAZARD**



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



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



Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood. See Notes to Users for important information.

**OTHER AREAS**

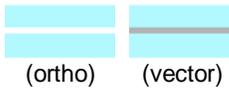


Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.



Unshaded Zone X: Areas of minimal flood hazard.

**FLOOD HAZARD AND OTHER BOUNDARY LINES**



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



Limit of Study

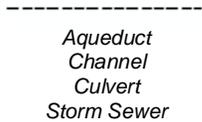


Jurisdiction Boundary

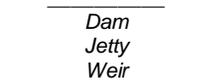


Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet

**GENERAL STRUCTURES**



Channel, Culvert, Aqueduct, or Storm Sewer



Dam, Jetty, Weir



Levee, Dike, or Floodwall accredited or provisionally accredited to reduce the flood risk from the 1% annual chance flood.



Levee, Dike or Floodwall not accredited to reduce the flood risk from the 1% annual chance flood.



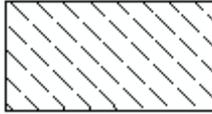
Bridge

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



**CBRS AREA**  
09/30/2009

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



**OTHERWISE PROTECTED AREA**  
09/30/2009

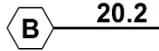
Otherwise Protected Area

**REFERENCE MARKERS**



River mile Markers

**CROSS SECTION & TRANSECT INFORMATION**



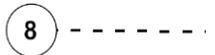
Lettered Cross Section with Regulatory Water Surface Elevation (BFE)



Numbered Cross Section with Regulatory Water Surface Elevation (BFE)



Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)



Coastal Transect



Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.



Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.



Base Flood Elevation Line (shown for flooding sources for which no cross sections or profile are available)

**ZONE AE**  
(EL 16)

Static Base Flood Elevation value (shown under zone label)

**ZONE AO**  
(DEPTH 2)

Zone designation with Depth

**ZONE AO**  
(DEPTH 2)  
(VEL 15 FPS)

Zone designation with Depth and Velocity

## BASE MAP FEATURES

*Missouri Creek*

River, Stream or Other Hydrographic Feature



Interstate Highway



U.S. Highway



State Highway



County Highway

MAPLE LANE

Street, Road, Avenue Name, or Private Drive if shown on Flood Profile



Railroad



Horizontal Reference Grid Line



Horizontal Reference Grid Ticks



Secondary Grid Crosshairs

Land Grant

Name of Land Grant

7

Section Number

R. 43 W. T. 22 N.

Range, Township Number

<sup>42</sup>76<sup>000m</sup>E

Horizontal Reference Grid Coordinates (UTM)

**365000 FT**

Horizontal Reference Grid Coordinates (State Plane)

**80° 16' 52.5"**

Corner Coordinates (Latitude, Longitude)

## SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS

### 2.1 Floodplain Boundaries

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

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

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

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

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

## **2.2 Floodways**

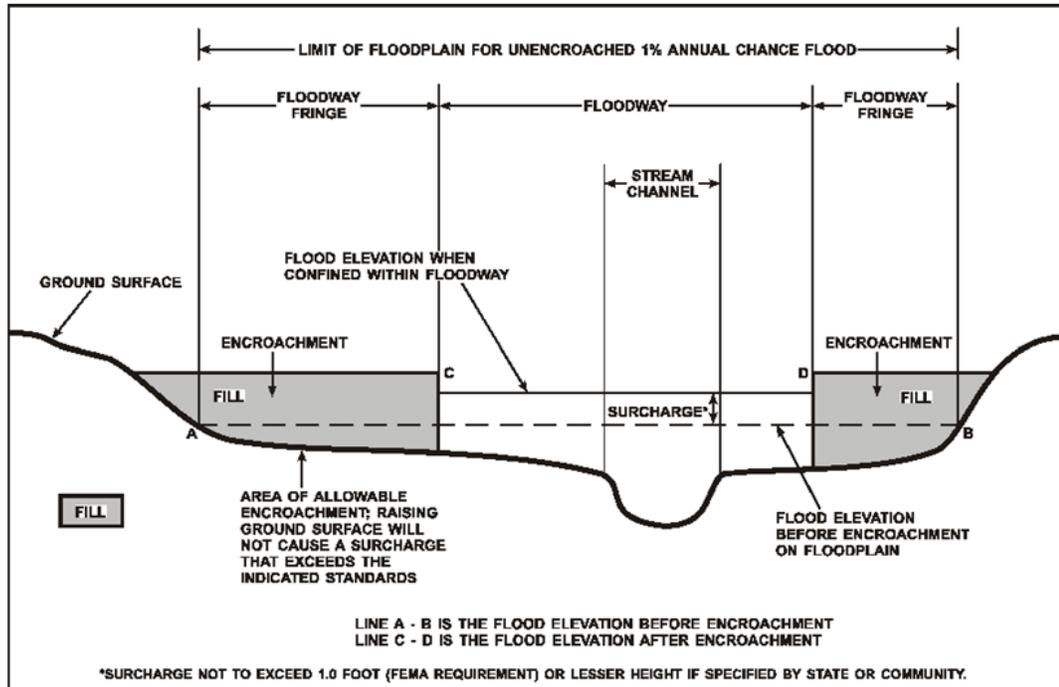
Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development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

For purposes of the NFIP, a floodway is used as a tool to assist local communities in balancing floodplain development against increasing flood hazard. With this approach, the area of the 1% annual chance floodplain on a river is divided into a floodway and a floodway fringe based on hydraulic modeling. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order to carry the 1% annual chance flood. The floodway fringe is the area between the floodway and the 1% annual chance floodplain boundaries where encroachment is permitted. The floodway must be wide enough so that the floodway fringe could be completely obstructed without increasing the water surface elevation of the 1% annual chance flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4. To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. Regulations for Texas require communities in Dallas County to limit increases caused by encroachment to 1 foot and several communities have adopted additional restrictions. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

Figure 4.

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. Regulations for Texas require communities in Dallas County to limit increases caused by encroachment to 1 foot and several communities have adopted additional restrictions. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

Figure 4: Floodway Schematic



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

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

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Stream Length (mi)	Ponding Area (mi <sup>2</sup> )	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Alspaugh Branch	City of Grand Prairie	At confluence with Mountain Creek	Just below Lakewood Pond	12030102	2.22	0.00	Y	AE	01/31/2014
Bear Creek	City of Irving	At confluence with West Fork of Trinity River	Just below Rock Island Road	12030102	7.36	0.00	Y	AE	01/31/2014
Dalworth Creek	City of Grand Prairie	At confluence with West Fork of Trinity River	Just below NW 23rd Street	12030102	2.93	0.00	Y	AE	01/31/2014
Dry Creek	City of Irving	At confluence with Bear Creek	Just below Rock Island Road	12030102	1.47	0.00	Y	AE	01/31/2014
Gopher Creek	City of Grand Prairie	At confluence with West Fork of Trinity River	Just above Small Hill Street	12030102	1.54	0.00	Y	AE	01/31/2014
Johnson Creek	City of Grand Prairie	At confluence with West Fork of Trinity River	At Dallas County / Tarrant County Boundary	12030102	1.44	0.00	Y	AE	01/31/2014
Turner Creek	City of Grand Prairie	At confluence with Gopher Branch	Just below East Main Street	12030102	0.91	0.00	Y	AE	01/31/2014

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

### **2.3 Base Flood Elevations**

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

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

### **2.4 Non-Encroachment Zones**

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

Non-encroachment determinations may be delineated where it is not possible to delineate floodways because specific channel profiles with bridge and culvert geometry were not developed. Any non-encroachment determinations for this Flood Risk Project have been tabulated for selected cross sections and are shown in Table 31, “Flood Hazard and Non-Encroachment Data for Selected Streams.”

### **2.5 Coastal Flood Hazard Areas**

This section is not applicable to this Flood Risk Project.

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

This section is not applicable to this Flood Risk Project.

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

[Not Applicable to this Flood Risk Project]

#### **2.5.2 Floodplain Boundaries and BFEs for Coastal Areas**

This section is not applicable to this Flood Risk Project.

#### **2.5.3 Coastal High Hazard Areas**

This section is not applicable to this Flood Risk Project.

#### **Figure 6: Coastal Transect Schematic**

[Not Applicable to this Flood Risk Project]

### 2.5.4 Limit of Moderate Wave Action

This section is not applicable to this Flood Risk Project.

## SECTION 3.0 – INSURANCE APPLICATIONS

### 3.1 National Flood Insurance Program Insurance Zones

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

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

Table 3 lists the flood insurance zones in the unincorporated and incorporated areas of Dallas County.

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

Community	Flood Zone(s)
Dallas County, Unincorporated Areas	AE, X
City of Cedar Hill	A, AE, X
City of Dallas	A, AE, X
City of Duncanville	AE, X
City of Irving	AE, X
City of Grand Prairie	A, AE, X

### 3.2 Coastal Barrier Resources System

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

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

[Not Applicable to this Flood Risk Project]

## SECTION 4.0 – AREA STUDIED

### 4.1 Basin Description

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

description of the basin, and its drainage area.

**Table 5: Basin Characteristics**

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (mi <sup>2</sup> )
Elm Fork Trinity	12030103	Elm Fork Trinity	Begins in headwaters of Elm Fork Trinity River in Eastern Montague County to its confluence with West Fork Trinity and the Trinity River in Dallas County. Also crosses Cooke, Wise, Collin, Denton, and Tarrant Counties.	117.34
Lower West Fork Trinity	12030102	West Fork Trinity	Begins in headwaters of Clear Fork Trinity River in North Western Parker County to the confluence of West Fork Trinity River and Elm Fork Trinity with the Trinity River in Dallas County. Also crosses Wise, Tarrant, Hood, Johnson, and Ellis Counties.	128.36
Upper Trinity	12030105	Trinity River	Begins in headwaters of White Rock Creek in Collin County in the North to the confluence of Trinity River and Richland Chambers Creek in Freestone County. Also crosses Denton, Dallas, Rockwall, Ellis, Kaufman, Navarro, Henderson, and Anderson Counties.	469.36

#### 4.2 Principal Flood Problems

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

**Table 6: Principal Flood Problems**

Flooding Source	Description of Flood Problems
Alspaugh Branch	See 2014 TSDN Report (FEMA Case Number: 13-06-1185S)
Bear Creek	See 2014 TSDN Report (FEMA Case Number: 13-06-1185S)
Dalworth Creek	See 2014 TSDN Report (FEMA Case Number: 13-06-1185S)
Dry Creek	See 2014 TSDN Report (FEMA Case Number: 13-06-1185S)
Gopher Creek	See 2014 TSDN Report (FEMA Case Number: 13-06-1185S)
Johnson Creek	See 2014 TSDN Report (FEMA Case Number: 13-06-1185S)
Turner Creek	See 2014 TSDN Report (FEMA Case Number: 13-06-1185S)

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

#### Table 7: Historic Flooding Elevations

[Not Applicable to this Flood Risk Project]

#### 4.3 Non-Levee Flood Protection Measures

Table 8 contains information about non-levee flood protection measures within Dallas County such as dams, jetties, and or dikes. Levees are addressed in Section 4.4 of this FIS Report.

