

TECHNICAL DATA NOTEBOOK:

Letter of Map Revision For the Kemper Property APN 505-47-164C

Portion of South Branch Casandro Wash RM 0.720 to 0.924

Work Assignment No. 1

CONTRACT FCD 2011C002

ON-CALL FLOODPLAIN DELINEATION &
GENERAL ENGINEERING SERVICES

September 2011

Revised February 2012



Expires 3/31/2013

Prepared for:

Flood Control District of Maricopa County
2801 W. Durango Street
Phoenix, AZ 85009
(602) 506-1501

Prepared by:

JE Fuller/ Hydrology & Geomorphology
8400 S. Kyrene Rd., Suite 201
Tempe, Arizona 85284
480) 752-2124



Federal Emergency Management Agency

Washington, D.C. 20472

March 27, 2012

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Kelly Blunt
Mayor, Town of Wickenburg
155 North Tegner Street, Suite A
Wickenburg, AZ 85390

IN REPLY REFER TO:

Case No.: 12-09-0272P
Community Name: Town of Wickenburg, AZ
Community No.: 040056
Effective Date of
This Revision: **August 10, 2012**

Dear Mayor Blunt:

The Flood Insurance Study report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7175, or the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Sincerely,

Siamak Esfandiary, Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

For: Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

List of Enclosures:

Letter of Map Revision Determination Document
Annotated Flood Insurance Study Report
Annotated Flood Insurance Rate Map

cc: (see attached list)

Courtesy Copy List - Town of Wickenburg, AZ

Mr. Rick Destefano
Floodplain Administrator
Town of Wickenburg

Mr. Tim Murphy, P.E.
Mitigation Planning & Technical Programs Manager
Floodplain Management and Services Division
Flood Control District of Maricopa County

Ms. Kelli Sertich, AICP, CFM
FMS Division Manger
Flood Control District of Maricopa County

Mr. John Hathaway, P.E., CFM
Project Manager
Flood Control District of Maricopa County

Mr. Kevin Lavalle
GIS Analyst
Flood Control District of Maricopa County

Mr. Brian Cosson, CFM
NFIP State Manager
Arizona Department of Water Resources

Mr. Ted Lehman, P.E.
Project Engineer
JE Fuller/Hydrology and Geomorphology



Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	Town of Wickenburg Maricopa County Arizona	CULVERT	FLOODWAY HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 040056		
IDENTIFIER	South Branch Casandro Wash RM 0.730 To 0.924	APPROXIMATE LATITUDE & LONGITUDE: 33.957, -112.769 SOURCE: USGS QUADRANGLE DATUM: NAD 83	
ANNOTATED MAPPING ENCLOSURES		ANNOTATED STUDY ENCLOSURES	
TYPE: FIRM* NO.: 04013C0235G DATE: September 30, 2005		DATE OF EFFECTIVE FLOOD INSURANCE STUDY: September 30, 2005 PROFILE: 43P FLOODWAY DATA TABLE: 5	

Enclosures reflect changes to flooding sources affected by this revision.

* FIRM - Flood Insurance Rate Map; ** FBFM - Flood Boundary and Floodway Map; *** FHBM - Flood Hazard Boundary Map

FLOODING SOURCE(S) & REVISED REACH(ES)

South Branch Casandro Wash - from approximately 570 feet downstream to approximately 520 feet upstream of Vista Drive

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
South Branch Casandro Wash	Zone AE	Zone AE	YES	YES
	BFEs*	BFEs	YES	NONE
	Floodway	Floodway	YES	YES

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 7390 Coca Cola Drive, Ste 204, Hanover, MD 21076. Additional Information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Siamak Esfandiary Ph.D., P.E., Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency
Washington, D.C. 20472

**LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)**

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

We provide the floodway designation to your community as a tool to regulate floodplain development. Therefore, the floodway revision we have described in this letter, while acceptable to us, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

NFIP regulations Subparagraph 60.3(b)(7) requires communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management ordinances; therefore, responsibility for maintenance of the altered or relocated watercourse, including any related appurtenances such as bridges, culverts, and other drainage structures, rests with your community. We may request that your community submit a description and schedule of maintenance activities necessary to ensure this requirement.

COMMUNITY REMINDERS

We based this determination on the base (1-percent-annual-chance) flood discharges computed in the FIS for your community without considering subsequent changes in watershed characteristics that could increase flood discharges. Future development of projects upstream could cause increased flood discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on flood discharges subsequent to the publication of the FIS report for your community and could, therefore, establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 7390 Coca Cola Drive, Ste 204, Hanover, MD 21076. Additional Information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Program Specialist
Management Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency
Washington, D.C. 20472

**LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)**

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Sally M. Ziolkowski
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

STATUS OF THE COMMUNITY NFIP MAPS

We are processing a revised FIRM and FIS report for Maricopa county in our countywide format; therefore, we will not physically revise and republish the FIRM and FIS report for your community to incorporate the modifications made by this LOMR at this time. Preliminary copies of the countywide FIRM and FIS report, which presents information from the effective FIRMs and FIS reports for your community and other incorporated communities in Maricopa County, were submitted to your community for review on December 3, 2010. We will incorporate the modifications made by this LOMR into the countywide FIRM and FIS report before they become effective.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 7390 Coca Cola Drive, Ste 204, Hanover, MD 21076. Additional Information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

A handwritten signature in black ink, appearing to read "Sally M. Ziolkowski".

Sally M. Ziolkowski, Ph.D., P.E., Program Specialist
Mitigation Division
Federal Emergency Management Agency
Department of Homeland Security

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Casandro Wash								
A	0.327	29	18	4.80	2,073.3	2,073.3	2,073.3	0.0
B	0.507	26	39	7.10	2,087.6	2,087.6	2,087.6	0.0
C	0.751	41	41	4.60	2,106.0	2,106.0	2,106.0	0.0
D	0.962	178	19	1.60	2,126.1	2,126.1	2,126.1	0.0
E	1.455	124	183	6.90	2,181.6	2,181.6	2,181.6	0.0
F	1.900	196	254	3.50	2,215.5	2,215.5	2,215.5	0.0
G	2.460	164	271	2.95	2,253.0	2,253.0	2,253.0	0.0
H	2.560	169	378	2.21	2,258.8	2,258.8	2,258.8	0.0
South Branch Casandro Wash								
A	0.375	157	122	4.50	2,245.5	2,245.5	2,245.5	0.0
B	0.565	105	128	3.91	2,257.4	2,257.4	2,257.4	0.0
C	0.730	69	112	3.57	2,274.2	2,274.2	2,274.3	0.1
D	0.893	55	211	1.90	2,288.4	2,288.4	2,289.3	0.9

Revised Data →

¹Miles Above Mouth

REVISED TO
REFLECT LOMR
EFFECTIVE: August 10, 2012

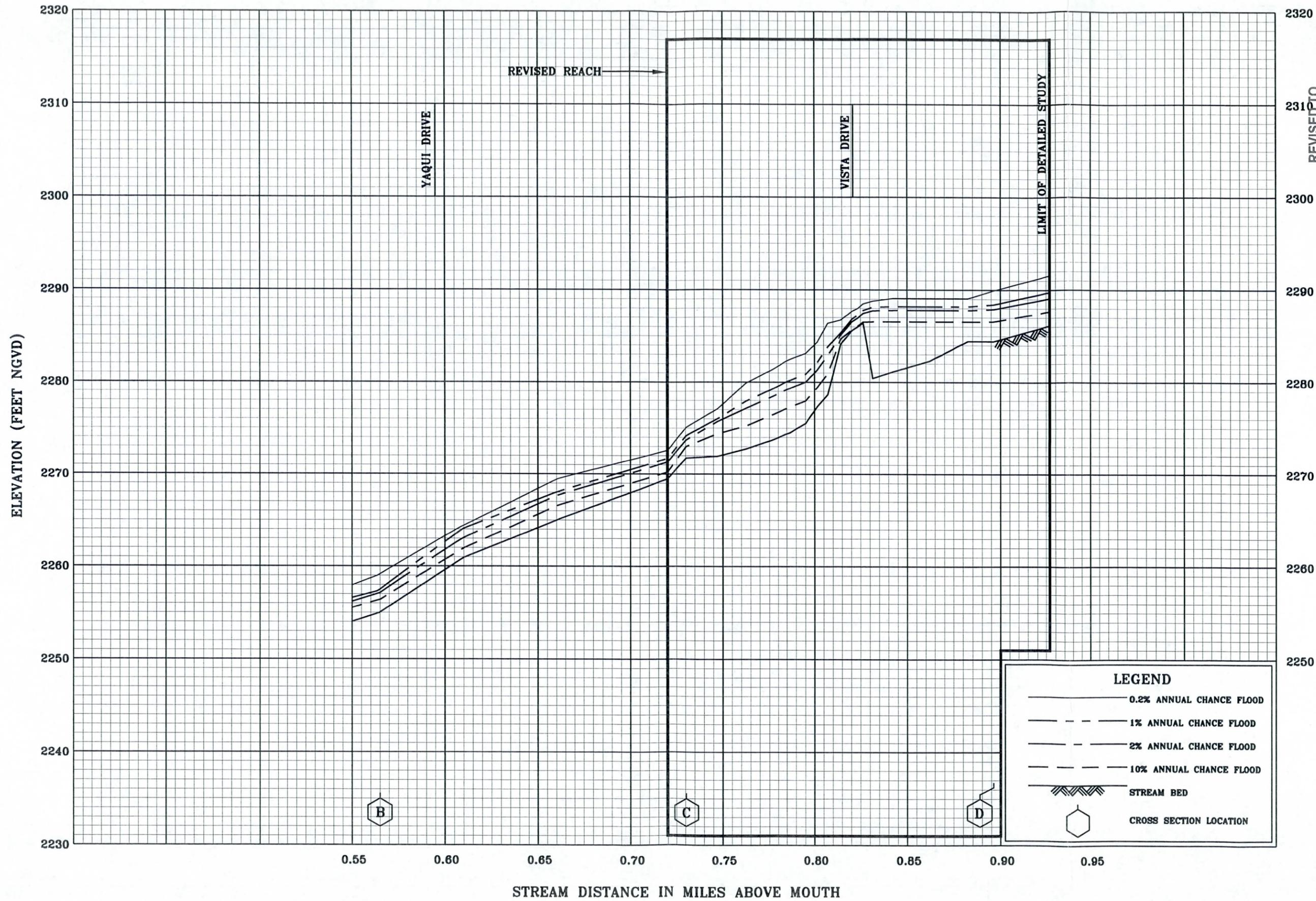
T
A
B
L
E
5

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

FLOODWAY DATA

CASANDRO WASH -
SOUTH BRANCH CASANDRO WASH



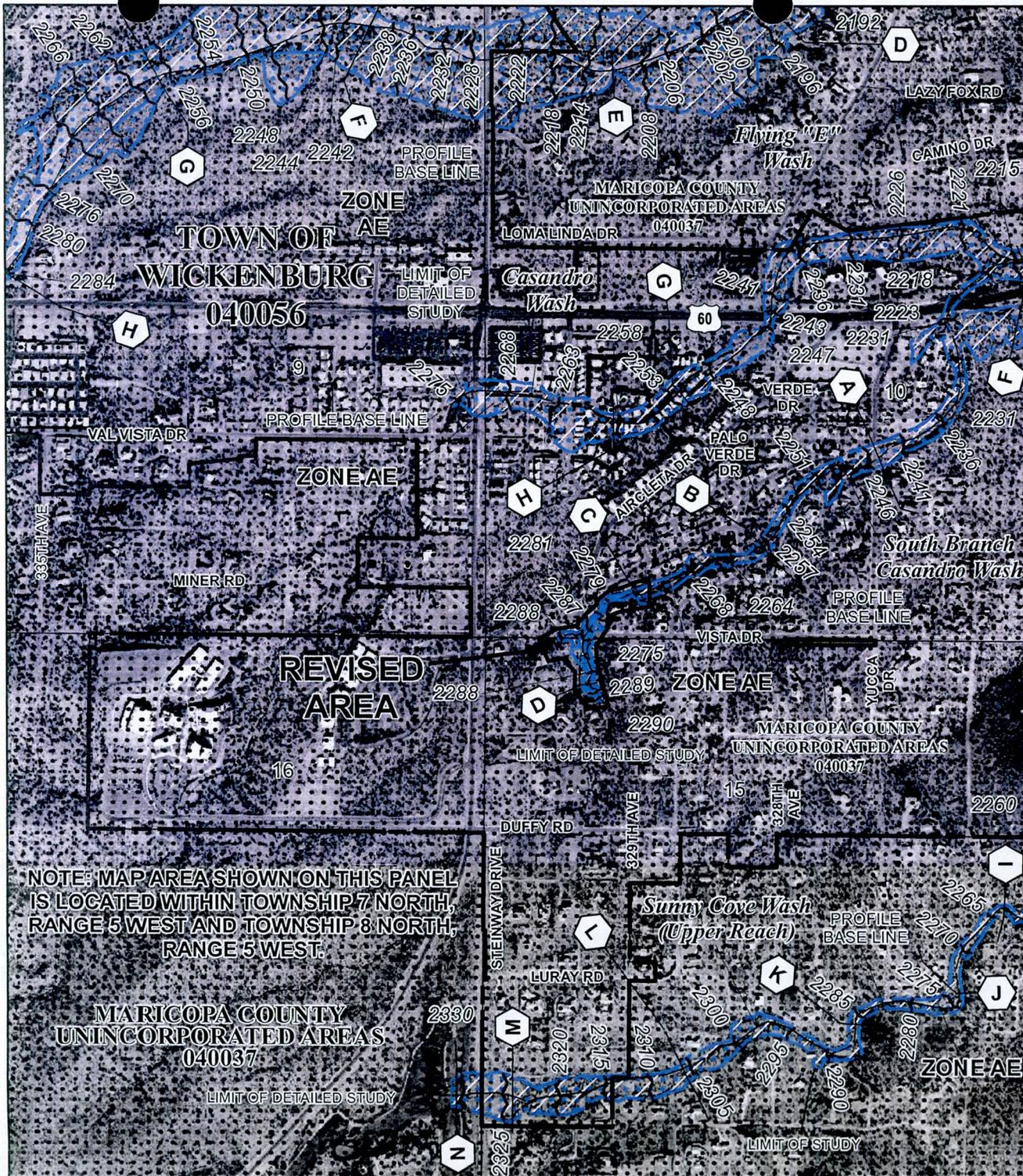
REVISED TO
REFLECT LOMR
EFFECTIVE: August 10, 2012

FLOOD PROFILES

SOUTH BRANCH CASANDRO WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS



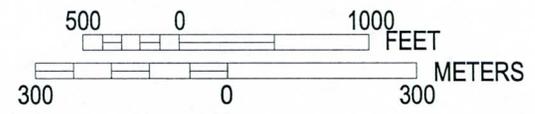
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 7 NORTH, RANGE 5 WEST AND TOWNSHIP 8 NORTH, RANGE 5 WEST.

MARICOPA COUNTY UNINCORPORATED AREAS 040037

- Legend**
-  1% annual chance (100-Year) Floodplain
 -  1% annual chance (100-Year) Floodway
 -  0.2% annual chance (500-Year) Floodplain



MAP SCALE 1" = 1000'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0235G

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY,
ARIZONA
AND INCORPORATED AREAS

PANEL 235 OF 4350
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	0235	G
WICKENBURG, TOWN OF	040056	0235	G

REVISED TO REFLECT LOMR
EFFECTIVE: August 10, 2012

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



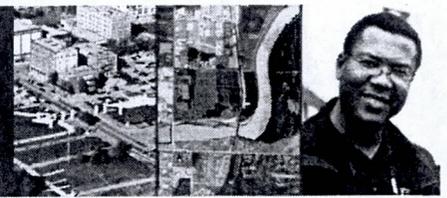
MAP NUMBER
04013C0235G

MAP REVISED
SEPTEMBER 30, 2005

Federal Emergency Management Agency



FEMA



Changes to FEMA's Appeals Process

FEMA has revised its existing appeal policy to expand the due process procedures currently provided for new or modified Base Flood Elevations (BFEs) to other new or modified flood hazard information shown on a Flood Insurance Rate Map (FIRM), including additions or modifications to any Special Flood Hazard Area (SFHA) boundary (both approximate and detailed floodplains), zone designation, and/or regulatory floodway boundary. This policy is known as the Expanded Appeals Process (EAP). The EAP, which became effective on December 1, 2011, affects Letters of Map Revision (LOMRs) issued on or after that date, and a 90-day appeal period will be required for LOMRs that result in **any change** to flood hazards.

To provide expanded due process rights for changes due to LOMRs, any LOMR that requires an appeal period in a community already compliant with the necessary requirements outlined in 44 CFR Section 60.3 **will become effective 120 days from the second newspaper publication date**, following FEMA's current policy for setting LOMR effective dates. This allows time to collect appeals and provides for newspaper publication schedule conflicts. LOMRs with an appeal period in communities that are not currently compliant with the necessary requirements outlined in 44 CFR Section 60.3, or in communities that require adoption of the LOMR, will become effective following a six-month compliance period.

Evidence of public notice or property owner notification of the changes effected by the LOMR will continue to be requested during the review of the LOMR request. This will help to ensure that the affected population is aware of the flood hazard changes in the affected area and the resultant LOMR. However, FEMA will no longer request evidence of property owner acceptance of the changes effected by a LOMR, as such acceptance will have no influence on the effective date of the LOMR. LOMR requests that are currently in-progress with FEMA when the EAP becomes effective will be reviewed to determine whether the notification already provided is sufficient, and such requests will proceed with processing.



Flood Control District of Maricopa County

INTEROFFICE MEMORANDUM

Date: October 5, 2011
To: Timothy S. Phillips, P.E., Chief Engineer and General Manager
From: John Hathaway, P.E., CFM
Subject: Kemper LOMR Request and Technical Data Notebook, Contract FCD 2011C002 – WA #1

The floodplain and floodway re-study for the Kemper LOMR is ready to send to FEMA for review and incorporation into the County's FIRM panels. The Town of Wickenburg does their own floodplain management and will determine when this will be considered the best available technical information.