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

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Dry Creek	N/A	Dam	880 ft. below Belt Line Road	Flood Reduction Dam
Dry Creek	N/A	Dam	1410 ft. below Belt Line Road	Flood Reduction Dam
Dry Creek	N/A	Dam	1990 ft. below Belt Line Road	Flood Reduction Dam
Dry Creek	N/A	Dam	2410 ft. below Belt Line Road	Flood Reduction Dam
Gopher Branch	N/A	Storm Sewer	250 ft. above Belt Line Road	Managed by City of Grand Prairie
Gopher Branch	N/A	Dam	300 ft. below Small Hill Drive	High School Pond Dam
Gopher Branch	N/A	Storm Sewer	230 ft. above Highschool Drive	Managed by City of Grand Prairie
Gopher Branch	N/A	Storm Sewer	370 ft. above Highschool Drive	Managed by City of Grand Prairie
Johnson Creek	N/A	Dam	550 ft. below 19 <sup>th</sup> Street	Flood Reduction Dam

#### 4.4 Levees

For purposes of the NFIP, FEMA only recognizes levee systems that meet, and continue to meet, minimum design, operation, and maintenance standards that are consistent with comprehensive floodplain management criteria. The Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10) describes the information needed for FEMA to determine if a levee system reduces the risk from the 1% annual chance flood. This information must be supplied to FEMA by the community or other party when a flood risk study or restudy is conducted, when FIRMs are revised, or upon FEMA request. FEMA reviews the information for the purpose of establishing the appropriate FIRM flood zone.

Levee systems that are determined to reduce the risk from the 1% annual chance flood are accredited by FEMA. FEMA can also grant provisional accreditation to a levee system that was previously accredited on an effective FIRM and for which FEMA is awaiting data and/or documentation to demonstrate compliance with Section 65.10. These levee systems are referred to as Provisionally Accredited Levees, or PALs. Provisional accreditation provides communities and levee owners with a specified timeframe to obtain the necessary data to confirm the levee's certification status. Accredited levee systems and PALs are shown on the FIRM using the symbology shown in Figure 3 and in Table 9. If the required information for a PAL is not submitted within the required timeframe, or if information indicates that a levee system no longer meets Section 65.10, FEMA will de-accredit the levee system and issue an effective FIRM showing the levee-impacted area as a SFHA.

FEMA coordinates its programs with USACE, who may inspect, maintain, and repair levee systems. The USACE has authority under Public Law 84-99 to supplement local efforts to repair flood control projects that are damaged by floods. Like FEMA, the USACE provides a program to allow public sponsors or operators to address levee system maintenance deficiencies. Failure to do so within the required timeframe results in the levee system being placed in an inactive status in the USACE Rehabilitation and Inspection Program. Levee systems in an inactive status are ineligible for rehabilitation assistance under Public Law 84-99.

FEMA coordinated with the USACE, the local communities, and other organizations to compile a list of levees that exist within Dallas County. Table 9, "Levees," lists all accredited levees, PALs, and de-accredited levees shown on the FIRM for this FIS Report. Other categories of levees may also be included in the table. The Levee ID shown in this table may not match numbers based on other identification systems that were listed in previous FIS Reports. Levees identified as PALs in the table are labeled on the FIRM to indicate their provisional status.

Please note that the information presented in Table 9 is subject to change at any time. For that reason, the latest information regarding any USACE structure presented in the table should be obtained by contacting USACE and accessing the USACE national levee database. For levees owned and/or operated by someone other than the USACE, contact the local community shown in Table 31.

**Table 9: Levees**

Community	Flooding Source	Levee Location	Levee Owner	USACE Levee	Levee ID	Covered Under PL84-99 Program?	FIRM Panel(s)	Levee Status
City of Grand Prairie	Keas Branch	Left Bank	Grand Prairie Metropolitan Utility Reclamation District	F	1605557008	F	48113C0315L	Accredited
City of Irving	Bear Creek	Left Bank	Dallas County Flood Control District #1	F	1604557006	F	48113C0285L	Accredited
City of Grand Prairie	West Fork of Trinity River	Right Bank	Trinity River Authority	F	1605557010	F	48113C0315L	Accredited
City of Irving	West Fork of Trinity River	Left Bank	City of Irving	F	1605557011	F	48113C0315L	Accredited
City of Grand Prairie	Johnson Creek	Right Bank	City of Grand Prairie	F	1605557007	F	48113C0295L	Accredited
City of Grand Prairie	West Fork of Trinity River	Right Bank	Trinity River Authority	F	1605557010	F	48113C0315L	Accredited
City of Grand Prairie	West Fork of Trinity River	Right Bank	City of Grand Prairie	F	1601557009	F	48113C0315L	Accredited

## SECTION 5.0 – ENGINEERING METHODS

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

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

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

### 5.1 Hydrologic Analyses

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

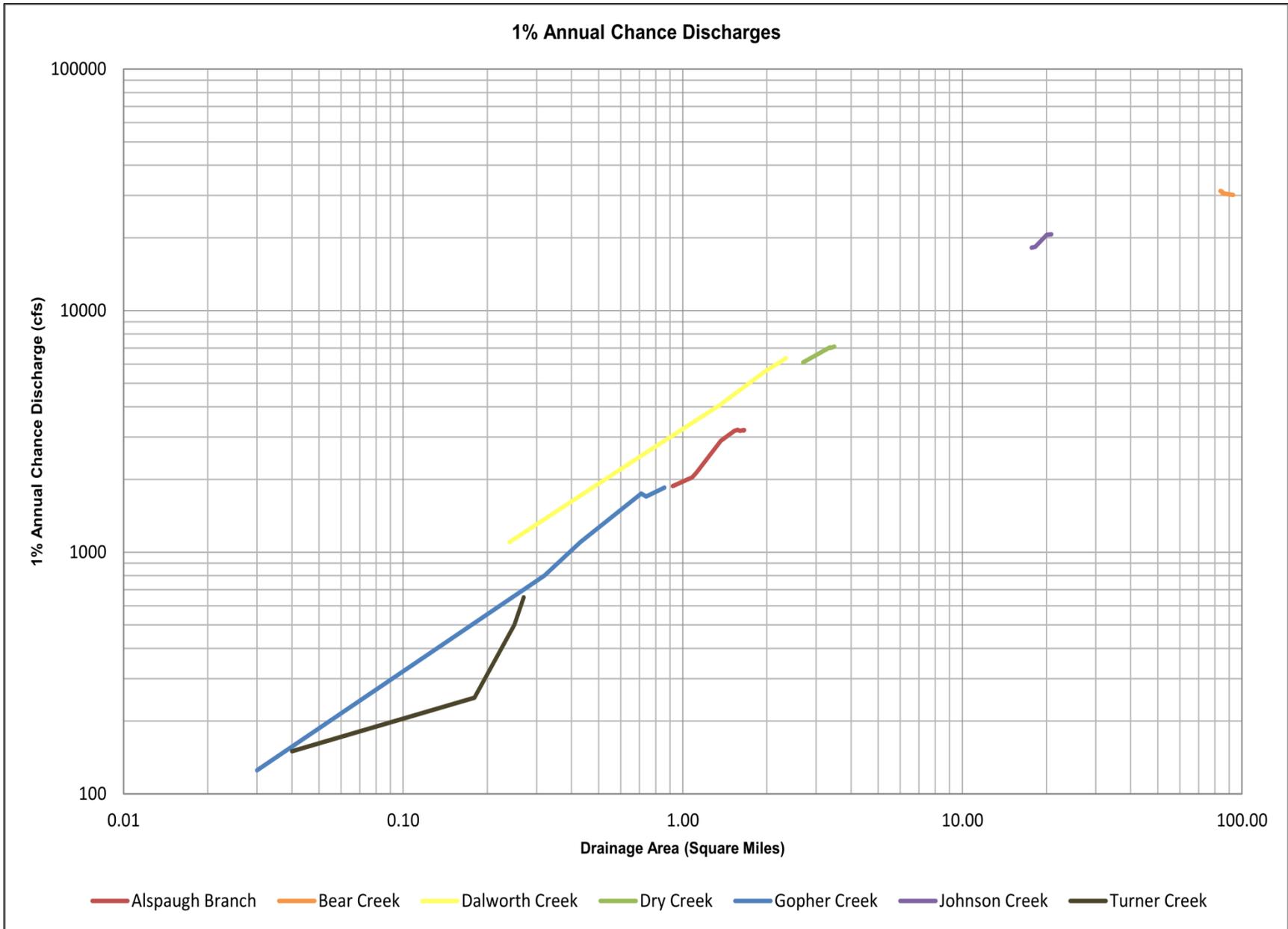
A summary of the discharges is provided in Table 10. Frequency Discharge-Drainage Area Curves used to develop the hydrologic models may also be shown in Figure 7 for selected flooding sources. A summary of stillwater elevations developed for non-coastal flooding sources is provided in Table 11. (Coastal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

**Table 10: Summary of Discharges**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Alspaugh Branch	At Lakewood Pond	0.92	815	1,110	1,430	1,880	3,280
Alspaugh Branch	1,180 ft above Robinson Road	1.00	870	1,180	1,520	1,960	3,400
Alspaugh Branch	450 ft above Robinson Road	1.03	870	1,180	1,550	1,990	3,450
Alspaugh Branch	Above Robinson Road	1.05	860	1,170	1,560	2,010	3,470
Alspaugh Branch	Below Robinson Road	1.08	875	1,190	1,590	2,040	3,520
Alspaugh Branch	790 ft below Robinson Road	1.12	915	1,250	1,680	2,140	3,670
Alspaugh Branch	1,080 ft below Robinson Road	1.37	1,370	1,720	2,340	2,890	4,700
Alspaugh Branch	1,520 ft above Camp Wisdom Road West	1.53	1,615	1,980	2,590	3,180	5,180
Alspaugh Branch	Below Camp Wisdom Road West	1.57	1,575	2,020	2,600	3,210	5,220
Alspaugh Branch	1,020 ft below Camp Wisdom Road West	1.60	1,565	1,990	2,590	3,180	5,080
Alspaugh Branch	1,700 ft below Camp Wisdom Road West	1.65	1,580	2,010	2,610	3,200	5,130
Alspaugh Branch	Above Camp Wisdom Road East	1.65	1,575	2,000	2,610	3,190	5,120
Alspaugh Branch	At Confluence with Mountain Creek	1.66	1,580	2,010	2,610	3,200	5,130
Bear Creek	At Rock Island Road	83.64	15,700	21,150	25,550	31,300	46,050
Bear Creek	At Shady Grove Road	84.64	15,650	21,050	25,500	31,200	45,950
Bear Creek	At Trinity Boulevard	85.06	15,650	21,050	25,500	31,100	45,950
Bear Creek	At confluence with Dry Creek/Belt Line Road	85.19	14,900	20,500	25,050	30,650	45,700
Bear Creek	At MacArthur Boulevard	92.93	14,550	20,050	24,850	30,150	45,150
Bear Creek	At confluence with West Fork Trinity River	93.05	14,550	20,050	24,850	30,150	45,150
Dalworth Creek	At Dalworth Street	0.24	750	900	1,000	1,100	1,300
Dalworth Creek	At State Highway 161	0.69	1,600	1,900	2,200	2,450	3,100

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Dalworth Creek	At Carrier Parkway	1.35	2,600	3,050	3,550	4,050	5,050
Dalworth Creek	At Interstate 30	1.97	3,850	4,500	4,950	5,600	6,800
Dalworth Creek	At confluence with West Fork Trinity River	2.34	4,450	5,250	5,800	6,350	7,800
Dry Creek	At Rock Island Road	2.69	3,950	4,750	5,450	6,100	7,800
Dry Creek	At Shady Grove Road	3.36	4,600	5,500	6,350	7,050	8,500
Dry Creek	At Belt Line Road	3.37	4,550	5,500	6,300	7,000	8,500
Dry Creek	At confluence with Bear Creek	3.49	4,600	5,550	6,350	7,100	8,650
Gopher Creek	At Small Hill Street	0.03	75	100	100	125	150
Gopher Creek	At Tarrant Road	0.32	600	650	700	800	1,200
Gopher Creek	At Belt Line Road	0.43	850	950	1,000	1,100	1,350
Gopher Creek	At confluence with Turner Branch	0.71	1,300	1,450	1,600	1,750	2,100
Gopher Creek	At Interstate 30	0.74	1,300	1,450	1,600	1,700	2,100
Gopher Creek	At confluence with West Fork Trinity River	0.86	1,350	1,500	1,650	1,850	2,200
Johnson Creek	2,400 ft below Duncan Perry Road	17.70	12,600	14,600	16,900	18,200	22,300
Johnson Creek	Above Carrier Parkway	18.26	12,700	14,700	17,100	18,400	22,300
Johnson Creek	At confluence of Arbor Creek	20.04	14,500	16,600	19,100	20,600	24,400
Johnson Creek	At confluence with West Fork Trinity River	20.84	14,500	16,800	19,300	20,700	24,600
Turner Creek	At Small Hill Street	0.04	100	125	150	150	200
Turner Creek	At Belt Line Road	0.18	200	225	250	250	300
Turner Creek	At Tarrant Road	0.25	375	425	475	500	650
Turner Creek	At confluence with Gopher Branch	0.27	450	550	600	650	800