The background for the study includes the following:

The study re-delineates approximately 0.19 linear miles of Zone AE floodplain and floodway originally delineated as part of the 1977 Wickenburg FIS, revised 1983. The topographic basis for the re-study is new 2-foot contour interval mapping in NAVD88 vertical datum by Stewart Geo Technologies, Inc. The study area was flown July 7, 2004. The study Consultant was JE Fuller/Hydrology & Geomorphology, Inc. The project manager for the Consultant was Ted Lehman, P.E. The project manager for the District was John Hathaway, P.E., CFM.

Please concur and authorize below the use of this new study.

 Date: 10/5/11 John Hathaway, P.E., CFM Project Manager	 Date: 10/11/11 Timothy S. Phillips, P.E., Chief Engineer and General Manager
 Date: 10/7/11 Amir Motamedi Hydrology/Hydraulics Branch Manager	 Date: 10/5/11 Kathryn Gross, CFM Floodplain Reviewer
 Date: 10/11/11 Kelli Sertich, AICP Floodplain Management & Services Division Manager	 Date: 10/12/11 Douglas A. Williams, AICP Planning Branch Manager
 Date: 10/7/11 Ed Raleigh, P.E. Engineering Division Manager	N/A Date: Assistant Project Manager
File Copies: 1. _____ 2. _____	YES <input type="checkbox"/> GIS Posted (Pending Floodplain Only) Date: _____ N/A

TECHNICAL DATA NOTEBOOK:

Letter of Map Revision For the Kemper Property APN 505-47-164C

Portion of South Branch Casandro Wash RM 0.720 to 0.924

Work Assignment No. 1

CONTRACT FCD 2011C002

ON-CALL FLOODPLAIN DELINEATION &
GENERAL ENGINEERING SERVICES

September 2011

Revised February 2012



Expires 3/31/2013

Prepared for:

Flood Control District of Maricopa County
2801 W. Durango Street
Phoenix, AZ 85009
(602) 506-1501

Prepared by:

JE Fuller/ Hydrology & Geomorphology
8400 S. Kyrene Rd., Suite 201
Tempe, Arizona 85284
480) 752-2124

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ENCLOSED DATA CD INCLUDES:

- Digital Copy of Report in PDF Format
- Digital Copies of HEC-RAS Files
- GIS Shapefiles of Project Elements



Expires 3/31/2013



SECTION 1: SECTION 1: INTRODUCTION

1.1 Study Purpose

The purpose of this floodplain delineation study is to reevaluate the floodplain and floodway delineations for a portion of the South Branch of Casandro Wash in Wickenburg, Arizona. The Effective FIS delineation was apparently performed in 1977 or 1983. The flood discharges and flood profiles were found reported in the July 1977 FIS for Town of Wickenburg, FEMA Community No. 040056 with a revision date of March 29, 1983.

1.2 Study Authority

The current study was authorized by the Flood Control District of Maricopa County (District) under contract FCD 2011 C002, Work Assignment No. 1. The study was performed by JE Fuller/Hydrology & Geomorphology, Inc. on behalf of the District.

1.3 Study Location

Figure 1.1 shows the location of the study area. The study area is located in within the Town of Wickenburg, Arizona in Maricopa County. The watershed is about 0.2 square miles in area to its crossing of Vista Drive within the study reach. The upper watershed is undeveloped whereas the northern portion of the watershed is developed. The South Branch Casandro Wash drains to the northeast until it enters the main Casandro Wash just north of US Highway 60 about one mile upstream of Casandro Dam.

The reach being restudied runs from an existing FIS cross section at river mile 0.720 upstream to a newly designated river mile 0.924 about 500 feet south of Vista Drive.

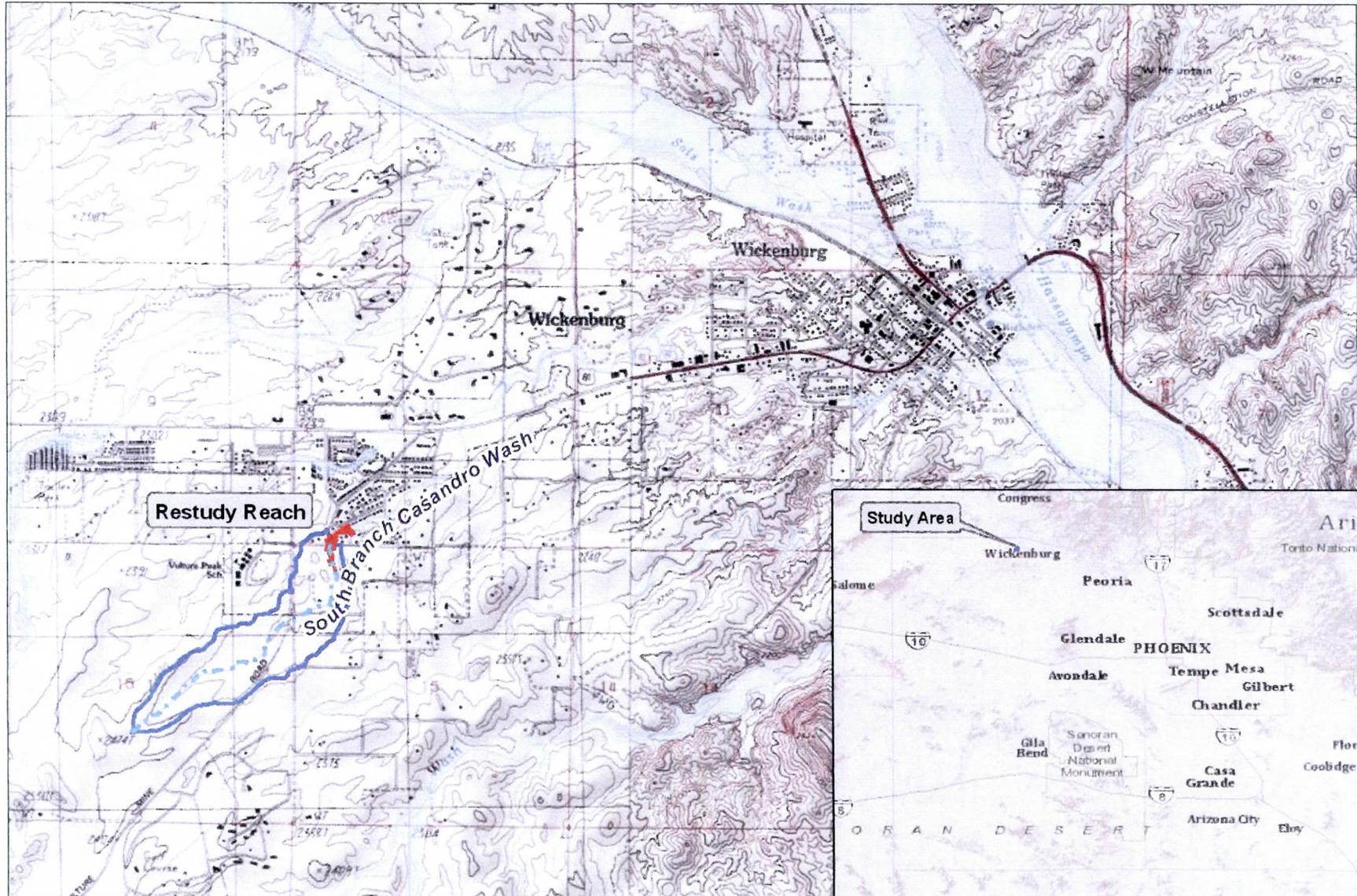


Figure 1.1 Location of Study Area

1.4 Methodology

This study used the Effective FIS data to the extent possible with updated topography and the newest HEC-RAS software version. Cross section geometry was generated using HEC-GeoRAS version 4.2.93.

1.4.1 Hydrology

The 100-year discharge used in this study was taken from the Effective FIS for the Town of Wickenburg dated July 1977 revised March 29, 1983. The 2005 FIS reports the same drainage area and 100-year discharge of 400 cfs at 'above Yaqui Drive' which is the next road crossing downstream near river mile 0.60. Table 1 in the FIS reports a discharge at the 'upstream corporate limit' with a drainage area of 0.2 square miles of 400 cfs for the 100-year event. The corporate limit at that time was at immediately upstream of Vista Drive. A newly performed delineation of the watershed contributing to Vista Drive finds a drainage area of 0.2 square miles. The majority of the watershed upstream of Vista Drive remains mostly undeveloped. Therefore, 400 cfs was used as the 100-year discharge for this study.

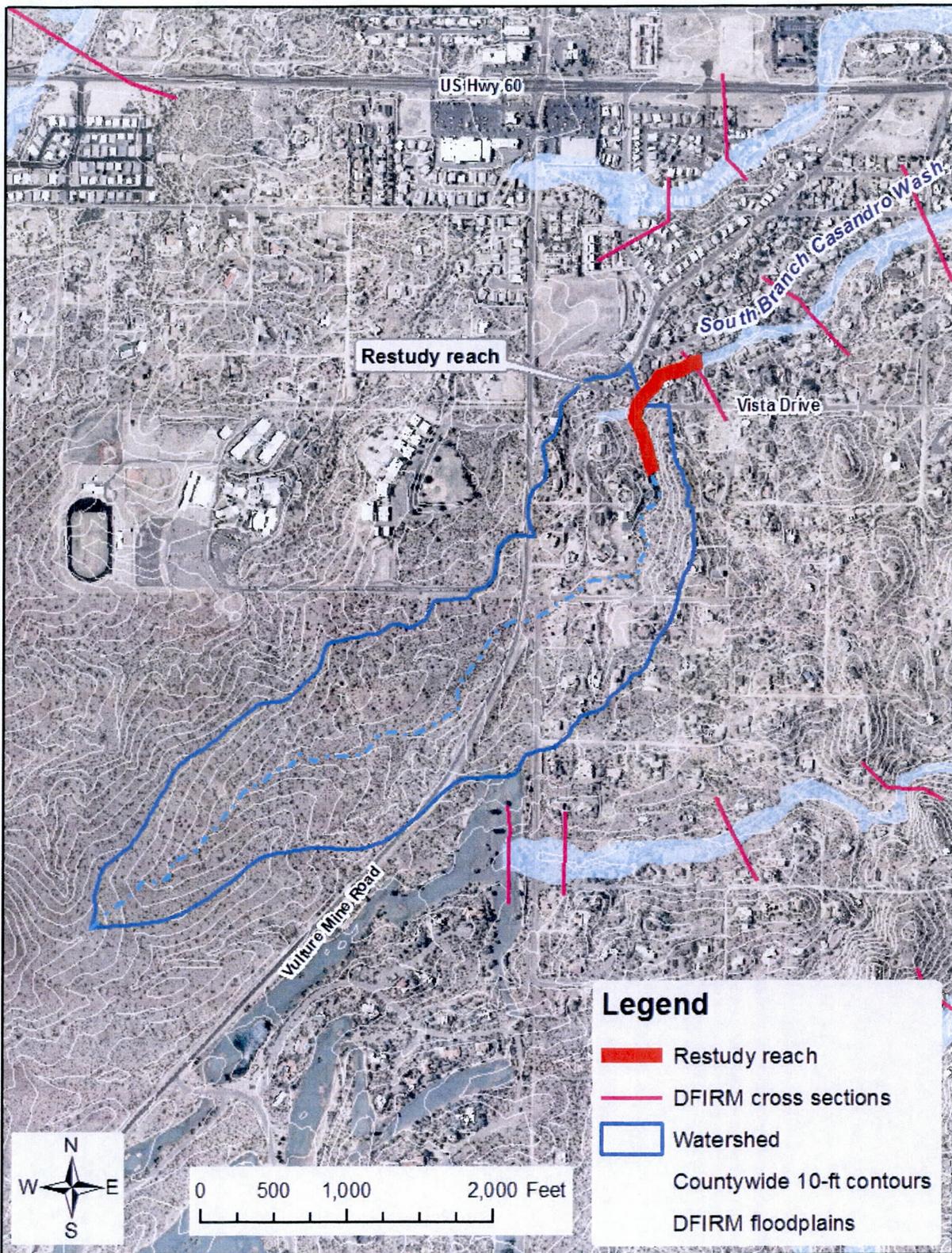


Figure 1.2 Watershed & Vicinity Map

1.4.2 *Hydraulics*

The U.S Army Corps of Engineers HEC-RAS model (version 4.1.0) was used to compute the water surface profiles and floodway encroachments. A description of the floodplain delineation is provided in Section 5.0 of this TDN.

1.5 **Acknowledgements**

This study was funded entirely by the Flood Control District of Maricopa County. Assistance and review from their staff was critical to the success of this project.

1.6 **Study results**

The study resulted in the redelineation of about 0.2 linear miles of the 100-year floodplain and floodway of the South Branch of Casandro Wash. The inundation areas for the newly delineated floodplains are shown on the maps in Section 6 and 7 and the Exhibit Maps at the end of this notebook.



SECTION 2: SECTION 2: ADWR/FEMA FORMS

2.1 Study Documentation Abstract for FEMA Submittals

Study Documentation Abstract For FEMA Submittals	Initial Study	Restudy	CLOMR	LOMR	X	Other
2.1.1 Date Study Accepted						
2.1.2 Study Prime Contractor	JE Fuller / Hydrology and Geomorphology, Inc.					
Contact(s)	Ted Lehman, P.E.					
Address	8400 S. Kyrene Rd., Suite 201 Tempe, AZ 85284					
Phone	(480) 752-2124					
Internal Reference Number	FCDMC 2011C002 – Assignment No. 1					
2.1.2 Study Sub-Contractor	None					
Contact(s)						
Address						
Phone						
Internal Reference Number						
2.1.2 Sub Study Sub-Contractor						
Contact(s)						
Address						
Phone						
Internal Reference Number						
2.1.3 FEMA Technical Review Contractor	Jaclyn Bloor					
Contact(s)	FEMA Production and Technical Services Contractor					
Address	355 Union Blvd Suite 200 Lakewood CO 80288					
Phone	(720)-514-1116					
Internal Reference Number						
2.1.4 FEMA Regional Reviewer	Not Applicable					
Phone						
2.1.5 State Technical Reviewer	None					
Phone						
2.1.6 Local Technical Reviewer	Flood Control District of Maricopa County (FCDMC)					
Phone	John Hathaway, P.E. (602) 506-1501					
2.1.7 Reach Description	South Branch Casandro Wash RM 0.720 to 0.924					
2.1.8 USGS Quad Sheet(s) with original photo date & latest photo revision date						
2.1.9 Unique Conditions and Problems	Original study extended up minor tributary rather than main wash. Effective BFE near existing channel invert ground elevation at starting cross section.					
2.1.10 Coordination of Peak Discharges (Agency, Date, Comments)						

2.2 FEMA Forms

U.S. DEPARTMENT OF HOMELAND SECURITY
 FEDERAL EMERGENCY MANAGEMENT AGENCY
OVERVIEW & CONCURRENCE FORM

*O.M.B No. 1660-0016
 Expires February 28, 2014*

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

- CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).
- LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
040056	Wickenburg, Town of	AZ	04013C	0235G	09/30/2005

2. a. Flooding Source:

- b. Types of Flooding: Riverine Coastal Shallow Flooding (e.g., Zones AO and AH)
 Alluvial fan Lakes Other (Attach Description)

3. Project Name/Identifier: South Branch Casandro Wash RM 0.720 to 0.924

4. FEMA zone designations affected: AE (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

- Physical Change Improved Methodology/Data Regulatory Floodway Revision Base Map Changes
 Coastal Analysis Hydraulic Analysis Hydrologic Analysis Corrections
 Weir-Dam Changes Levee Certification Alluvial Fan Analysis Natural Changes
 New Topographic Data Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

Structures: Channelization Levee/Floodwall Bridge/Culvert
 Dam Fill Other (Attach Description)

6. Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? Yes Fee amount: \$ ____
 No, Attach Explanation

Please see the DHS-FEMA Web site at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm for Fee Amounts and Exemptions.

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: John Hathaway	Company: Flood Control District of Maricopa County	
Mailing Address: 2801 W Durango St Phoenix AZ 85009	Daytime Telephone No.: 602-506-1501	Fax No.: 602-506-4601
	E-Mail Address: joh@mail.maricopa.gov	
Signature of Requester (required): 	Date: 10/6/2011	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Timothy S. Phillips, P.E., Chief Engineer and General Manager	Community Name: Maricopa County	
Mailing Address: 2801 W Durango St Phoenix AZ 85009	Daytime Telephone No.: (602) 506-4701	Fax No.: 602-506-1580
	E-Mail Address: tsp@mail.maricopa.gov	
Community Official's Signature (required): 	Date: 10/11/11	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Ted Lehman	License No.: 35895	Expiration Date: 3/31/2013
Company Name: J E Fuller Hydrology/Geomorphology Inc.	Telephone No.: 480-222-5709	Fax No.: 480-839-2193
Signature: 	Date: 9/16/2011	E-Mail Address: ted@jefuller.com

Structures:

- Channelization Levee/Floodwall Bridge/Culvert
 Dam Fill Other (Attach Description)

6. Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? Yes Fee amount: \$ _____
 No, Attach Explanation

Please see the DHS-FEMA Web site at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm for Fee Amounts and Exemptions.

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: John Hathaway	Company: Flood Control District of Maricopa County	
Mailing Address: 2801 W Durango St Phoenix AZ 85009	Daytime Telephone No.: 602-506-1501	Fax No.: 602-506-4601
	E-Mail Address: joh@mail.maricopa.gov	
Signature of Requester (required): 	Date: 10/21/2011	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Rick Destefano, Floodplain Administrator	Community Name: Town of Wickenburg	
Mailing Address: 155 N. Tegner Street, Suite A Wickenburg, AZ 85390	Daytime Telephone No.: (928) 668-0513	Fax No.: 602-506-1580
	E-Mail Address: rdestefano@ci.wickenburg.az.us	
Community Official's Signature (required): 	Date: Oct. 12, 2011	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

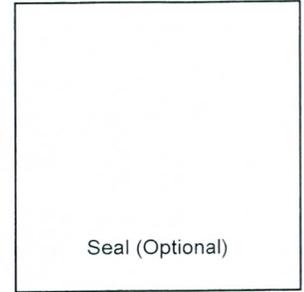
Certifier's Name: Ted Lehman	License No.: 35895	Expiration Date: 3/31/2013
Company Name: J E Fuller Hydrology/Geomorphology Inc.	Telephone No.: 480-222-5709	Fax No.: 480-839-2193
Signature: 	Date: 9/16/2011	E-Mail Address: ted@jefuller.com

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)

Required if ...

- | | |
|---|---|
| <input checked="" type="checkbox"/> Riverine Hydrology and Hydraulics Form (Form 2) | New or revised discharges or water-surface elevations |
| <input type="checkbox"/> Riverine Structures Form (Form 3) | Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam |
| <input type="checkbox"/> Coastal Analysis Form (Form 4) | New or revised coastal elevations |
| <input type="checkbox"/> Coastal Structures Form (Form 5) | Addition/revision of coastal structure |
| <input type="checkbox"/> Alluvial Fan Flooding Form (Form 6) | Flood control measures on alluvial fans |



**U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
RIVERINE HYDROLOGY & HYDRAULICS FORM**

*O.M.B No. 1660-0016
Expires February 28, 2014*

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: South Branch Casandro Wash

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> Not revised (skip to section B) | <input type="checkbox"/> No existing analysis | <input type="checkbox"/> Improved data |
| <input type="checkbox"/> Alternative methodology | <input type="checkbox"/> Proposed Conditions (CLOMR) | <input type="checkbox"/> Changed physical condition of watershed |

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)
----------	-------------------------	---------------------	---------------

3. Methodology for New Hydrologic Analysis (check all that apply)

- Statistical Analysis of Gage Records
- Regional Regression Equations
- Precipitation/Runoff Model → Specify Model: _____
- Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? Yes No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation..

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit*	<u>South Branch Casandro Wash</u>	<u>0.720</u>	<u>2273.92**</u>	<u>2274.06***</u>
Upstream Limit*	<u>Same</u>	<u>0.924</u>	<u>none</u>	<u>2291.98</u>

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

** Effective WSE shown adjusted to NAVD 1988 vertical datum using local VERTCON adjustment of +2.22 feet from original NGVD 1929 elevation.

*** Revised HEC-RAS shows model defaulting to critical depth above Effective elevation. Revised top width compares reasonably well with Effective Floodway Data Table.

2. Hydraulic Method/Model Used: HEC-RAS version 4.1.0

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

<u>Models Submitted</u>	<u>Natural Run</u>		<u>Floodway Run</u>		<u>Datum</u>
	File Name:	Plan Name:	File Name:	Plan Name:	
Duplicate Effective Model*	_____	_____	_____	_____	_____
Corrected Effective Model*	_____	_____	_____	_____	_____
Existing or Pre-Project Conditions Model**	_____	_____	_____	_____	_____
Revised or Post-Project Conditions Model	File Name: <u>KemperLOMR.prj</u>	Plan Name: <u>No Culvert</u>	File Name: <u>KemperLOMR.prj</u>	Plan Name: <u>No culvert</u>	<u>NAVD88</u>
Other - (attach description)	File Name: _____	Plan Name: _____	File Name: _____	Plan Name: _____	_____

* For details, refer to the corresponding section of the instructions.

** There is no Existing or Pre-project conditions model available.

Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A **certified topographic work map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: 2-foot contours from flight date of July 7, 2004

Source: Flood Control District of Maricopa County

Date: flight date 7/7/2004

Accuracy: 2-foot contour interval DTM

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach a **copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? Yes No

a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
- The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? Yes No

If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

2. Does the request involve the placement or proposed placement of fill? Yes No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? Yes No

If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

*** Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.**



SECTION 3: MAPPING AND SURVEY INFORMATION

3.1 Field Survey Information

Field survey of the culvert and vicinity of its crossing at Vista Drive were performed by FCDMC personnel on March 1, 2010. The survey was conducted in NAVD88 vertical datum

3.2 Mapping

Topographic mapping from the Wickenburg Mapping project (FCD 03-66), with a flight date of July 7, 2004 was provided by the District for use in the development of the cross section geometry. Two-foot contours from this data set were also provided by the District for use in the work study maps. The vertical datum of the topographic data is NAVD88. Its horizontal datum is State Plane Arizona Central, NAD 1983.



SECTION 4: HYDROLOGY

4.1 Method Description

Hydrology for use in this study was taken from the Effective FIS. Examination of the upstream watershed reveals that most of the watershed remains undeveloped. Therefore, continued use of the Effective FIS discharges of 50, 250, 400 and 1000 cfs respectively for the 10-year, 50-year, 100-year and 500-year events is considered reasonable.

4.2 Parameter Estimation

4.2.1 *Drainage Area Boundaries*

The drainage area to Vista Drive is shown in Figure 1.2. The watershed area is computed as 0.2 square miles which compares well with the estimates reported in the Effective FIS. The 2005 FIS reports the same drainage area and 100-year discharge of 400 cfs at 'above Yaqui Drive' which is the next road crossing downstream near river mile 0.60.

4.2.2 *Watershed work maps*

Not applicable.

4.2.3 *Gage data*

There is a FCDMC ALERT gaging station located on Steinway Drive about one-quarter mile upstream. The gage, ID# 5263, was installed on October 26, 2005. The maximum flow recorded in that time was 58 cfs in July 2007. In three of the 5 years of record, no flows were recorded at all. Given the short record, this station cannot be relied on to validate the Effective FIS discharge.

4.2.4 *Statistical parameters*

Not applicable.

4.2.5 *Precipitation*

Not applicable.

4.2.6 *Physical parameters*

Not applicable.

4.3 Problems Encountered During the Study

4.3.1 Special problems and solutions

Not applicable.

4.3.2 Modeling warning and error messages

Not applicable.

4.4 Calibration

Not applicable.

4.5 Final Results

4.5.1 Hydrologic analysis results

Not applicable.

4.5.2 Verification of results

Not applicable.

4.5.3 Comparison with Previous Studies

Not applicable.

4.6 References

Not applicable.



SECTION 5: HYDRAULIC ANALYSIS

5.1 Method Description

HEC-RAS version 4.1.0 was used to compute water surface profiles for the 100-year Effective FIS discharge for the study reach from River Mile 0.720 upstream to the new study limit at River Mile 0.924. Geometric data was developed from 2004 2-foot topography provided by the District. Floodway boundaries were also delineated using HEC-RAS.

5.2 Work Study Maps

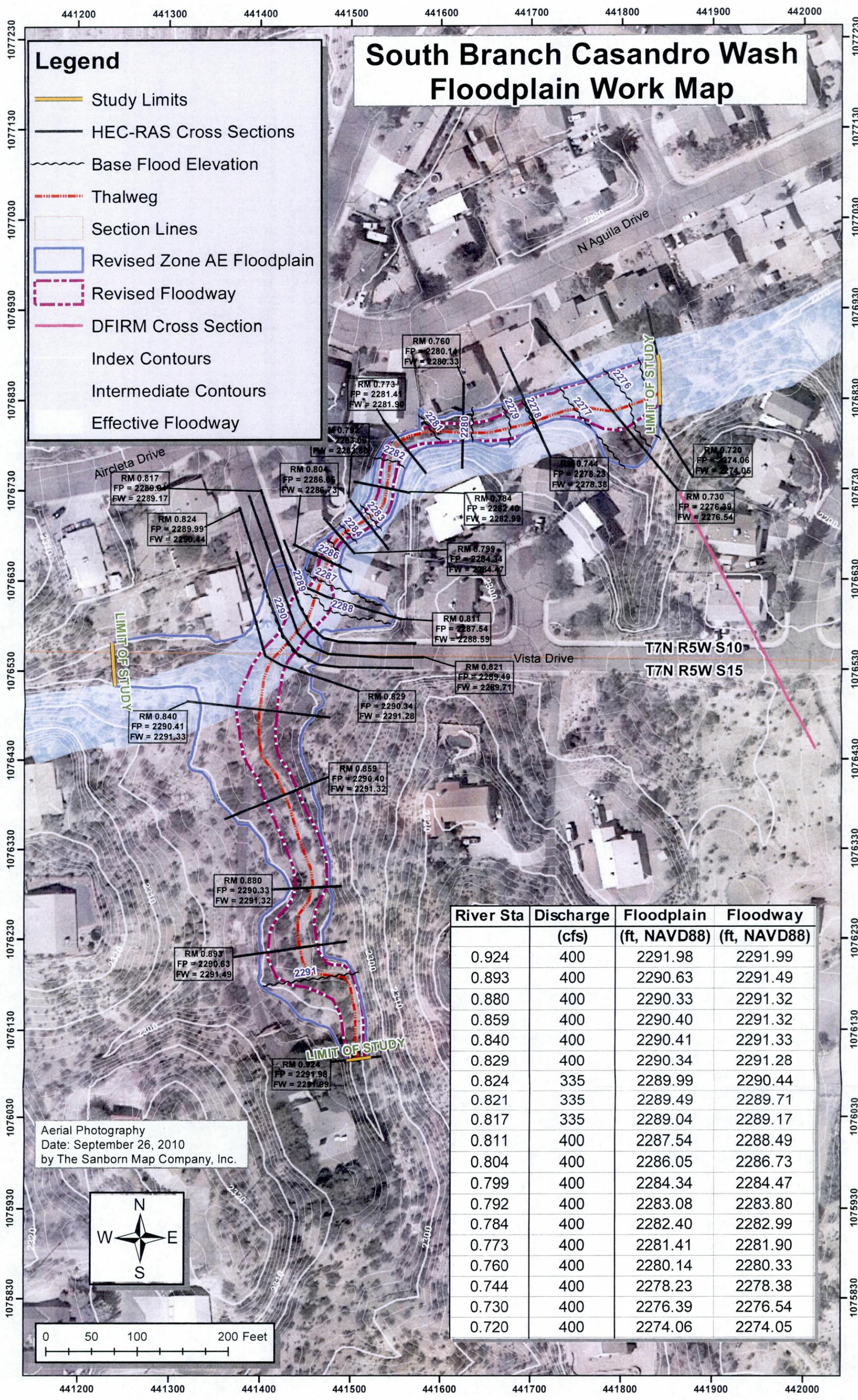
The revised floodplain and floodway delineation for the study reach is shown on 1 inch = 100 feet, 2-foot contour interval base mapping with orthographic aerial photography. A copy of the work study map is included on Figure 5.1 as well as provided in Appendix E.

The work study maps include cross-section locations, floodplain boundaries, zone designations, road names, state plane coordinate grid, section lines, and stream names/numbers.

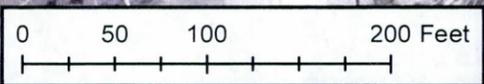
South Branch Casandro Wash Floodplain Work Map

Legend

-  Study Limits
-  HEC-RAS Cross Sections
-  Base Flood Elevation
-  Thalweg
-  Section Lines
-  Revised Zone AE Floodplain
-  Revised Floodway
-  DFIRM Cross Section
-  Index Contours
-  Intermediate Contours
-  Effective Floodway



Aerial Photography
Date: September 26, 2010
by The Sanborn Map Company, Inc.



River Sta	Discharge (cfs)	Floodplain (ft, NAVD88)	Floodway (ft, NAVD88)
0.924	400	2291.98	2291.99
0.893	400	2290.63	2291.49
0.880	400	2290.33	2291.32
0.859	400	2290.40	2291.32
0.840	400	2290.41	2291.33
0.829	400	2290.34	2291.28
0.824	335	2289.99	2290.44
0.821	335	2289.49	2289.71
0.817	335	2289.04	2289.17
0.811	400	2287.54	2288.49
0.804	400	2286.05	2286.73
0.799	400	2284.34	2284.47
0.792	400	2283.08	2283.80
0.784	400	2282.40	2282.99
0.773	400	2281.41	2281.90
0.760	400	2280.14	2280.33
0.744	400	2278.23	2278.38
0.730	400	2276.39	2276.54
0.720	400	2274.06	2274.05

5.3 Parameter Estimation

HEC-RAS v4.1.0 was used to determine water surface elevations for the reach. The model was run in the sub-critical flow regime for both the floodplain and floodway profiles. The downstream boundary conditions were set equal to the Effective water surface elevation at RM 0.720. The Effective water surface elevation was obtained from the Effective Profile Plot at location RM 0.720 and was adjusted from NGVD 1929 to NAVD 1988 by adding 2.22 feet per VERTCON for the local area. The HEC-RAS model results indicate flow calculations defaulting to critical depth above effective water surface elevation.

5.3.1 Roughness Coefficients

Manning's roughness coefficient (n value) were set to 0.035 for sandy bottom wash, 0.08 for all channel reaches with heavy vegetation and 0.016 for the roadway overflow of Vista Drive. For cross section 0.811 which passes through the gravel yard of the Kemper's property, an n-value of 0.025 was used. An n-value of 0.06 was used for overbanks above Vista Drive and 0.08 was used below Vista Drive.

5.3.2 Expansion and Contraction Coefficients

The expansion and contraction coefficients used throughout the study were 0.3 and 0.1, respectively. No adjustment was made at the Vista Drive crossing given the high amount of weir flow as compared to the actual flow through the culvert itself.

5.4 Cross-section descriptions

Cross section data geometry were developed in HEC-GeoRAS version 10 from a digital elevation model developed from 2004 data provided by Flood Control District of Maricopa County. Cross sections were taken about every 50 to 100 feet depending on the width and orientation of the floodplain. Additional cross sections were added in the vicinity of the culvert crossing at Vista Drive. Cross section stationing is from left to right if viewed in the downstream direction. Cross section stations were adjusted from the initial GeoRAS output to make the approximate thalweg station set to 10,000 per District standards. The latest 2010 aerial photos were also examined to assist in determination of cross section locations, orientation, and blocked obstructions and ineffective flow areas.

5.5 Modeling Considerations

5.5.1 Hydraulic Jump and drop analysis

No hydraulic jump or drop analyses were conducted in this study.

5.5.2 *Bridge or Culverts*

One culvert is present in the study reach but was not included in the final RAS modeling conducted in this study. The longitudinal length of the culvert overflow area could not be adequately represented within the culvert modeling option in RAS. A separate 'with culvert' plan was developed to estimate the culvert flow capacity. However, it was found to overestimate the water surface in the right overbank area in the vicinity of the Kemper's home. Therefore, a 'without culvert' plan was used with additional cross sections over Vista Drive and near the Kemper home to compute a more accurate water surface elevation in the right overbank just north of Vista Drive. Discharge in the 'without culvert' plan was adjusted to remove the culvert flows for the overflow reach of the study area.

In order to estimate the culvert capacity and the correct flow to remove from the model, the single 3-foot corrugated metal pipe (CMP) culvert that crosses under Vista Drive was modeled in the 'with culvert' plan. Culvert inlet and outlet invert elevations were taken from site survey performed on March 1, 2010 by District surveyors. The culvert length was also obtained using the field survey data points at culvert inlet and outlet locations in conjunction with the use of aerial photography within GIS environment. Ineffective flow elevations were set at approximately the Vista Drive overtopping elevation. Expansion and contraction coefficients were not adjusted due to the large proportion of overtopping flow (335 cfs) relative to the resulting culvert flow (65 cfs).

An entrance loss coefficient of 0.7 was used with Manning's n-value of 0.019 for the 3-foot corrugated metal pipe culvert per Table 6-2 and 6-3 in the HEC-RAS Reference Manual.

The flow rate of the overtopping discharge from the 'with culvert' model was used between RM 0.811 and RM 0.824 in the 'without culvert' model to more accurately compute water surface elevations over the roadway and near the Kemper residence.

5.5.3 *Levees and Dikes*

There are no levees or dikes within the project area.

5.5.4 *Islands and Flow Splits*

There were no islands or split flows modeled in this study.

5.5.5 *Ineffective Flow Areas*

Ineffective flow areas were added immediately upstream and downstream of the Vista Drive crossing to accompany the modeling of the culvert crossing in the 'with culvert' model. Ineffective flow elevations for those cross sections were set at the approximate overflow elevation of the roadway.

5.5.6 *Supercritical Flow*

Supercritical flow does occur in the area of the Vista Drive overtopping. The model was run in the subcritical flow regime. However, flow passes through critical depth as it flows over Vista Drive at RM 0.824 and then reenters the main channel downstream near RM 0.811.

5.6 **Floodway modeling**

Floodway modeling was performed in HEC-RAS using Method 4 with a target water surface rise of 1 foot. The initial run found several locations that exceeded the 1 foot surcharge. These were adjusted one at a time reducing the target elevation and then examining the surcharge results. Eventually a set of encroachments were determined that met the maximum 1 foot restriction. The results were then imported to Method 1 to set the encroachment stations for each cross section. Floodway encroachments were limited to no greater than one foot rise in the energy grade line for the sections near Vista Drive where computations default to critical depth.

5.7 **Special problems encountered during the study**

No special problems were encountered.

5.8 **Calibration**

No hydraulic calibration was performed during this study.

5.9 **Final Results**

5.9.1 *Hydraulic analysis results*

A summary of the hydraulic analysis results are provided in the following HEC-RAS Summary tables below. Appendix E contains cross section plots, detailed geometry input data and detailed output tables.