Figure 7: Frequency Discharge-Drainage Area Curves



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

[Not Applicable to this Flood Risk Project]

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

[Not Applicable to this Flood Risk Project]

**5.2 Hydraulic Analyses**

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

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

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

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

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Alspaugh Branch	At confluence with Mountain Creek	Just below Lakewood Pond	HEC-HMS 3.0 and up	HEC-RAS 3.1.1 and up	1/31/2014	AE w/ FW	See Grand Prairie CTP FY2012 Combined TSDN Report with Case No. 13-06-1185S
Bear Creek	At confluence with West Fork of Trinity River	Just below Rock Island Road	HEC-HMS 3.0 and up	HEC-RAS 3.1.1 and up	1/31/2014	AE w/ FW	See Grand Prairie CTP FY2012 Combined TSDN Report with Case No. 13-06-1185S
Dalworth Creek	At confluence with West Fork of Trinity River	Just below NW 23rd Street	HEC-HMS 3.0 and up	HEC-RAS 3.1.1 and up	1/31/2014	AE w/ FW	See Grand Prairie CTP FY2012 Combined TSDN Report with Case No. 13-06-1185S
Dry Creek	At confluence with Bear Creek	Just below Rock Island Road	HEC-HMS 3.0 and up	HEC-RAS 3.1.1 and up	1/31/2014	AE w/ FW	See Grand Prairie CTP FY2012 Combined TSDN Report with Case No. 13-06-1185S
Gopher Creek	At confluence with West Fork of Trinity River	Just above Small Hill Street	HEC-HMS 3.0 and up	HEC-RAS 3.1.1 and up	1/31/2014	AE w/ FW	See Grand Prairie CTP FY2012 Combined TSDN Report with Case No. 13-06-1185S
Johnson Creek	At confluence with West Fork of Trinity River	At Grand Prairie / Arlington City Limits	HEC-HMS 3.0 and up	HEC-RAS 3.1.1 and up	1/31/2014	AE w/ FW	See Grand Prairie CTP FY2012 Combined TSDN Report with Case No. 13-06-1185S
Turner Creek	At confluence with Gopher Branch	Just below East Main Street	HEC-HMS 3.0 and up	HEC-RAS 3.1.1 and up	1/31/2014	AE w/ FW	See Grand Prairie CTP FY2012 Combined TSDN Report with Case No. 13-06-1185S

**Table 14: Roughness Coefficients**

Flooding Source	Channel "n"	Overbank "n"
Alspaugh Branch	0.030-0.050	0.015-0.100
Bear Creek	0.035-0.060	0.015-0.120
Dalworth Creek	0.013-0.090	0.015-0.120
Dry Creek	0.015-0.090	0.015-0.120
Gopher Creek	0.015-0.370	0.015-0.120
Johnson Creek	0.020-0.110	0.015-0.110
Turner Creek	0.040-0.045	0.015-0.120

**5.3 Coastal Analyses**

This section is not applicable to this Flood Risk Project.

**Table 15: Summary of Coastal Analyses**

[Not Applicable to this Flood Risk Project]

**5.3.1 Total Stillwater Elevations**

This section is not applicable to this Flood Risk Project.

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

[Not Applicable to this Flood Risk Project]

**Table 16: Tide Gage Analysis Specifics**

[Not Applicable to this Flood Risk Project]

**5.3.2 Waves**

This section is not applicable to this Flood Risk Project.

**5.3.3 Coastal Erosion**

This section is not applicable to this Flood Risk Project.

**5.3.4 Wave Hazard Analyses**

This section is not applicable to this Flood Risk Project.

**Table 17: Coastal Transect Parameters**

[Not Applicable to this Flood Risk Project]

**Figure 9: Transect Location Map**

[Not Applicable to this Flood Risk Project]

**5.4 Alluvial Fan Analyses**

This section is not applicable to this Flood Risk Project.

**Table 18: Summary of Alluvial Fan Analyses**

[Not Applicable to this Flood Risk Project]

## **Table 19: Results of Alluvial Fan Analyses**

[Not Applicable to this Flood Risk Project]

### **SECTION 6.0 – MAPPING METHODS**

#### **6.1 Vertical and Horizontal Control**

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

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

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

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

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

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

#### **Table 20: Countywide Vertical Datum Conversion**

[Not Applicable to this Flood Risk Project]

#### **Table 21: Stream-Based Vertical Datum Conversion**

[Not Applicable to this Flood Risk Project]

#### **6.2 Base Map**

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA's FIRM database specifications and geographic information standards. This information is

provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features. For example, the information contained in the Floodway Data table and Flood Profiles can be linked to the cross sections that are shown on the FIRMs. Additional information about the FIRM Database and its contents can be found in FEMA’s *Guidelines and Standards for Mapping Partners*, Appendix L.

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

**Table 22: Base Map Sources**

Data Type	Data Provider	Data Date	Data Scale	Data Description
FIRM Panels	U.S. Geological Survey (USGS)	1989	1:12000	FIRM Panel Boundaries
Transportation and Surface Water Features	North Central Texas Council of Governments	2005	1:12000	Road, Railroads, Airports, Streams, and Lakes.
Road Features	City of Grand Prairie	2012	1:12000	Road Lines
TNRIS Stratmap v. 2.0 GIS Data	TNRIS	2014	1:12000	Transportation and Political Boundary Features

### 6.3 Floodplain and Floodway Delineation

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

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

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

The floodway widths presented in this FIS Report and on the FIRM were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. Table 2 indicates the flooding sources for which floodways have been determined. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 24, “Floodway Data.”

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

Community	Flooding Source	Source for Topographic Elevation Data			
		Description	Scale	Contour Interval	Citation
City of Grand Prairie	FY2012 Study Streams, FEMA Case # 13-06-1185S	LiDAR	12000	1 ft.	Grand Prairie 2009

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

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION ( FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,174	406	889	5.2	470.8	470.8	471.8	1.0
B	1,976	165	676	6.1	479.0	479.0	479.7	0.7
C	2,587	45	323	9.4	484.3	484.3	485.1	0.8
D	3,487	173	1,365	2.5	490.0	490.0	491.5	1.5
E	4,318	237	2,278	1.7	498.3	498.3	499.4	1.1
F	5,148	179	1,365	2.6	498.5	498.5	499.7	1.2
G	5,732	120	394	8.9	498.7	498.7	499.7	1.0
H	6,569	108	549	5.5	502.9	502.9	504.0	1.1
I	7,436	69	304	7.4	513.3	513.3	514.5	1.2
J	8,436	79	578	6.5	516.4	516.4	517.1	0.7
K	9,410	56	396	6.1	520.2	520.2	521.3	1.1
L	10,027	62	597	4.0	525.6	525.6	526.6	1.0
M	11,050	43	202	10.0	526.7	526.7	527.8	1.1
N	11,471	85	757	3.8	529.4	529.4	530.5	1.1

<sup>1</sup>Feet above confluence with Mountain Creek.

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**DALLAS COUNTY, TEXAS**  
AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: ALSPAUGH BRANCH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION ( FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	31,377	316	3,765	8.8	450.6	450.6	451.5	0.9
B	33,019	576	7,147	4.3	454.4	454.4	455.0	0.6
C	33,533	359	4,319	6.9	454.5	454.5	455.1	0.6
D	34,498	498	6,266	5.1	456.4	456.4	456.7	0.3
E	36,630	821	6,717	4.7	459.2	459.2	459.4	0.2
F	38,761	315	3,632	8.7	460.9	460.9	461.5	0.6

<sup>1</sup>Feet above confluence with West Fork of Trinity River.

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**DALLAS COUNTY, TEXAS**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: BEAR CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION ( FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,674	98	575	10.6	433.7	433.7	433.7	0.0
B	2,565	142	1,324	6.8	440.3	440.3	440.9	0.6
C	3,554	94	982	5.4	444.0	444.0	444.6	0.6
D	4,343	139	1,189	5.1	448.5	448.5	448.8	0.3
E	5,106	56	566	10.5	453.4	453.4	454.0	0.6
F	5,324	48	655	9.7	454.9	454.9	455.2	0.3
G	6,043	38	273	14.8	457.6	457.6	457.6	0.0
H	6,606	38	318	12.8	460.0	460.0	460.0	0.0
I	8,397	57	310	9.3	482.3	482.3	482.8	0.5
J	9,487	38	199	13.5	487.5	487.5	487.5	0.0
K	10,605	45	308	8.3	498.6	498.6	499.1	0.5
L	12,442	76	453	3.8	508.3	508.3	509.2	0.9
M	14,068	39	141	10.9	518.9	518.9	519.0	0.1
N	14,831	29	139	7.5	527.6	527.6	527.8	0.2
O	15,370	41	211	4.5	537.0	537.0	537.9	0.9

<sup>1</sup>Feet above confluence with West Fork of Trinity River.

TABLE 24

**FEDERAL EMERGENCY MANAGEMENT AGENCY  
DALLAS COUNTY, TEXAS  
AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: DALWORTH CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION ( FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,838	151	1,106	5.9	448	448	449	1.0
B	3,600	73	1,677	8.2	458.5	458.5	458.6	0.1
C	4,715	315	1,333	4.3	460.2	460.2	461.1	0.9

<sup>1</sup>Feet above confluence with Bear Creek.

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**DALLAS COUNTY, TEXAS**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: DRY CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION ( FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	491	240	1,539	1.2	426.1	426.1	426.6	0.5
B	1,195	100	1,313	1.9	426.3	426.3	426.7	0.4
C	3,489	22	322	3.7	436.8	436.8	437.2	0.4
D	4,714	58	592	2.1	447.8	447.8	448.5	0.7
E	7,354	85	546	0.3	496.5	496.5	496.5	0.0

<sup>1</sup>Feet above confluence with West Fork of Trinity River.

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**DALLAS COUNTY, TEXAS**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: GOPHER BRANCH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION ( FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A - O <sup>2</sup>	-	-	-	-	-	-	-	-

<sup>1</sup>Feet above confluence with West Fork Trinity River.

<sup>2</sup>Cross Sections A-O are located in Tarrant County

TABLE 24	<b>FEDERAL EMERGENCY MANAGEMENT AGENCY</b> <b>DALLAS COUNTY, TEXAS</b> <b>AND INCORPORATED AREAS</b>	<b>FLOODWAY DATA</b>
		<b>FLOODING SOURCE: JOHNSON CREEK</b>

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION ( FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	393	23	120	4.3	433.1	433.1	433.1	0.0
B	989	24	143	1.9	437.1	437.1	437.1	0.0
C	2,836	135	942	0.2	463.1	463.1	463.1	0.0

<sup>1</sup>Feet above confluence with Gopher Branch.

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**DALLAS COUNTY, TEXAS**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: TURNER BRANCH**

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

[Not Applicable to this Flood Risk Project]

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

This section is not applicable to this Flood Risk Project.