Table 5-1 HECRAS Results Summary

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
0.924	Floodplain	400	2288.36	2291.98	2291.98	2293.01	0.032868	8.48	52.07	26.25	0.91
0.924	Floodway	400	2288.36	2291.99	2291.99	2293.33	0.039054	9.28	43.27	16	0.99
0.924	10yr	50	2288.36	2289.89	2289.89	2290.27	0.060228	4.96	10.08	13.17	1
0.924	50yr	250	2288.36	2291.3	2291.3	2292.13	0.037354	7.45	35.61	22.37	0.92
0.924	500yr	1000	2288.36	2293.79	2293.79	2295.35	0.027181	10.87	108.09	34.71	0.9
0.893	Floodplain	400	2286.64	2290.63	2288.79	2290.73	0.000807	2.62	174.07	70.03	0.26
0.893	Floodway	400	2286.64	2291.49	2288.79	2291.55	0.000372	2.09	210.56	55	0.18
0.893	10yr	50	2286.64	2288.78	2287.6	2288.79	0.000241	0.81	62.72	50.39	0.12
0.893	50yr	250	2286.64	2290.12	2288.4	2290.18	0.000578	1.98	139.9	64.81	0.21
0.893	500yr	1000	2286.64	2292.15	2289.89	2292.4	0.001241	4.21	293.14	86.42	0.34
0.88	Floodplain	400	2286.64	2290.33	2289.06	2290.62	0.002642	4.67	105.03	45.12	0.46
0.88	Floodway	400	2286.64	2291.32	2289.03	2291.5	0.001125	3.66	135.21	34.39	0.32
0.88	10yr	50	2286.64	2288.75	2287.48	2288.77	0.000452	1.22	47.61	32.09	0.17
0.88	50yr	250	2286.64	2289.96	2288.54	2290.11	0.001594	3.34	90.26	41.34	0.35
0.88	500yr	1000	2286.64	2290.81	2290.59	2292.1	0.010033	9.99	125.73	50.03	0.92
0.859	Floodplain	400	2284.52	2290.4	2287.33	2290.46	0.000374	2.56	298.2	95.31	0.19
0.859	Floodway	400	2284.52	2291.32	2287.28	2291.41	0.000363	2.79	219.7	37.59	0.19
0.859	10yr	50	2284.52	2288.75	2285.63	2288.76	0.000028	0.55	157.49	69.66	0.05
0.859	50yr	250	2284.52	2289.99	2286.81	2290.02	0.000208	1.81	260.05	90.6	0.14
0.859	500yr	1000	2284.52	2291.28	2288.64	2291.49	0.001201	5.05	386.32	105.84	0.35
0.84	Floodplain	400	2283.35	2290.41	2286.09	2290.43	0.000113	1.58	481.87	127.52	0.11
0.84	Floodway	400	2283.35	2291.33	2286.04	2291.37	0.000142	1.93	308.13	45	0.12
0.84	10yr	50	2283.35	2288.75	2284.45	2288.75	0.000006	0.31	290.22	104.03	0.02
0.84	50yr	250	2283.35	2290	2285.58	2290.01	0.000059	1.09	430.51	121.69	0.08
0.84	500yr	1000	2283.35	2291.29	2287.34	2291.38	0.000412	3.28	602.67	146.88	0.21
0.829	Floodplain	400	2282.64	2290.34	2286.47	2290.41	0.000303	2.35	252.95	101.74	0.17
0.829	Floodway	400	2282.64	2291.28	2286.47	2291.36	0.000226	2.24	206.46	33	0.15
0.829	10yr	50	2282.64	2288.75	2284.38	2288.75	0.000016	0.44	138.08	51.71	0.04
0.829	50yr	250	2282.64	2289.96	2285.88	2290	0.000157	1.62	217.06	87.65	0.12
0.829	500yr	1000	2282.64	2291	2288.36	2291.32	0.001184	4.99	335.04	157.91	0.34

Table 5-1 HECRAS Results Summary (contd.)

River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
0.824	Floodplain	335	2288.61	2289.99	2289.99	2290.37	0.003109	5.93	74.76	106.4	0.94
0.824	Floodway	335	2288.61	2290.44	2290.44	2291.27	0.003278	7.52	46.95	29	1.02
0.824	10yr	1	2288.61	2288.72	2288.72	2288.75	0.009946	1.44	0.69	11.28	1.03
0.824	50yr	180	2288.61	2289.67	2289.67	2289.96	0.003282	4.99	44.81	80.43	0.92
0.824	500yr	950	2288.61	2290.71	2290.71	2291.25	0.002661	7.49	174.33	156.02	0.94
0.821	Floodplain	335	2288.2	2289.49	2289.49	2289.84	0.002871	5.38	76.74	109.75	0.89
0.821	Floodway	335	2288.2	2289.71	2289.71	2290.38	0.003622	6.55	51.18	37.97	0.99
0.821	10yr	1	2288.2	2288.28	2288.28	2288.3	0.00992	1.15	0.87	20.42	0.97
0.821	50yr	180	2288.2	2289.17	2289.17	2289.46	0.00332	4.64	45.52	84.57	0.91
0.821	500yr	950	2288.2	2290.22	2290.22	2290.79	0.002574	7.11	169.14	142.74	0.92
0.817	Floodplain	335	2287.79	2289.04	2289.04	2289.44	0.003076	5.41	70.2	86.96	0.92
0.817	Floodway	335	2287.79	2289.17	2289.17	2289.78	0.003747	6.27	53.45	44.4	1.01
0.817	10yr	1	2287.79	2287.87	2287.87	2287.9	0.010333	1.32	0.76	14.54	1.02
0.817	50yr	180	2287.79	2288.75	2288.75	2289.02	0.003117	4.41	45.78	79.32	0.88
0.817	500yr	950	2287.79	2289.89	2289.89	2290.53	0.002505	7.18	157.26	118.31	0.91
0.811	Floodplain	400	2286.32	2287.54	2287.54	2287.93	0.00935	5.13	80.27	103.52	0.98
0.811	Floodway	400	2286.32	2288.49	2288.49	2289.36	0.0081	7.89	54.13	31.52	1.04
0.811	10yr	50	2286.32	2286.88	2286.88	2287	0.015757	3.19	18.46	85.55	1.06
0.811	50yr	250	2286.32	2287.3	2287.3	2287.6	0.010971	4.49	56.94	96.94	1.01
0.811	500yr	1000	2286.32	2288.95	2288.23	2289.2	0.001728	4.24	255.75	137.18	0.5
0.804	Floodplain	400	2280.86	2286.05	2284.79	2286.41	0.012603	5.23	91.9	35.25	0.45
0.804	Floodway	400	2280.86	2286.73	2284.78	2287.23	0.021049	5.72	69.96	14.52	0.46
0.804	10yr	50	2280.86	2283.14	2282.52	2283.26	0.017915	2.78	18.04	15.62	0.44
0.804	50yr	250	2280.86	2285.11	2284.07	2285.41	0.013924	4.64	61.94	28.94	0.46
0.804	500yr	1000	2280.86	2288.59	2286.71	2289.05	0.009827	6.35	202.8	49.54	0.43
0.799	Floodplain	400	2279.55	2284.34	2284.34	2285.57	0.069729	9.2	46.6	19.46	0.95
0.799	Floodway	400	2279.55	2284.47	2284.47	2285.96	0.093459	9.8	40.83	13.51	0.99
0.799	10yr	50	2279.55	2281.63	2281.63	2282.13	0.104381	5.71	8.76	8.43	0.99
0.799	50yr	250	2279.55	2283.53	2283.53	2284.53	0.072486	8.2	32.12	16.16	0.94
0.799	500yr	1000	2279.55	2286.55	2286.55	2288.34	0.052017	11.55	99.92	29.15	0.9

Table 5-1 HECRAS Results Summary (contd.)

River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
0.792	Floodplain	400	2277.74	2283.08	2282.05	2283.6	0.021725	5.87	71.7	26.2	0.56
0.792	Floodway	400	2277.74	2283.8	2281.99	2284.2	0.015689	5.04	79.29	19.15	0.44
0.792	10yr	50	2277.74	2280.18	2279.55	2280.33	0.022484	3.13	15.96	12.43	0.49
0.792	50yr	250	2277.74	2282.22	2281.28	2282.6	0.022672	5.04	50.81	21.98	0.55
0.792	500yr	1000	2277.74	2285.32	2284.11	2286.21	0.02053	7.98	142.52	37.1	0.59
0.784	Floodplain	400	2276.72	2282.4	2280.98	2282.8	0.013262	5.35	85.07	29.66	0.46
0.784	Floodway	400	2276.72	2282.99	2280.91	2283.44	0.017517	5.35	74.72	15.5	0.43
0.784	10yr	50	2276.72	2279.48	2278.56	2279.57	0.012184	2.45	20.4	14.59	0.37
0.784	50yr	250	2276.72	2281.53	2280.23	2281.82	0.012582	4.47	61.18	25.22	0.43
0.784	500yr	1000	2276.72	2284.68	2283.07	2285.37	0.014201	7.38	165.75	40.9	0.51
0.773	Floodplain	400	2275.89	2281.41	2280.36	2281.91	0.020657	5.85	74.62	27.48	0.53
0.773	Floodway	400	2275.89	2281.9	2280.3	2282.4	0.019924	5.68	71.01	17.51	0.49
0.773	10yr	50	2275.89	2278.61	2277.86	2278.74	0.019437	2.88	17.35	13.24	0.44
0.773	50yr	250	2275.89	2280.6	2279.57	2280.96	0.020108	4.9	53.91	23.28	0.51
0.773	500yr	1000	2275.89	2283.51	2282.36	2284.41	0.022219	8.18	140.56	35.32	0.6
0.76	Floodplain	400	2274.96	2280.14	2278.99	2280.55	0.016675	5.36	83.11	32.58	0.5
0.76	Floodway	400	2274.96	2280.33	2278.99	2280.85	0.02334	5.8	68.99	18.3	0.53
0.76	10yr	50	2274.96	2277.44	2276.68	2277.54	0.014252	2.56	19.57	15.62	0.39
0.76	50yr	250	2274.96	2279.36	2278.26	2279.65	0.015937	4.46	60.23	26.75	0.47
0.76	500yr	1000	2274.96	2282.1	2280.94	2282.88	0.019772	7.8	169.76	71.2	0.58
0.744	Floodplain	400	2274.17	2278.23	2277.67	2278.73	0.032685	5.64	71.78	38.13	0.66
0.744	Floodway	400	2274.17	2278.38	2277.66	2278.82	0.026591	5.31	75.49	31.64	0.6
0.744	10yr	50	2274.17	2276.61	2275.68	2276.67	0.008231	1.91	26.23	21.1	0.3
0.744	50yr	250	2274.17	2277.93	2277.02	2278.19	0.020836	4.09	61.21	32.16	0.52
0.744	500yr	1000	2274.17	2279.31	2279.31	2280.48	0.048675	8.93	124.05	57.41	0.86
0.73	Floodplain	400	2273.97	2276.39	2275.85	2276.53	0.017637	3.25	134.51	109.22	0.46
0.73	Floodway	400	2273.97	2276.54	2275.92	2276.73	0.019572	3.59	112.08	68.76	0.49
0.73	10yr	50	2273.97	2275.22	2275.06	2275.28	0.040279	2.01	25.26	69.38	0.56
0.73	50yr	250	2273.97	2275.93	2275.61	2276.07	0.026342	3.13	86.39	99.91	0.54
0.73	500yr	1000	2273.97	2277.29	2276.58	2277.58	0.01891	4.59	238.11	119.6	0.52
0.72	Floodplain	400	2271.61	2274.06	2274.06	2274.66	0.085344	6.21	64.65	55.65	0.99
0.72	Floodway	400	2271.61	2274.05	2274.05	2274.66	0.087973	6.26	64.02	55.38	1
0.72	10yr	50	2271.61	2272.84	2272.61	2272.97	0.04206	2.88	17.39	26.31	0.62
0.72	50yr	250	2271.61	2273.97	2273.62	2274.24	0.041996	4.17	59.99	52.99	0.68
0.72	500yr	1000	2271.61	2275.34	2275.15	2276.06	0.042045	7.01	155.09	81.99	0.78

5.10 References

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2. Thomsen, B.W. and Hjalmarson, H.W., 1991, *Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona*. U.S. Geological Survey: Tucson, Arizona, 126 p.
3. U.S. Army Corps of Engineers, HEC-RAS River Analysis System Users Manual, Version 4.1, January 2010.
4. U.S. Army Corps of Engineers, HEC-RAS River Analysis System Hydraulic Reference Manual, Version 4.1, January 2010.
5. U.S. Army Corps of Engineers, HEC-RAS River Analysis System, Version 4.1.0, Jan 2010



SECTION 6: SEDIMENT TRANSPORT/EROSION

SECTION 6A: EROSION AND SEDIMENT TRANSPORT

No specific erosion or sediment transport analyses were conducted as part of this study.



SECTION 7: DRAFT FIS

7.1 Summary of Discharges

Discharges were taken from the Effective FIS for South Branch Casandro Wash.

Table 7-1 Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs)			
		10-Year	50-year	100-Year	500-Year
South Branch Casandro Wash at Vista Drive	0.20	50	250	400	1000

7.2 Floodway Data

Floodway data table for the study reach is presented below. The table summarizes floodway variables by cross section. All elevations are presented in NGVD29 vertical datum and have been converted from NAVD88 using a conversion factor of -2.22 ft.

Table 7-2 Floodway Data

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
(Feet NGVD)								
Casandro Wash								
A								
B								
C								
D								
E								
F								
G								
H								
South Branch Casandro Wash								
	LIMIT OF STUDY							
A	0.375	157	122	4.5	2,245.5	2,245.5	2,245.5	0.0
B	0.565	105	128	3.9	2,257.4	2,257.4	2,257.4	0.0
C	0.720	56	65	6.2	2,271.8	2,271.8	2,271.8	0.0
	0.730	109	135	3.0	2,274.2	2,274.2	2,274.3	0.1
	0.744	38	72	5.6	2,276.0	2,276.0	2,276.2	0.2
	0.760	33	83	4.8	2,277.9	2,277.9	2,278.1	0.2
	0.773	27	75	5.4	2,279.2	2,279.2	2,279.7	0.5
	0.784	30	85	4.7	2,280.2	2,280.2	2,280.8	0.6
	0.792	26	72	5.6	2,280.9	2,280.9	2,281.6	0.7
	0.799	19	47	8.6	2,282.1	2,282.1	2,282.3	0.2
	0.804	35	92	4.4	2,283.8	2,283.8	2,284.5	0.7
	0.811	104	80	5.0	2,285.3	2,285.3	2,286.3	1.0
	0.817	87	70	4.8	2,286.8	2,286.8	2,287.0	0.2
	0.821	110	77	4.4	2,287.3	2,287.3	2,287.5	0.2
	0.824	106	75	4.5	2,287.8	2,287.8	2,288.2	0.4
	0.829	102	253	1.6	2,288.1	2,288.1	2,289.1	1.0
	0.840	128	482	0.8	2,288.2	2,288.2	2,289.1	0.9
	0.859	95	298	1.3	2,288.2	2,288.2	2,289.1	0.9
	0.880	45	105	3.8	2,288.1	2,288.1	2,289.1	1.0
	0.893	70	174	2.3	2,288.4	2,288.4	2,289.3	0.9
	0.924	26	52	7.7	2,289.8	2,289.8	2,289.8	0.0
1 Miles above mouth								
FEDERAL EMERGENCY MANAGEMENT AGENCY					FLOODWAY DATA			
MARICOPA COUNTY, AZ AND INCORPORATED AREAS					CASANDRO WASH - SOUTH BRANCH CASANDRO WASH			

NOTE: VALUES PRESENTED IN THIS TABLE ARE IN NGVD. THE VALUES HAVE BEEN CONVERTED FROM NAVD88 USING A CONVERSION FACTOR OF -2.22 FT

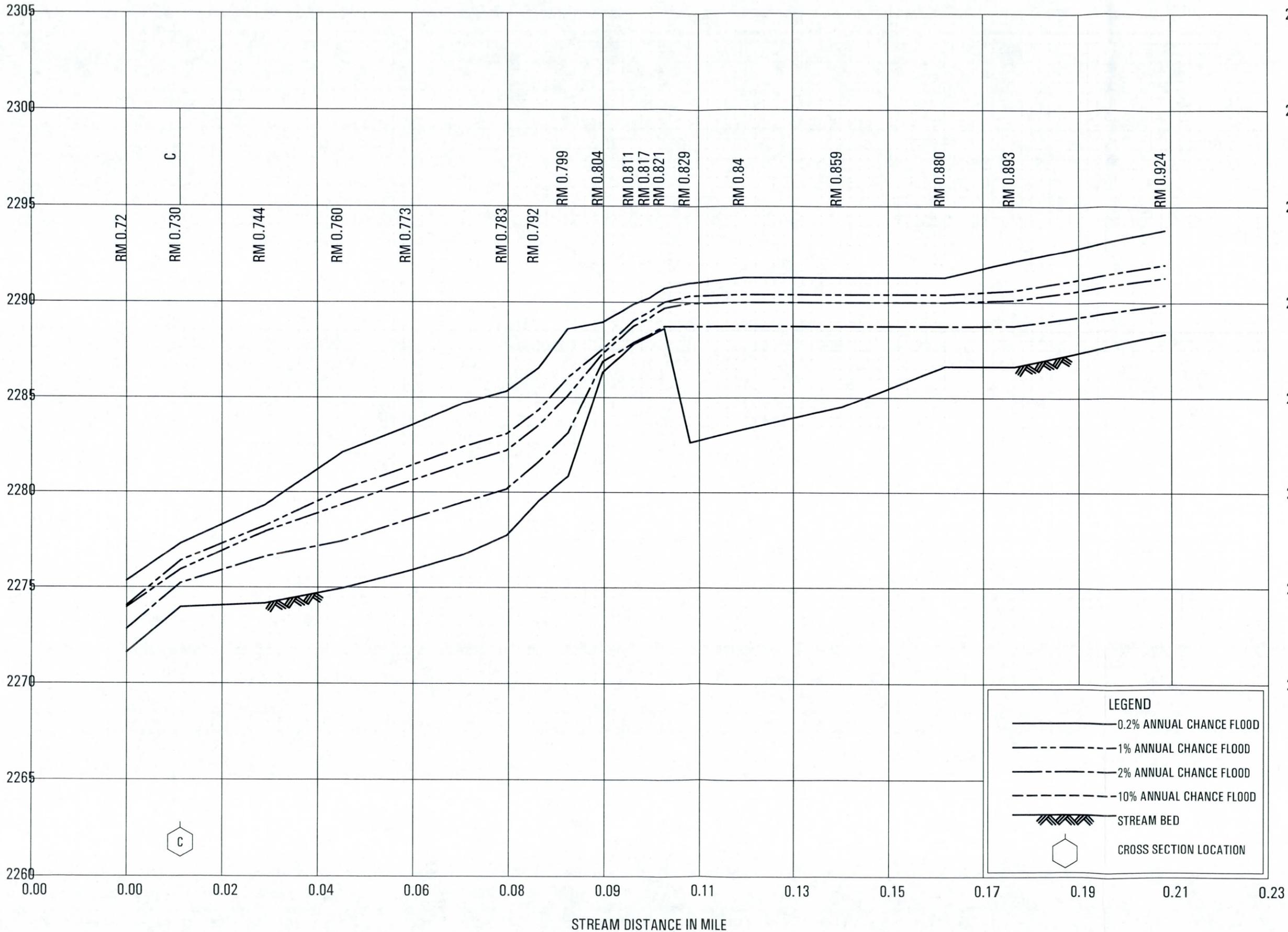
7.3 Annotated Flood Insurance Rate Maps

The redline FIRM is shown on the following page.

7.4 Flood Profiles

Flood profiles are presented below and are included in Appendix E as well.

ELEVATION IN FEET (NAVD 88)



FEDERAL EMERGENCY MANAGEMENT AGENCY
MARICOPA COUNTY, AZ
MARICOPA

FLOOD PROFILES
SOUTH BRANCH CASANDRO WASH

01P



Appendix A

References

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6. Thomas, Blakemore E, Hjalmarson, H.W., and Waltemeyer, S.D., 1997, Methods for Estimating Magnitude and Frequency of Floods in the Southwest United States: U.S. Geological Survey, Water Supply Paper 2433, 195 p.
7. Thomsen, B.W. and Hjalmarson, H.W., 1991, Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona. U.S. Geological Survey: Tucson, Arizona, 126 p.
8. U.S. Army Corps of Engineers, 1990, HEC-1 Flood Hydrograph Package, User's Manual, CPD-1A
9. U.S. Army Corps of Engineers, HEC-RAS River Analysis System, Version 3.1.3, May, 2005.



Appendix B
Correspondence

B.1 General Correspondence



Flood Control District

of Maricopa County

INTEROFFICE MEMORANDUM

Date: August 3, 2011
To: John Hathaway P.E., PPM Division
From: Kathryn Gross, CFM, Senior Hydrologist, ENG Division
Subject: Kemper LOMR submittal July 2011

I have reviewed the above submittal and have the following comments. Overall the models appear reasonable.

Modeling Approach

1. The approach to use the non-culvert RAS model as the proposed floodplain model appears reasonable. Using the culvert RAS model as support for the discharges appears reasonable.
2. In the non-culvert RAS model, the roadway is modeled as a cross-section. Would it be better to model the roadway as an inline weir?

Cross-section Data

1. Cross section alignments in both models appear reasonable.
2. Bank stations. Please verify the bank stations for the following cross-sections.
 - For cross-sections .983 - .840 consider shifting the bank stations to the small sandy bottom wash.
 - For cross-section .703 consider shifting the left bank station to be lower in the cross-section.
3. N values. All natural cross-sections are using .08 for both the overbank and channel.
 - For cross-sections .983-.840 consider using .035 for the small sandy bottom wash and possibly .06 to .08 for the overbank areas.
 - Based on proposed n values for the Wickenburg ADMS in the area, typically channel n values used are between .033 and .042 and overbanks are usually

not above .06. Please consider n values more along those lines for the cross-sections mentioned above.

- N values for the street cross-sections appear reasonable.
4. Obstructions. For .807, it appears that the obstruction may need to be shifted and possibly decreased in width. For my review I used the footprint of the house which started at station 10023.
 5. Ineffective flow areas. Please add an ineffective flow area for the right side of cross-section .881.

Discharges

1. Discharges for both models are reasonable.

Culvert Modeling

1. Documentation for the culvert inverts and lengths were not provided. The information appears reasonable but formal approval cannot be given until documentation is provided.

Floodplain and Floodway Delineation

1. Delineation. For certain cross-sections the water surface stationing shown in the model does not match the limits for the delineation, please verify/update the floodplain delineation for the following cross-sections: .893, .821, .817, .744.
2. Delineation Tie-In. At cross-section .730 the updated floodplain limits do not tie in to the existing floodplain limits. Please look into how a horizontal tie-in can be achieved. Do we need to delineate further downstream or stop the delineation further upstream?
3. Delineation. Consider reducing the floodplain extent up the minor tributary.
4. Floodway. It appears that the floodway was not significantly encroached in the upper portions of the delineation. This may be due to the bank station positions. Consider modifying the bank stations to determine if a more consistent encroachment may be achieved.
5. Floodway. For certain cross-sections the floodway stationing shown in the model does not match the limits for the floodway, please verify/update the floodplain delineation for the following cross-sections: .730 (floodway limit is beyond delineated floodplain), .744, .811, .817, .829, .840, and .893.

TDN Comments

1. Main Report.

- Section 1.4.1, the FIS reference should be able to use the 2005 FIS as a reference. It is ok to mention that it hasn't changed since 1977.
 - Section 2.1, ADWR abstract lists Craig Kennedy's information this should be updated.
2. Appendix B. Public Notification information will need to be included. District will provide prior to sending out LOMR.
 3. Appendix C. Needs to include the sealed survey information for the culvert as documentation.
 4. Appendix E. Needs to include a RAS report for the models as well as documentation for the n values.
 5. Table 7.2 and Floodplain workmap. Water surface elevations on these items were not reviewed at this time. I will review the items with the next submittal.

I have no more comments at this time.

Date: August 3, 2011
To: John Hathaway P.E., PPM Division
From: Hari Raghavan, PhD, PE, CFM
Subject: Kemper LOMR submittal July 2011

This memorandum is written to provide responses to the review comments received from Ms. Kathryn Gross. For the purposes of clarity, the original comments are included and the responses are included in italicized fashion.

Overall the models appear reasonable.

Modeling Approach

1. The approach to use the non-culvert RAS model as the proposed floodplain model appears reasonable. Using the culvert RAS model as support for the discharges appears reasonable.
2. In the non-culvert RAS model, the roadway is modeled as a cross-section. Would it be better to model the roadway as an inline weir?

JE FULLER RESPONSE: The preliminary analysis shows that the culverts convey considerable portion of the discharges. Hence, the current modeling approach is expected to be more appropriate.

Cross-section Data

1. Cross section alignments in both models appear reasonable.
2. Bank stations. Please verify the bank stations for the following cross-sections.
 - For cross-sections .983 - .840 consider shifting the bank stations to the small sandy bottom wash.
 - For cross-section .703 consider shifting the left bank station to be lower in the cross-section.

JE FULLER RESPONSE: The bank stations have been shifted.

3. N values. All natural cross-sections are using .08 for both the overbank and channel.

- For cross-sections .983-.840 consider using .035 for the small sandy bottom wash and possibly .06 to .08 for the overbank areas.
- Based on proposed n values for the Wickenburg ADMS in the area, typically channel n values used are between .033 and .042 and overbanks are usually not above .06. Please consider n values more along those lines for the cross-sections mentioned above.
- N values for the street cross-sections appear reasonable.

JE FULLER RESPONSE: The Mannings n values for cross-sections 0.893 to 0.840 have been modified per above recommendations..

4. Obstructions. For .807, it appears that the obstruction may need to be shifted and possibly decreased in width. For my review I used the footprint of the house which started at station 10023.

JE FULLER RESPONSE: The obstruction limits were checked against the GIS and have been set from 10016 to 10072 using the river centerline shapefile and the aerials.

5. Ineffective flow areas. Please add an ineffective flow area for the right side of cross-section .881.

JE FULLER RESPONSE: An ineffective area has been added to the cross-section 0.880.

Discharges

1. Discharges for both models are reasonable.

Culvert Modeling

1. Documentation for the culvert inverts and lengths were not provided. The information appears reasonable but formal approval cannot be given until documentation is provided.

JE FULLER RESPONSE: Culvert inverts and lengths were obtained from the Field Survey data. The Field Survey report will be included once JEF receives the sealed report.

Floodplain and Floodway Delineation

1. Delineation. For certain cross-sections the water surface stationing shown in the model does not match the limits for the delineation, please verify/update the floodplain delineation for the following cross-sections: .893, .821, .817, .744.

JE FULLER RESPONSE: The floodplain has been re-delineated as part of modifications to the HECRAS model based on the reviewer comments. A check was performed to ensure a match between water surface stationing and the floodplain delineation.

2. Delineation Tie-In. At cross-section .730 the updated floodplain limits do not tie in to the existing floodplain limits. Please look into how a horizontal tie-in can be achieved. Do we need to delineate further downstream or stop the delineation further upstream?

JE FULLER RESPONSE: The floodplain tie-in at the downstream end has been performed using graphical approach. The tie-in occurs immediately downstream of the cross-section 0.730 and was performed using the topographic contours as a guideline.

3. Delineation. Consider reducing the floodplain extent up the minor tributary.

JE FULLER RESPONSE: The floodplain extent was reduced per reviewer recommendation.

4. Floodway. It appears that the floodway was not significantly encroached in the upper portions of the delineation. This may be due to the bank station positions. Consider modifying the bank stations to determine if a more consistent encroachment may be achieved.

JE FULLER RESPONSE: The floodway has been re-delineated to provide optimal encroachment.

5. Floodway. For certain cross-sections the floodway stationing shown in the model does not match the limits for the floodway, please verify/update the floodplain delineation for the following cross-sections: .730 (floodway limit is beyond delineated floodplain), .744, .811, .817, .829, .840, and .893.

JE FULLER RESPONSE: A check in GIS has been performed to ensure that the latest floodway delineation matches the stationing used in the model.

TDN Comments

1. Main Report.

- Section 1.4.1, the FIS reference should be able to use the 2005 FIS as a reference. It is ok to mention that it hasn't changed since 1977.
- Section 2.1, ADWR abstract lists Craig Kennedy's information this should be updated.

JE FULLER RESPONSE: A reference to the 2005 FIS report has been included in Section 1.4.1. The FEMA Technical Review Contact will be updated once the information is available.

2. Appendix B. Public Notification information will need to be included. District will provide prior to sending out LOMR.

JE FULLER RESPONSE: JEF will include the Public Notification Information provided into Appendix B.

3. Appendix C. Needs to include the sealed survey information for the culvert as documentation.

JE FULLER RESPONSE: JEF will include sealed Field Survey report after obtaining the same from the District.

4. Appendix E. Needs to include a RAS report for the models as well as documentation for the n values.

JE FULLER RESPONSE: RAS report and Manning's n documentation is included in Appendix E..

5. Table 7.2 and Floodplain workmap. Water surface elevations on these items were not reviewed at this time. I will review the items with the next submittal.

I have no more comments at this time.



Flood Control District

of Maricopa County

INTEROFFICE MEMORANDUM

Date: August 3, 2011
To: John Hathaway P.E., PPM Division
From: Kathryn Gross, CFM, Senior Hydrologist, ENG Division
Subject: Kemper LOMR submittal July 2011

I have reviewed the above submittal and have the following comments. Overall the models appear reasonable.

Modeling Approach

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 5. Ineffective flow areas. Please add an ineffective flow area for the right side of cross-section .881.

Discharges

1. Discharges for both models are reasonable.

Culvert Modeling

1. Documentation for the culvert inverts and lengths were not provided. The information appears reasonable but formal approval cannot be given until documentation is provided.

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 5. Table 7.2 and Floodplain workmap. Water surface elevations on these items were not reviewed at this time. I will review the items with the next submittal.

I have no more comments at this time.

Memorandum **JE Fuller/ Hydrology & Geomorphology, Inc.**

DATE: August 23, 2011
TO: John Hathaway, PE, FCDMC
FROM: Ted Lehman, PE, JEF & Hari Raghavan, PhD, PE, JEF
RE: Review of first TDN submittal for Kemper FPAP LOMR
CC: Kathryn Gross, CFM, M.A., FCDMC

This memorandum is written to provide responses to the review comments received from Ms. Kathryn Gross. For the purposes of clarity, the original comments are included and the responses are included in italicized fashion.

Overall the models appear reasonable.

Modeling Approach

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2. In the non-culvert RAS model, the roadway is modeled as a cross-section. Would it be better to model the roadway as an inline weir?

JE FULLER RESPONSE: The preliminary analysis shows that the culverts convey considerable portion of the discharges. Hence, the current modeling approach is expected to be more appropriate.

Cross-section Data

1. Cross section alignments in both models appear reasonable.
2. Bank stations. Please verify the bank stations for the following cross-sections.
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 - For cross-section .703 consider shifting the left bank station to be lower in the cross-section.

JE FULLER RESPONSE: The bank stations have been shifted.

3. N values. All natural cross-sections are using .08 for both the overbank and channel.
 - For cross-sections .983-.840 consider using .035 for the small sandy bottom wash and possibly .06 to .08 for the overbank areas.

Memorandum

JE Fuller/ Hydrology & Geomorphology, Inc.

- Based on proposed n values for the Wickenburg ADMS in the area, typically channel n values used are between .033 and .042 and overbanks are usually not above .06. Please consider n values more along those lines for the cross-sections mentioned above.
- N values for the street cross-sections appear reasonable.

JE FULLER RESPONSE: The Mannings n values for cross-sections 0.893 to 0.840 have been modified per above recommendations..

4. Obstructions. For .807, it appears that the obstruction may need to be shifted and possibly decreased in width. For my review I used the footprint of the house which started at station 10023.

JE FULLER RESPONSE: The obstruction limits were checked against the GIS and have been set from 10016 to 10072 using the river centerline shapefile and the aeriels.

5. Ineffective flow areas. Please add an ineffective flow area for the right side of cross-section .881.

JE FULLER RESPONSE: An ineffective area has been added to the cross-section 0.880.

Discharges

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JE FULLER RESPONSE: Culvert inverts and lengths were obtained from the Field Survey data. The Field Survey report will be included once JEF receives the sealed report.

Floodplain and Floodway Delineation

1. Delineation. For certain cross-sections the water surface stationing shown in the model does not match the limits for the delineation, please verify/update the floodplain delineation for the following cross-sections: .893, .821, .817, .744.

JE FULLER RESPONSE: The floodplain has been re-delineated as part of modifications to the HECRAS model based on the reviewer comments. A check was performed to ensure a match between water surface stationing and the floodplain delineation.

2. Delineation Tie-In. At cross-section .730 the updated floodplain limits do not tie in to the existing floodplain limits. Please look into how a horizontal tie-in can be achieved. Do we need to delineate further downstream or stop the delineation further upstream?

Memorandum **JE Fuller/ Hydrology & Geomorphology, Inc.**

JE FULLER RESPONSE: The floodplain tie-in at the downstream end has been performed using graphical approach. The tie-in occurs immediately downstream of the cross-section 0.730 and was performed using the topographic contours as a guideline.

3. Delineation. Consider reducing the floodplain extent up the minor tributary.

JE FULLER RESPONSE: The floodplain extent was reduced per reviewer recommendation.

4. Floodway. It appears that the floodway was not significantly encroached in the upper portions of the delineation. This may be due to the bank station positions. Consider modifying the bank stations to determine if a more consistent encroachment may be achieved.

JE FULLER RESPONSE: The floodway has been re-delineated to provide optimal encroachment.

5. Floodway. For certain cross-sections the floodway stationing shown in the model does not match the limits for the floodway, please verify/update the floodplain delineation for the following cross-sections: .730 (floodway limit is beyond delineated floodplain), .744, .811, .817, .829, .840, and .893.

JE FULLER RESPONSE: A check in GIS has been performed to ensure that the latest floodway delineation matches the stationing used in the model.

TDN Comments

1. Main Report.
 - Section 1.4.1, the FIS reference should be able to use the 2005 FIS as a reference. It is ok to mention that it hasn't changed since 1977.
 - Section 2.1, ADWR abstract lists Craig Kennedy's information this should be updated.

JE FULLER RESPONSE: A reference to the 2005 FIS report has been included in Section 1.4.1. The FEMA Technical Review Contact will be updated once the information is available.

2. Appendix B. Public Notification information will need to be included. District will provide prior to sending out LOMR.

JE FULLER RESPONSE: JEF will include the Public Notification Information provided into Appendix B.

3. Appendix C. Needs to include the sealed survey information for the culvert as documentation.

JE FULLER RESPONSE: JEF will include sealed Field Survey report after obtaining the same from the District.

4. Appendix E. Needs to include a RAS report for the models as well as documentation for the n values.

Memorandum **JE Fuller/ Hydrology & Geomorphology, Inc.**

JE FULLER RESPONSE: RAS report and Manning's n documentation is included in Appendix E..

5. Table 7.2 and Floodplain workmap. Water surface elevations on these items were not reviewed at this time. I will review the items with the next submittal.

I have no more comments at this time.



Flood Control District

of Maricopa County

INTEROFFICE MEMORANDUM

Date: September 6, 2011
To: John Hathaway P.E., PPM Division
From: Kathryn Gross, CFM, ENG Division
Subject: Kemper LOMR submittal August 2011

I have reviewed the above submittal and have the following comments. Overall the models appear reasonable.

Modeling Approach

1. The approach to use the non-culvert RAS model as the proposed floodplain model appears reasonable. Using the culvert RAS model as support for the discharges appears reasonable.

Boundary Condition

1. Is there an issue with the boundary condition starting water surface elevation and the final water surface elevation for .703 not being the same?

Cross-section Data

1. Cross section alignments in both models appear reasonable.
2. Bank stations. Different bank stations are used for the following cross-sections between the with culvert geometry file and the without culvert geometry file. Please correct.
 - .893, .829, .773, and .730 (slightly off)
3. N values. No comments.

Discharges

1. Discharges for both models are reasonable.

Culvert Modeling

1. Culvert modeling is reasonable.

2. In this submittal, the internal cross-section option was used with the culvert. This was not the case with the last submittal. Please verify that the bank stations set in the internal cross-sections are included within the station data for those cross-sections or do not use the internal cross-section option.

Profiles

1. Per earlier conversations, please incorporate profiles for the other return intervals shown in the FIS.

Floodplain and Floodway Delineation

1. The floodplain and floodway delineations appear reasonable. If possible, consider modifying the delineation between .840 and .829 in the left overbank.
2. The floodway encroachment for .924 needs to be modified slightly. Presently it has a negative surcharge.

TDN Comments

1. FEMA forms.
 - Overview and Concurrence. Page 1 Section B. Remove Maricopa County from the list. This LOMR does not impact unincorporated Maricopa County.
 - Overview and Concurrence. Page 2 Section D
 - i. Revision Requestor. I have asked John Hathaway who should be the revision requester. It will be either Ted or John H. I should have an answer later this week or early next.
 - ii. Community Signature. John Hathaway's information needs to be replaced with the floodplain administrator for Wickenburg. A second form for Tim Phillips might be necessary. Timeline for an answer same as above.
 - iii. For the final submittal the certification by registered professional engineer will need to be filled out by the consultant.
 - Hydrology/Hydraulics. Page 3 Section B number 4. Consider adding a note under Existing or Pre-Project conditions that there is no original model.
2. Section 3.1. The survey data will be supplied for inclusion shortly. No sketches or other culvert notes other than inverts were collected as part of the survey work.
3. Section 5.3.1. Should the text be modified to reflect the new n values being used above Vista Drive?