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

[Not Applicable to this Flood Risk Project]

### **6.5 FIRM Revisions**

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

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

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

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

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

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

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

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

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

MAP (1-877-336-2627). Fees for applying for a LOMR-F, if any, are listed in the “Flood Map-Related Fees” section.

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

### 6.5.3 Letters of Map Revision

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

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

Previously issued mappable LOMCs (including LOMRs) that have been incorporated into the Dallas County FIRM are listed in Table 27.

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

Case Number	Effective Date	Flooding Source	FIRM Panel(s)
15-06-0292P	January 16, 2015	West Irving Branch	48113C0315L

### 6.5.4 Physical Map Revisions

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

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

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

### 6.5.5 Contracted Restudies

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

### 6.5.6 Community Map History

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

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

The initial effective date for the Dallas County FIRMs in countywide format was 08/23/2001.

**Table 28: Community Map History**

Community Name	Initial Identification Date	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
Dallas County, Unincorporated Areas	09/01/1970	09/01/1970	01/03/1978	07/19/1982	11/20/1996 07/07/2014
City of Cedar Hill	03/01/1974	03/01/1974	06/18/1976	04/01/1981	05/17/1988 07/07/2014
City of Dallas	01/10/1975	01/10/1975	07/08/1980 02/11/1977	03/16/1983	07/02/1991 06/05/1997 07/07/2014

Community Name	Initial Identification Date	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
City of Duncanville	02/08/1974	02/08/1974	08/20/1976	04/15/1981	12/21/1982 11/19/1987 07/07/2014
City of Irving	06/19/1970	06/19/1970	N/A	11/19/1980	03/29/1983 06/15/1984 02/05/1986 07/17/1989 06/18/1990 04/02/1991 09/30/1992 09/30/1993 11/20/1996 07/07/2014
City of Grand Prairie	07/06/1973	09/09/9999	N/A	07/6/1973	09/10/1976 04/01/1982 02/01/1985 09/04/1986 07/15/1988 04/02/1990 05/03/1993 11/20/1996 07/07/2014

## SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION

### 7.1 Contracted Studies

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

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

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Alsbaugh Branch	1/31/2014	City of Grand Prairie	EMT-2012-CA-0006	1/31/2014	City of Grand Prairie
Bear Creek	1/31/2014	City of Grand Prairie	EMT-2012-CA-0006	1/31/2014	City of Grand Prairie, City of Irving
Dalworth Creek	1/31/2014	City of Grand Prairie	EMT-2012-CA-0006	1/31/2014	City of Grand Prairie
Dry Creek	1/31/2014	City of Grand Prairie	EMT-2012-CA-0006	1/31/2014	City of Grand Prairie, City of Irving
Gopher Creek	1/31/2014	City of Grand Prairie	EMT-2012-CA-0006	1/31/2014	City of Grand Prairie
Johnson Creek	1/31/2014	City of Grand Prairie	EMT-2012-CA-0006	1/31/2014	City of Grand Prairie
Turner Creek	1/31/2014	City of Grand Prairie	EMT-2012-CA-0006	1/31/2014	City of Grand Prairie

### 7.2 Community Meetings

The dates of the community meetings held for this Flood Risk Project and any previous Flood Risk Projects are shown in Table 30. These meetings may have previously been referred to by a variety of names (Community Coordination Officer (CCO), Scoping, Discovery, etc.), but all

meetings represent opportunities for FEMA, community officials, study contractors, and other invited guests to discuss the planning for and results of the project.

**Table 30: Community Meetings**

Community	FIS Report Dated	Date of Meeting	Meeting Type	Attended By
City of Grand Prairie	07/07/2014	11/27/2012	Discovery	Grand Prairie, study contractors, project manager contractor
		10/30/2013	Resilience	Grand Prairie, Alspaugh Branch study contractor, project manager contractor
		04/24/2014	Resilience	Grand Prairie, Alspaugh Branch study contractor, project manager contractor
		06/10/2014	Resilience	Grand Prairie, project manager contractor
		07/29/2014	Resilience	Grand Prairie, project manager contractor

## SECTION 8.0 – ADDITIONAL INFORMATION

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

The additional data that was used for this project includes the FIS Report and FIRM that were previously prepared for Dallas County (FEMA 2014).

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

**Table 31: Map Repositories**

Community	Address	City	State	Zip Code
Dallas County, Unincorporated Areas	Dallas County Records Building 509 Main Street	Dallas	Texas	75202
City of Cedar Hill	City Hall 502 Cedar Street	Cedar Hill	Texas	75104
City of Dallas	Department of Public Works 320 East Jefferson Boulevard Room 321	Dallas	Texas	75203
City of Duncanville	City Hall 203 East Wheatland Road	Duncanville	Texas	75116
City of Irving	Public Works Department 825 West Irving Boulevard	Irving	Texas	75060
City of Grand Prairie	City Development Center 206 West Church Street	Grand Prairie	Texas	75050

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

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

**Table 32: Additional Information**

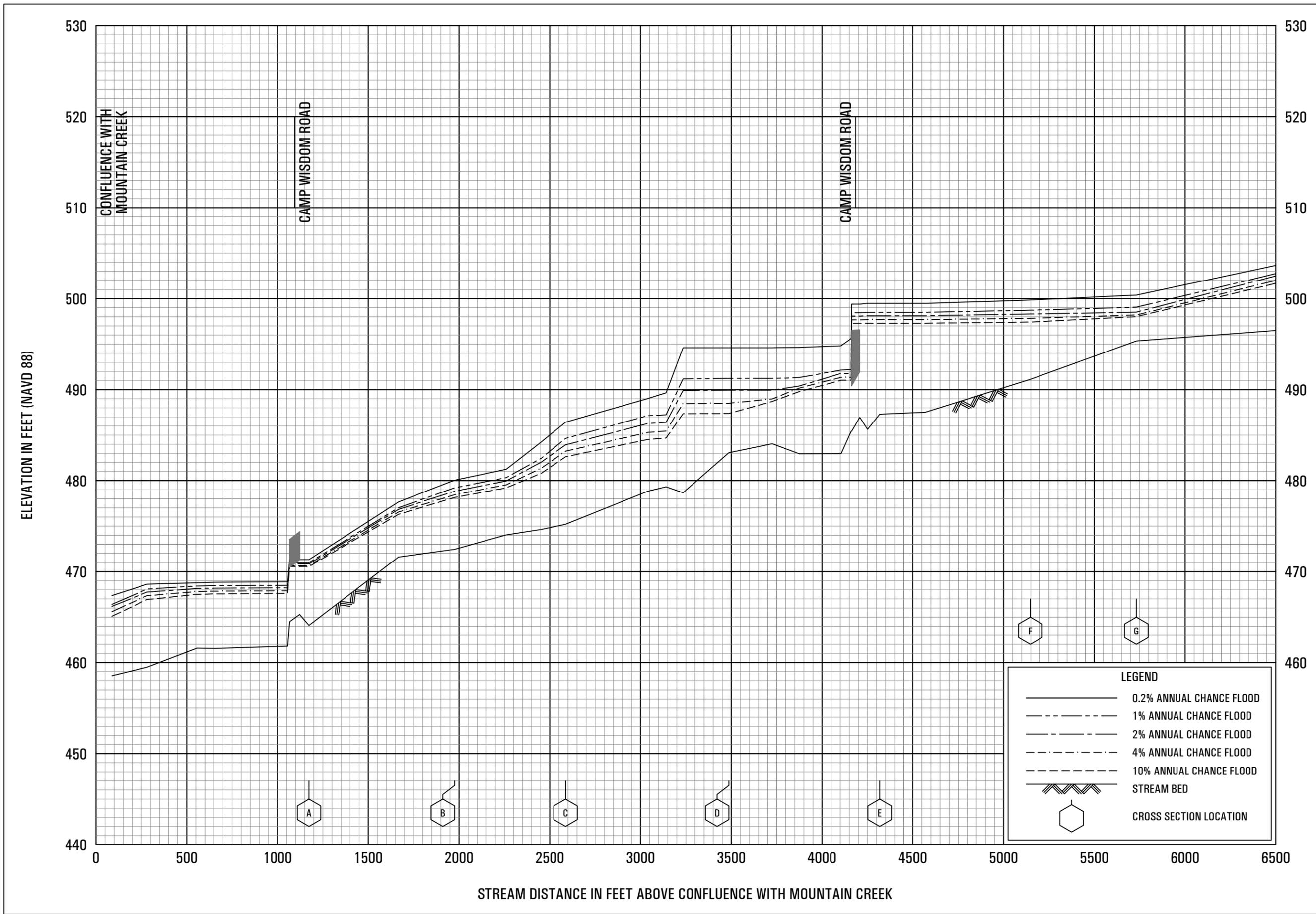
FEMA and the NFIP	
FEMA and FEMA Engineering Library website	<a href="http://www.fema.gov">http://www.fema.gov</a>
NFIP website	<a href="http://www.fema.gov/business/nfip">http://www.fema.gov/business/nfip</a>
NFHL Dataset	<a href="http://msc.fema.gov">http://msc.fema.gov</a>
FEMA Region VI	Federal Emergency Management Agency FRC 800 North Loop 288, Denton, TX 76209-3698
Other Federal Agencies	
USGS website	<a href="http://www.usgs.gov">http://www.usgs.gov</a>
Hydraulic Engineering Center website	<a href="http://www.hec.usace.army.mil">http://www.hec.usace.army.mil</a>
State Agencies and Organizations	
State NFIP Coordinator	Michael Segner Texas Water Development Board 1700 North Congress Ave P.O. Box 13231, Austin, TX 78711-3231 512-463-3509 Michael.Segner@twdb.state.tx.us
State GIS Coordinator	Richard Wade Texas Geographic Information Officer - TNRIS 1700 North Congress Ave P.O. Box 13231, Austin, TX 78711-3231 512-463-4010 Richard.Wade@twdb.texas.gov

## SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES

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

**Table 33: Bibliography and References**

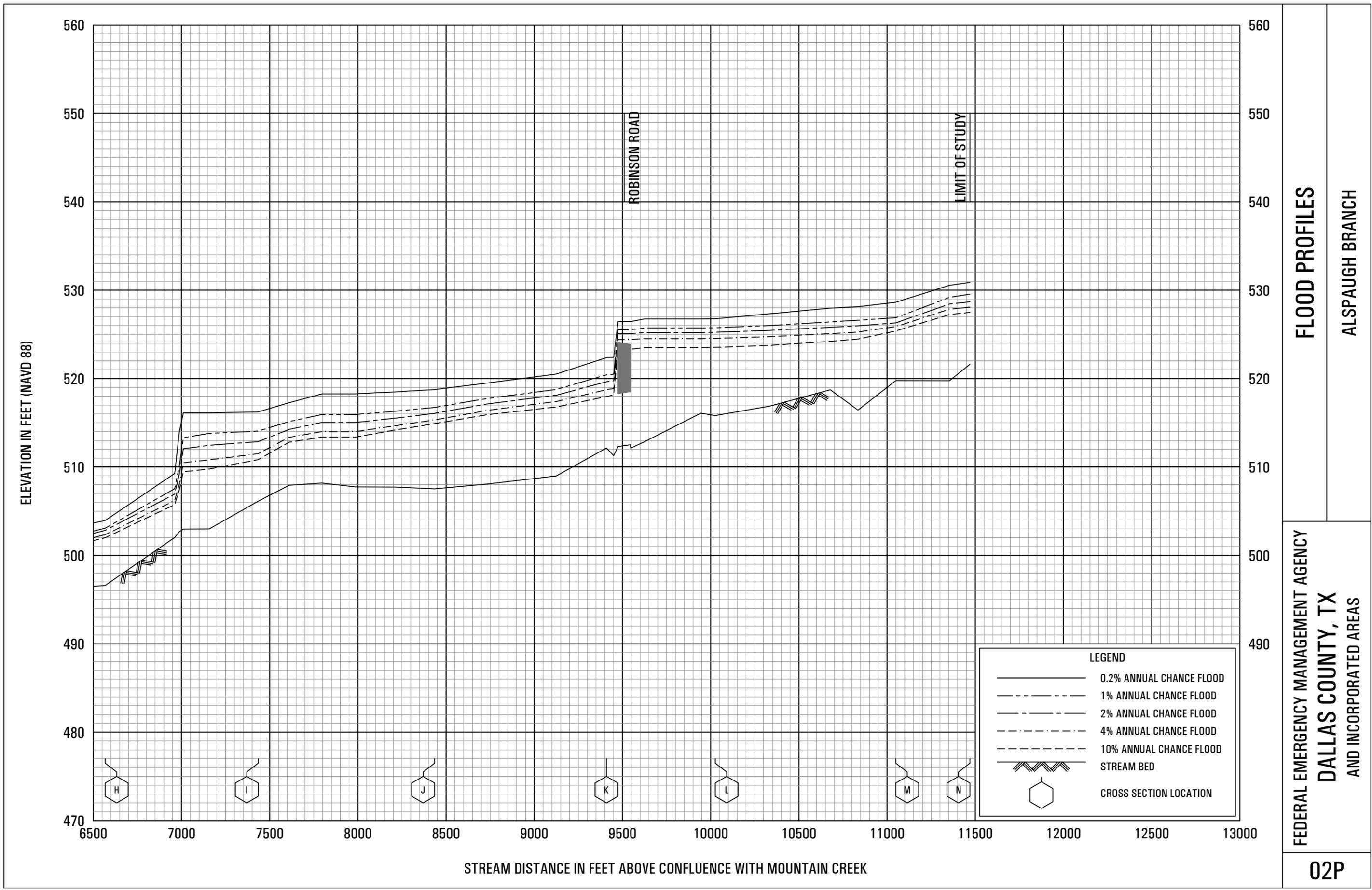
Citation in this FIS	Publisher / Issuer	<i>Publication Title</i> , "Article," Volume, Number, etc.	Author / Editor	Place of Publication	Publication Date / Date of Issuance	Link
Dallas, 2010	FEMA	City of Dallas CTP FY2010	Dallas	Washington, D.C.	2010	<a href="http://www.fema.gov">www.fema.gov</a>
FEMA, 2001	FEMA	Dallas County 2001 Effective FIRMs	FEMA	Washington, D.C.	2001	<a href="http://www.fema.gov">www.fema.gov</a>
Grand Prairie, 2010	FEMA	City of Grand Prairie CTP FY2010	Grand Prairie	Washington, D.C.	2010	<a href="http://www.fema.gov">www.fema.gov</a>
Grand Prairie, 2012	FEMA	City of Grand Prairie CTP FY2012	Grand Prairie	Washington, D.C.	2014	<a href="http://www.fema.gov">www.fema.gov</a>
Halff, 2006	FEMA	Appeals and Protest Data for the Cities of Carrollton, Cedar Hill, Coppell, Dallas, DeSoto, Grand Prairie, Hutchins, Irving, Mesquite, Richardson, Rowlett, and Sachse, and the Town of Addison	Michael Baker Jr. Corporation	Washington, D.C.	2006	<a href="http://www.fema.gov">www.fema.gov</a>
Halff, 2010	FEMA	Halff Associates Mapping - Map Mod	Halff Associates, Inc.	Washington, D.C.	2010	<a href="http://www.fema.gov">www.fema.gov</a>
NCTCOG, 2005	NCTCOG	Basemap Data	NCTCOG	Arlington, TX	2005	<a href="http://www.nctcog.org">www.nctcog.org</a>
TNRIS, 2014	TNRIS	Basemap Data	TNRIS	Austin, TX	2014	<a href="http://www.tnr.org">www.tnr.org</a>
USGS, 1989	USGS	USGS 7.5-Minute Series Topographic Maps	USGS	Reston, VA	1989	<a href="http://www.usgs.gov">www.usgs.gov</a>