4. Section 5.5.2. It is recommended that additional text be added in the second paragraph that states the culvert length was measured from the aerial photography.
5. Section 7.1. Please add the other return interval discharges to Table 7-1 to match the current FIS.
6. Section 7.2. Please correct the values for Regulatory (2273.7) with Floodway (2274.4) and increase (.74) in Table 7-2.
7. Section 7.4. Please state that the flood profiles are included in Appendix E.
8. Appendix B.2. District will provide prior to sending out LOMR.
9. Appendix B.4. This is where we typically put a copy of the FEMA transmittal letter when we send out the TDN package and then the rest of the correspondence as the review progresses. However, that is when we have a 3 ring binder. I will let the PM determine if this section is warranted for this type of LOMR.
10. Appendix C. Sealed survey points forthcoming.
11. Floodplain workmap. Consider producing as a larger map. We have received some comments from FEMA where they were having trouble reviewing off of our 24x36 exhibits. Whether or not to do this is at the discretion of the consultant. Delineation and water surface elevations shown on the exhibit match the digital data and modeling results.

I have no more comments at this time.

Memorandum **JE Fuller/ Hydrology & Geomorphology, Inc.**

DATE: September 13, 2011
TO: John Hathaway, PE, FCDMC
FROM: Ted Lehman, PE, JEF & Hari Raghavan, PhD, PE, JEF
RE: Review of first TDN submittal for Kemper FPAP LOMR
CC: Kathryn Gross, CFM, M.A., FCDMC

This memorandum is written to provide responses to the review comments received from Ms. Kathryn Gross dated September 6, 2011. For the purposes of clarity, the original comments are included and the responses are included in italicized fashion:

I have reviewed the above submittal and have the following comments. Overall the models appear reasonable.

Modeling Approach

1. The approach to use the non-culvert RAS model as the proposed floodplain model appears reasonable. Using the culvert RAS model as support for the discharges appears reasonable.

JEF RESPONSE: OK

Boundary Condition

1. Is there an issue with the boundary condition starting water surface elevation and the final water surface elevation for .703 not being the same?

JEF RESPONSE: It is assumed that the comment refers to cross-section .730 instead of .703 as there is no cross-section numbered as 0.703. Revised HEC-RAS shows model defaulting to critical depth above Effective water surface elevation at cross-section .730. Revised top width matches Effective Floodway Data Table. Revised channel invert shown in new topography as only 0.3 feet below Effective WSE. JEF has included additional text to the TDN providing better explanation of this issue.

Cross-section Data

1. Cross section alignments in both models appear reasonable.

JEF RESPONSE: OK

2. Bank stations. Different bank stations are used for the following cross-sections between the with culvert geometry file and the without culvert geometry file. Please correct.
 - .893, .829, .773, and .730 (slightly off)

JEF RESPONSE: Bank stations have been fixed.

Memorandum

JE Fuller/ Hydrology & Geomorphology, Inc.

3. N values. No comments.

JEF RESPONSE: OK

Discharges

1. Discharges for both models are reasonable.

JEF RESPONSE: OK

Culvert Modeling

1. Culvert modeling is reasonable.

JEF RESPONSE: OK

2. In this submittal, the internal cross-section option was used with the culvert. This was not the case with the last submittal. Please verify that the bank stations set in the internal cross-sections are included within the station data for those cross-sections or do not use the internal cross-section option.

JEF RESPONSE: JEF has fixed the bank stations in the internal cross-sections.

Profiles

1. Per earlier conversations, please incorporate profiles for the other return intervals shown in the FIS.

JEF RESPONSE: JEF has incorporated 10, 50 and 500 year profiles.

Floodplain and Floodway Delineation

1. The floodplain and floodway delineations appear reasonable. If possible, consider modifying the delineation between .840 and .829 in the left overbank.

JEF RESPONSE: JEF has modified the delineation as recommended.

2. The floodway encroachment for .924 needs to be modified slightly. Presently it has a negative surcharge.

JEF RESPONSE: JEF has modified the floodway encroachment at .924 removing negative surcharge.

TDN Comments

1. FEMA forms.
 - Overview and Concurrence. Page 1 Section B. Remove Maricopa County from the list. This LOMR does not impact unincorporated Maricopa County.

Memorandum

JE Fuller/ Hydrology & Geomorphology, Inc.

JEF RESPONSE: Done.

- Overview and Concurrence. Page 2 Section D
 - i. Revision Requestor. I have asked John Hathaway who should be the revision requester. It will be either Ted or John H. I should have an answer later this week or early next.

JEF RESPONSE: JEF will modify this portion of the form once the information is available.

- ii. Community Signature. John Hathaway's information needs to be replaced with the floodplain administrator for Wickenburg. A second form for Tim Phillips might be necessary. Timeline for an answer same as above.

JEF RESPONSE: JEF has replaced the floodplain administrator information based on information provided the District.

- iii. For the final submittal the certification by registered professional engineer will need to be filled out by the consultant.

JEF RESPONSE: JEF has included the certification information.

- Hydrology/Hydraulics. Page 3 Section B number 4. Consider adding a note under Existing or Pre-Project conditions that there is no original model.

JEF RESPONSE: JEF has included a note that there is no Existing or Pre-conditions model available.

2. Section 3.1. The survey data will be supplied for inclusion shortly. No sketches or other culvert notes other than inverts were collected as part of the survey work.

JEF RESPONSE: JEF will include the survey data after the District provides that information.

3. Section 5.3.1. Should the text be modified to reflect the new n values being used above Vista Drive?

JEF RESPONSE: JEF has modified the text to reflect the variations in mannings n values.

4. Section 5.5.2. It is recommended that additional text be added in the second paragraph that states the culvert length was measured from the aerial photography.

JEF RESPONSE: JEF has added text to describing the procedure used to obtain the culvert length.

5. Section 7.1. Please add the other return interval discharges to Table 7-1 to match the current FIS.

JEF RESPONSE: Done

6. Section 7.2. Please correct the values for Regulatory (2273.7) with Floodway (2274.4) and increase (.74) in Table 7-2.

Memorandum

JE Fuller/ Hydrology & Geomorphology, Inc.

JEF RESPONSE: *Done*

7. Section 7.4. Please state that the flood profiles are included in Appendix E.

JEF RESPONSE: *Done*

8. Appendix B.2. District will provide prior to sending out LOMR.

JEF RESPONSE: *JEF will include the Appendix B.2 information provided by the District once it is available.*

9. Appendix B.4. This is where we typically put a copy of the FEMA transmittal letter when we send out the TDN package and then the rest of the correspondence as the review progresses. However, that is when we have a 3 ring binder. I will let the PM determine if this section is warranted for this type of LOMR.

JEF RESPONSE: *JEF is leaving the Appendix B.4 as place-holder for future FEMA related correspondence.*

10. Appendix C. Sealed survey points forthcoming.

JEF RESPONSE: *JEF will include the Appendix C information provided by the District once it is available.*

11. Floodplain workmap. Consider producing as a larger map. We have received some comments from FEMA where they were having trouble reviewing off of our 24x36 exhibits. Whether or not to do this is at the discretion of the consultant. Delineation and water surface elevations shown on the exhibit match the digital data and modeling results.

JEF RESPONSE: *The map is presented as 1" = 100 ft scale and is expected to adequately represent the accuracy of the topographic information used in the floodplain delineation. Therefore, the size of the map is retained as 11" by 17".*

I have no more comments at this time.

JEF RESPONSE: *OK*

B.2 Public Notification

Arizona Business Gazette

The business resource

PO BOX 194
Phoenix, Arizona 85001-0194
(602) 444-7315 FAX (602) 444-7364

Announcement of Floodplain/Floodway
Revisions for Casandro Wash Area
approximately 400 feet downstream of
Vista Drive to approximately 500 feet
upstream of Vista Drive, Maricopa,
AZ.

The Flood Control District of Maricopa
County (District), in cooperation with
the Town of Maricopa, in accordance
with the National Flood Insurance Pro-
gram regulation 45.203(i), hereby pres-
enters the District's intent to revise
the floodway, generally located within
Township 7 North, Range 5 West, Sec-
tion 18 and 19.

The floodplain/floodway was revised
along Casandro Wash from approx-
imately 400 feet downstream of Vista
Drive to approximately 100 feet up-
stream of Vista Drive. The revision re-
sults in increases and decreases to
flood widths and depths of both the
floodplain and floodway.

Additional floodplain/floodway was also
established along Casandro Wash from
approximately 100 feet upstream of Vi-
sta Drive to approximately 500 feet up-
stream of Vista Drive.

Maps and detailed analysis of the re-
vised floodplain and floodway can be
reviewed at the Flood Control District of
Maricopa County, 2501 W. Burdette St.,
Phoenix, AZ 85009. Additional questions
may call John Hathaway at (602) 561-
0500 or by e-mail at
johath@fcd.maricopa.gov for additional
information.
Published August 18, 2011

STATE OF ARIZONA
COUNTY OF MARICOPA

} SS.

Mark Gilmore, being first duly sworn, upon oath
deposes and says: That he is the Legal Ad Rep of the
Arizona Business Gazette, a newspaper of general
circulation in the county of Maricopa, State of Arizona,
published weekly at Phoenix, Arizona, and that the
copy hereto attached is a true copy of the advertisement
published in the said paper on the dates indicated.

8/18/2011

Mark Gilmore

Sworn to before me this
18TH day of
AUGUST 2011

MELISSA HOEY STRA
Notary Public - Arizona
Maricopa County
My Comm. Expires Aug 1, 2014

Melissa Hoey Stra

Notary Public

01

Arizona Business Gazette

The business resource

PO BOX 194
Phoenix, Arizona 85001-0194
(602) 444-7315 FAX (602) 444-7364

Arizona Department of Transportation
Division for Casandro Wash from
approximately 400 feet downstream of
Vista Drive to approximately 150 feet
upstream of Vista Drive, Maricopa,
AZ
The Flood Control District of Maricopa
County (District) is cooperating with
the Town of Wickenburg in accordance
with the National Flood Insurance Pro-
gram regulation 63.2(b)(1), hereby gives
notice of the District's intent to revise
the floodway, generally located within
Township 7 North, Range 5 West, Sec-
tion 18 and 19.
The floodway floodway was revised
along Casandro Wash from approx-
imately 400 feet downstream of Vista
Drive to approximately 150 feet up-
stream of Vista Drive. The revision re-
sults in increases and decreases in
flood depths and depths of both the
floodway and floodway.
Additional floodway floodway was also
established along Casandro Wash from
approximately 100 feet upstream of Vista
Drive to approximately 150 feet up-
stream of Vista Drive.
Plans and detailed analysis of the re-
vised floodway and floodway can be
reviewed at the Flood Control District of
Maricopa County, 2681 W. Durango St.,
Phoenix AZ 85009. Interested persons
may call John Hathaway at (602) 586-
8500 or by email at
j.hathaway@maricopa.gov for additional
information.
Published August 18, 2011

STATE OF ARIZONA
COUNTY OF MARICOPA

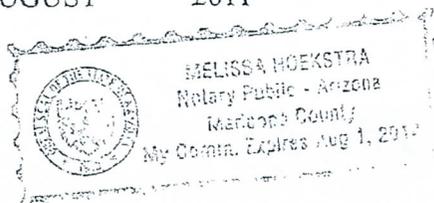
} SS.

Mark Gilmore, being first duly sworn, upon oath
deposes and says: That he is the Legal Ad Rep of the
Arizona Business Gazette, a newspaper of general
circulation in the county of Maricopa, State of Arizona,
published weekly at Phoenix, Arizona, and that the
copy hereto attached is a true copy of the advertisement
published in the said paper on the dates indicated.

8/18/2011

Mark Gilmore

Sworn to before me this
18TH day of
AUGUST 2011



Melissa Hoekstra

Notary Public

FLOOD CONTROL DISTRICT OF MARICOPA
COUNTY
ANNOUNCEMENT OF FLOODPLAIN/FLOODWAY
REVISION FOR CASANDRO WASH

STATE OF ARIZONA

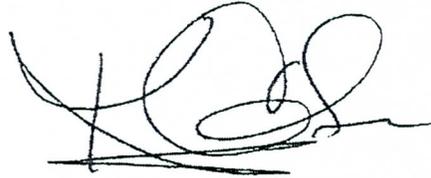
County of Maricopa

Kevin Cloe, being duly sworn, upon oath, deposes and says:
That he is the Publisher of

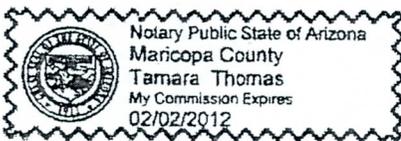
The Wickenburg Sun

A newspaper of general circulation in the County of Maricopa
State of Arizona, published in Wickenburg, Arizona, and that
the copy hereto attached is a true copy of the advertisement as
published weekly in The Wickenburg Sun on the Dates
following:

August 17, 2011



KEVIN CLOE
PUBLISHER



Subscribed and sworn to before me this 17th day of August,
2011.



Notary Public My commission expires February 2, 2012

**ANNOUNCEMENT OF FLOODPLAIN/
FLOODWAY REVISION FOR CASANDRO
WASH FROM APPROXIMATELY 480 FEET
DOWNSTREAM OF VISTA DRIVE TO
APPROXIMATELY 550 FEET UPSTREAM OF
VISTA DRIVE, WICKENBURG, AZ**

The Flood Control District of Maricopa County (District), in cooperation with the Town of Wickenburg, in accordance with the National Flood Insurance Program regulation 65.7(b)(1), hereby gives notice of the District's intent to revise the floodway, generally located within Township 7 North, Range 5 West, Sections 10 and 15.

The floodplain/floodway was revised along Casandro Wash from approximately 480 feet downstream of Vista Drive to approximately 100 feet upstream of Vista Drive. The revision results in increases and decreases to flood widths and depths of both the floodplain and floodway.

Additional floodplain/floodway was also established along Casandro Wash from approximately 100 feet upstream of Vista Drive to approximately 550 feet upstream of Vista Drive.

Maps and detailed analysis of the revised floodplain and floodway can be reviewed at the Flood Control District of Maricopa County, 2801 W Durango St., Phoenix, AZ 85009. Interested persons may call John Hathaway at (602) 506-0503 or by email at John@mail.maricopa.gov for additional information.

Published in The Wickenburg Sun on August 17, 2011.



Flood Control District of Maricopa County

Board of Directors

Fulton Brock, District 1
Don Stapley, District 2
Andrew Kunasek, District 3
Max Wilson, District 4
Mary Rose Wilcox, District 5

www.fcd.maricopa.gov

2801 West Durango Street
Phoenix, Arizona 85009
Phone: 602-506-1501
Fax: 602-506-4601
TT: 602-505-5897

September 22, 2011

John Doe
123 Sample Street
Wickenburg, AZ 85390

To Whom It May Concern:

The Flood Control District of Maricopa County (District), in cooperation with the Town of Wickenburg, is preparing a Letter of Map Revision (LOMR) to update the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) along Casandro Wash South Branch.

The floodplain/floodway was revised from approximately 480 feet downstream of Vista Drive to approximately 100 feet upstream of Vista Drive. The revision results in increases and decreases to flood widths and depths of both the floodplain and floodway.

Additional floodplain/floodway was also established along Casandro Wash South Branch from approximately 100 feet upstream of Vista Drive to approximately 550 feet upstream of Vista Drive.

You are receiving this letter because your property will be impacted by the updated floodplain information when FEMA issues the LOMR. These changes may impact the requirements for flood insurance.

The District anticipates that FEMA will issue the LOMR no sooner than three months from now. Once issued, FEMA requires a mandatory 90-day appeal period. After the 90 days, the FIRM panels will be considered effective.

If a structure is located on the property, you may be required to purchase flood insurance; or, if you already carry flood insurance, you may need a rate modification based on the updated floodplain information. It is recommended that you contact an insurance agent familiar with flood insurance to determine the appropriate insurance coverage for your property.

If you have any questions regarding the study and its impacts to your property, or have questions regarding the LOMR process, please contact me at (602) 506-0503 or joh@mail.maricopa.gov.

Sincerely,

John Hathaway, P.E.
Watercourse Planning Manager

Letter of Map Revision for the Kemper Property
Portion of South Branch Cassandro Wash
Wickenburg, Maricopa County, Arizona
Public Notice - Mailing List

P.O. Box 1477
Wickenburg, AZ 85390

1892 Vista Drive
Wickenburg, AZ 85390

P.O. Box 21377
Wickenburg, AZ 85358

1867 Aguila Drive
Wickenburg, AZ 85390

1880 Vista Drive
Wickenburg, AZ 85390

P.O. Box 833
Wickenburg, AZ 85358

1905 N. Vista Drive
Wickenburg, AZ 85390

1858 W. Vista Drive
Wickenburg, AZ 85390

1851 Vista Drive
Wickenburg, AZ 85390

1910 Duff Road
Wickenburg, AZ 85390

1847 W. Aguila Drive
Wickenburg, AZ 85390

855 S. Aircleta Drive
Wickenburg, AZ 85390

1853 Vista Drive
Wickenburg, AZ 85390

24825 SE Tiger Mountain Road
Issaquah, WA 98027

P.O. Box 2072
Wickenburg, AZ 85358

B.3 Contract Documentation

EXHIBIT A



SCOPE OF WORK

**WORK ASSIGNMENT No. 1
KEMPER PROPERTY APN 505-47-164C
LETTER OF MAP REVISION**

CONTRACT FCD 2011C002

**ON-CALL FLOODPLAIN DELINEATION &
GENERAL ENGINEERING SERVICES**

EXHIBIT A

SCOPE OF WORK

WORK ASSIGNMENT NO. 1 Kemper Property APN 505-47-164C Letter of Map Revision

CONTRACT FCD 2011C002

Objective

The objective of Work Assignment No. 1 is to develop documentation in support of a Letter of Map Revision (LOMR) submittal to FEMA for parcel APN 505-47-164C, aka the Kemper Property, on an upper reach of Casandro Wash in Wickenburg, Arizona. It is the CONSULTANT's understanding that new HEC-RAS modeling of the floodplain and floodway has been performed by the DISTRICT. These models will serve as the basis for the LOMR submittal development as part of this assignment.