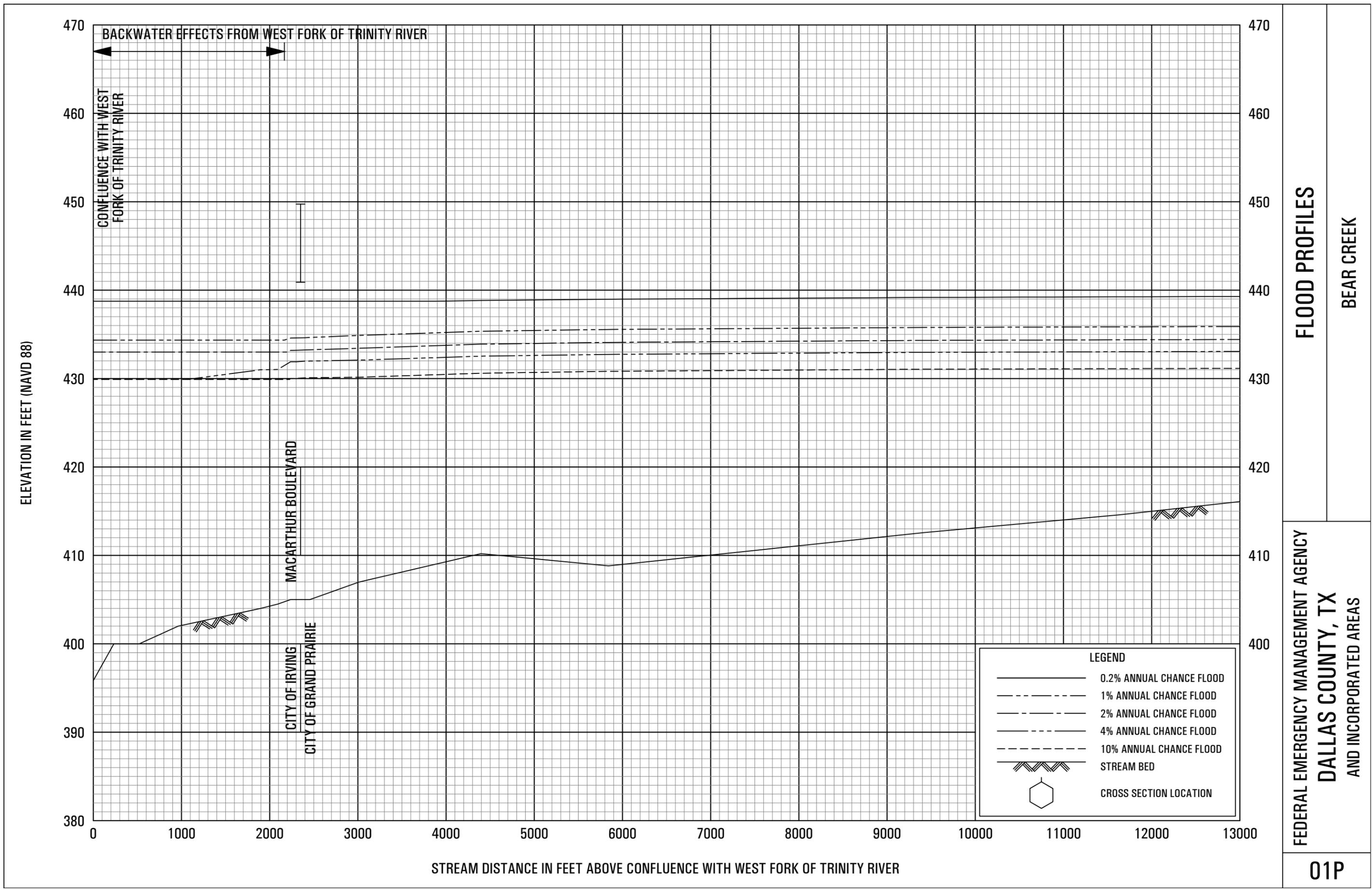


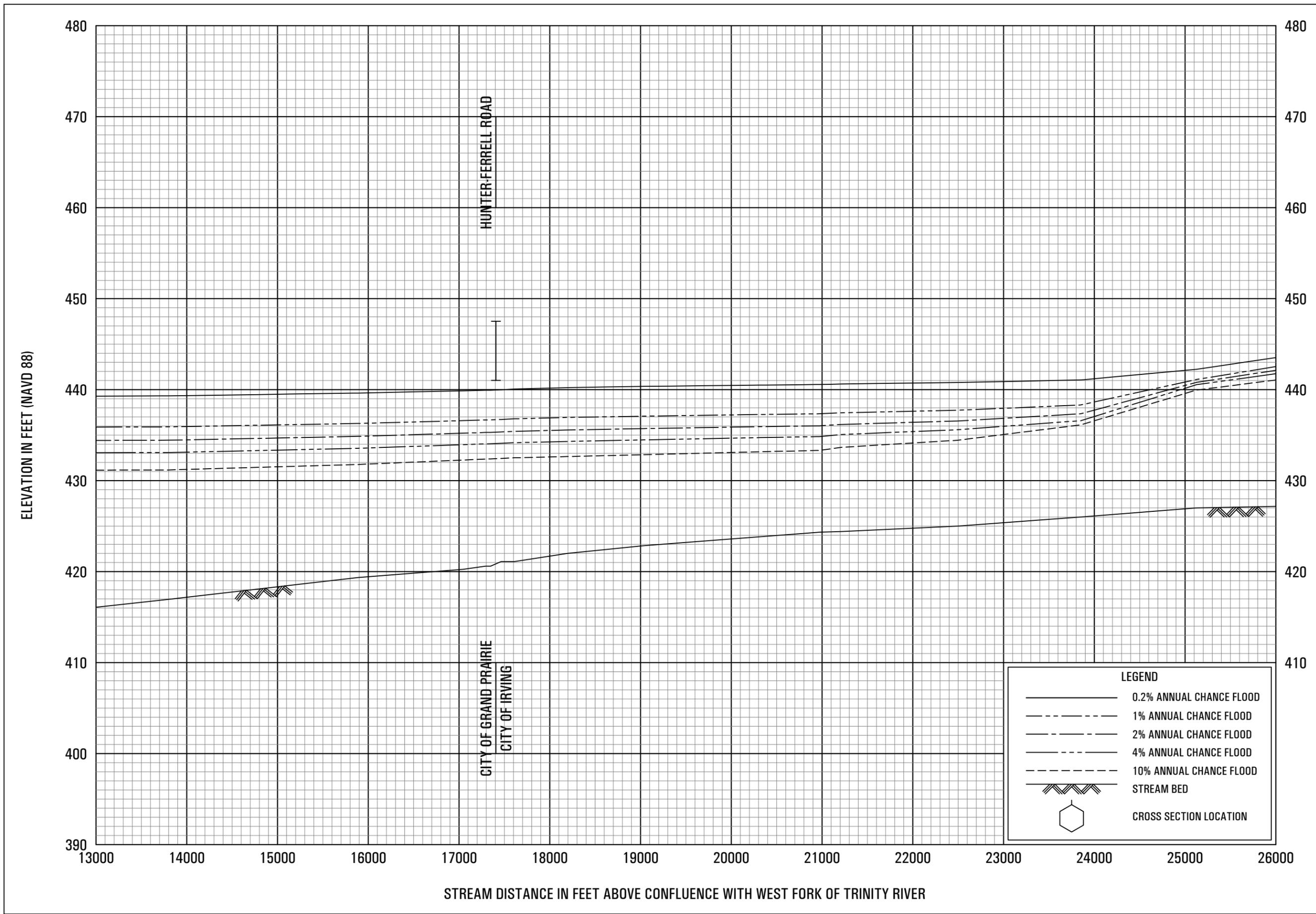
**FLOOD PROFILES**  
ALSPAUGH BRANCH

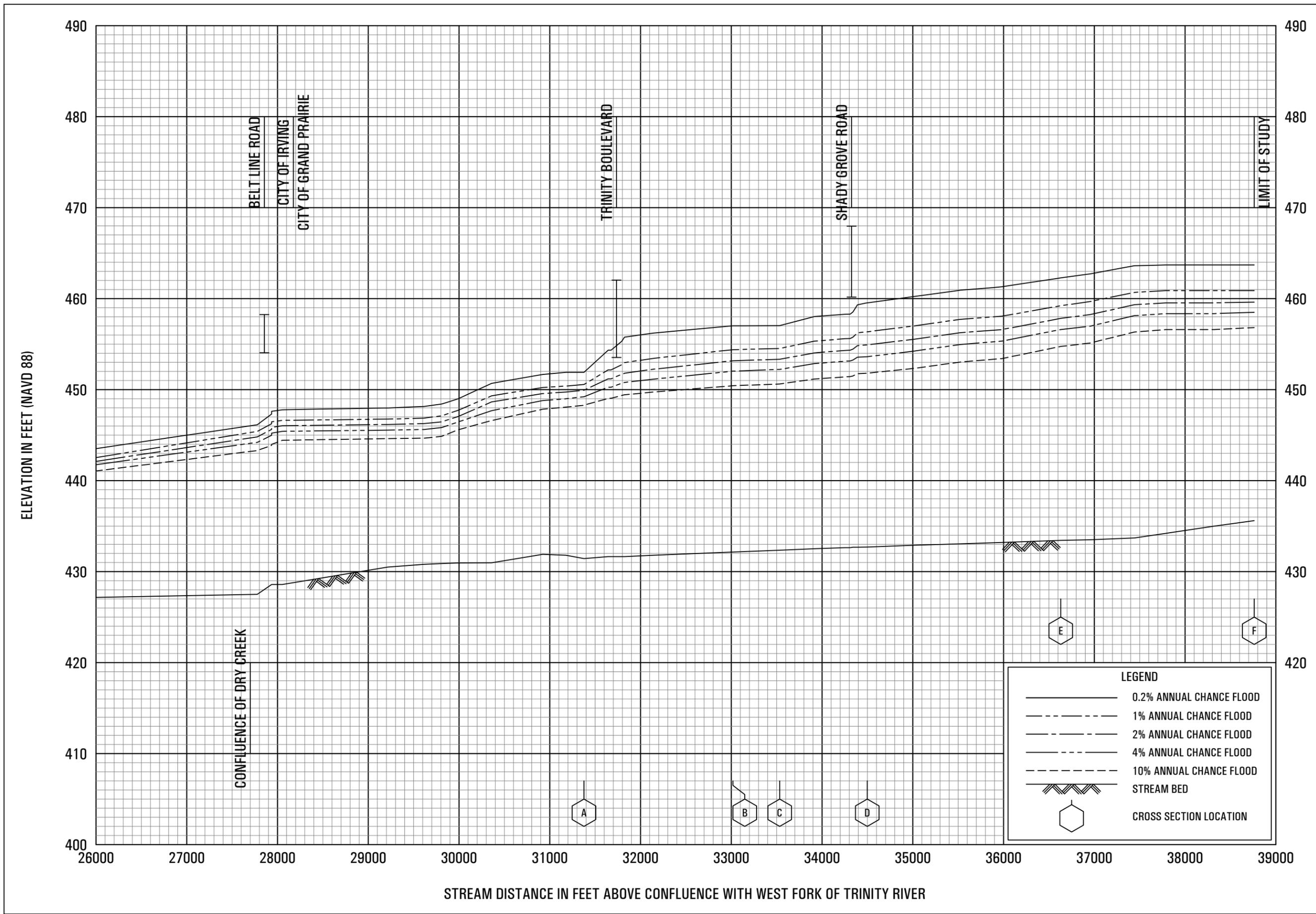
FEDERAL EMERGENCY MANAGEMENT AGENCY  
**DALLAS COUNTY, TX**  
AND INCORPORATED AREAS

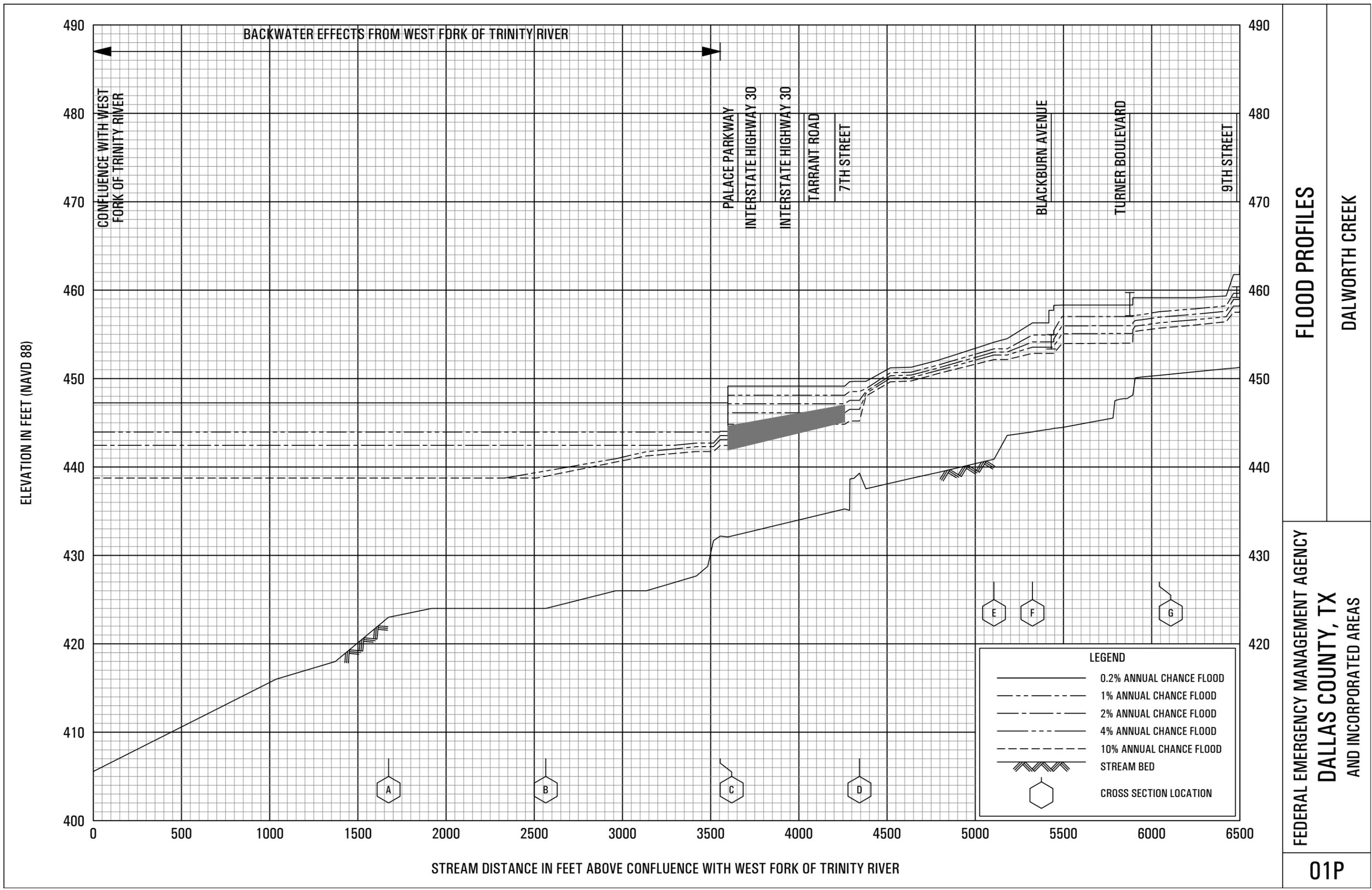
**01P**

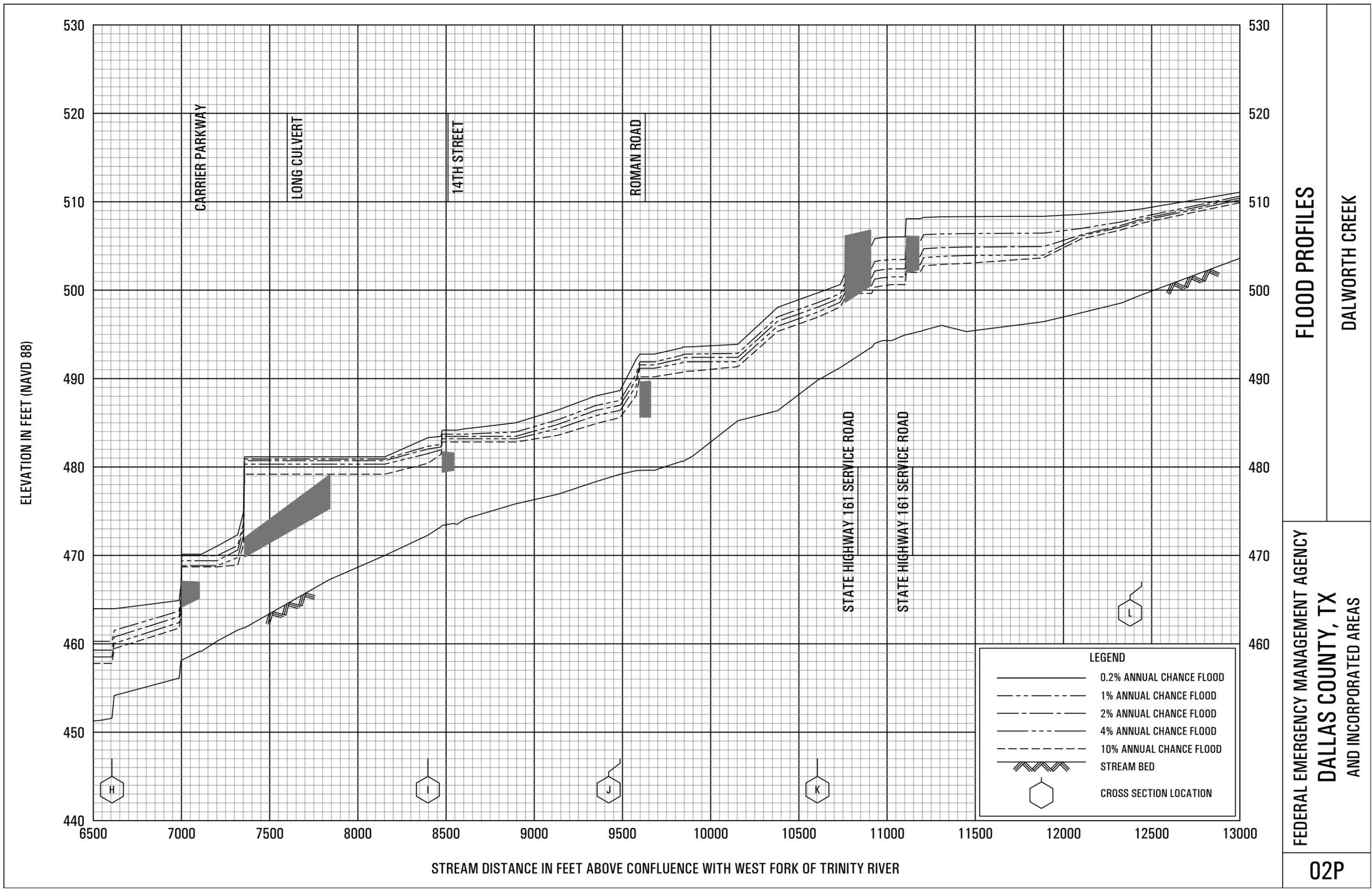


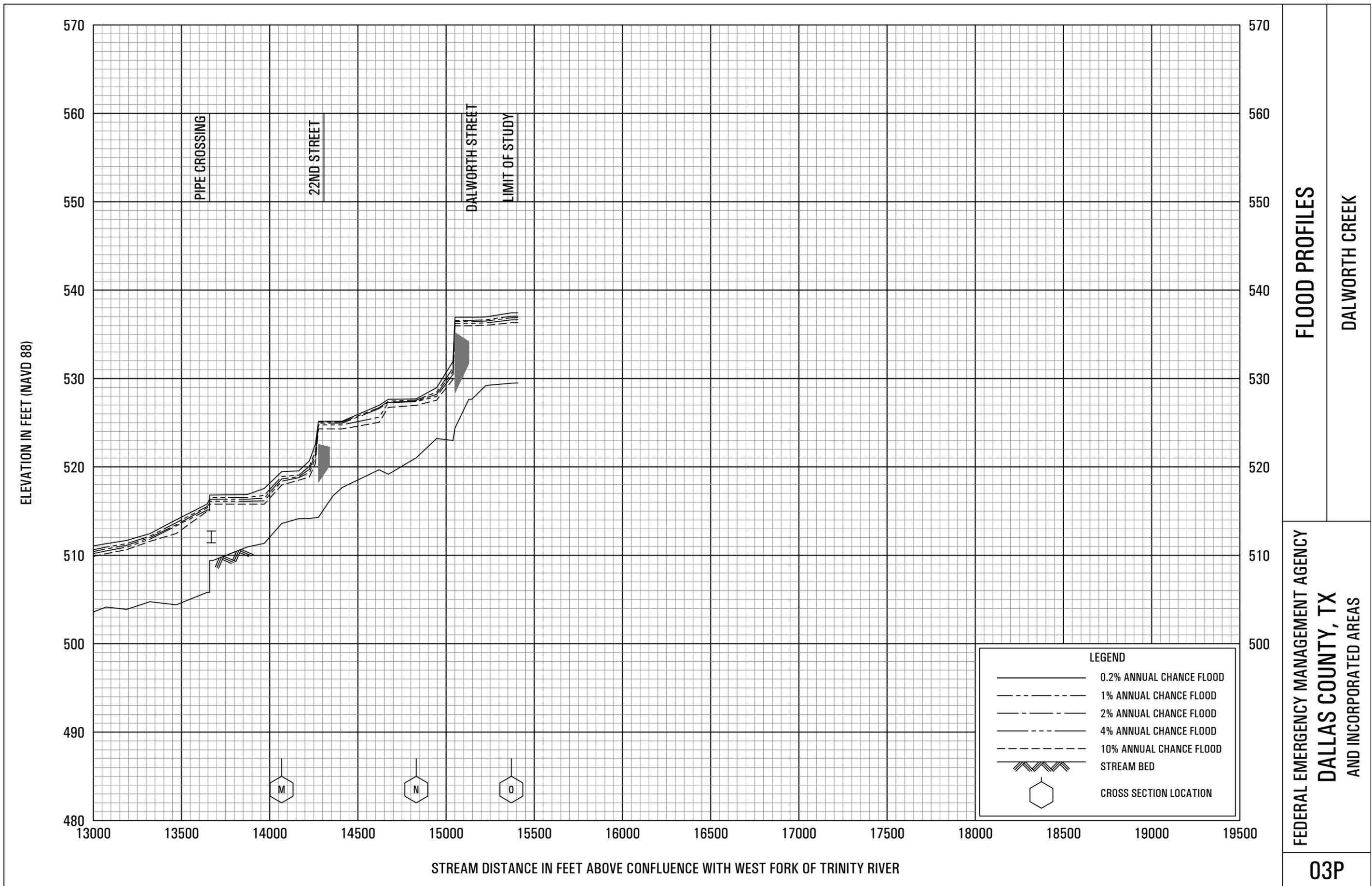


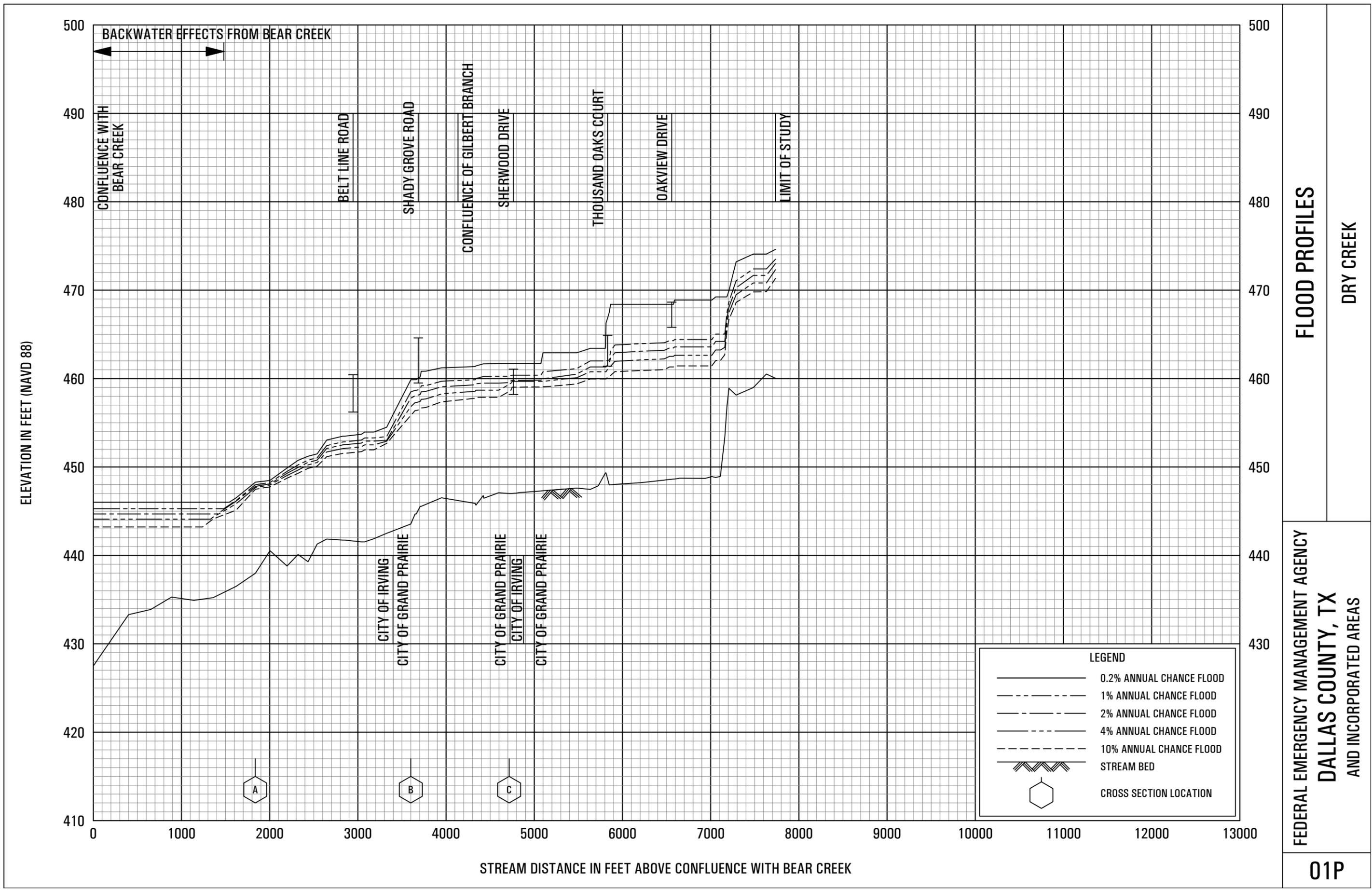


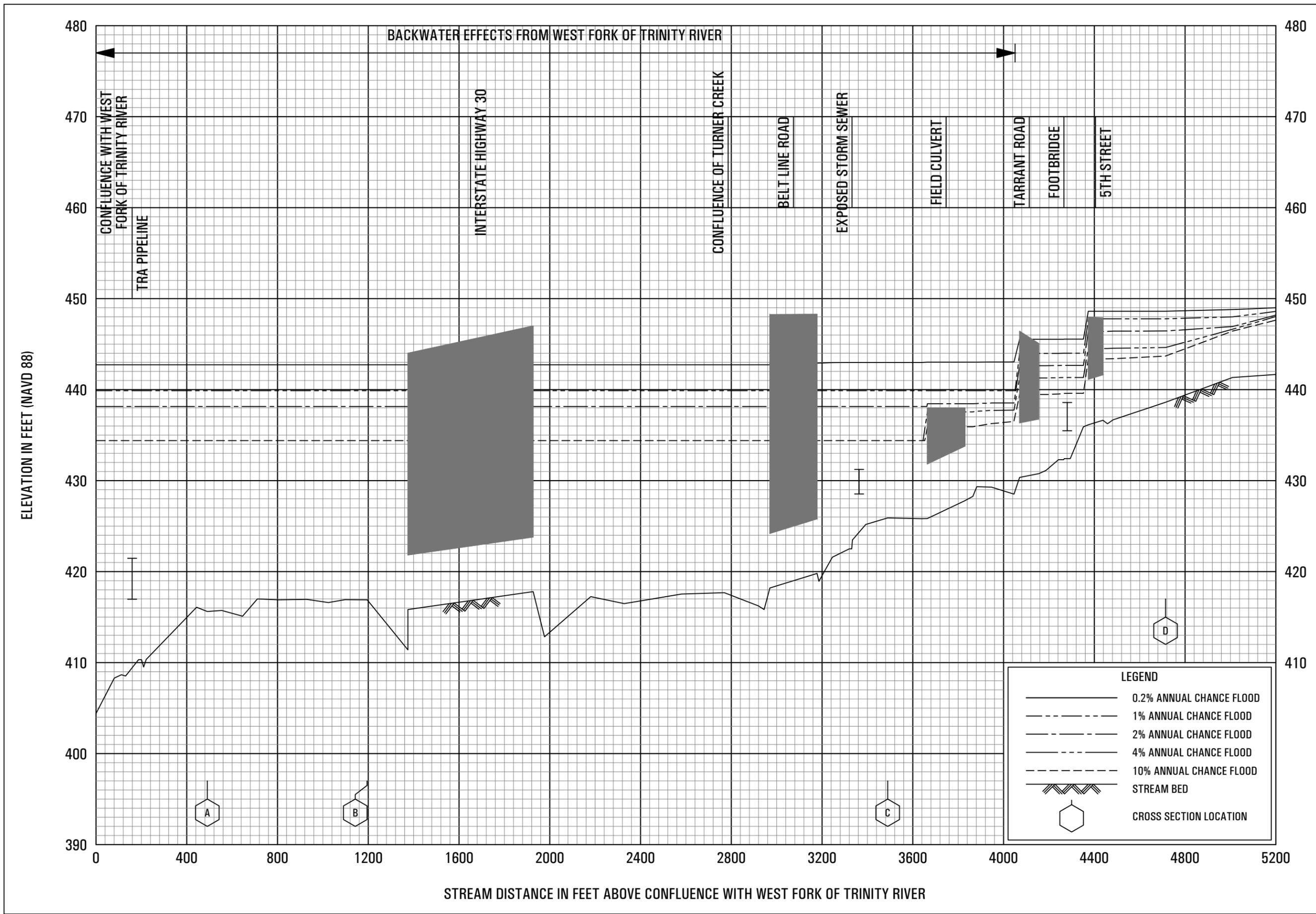




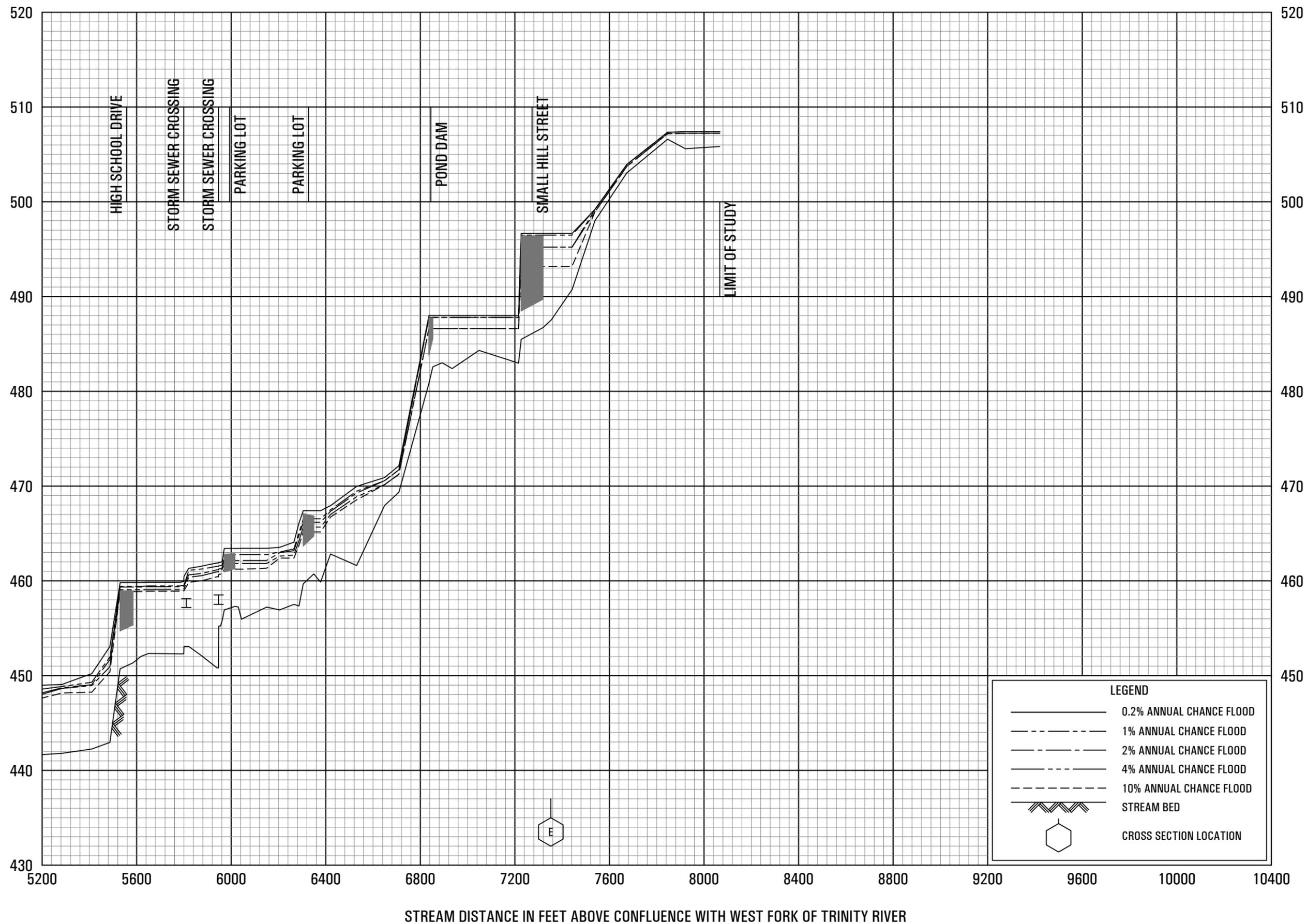








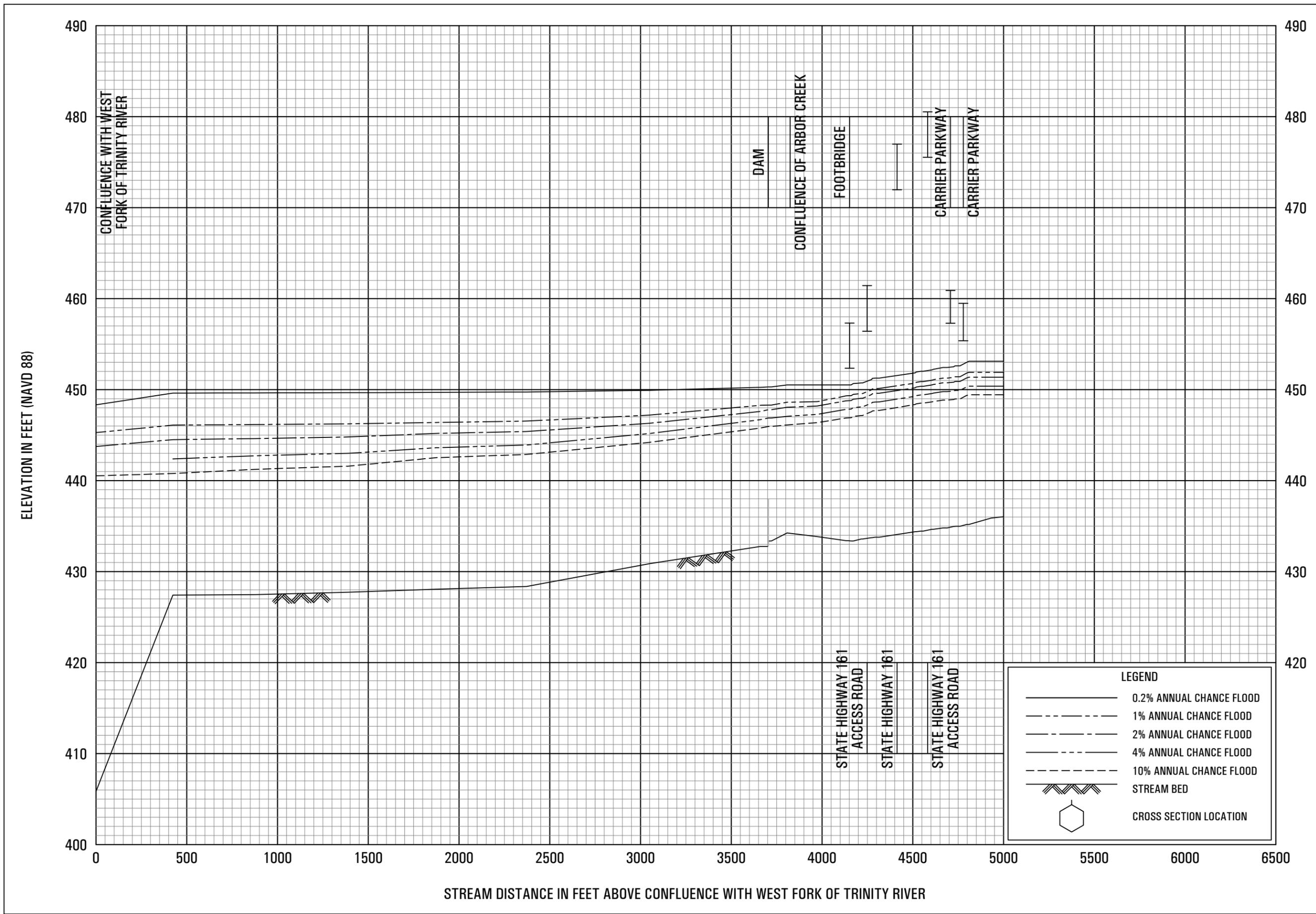
ELEVATION IN FEET (NAVD 88)



**FLOOD PROFILES**

**GOPHER BRANCH**

**FEDERAL EMERGENCY MANAGEMENT AGENCY  
DALLAS COUNTY, TX  
AND INCORPORATED AREAS**