In order to accomplish this objective, the following tasks will be performed as part of Work Assignment No.1.

Task 1 – Data Collection

The CONSULTANT will collect the digital topographic data, aerial photographs and other pertinent GIS data from the DISTRICT for use in the LOMR documentation development. The DISTRICT will also supply the existing work, e.g. HEC-RAS models, GeoRAS databases, topographic survey, as-builts, etc. already developed as part of their previous work. Any new topographic information needed to support the LOMR submittal will be provided by the DISTRICT at no cost to the CONSULTANT.

Task 2 – Field Visit

One site visit is budgeted for the CONSULTANT to verify conditions on the ground and familiarize themselves with the conditions in the reach to be redelineated as part of the LOMR.

Task 3 – Project Coordination

The CONSULTANT will coordinate and meet with the DISTRICT on items related to the development and review of the LOMR submittal package. At least three (3) meetings are anticipated as part of this task.

Task 4 – Review & Refinement of District Modeling

The CONSULTANT will review the HEC-RAS modeling performed by the DISTRICT to confirm its accuracy and adequacy for support of the LOMR submittal to FEMA. Any refinements identified to the modeling will also be performed as part of this task.

Task 5 – Technical Data Notebook

The CONSULTANT will develop a Technical Data Notebook (TDN) in support of the LOMR package according to State Standard SS1-97. The TDN will include completion of the FEMA forms and technical

information provided in support of the HEC-RAS modeling and revised floodplain and floodway delineation.

Task 6 – Agency Review & Comment Response

The CONSULTANT will respond and revise the TDN accordingly to address agency comments of the draft LOMR submittal.

Task 7 – Deliverables

Three (3) copies of the draft and final TDN's will be provided in hard copy and electronically. Each TDN will include electronic discs of the model data and reports.

Assumptions & Limitations

The DISTRICT will supply all the existing work and digital data complied to date.

The DISTRICT will also supply any needed topographic data such as as-built surveys of the culvert crossing at Vista Drive to the CONSULTANT at no cost to the CONSULTANT.

The fee estimate for this work assignment does not include any agency review fees that may be charged as part the LOMR submittal.

B.4 FEMA Correspondence



NATIONAL FLOOD INSURANCE PROGRAM

FEMA PRODUCTION AND TECHNICAL SERVICES CONTRACTOR

November 16, 2011

Mr. Ted Lehman, P.E.
Project Engineer
JE Fuller/Hydrology and Geomorphology
8400 South Kyrene Road, Suite 201
Tempe, AZ 85284

IN REPLY REFER TO:
Case No.: 12-09-0272P
Community: Town of Wickenburg, AZ
Community No.: 040056

316-AD

Dear Mr. Lehman:

This responds to your request dated October 21, 2011, that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issue a revision to the Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas. Pertinent information about the request is listed below.

Identifier:	South Branch Casandro Wash RM 0.730 to 0.924
Flooding Source:	South Branch Casandro Wash
FIRM Panel(s) Affected:	04013C0235G

The data required to complete our review, which must be submitted within 90 days of the date of this letter, are listed on the enclosed summary.

If we do not receive the required data within 90 days, we will suspend our processing of your request. Any data submitted after 90 days will be treated as an original submittal and will be subject to all submittal/payment procedures, including the flat review and processing fee for requests of this type established by the current fee schedule. A copy of the notice summarizing the current fee schedule, which was published in the *Federal Register*, is available on the FEMA website at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm for your information.

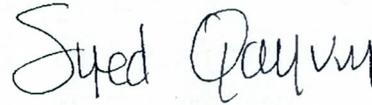
FEMA receives a very large volume of requests and cannot maintain inactive requests for an indefinite period of time. Therefore, we are unable to grant extensions for the submission of required data/fee for revision requests. If a requester is informed by letter that additional data are required to complete our review of a request, the data/fee **must** be submitted within 90 days of the date of the letter. Any fees already paid will be forfeited for any request for which the requested data are not received within 90 days.

LOMC Clearinghouse, 7390 Coca Cola Drive, Suite 204, Hanover, MD 21076 PH: 1-877-FEMA MAP

BakerAECOM, under contract with the FEDERAL EMERGENCY MANAGEMENT AGENCY, is a
Production and Technical Services Contractor for the National Flood Insurance Program

If you have general questions about your request, FEMA policy, or the National Flood Insurance Program, please call the FEMA Map Information eXchange (FMIX), toll free, at 1-877-FEMA MAP (1-877-336-2627). If you have specific questions concerning your request, please contact your case reviewer, Mr. Paul Anderson, P.E., CFM, by e-mail at PMAnderson@mbakercorp.com or by telephone at 720-514-1121, or the Revisions Coordinator for your request, Mrs. Jaclyn Bloor, CFM, at jbloor@mbakercorp.com or at (720) 479-3160.

Sincerely,



Syed Qayum, CFM
LOMR Technical Manager
BakerAECOM

Enclosures

cc: Mr. Rick Destefano
Floodplain Administrator
Town of Wickenburg

Mr. John Hathaway, P.E., CFM
Project Manager
Flood Control District of Maricopa County

Mr. Timothy S. Phillips, P.E.
Chief Engineer and General Manager
Flood Control District of Maricopa County



NATIONAL FLOOD INSURANCE PROGRAM

FEMA PRODUCTION AND TECHNICAL SERVICES CONTRACTOR

Summary of Additional Data Required to Support a Letter of Map Revision (LOMR)

Case No.: 12-09-0272P

Requester: Mr. Tom Lehman, P.E.

Community: Town of Wickenburg, AZ

Community No.: 040056

The issues listed below must be addressed before we can continue the review of your request.

1. As required on page 10 of the instructions for the MT-2 application/certification forms (copy enclosed), please provide a copy of the duplicate effective model for South Branch Casandro Wash. This is required to ensure that the effective model's input data has been transferred correctly to the requester's equipment and to ensure that the revised data will be integrated into the effective data to provide a continuous Flood Insurance Study model upstream and downstream of the revised reach.
2. Our detailed review revealed that a depression or channel still exists where the currently effective floodplain is. This depression or channel also extends further upstream into the drainage area. Please provide an explanation as to why this flooding source is no longer being analyzed.
3. Paragraph 65.6(a)(2) of the National Flood Insurance Program (NFIP) regulations states that to avoid discontinuities between revised and unrevised flood data, hydraulic analyses must have a logical transition between revised elevations of the base (1-percent-annual-chance) flood and those developed previously for areas not affected by the revision. The hydraulic analyses must also be extensive enough to ensure a logical transition between the revised floodplain boundaries and those developed previously for areas not affected by the revision. Our review reveals that the existing hydraulic analysis along South Branch Casandro Wash does not tie into the effective hydraulic analysis at the downstream end of the proposed revised reach nor does the boundary of the base flood shown on the work map entitled, "South Branch Casandro Wash Floodplain Work Map," logically tie in to the effective base floodplain boundary at the downstream end of the revision. Please provide a revised existing conditions that tie into the effective hydraulic analysis within 0.5 foot, or within 0.0 feet if practical. Also, please revise the boundary delineation at the downstream end of the revision to provide a logical tie in.

Please send the required data and/or fee directly to us at the address shown at the bottom of this page. For identification purposes, please include the case number referenced above on all correspondence.

LOMC Clearinghouse, 7390 Coca Cola Drive, Suite 204, Hanover, MD 21076 PH: 1-877-FEMA MAP

BakerAECOM, under contract with the FEDERAL EMERGENCY MANAGEMENT AGENCY, is a
Production and Technical Services Contractor for the National Flood Insurance Program

Date: 2/8/2012

To: LOMR Manager
LOMC Clearinghouse
Hanover, MD 21076

From: Ted Lehman, P.E.
JE Fuller/Hydrology & Geomorphology, Inc.
8400 S Kyrene Road Suite 201
Tempe, AZ 85282
480-222-5709
ted@jefuller.com

Subject: Letter of Map Revision For the Kemper Property APN 505-47-164C Technical Data Notebook,
Portion of South Branch Casandro Wash RM 0.720 to 0.924 (FCD Contract 2011C002) by JE
Fuller Hydrology and Geomorphology, Inc.

Communities: Town of Wickenburg, Community No. 040056

Case No.: 12-09-0272P

FIRM panels affected: 04013C0235G

Flooding Sources: South Branch Casandro Wash

LOMR Manager:

We have received your comments dated November 16, 2011 and are providing the following responses. As part of this memo, we provide our response to the additional data request. In response to your additional data request, we are also providing a revised TDN report with accompanying electronic data. The text from the FEMA additional data request is shown in italics.

Data Request #1. *As required on page 10 of the instructions for the MT-2 application/certification forms (copy enclosed), please provide a copy of the duplicate effective model for South Branch Casandro Wash. This is required to ensure that the effective model's input data has been transferred correctly to the requester's equipment and to ensure that the revised data will be integrated into the effective data to provide a continuous Flood Insurance Study model upstream and downstream of the revised reach.*

Response to Data Request #1: Based on the data collection efforts performed as part of this study, it has been determined that there is no effective model available for this wash. The effective delineation has been in existence since 1977 or so. As part of the Countywide DFIRM update for Maricopa County, Ms. Sarah Houghland tried to find it in FEMA's library and was unsuccessful and there is no record of it at the Flood Control District as well. As a result, we are unable to include the effective model as part of this TDN.

Data Request #2. *Our detailed review revealed that a depression or channel still exists where the currently effective floodplain is. This depression or channel also extends further upstream into the drainage area. Please provide an explanation as to why this flooding source is no longer being analyzed.*

Response to Data Request #2: To aid in the explanation for this data request, Figure 1 and Figure 2 are included with this response that display the watershed and a close-up image at the location of the

current effective delineation. The original source of the topographic data for the original delineation is not known. However, based on existing topography, with most of the natural high spots preserved, it appears that the original delineation was not following the main flow path of the watershed, but was instead following a minor tributary with a drainage area of only 0.014 square miles. Figure 1 shows the watershed areas of both the main flow path and the minor tributary the original delineation appeared to be following. Regarding “the existence of a current depression or channel existing where the effective delineation is presently located”, the effective floodplain limits are not in agreement with the existing topography. This can be seen in the close-up image shown in Figure 2. The effective floodplain is shown in light blue and the proposed floodplain is shown in dark blue with a red floodway. The proposed delineation maps the backwater effects into the minor tributary by following the lowest point in the topographic data. The effective delineation is actually mapped up the side of a hill. The black numbers are the contour elevations. Contours shown are 2 foot interval. The proposed delineation corrects the effective delineation by following the main watercourse but still includes a backwater delineation into the minor tributary. The discharge from the smaller tributary to South Branch Casandro Wash (the .014 sq mile watershed) is estimated as 28 cfs. This estimated discharge of 28 cfs for the smaller tributary is significantly lower than the discharge for main wash which is 400 cfs. Therefore, the exclusion of the flows from the smaller is not expected to significantly impact the revised floodplain and floodway delineations of the main wash.

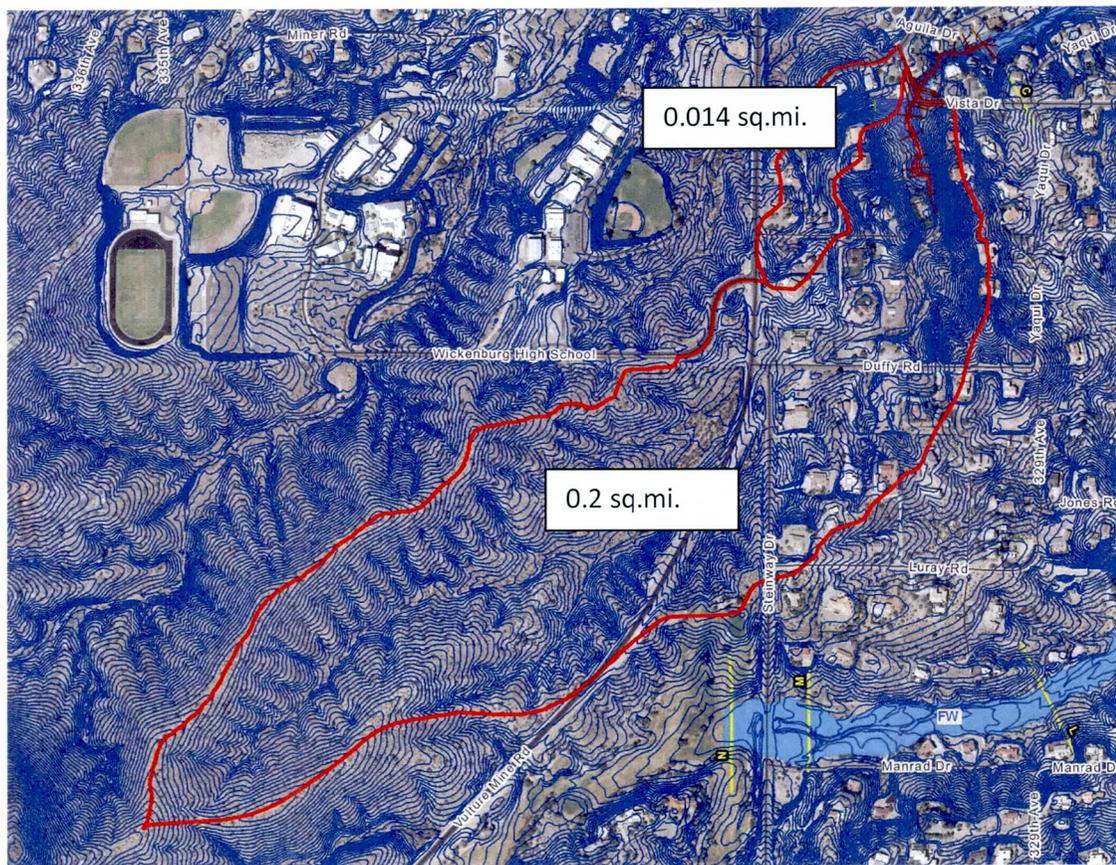


Figure 1. Watershed Map

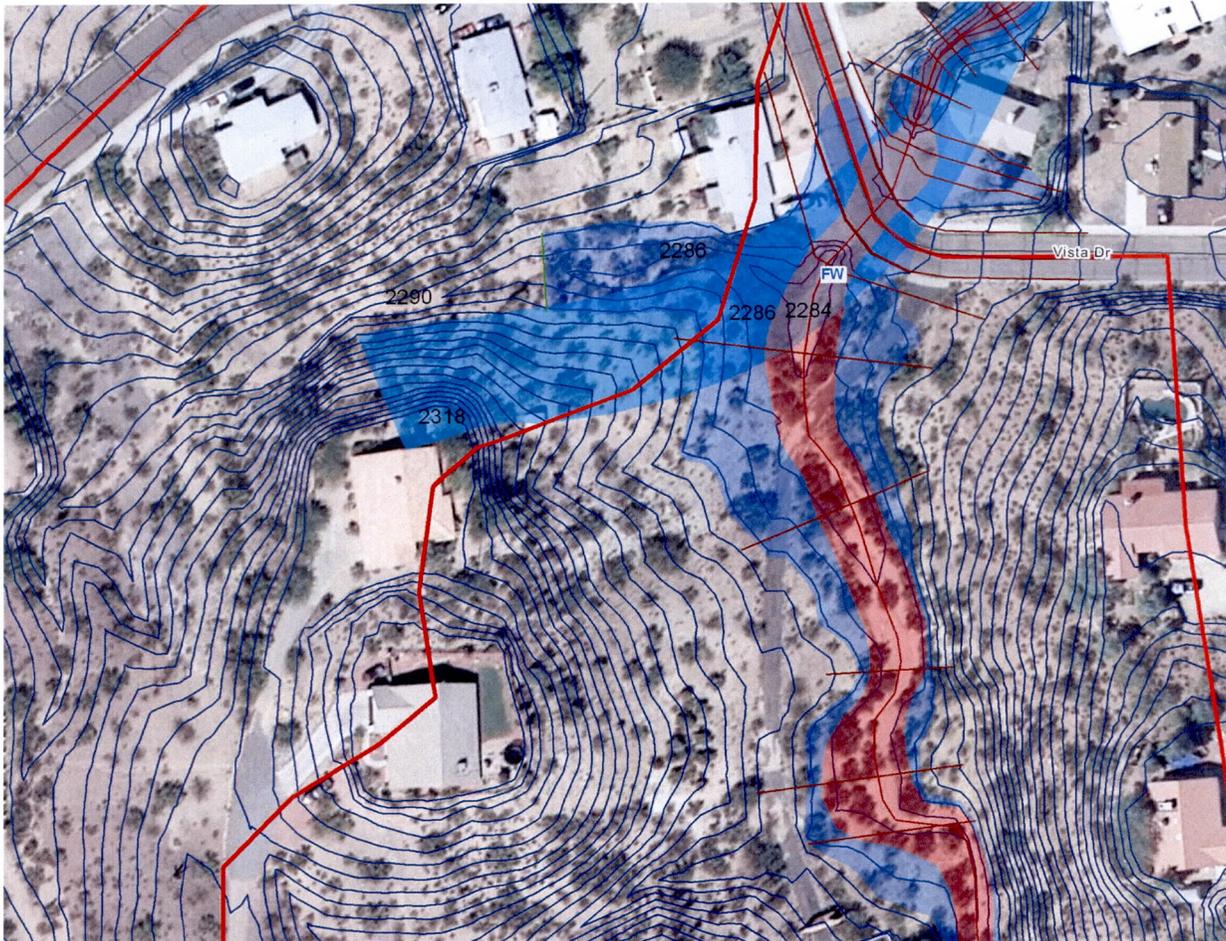


Figure 2. Close-up view of the smaller tributary

Data Request #3. Paragraph 65.6(a)(2) of the National Flood Insurance Program (NFIP) regulations states that to avoid discontinuities between revised and unrevised flood data, hydraulic analyses must have a logical transition between revised elevations of the base (1-percent-annual-chance) flood and those developed previously for areas not affected by the revision. The hydraulic analyses must also be extensive enough to ensure a logical transition between the revised floodplain boundaries and those developed previously for areas not affected by the revision. Our review reveals that the existing hydraulic analysis along South Branch Casandro Wash does not tie into the effective hydraulic analysis at the downstream end of the proposed revised reach nor does the boundary of the base flood shown on the work map entitled, "South Branch Casandro Wash Floodplain Work Map," logically tie in to the effective base floodplain boundary at the downstream end of the revision. Please provide a revised existing-conditions that tie into the effective hydraulic analysis within 0.5 foot, or within 0.0 feet if practical. Also, please revise the boundary delineation at the downstream end of the revision to provide a logical tie in.

Response to Data Request #3: In response to this data request, the hydraulic analysis has been extended downstream by the inclusion of additional cross-section at River Mile 0.72. The floodplain and

floodway delineations have also been extended to the River Mile 0.72 providing a suitable horizontal and vertical tie-in between the revised and effective delineations. The downstream water surface boundary condition value of 2273.92 ft (Adjusted from NAVD value of 2271.7 ft by adding 2.22 ft) was obtained from Effective Profile Plot and was specified at the cross-section at River Mile 0.72. However, due to apparent topographical differences between the effective study and current study, the computations within HEC-RAS model defaulted to a critical depth of 2274.06 ft resulting in a difference of 0.14 ft between the revised and the effective model. As a result, an adequate vertical tie-in is obtained as the difference of 0.14 ft is less than the required value of 0.5 ft. In the horizontal plane, the revised floodplain at the downstream tie-in location is within approximately 18 ft on the left side and 21 ft on the right side. Based on these values, the revised floodplain delineation is within 5% of the effective map scale (50 feet with map scale: 1" = 1000') providing an adequate horizontal tie-in.



Appendix C

Mapping & Survey

Kemper FPHF

505-47-164C

MAR 1 2010

M J. Orr

GPS J. Ashby

Clear 70°

Trimble 5800 Rover

Sta	+	HI	-	Elev.	Ts/m
				2290 ¹³	
	5 ¹⁰	2292 ⁴³			
			5 ⁰⁵	2290 ⁷³	SW COR
			5 ¹¹	2289 ⁷¹	NE COR
			5 ¹⁵	2290 ⁶⁵	SE COR
			5 ⁵⁵	2289 ⁸³	ESCAPE ROUTE
			5 ¹⁵	2287 ⁸³	TP
	3 ⁰⁵	2290 ⁹¹			
			3 ⁵⁷	2287 ³⁴	FF-HOUSE
			3 ²¹	2287 ²²	FF-GARAGE
			4 ⁰⁴	2286 ⁸¹	NW COR
			4 ¹¹	2286 ⁷⁴	BM

24

BM: SW COR of Driveway Pad
 Elev: 2286.73

LWA

HWA

Kemper FPAP 3-1-10

Note: Point #'s 502 & 503 are for the Cox FPAP but used this control to establish the benchmark

Meta Data:

Vertical Datum: NAVD 88 (Elevations in NGVD 29 established by a -2.22 Vertcon adjustment)

Coordinate System: US State Plane 1983

Zone: Arizona Central 0202

Datum: NAD 1983 (NSRS 2007)

Geoid Model: Geoid03AZ

LEGEND

BC	Back of Curb
BM	Benchmark
CHK	Check
CL	Centerline
CMP	Corrigated Metal Pipe
COR	Corner
EOR	Edge of Road
EOW	Edge of Sidewalk
ER	Escape Route
FF	Finished Floor
GB	Grade Break
HAG	Highest Adjacent Grade
INV	Invert
LAG	Lowest Adjacent Grade
NG	Natural Ground
PNT	Point
RD	Road
TB	Top of Bank

GDACS CALCULATED POINTS & CONTROL POINTS

Point #	Northing	Easting	NAVD 88	NGVD 29	Description
4NJ1	1071578	440652.9	2376.3	2374.08	GDACS
10	1071578	440652.9	2376.3	2374.08	4NJ1
4MI2	1059687	446013.6	2476.6	2474.38	GDACS
20	1059686	446013.6	2476.6	2474.38	4MI2
4NL1	1074252	410613	2676.3	2674.08	GDACS
30	1074252	410613	2676.3	2674.08	4NL1
500	1071578	440652.8	2376.38	2374.16	CHK PNT 10
501	1076608	441482.7	2286.73	2284.51	BM KEMPER
502	1075430	460301.8	2028.15	2025.93	BM COX
503	1074965	460081.2	2017.42	2015.2	COX ESCAPE ROUTE

KEMPER PROPERTY LEVEL WORK

	NAVD 88	NGVD 29
FF	2287.34	2285.12
LAG	2286.64	2284.42
HAG	2286.87	2284.65
ER	2286.88	2284.66



Expires 6-30-2013

No Utility Pad on Kemper Property

KEMPER PROPERTY TOPO POINTS

Point #	Northing	Easting	NAVD 88	NGVD 29	Description
100	1076528	441666.8	2298.14	2295.92	BC
101	1076529	441616.7	2299.61	2297.39	BC
102	1076530	441567.2	2297.04	2294.82	BC
103	1076530	441518.5	2293.58	2291.36	BC
104	1076531	441487.3	2291.33	2289.11	BC @ DRIVEWAY
105	1076531	441483.4	2290.76	2288.54	BC @ DRIVEWAY
106	1076535	441463.7	2290.04	2287.82	BC @ DRIVEWAY
107	1076536	441460	2290.42	2288.2	BC @ DRIVEWAY
108	1076546	441442.8	2289.89	2287.67	BC
109	1076562	441428.2	2289.18	2286.96	BC
110	1076574	441422	2288.98	2286.76	BC @ DRIVEWAY
111	1076578	441420.5	2288.46	2286.24	BC @ DRIVEWAY
112	1076613	441408.5	2289.4	2287.18	BC @ DRIVEWAY
113	1076617	441407.2	2289.91	2287.69	BC @ DRIVEWAY
114	1076663	441391.4	2291.5	2289.28	BC
115	1076709	441375.4	2292.83	2290.61	BC @ DRIVEWAY
116	1076713	441374.2	2292.54	2290.32	BC @ DRIVEWAY
117	1076726	441369.6	2292.96	2290.74	BC @ DRIVEWAY
118	1076730	441368.3	2293.45	2291.23	BC @ DRIVEWAY
119	1076734	441367	2293.31	2291.09	BC @ DRIVEWAY
120	1076751	441361.3	2293.83	2291.61	BC @ DRIVEWAY
121	1076755	441359.8	2294.12	2291.9	BC @ DRIVEWAY
122	1076769	441350	2295.1	2292.88	BC @ RAMP
123	1076771	441346.8	2294.93	2292.71	BC @ RAMP
124	1076773	441342.4	2295.26	2293.04	BC @ RAMP
125	1076774	441336.9	2295.99	2293.77	BC @ RAMP
126	1076770	441322.7	2297.02	2294.8	BC
127	1076798	441384.3	2294.15	2291.93	EOW

128	1076757	441397.5	2293.39	2291.17	EOW
129	1076713	441412.2	2291.92	2289.7	EOW
130	1076668	441427.7	2290.46	2288.24	EOW
131	1076626	441442.4	2288.93	2286.71	EOW
132	1076595	441452.9	2287.96	2285.74	EOW @ SPILLWAY
133	1076592	441453.7	2287.17	2284.95	EOW @ SPILLWAY
134	1076587	441455.8	2287.36	2285.14	EOW @ SPILLWAY
135	1076584	441457.2	2288.12	2285.9	EOW @ SPILLWAY
136	1076574	441465.8	2289.2	2286.98	EOW
137	1076567	441484.5	2290.6	2288.38	EOW
138	1076566	441522	2293.33	2291.11	EOW
139	1076566	441570.9	2296.72	2294.5	EOW
140	1076565	441618.4	2299.09	2296.87	EOW
141	1076565	441665.7	2297.85	2295.63	EOW
142	1076574	441477.5	2289.15	2286.93	TOE
143	1076578	441481.9	2287.71	2285.49	TOE
144	1076579	441507.1	2287.3	2285.08	TOE
145	1076580	441534.8	2287.5	2285.28	TOE
146	1076582	441542	2287.46	2285.24	TOE
147	1076589	441544.4	2287.29	2285.07	TOE
148	1076612	441550	2286.55	2284.33	TOE
149	1076645	441558.3	2286.97	2284.75	TOE
150	1076656	441559.1	2287.13	2284.91	TOE
151	1076684	441559.6	2286.85	2284.63	TOE
152	1076695	441559.5	2286.78	2284.56	TOE @ COR WALL
153	1076679	441549.3	2286.04	2283.82	NG
154	1076656	441547.9	2286.52	2284.3	NG
155	1076655	441525.3	2286.67	2284.45	NG
156	1076662	441508.1	2286.51	2284.29	NG
157	1076668	441530.2	2286.56	2284.34	NG
158	1076696	441560	2291.3	2289.08	TOP OF WALL
159	1076683	441559.9	2291.32	2289.1	TOP OF WALL
160	1076656	441559.5	2291.52	2289.3	TOP OF WALL
161	1076641	441552.3	2286.56	2284.34	NG

162	1076571	441559.5	2296.19	2293.97	NG
163	1076577	441559.5	2296.74	2294.52	TOP OF WALL
164	1076619	441560	2296.68	2294.46	TOP OF WALL
165	1076655	441560.6	2296.69	2294.47	TOP OF WALL
166	1076743	441578.8	2293.97	2291.75	TB
167	1076717	441573.7	2294.42	2292.2	TB
168	1076701	441572.1	2293.86	2291.64	TB
169	1076697	441546.7	2285.87	2283.65	TB
170	1076677	441531.4	2286.71	2284.49	TB
171	1076662	441497.2	2286.78	2284.56	TB
172	1076646	441489.1	2286.96	2284.74	TB
173	1076632	441482.2	2286.77	2284.55	TB
174	1076626	441478.1	2286.8	2284.58	TB
175	1076625	441471.3	2286.93	2284.71	TB
176	1076625	441464.8	2286.37	2284.15	TB
177	1076628	441458.5	2287.43	2285.21	TB
178	1076632	441454.3	2287.36	2285.14	TB
179	1076644	441439.2	2289.06	2286.84	TB
180	1076670	441430.5	2290.9	2288.68	TB
181	1076680	441451.3	2291.38	2289.16	TB
182	1076692	441475.1	2290.28	2288.06	TB
183	1076713	441503.7	2287.95	2285.73	TB
184	1076733	441502.5	2289.62	2287.4	TB
185	1076789	441525.3	2285.53	2283.31	TOP OF WALL
186	1076787	441538.7	2285.6	2283.38	TOP OF WALL
187	1076797	441572.7	2285.61	2283.39	TOP OF WALL
188	1076797	441572.4	2277.3	2275.08	TOE OF WALL
189	1076793	441573	2275.66	2273.44	TOE
190	1076788	441573.2	2275.97	2273.75	TOE
191	1076783	441554.5	2276.15	2273.93	TOE
192	1076786	441550.8	2275.67	2273.45	TOE
193	1076786	441539	2279.38	2277.16	TOE OF WALL
194	1076778	441545.8	2276.32	2274.1	TOE
195	1076776	441550.2	2276.21	2273.99	TOE

196	1076738	441537.3	2277.02	2274.8	TOE
197	1076736	441541.7	2276.8	2274.58	TOE
198	1076705	441531.4	2276.99	2274.77	TOE
199	1076706	441528.5	2277.16	2274.94	TOE
200	1076702	441516.8	2277.75	2275.53	TOE
201	1076693	441521.5	2278.11	2275.89	TOE
202	1076682	441501.6	2278.66	2276.44	TOE
203	1076687	441494.6	2278.96	2276.74	TOE
204	1076651	441473.8	2279.7	2277.48	TOE
205	1076650	441479.9	2279.86	2277.64	TOE
206	1076638	441476.8	2279.29	2277.07	TOE
207	1076641	441470.8	2279.57	2277.35	TOE
208	1076633	441470.3	2279.59	2277.37	INV 36" CMP
209	1076680	441507.3	2280.59	2278.37	GB
210	1076686	441521.9	2280.1	2277.88	GB
211	1076741	441525	2280.22	2278	GB
212	1076757	441530.6	2278.85	2276.63	GB
213	1076765	441569.4	2284.08	2281.86	GB
214	1076747	441561.7	2283.2	2280.98	GB
215	1076668	441432.3	2289.88	2287.66	GB
216	1076669	441448.3	2286.84	2284.62	GB
217	1076672	441460.9	2284.62	2282.4	GB
218	1076672	441470.2	2282.28	2280.06	GB
219	1076655	441466.1	2282.24	2280.02	GB
220	1076592	441453.7	2287.46	2285.24	GUTTER SPILLWAY
221	1076609	441459.2	2287.09	2284.87	GUTTER SPILLWAY
222	1076623	441463.2	2286.8	2284.58	GUTTER SPILLWAY
223	1076621	441467.1	2286.71	2284.49	GUTTER SPILLWAY
224	1076609	441463.3	2286.89	2284.67	GUTTER SPILLWAY
225	1076587	441456.3	2287.64	2285.42	GUTTER SPILLWAY
226	1076579	441466.4	2288.73	2286.51	NG
227	1076596	441481.1	2286.98	2284.76	NG
228	1076594	441504.9	2287.04	2284.82	NG
229	1076592	441529.1	2287.25	2285.03	NG

230	1076607	441534.7	2286.79	2284.57	NG
231	1076612	441502.8	2286.8	2284.58	NG
232	1076549	441415.6	2281.72	2279.5	INV 36" CMP
233	1076546	441418.7	2283.85	2281.63	TB
234	1076522	441410.3	2284.5	2282.28	TB
235	1076497	441403.2	2284.29	2282.07	TB
236	1076478	441400.8	2283.9	2281.68	TB
237	1076463	441407.3	2285.29	2283.07	TB @ EOR
238	1076449	441397.3	2285.42	2283.2	TB @ EOR
239	1076465	441389.3	2284.44	2282.22	TB
240	1076499	441394.4	2283.51	2281.29	TB
241	1076525	441401.1	2283.44	2281.22	TB
242	1076549	441411.3	2283.26	2281.04	TB
243	1076548	441413.5	2281.93	2279.71	TOE
244	1076547	441415.8	2282.17	2279.95	TOE
245	1076523	441406.7	2282.48	2280.26	TOE
246	1076525	441402.2	2282.74	2280.52	TOE
247	1076498	441401	2283.03	2280.81	TOE
248	1076499	441396.8	2282.59	2280.37	TOE
249	1076477	441400	2283.46	2281.24	TOE
250	1076466	441390.3	2283.5	2281.28	TOE
251	1076455	441485.1	2294.15	2291.93	NG
252	1076461	441439.8	2290.24	2288.02	TB
253	1076463	441432.2	2287.2	2284.98	TB
254	1076466	441418.1	2285.78	2283.56	CL RD
255	1076464	441366	2285.82	2283.6	TOE
256	1076465	441301.7	2295.71	2293.49	TB
257	1076467	441258.7	2299.76	2297.54	NG



Appendix D

Supporting Documentation for Hydrology

SOURCE: The following table was obtained from effective Flood Insurance Study, September 2005.

Table 3. Summary of Discharges (Continued)

<u>Flooding Source and Location</u>	<u>Drainage Area (Square Miles)</u>	<u>Peak Discharges (cfs)</u>			
		<u>10-Year</u>	<u>50-Year</u>	<u>100-Year</u>	<u>500-Year</u>
Sols Wash					
At confluence with Hassayampa River	147.2	7,019	12,453	15,045	20,836
Above confluence of Casandro Wash	145.5	6,758	11,964	14,459	20,005
Above confluence of Hospital Wash	145.1	6,725	11,927	14,413	19,986
Above confluence of Flying E Wash	134.8	5,784	10,433	12,945	18,691
At Railroad Bridge at Railroad Milepost 36	119.3	4,795	9,767	12,244	17,749
At Maricopa - Yavapai County Boundary	86.7	3,696	7,504	9,419	13,760
Casandro Wash					
At Sols Wash (including flow in outfall pipe, flow in outfall pipe of 274 cfs is diverted from Casandro Wash at the intersection of Mohave Street and Jackson Street and returns at Sols Wash)	1.58	-- ¹	-- ¹	406	-- ¹
At Atchison, Topeka & Santa Fe Railway	1.57	-- ¹	-- ¹	281	-- ¹
At intersection of Mohave Street and Jackson Street	1.44	-- ¹	-- ¹	63	-- ¹
At Navajo Street	1.42	-- ¹	-- ¹	305	-- ¹
Downstream of Casandro Wash Dam	1.24	-- ¹	-- ¹	30	-- ¹
Upstream of Casandro Wash Dam	1.24	-- ¹	-- ¹	1,265	-- ¹
At U.S. Highway 60 and 70	0.68	-- ¹	-- ¹	714	-- ¹
South Branch Casandro Wash					
Above Yaqui Drive	0.2	50	250	400	1,000
Hospital Wash					
At Honeysuckle Avenue	0.5	150	600	900	2,000
-- ¹ Not Computed					



Appendix E

Supporting Documentation for Hydraulic Analysis

Project: FCDMC 2011C001
Stream: South Branch Casandro Wash
Location: Maricopa County, Arizona

Typical Photo of Reach Upstream of Vista Drive



Channel Conditions		Manning's n Adjustment		n Value
Channel Material	Concrete	n _b	0.012-0.018	0.03
	Firm Soil		0.025-0.032	
	Coarse Sand		0.026-0.035	
	Gravel		0.028-0.035	
	Cobble		0.030-0.050	
	Boulder		0.040-0.070	
Degree of Irregularity	Smooth	n ₁	0.000	
	Minor		0.001-0.005	
	Moderate		0.006-0.010	
	Severe		0.011-0.020	
Effects of Obstruction	Negligible	n ₂	0.000-0.004	
	Minor		0.005-0.015	
	Appreciable		0.020-0.030	
	Severe		0.040-0.060	
Vegetation	Small	n ₃	0.002-0.010	0.03
	Medium		0.010-0.025	
	Large		0.025-0.050	
	Very Large		0.050-0.100	
Variations in Channel Cross Section	Gradual	n ₄	0.000	
	Occ. Alt.		0.001-0.005	
	Frequently Alt.		0.010-0.015	
Intermediate Sum				0.06
Degree of