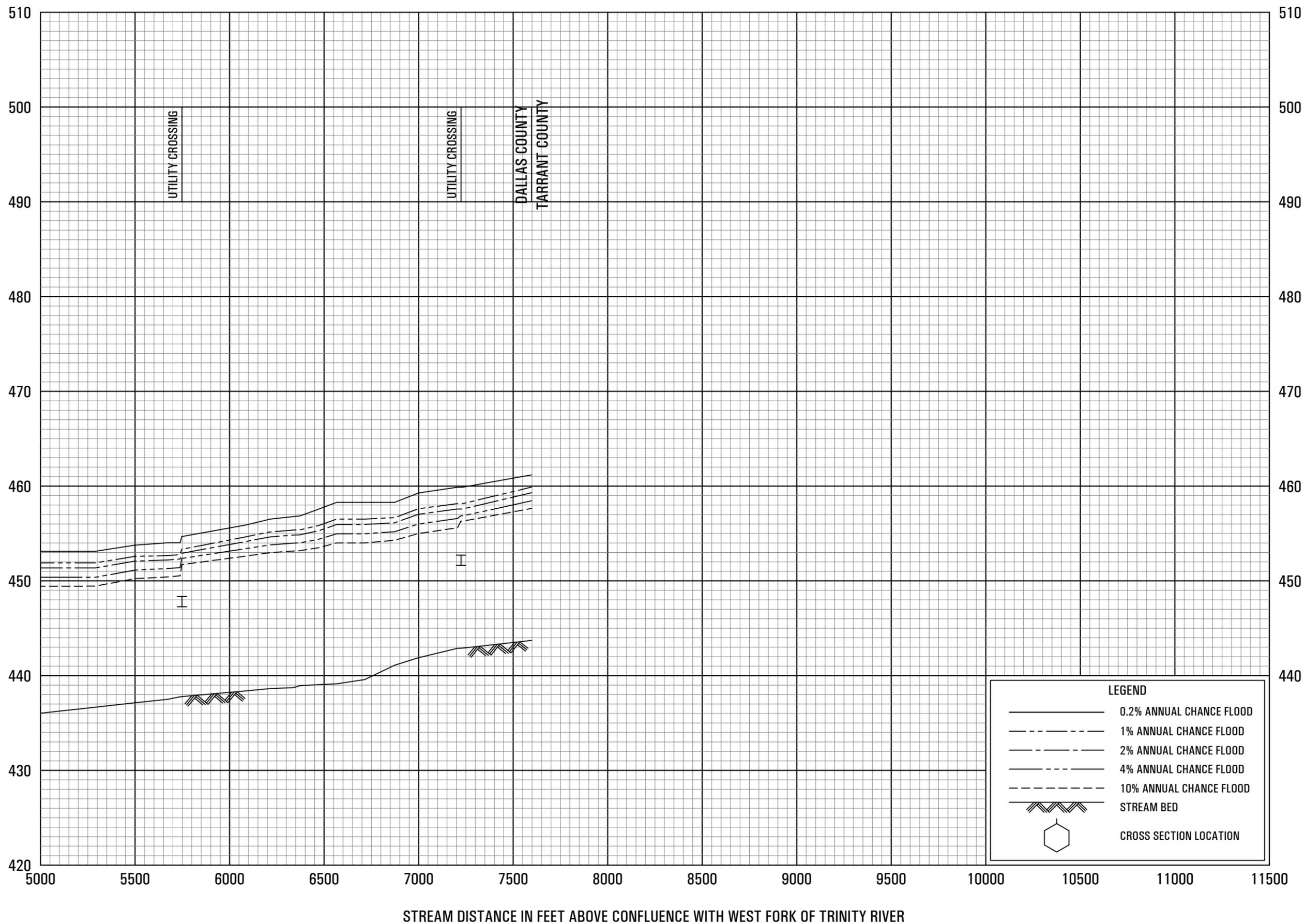


**FLOOD PROFILES**

**JOHNSON CREEK**

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**DALLAS COUNTY, TX**  
 AND INCORPORATED AREAS

ELEVATION IN FEET (NAVD 88)



**LEGEND**

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 4% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

**FLOOD PROFILES**

**JOHNSON CREEK**

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**DALLAS COUNTY, TX**  
AND INCORPORATED AREAS

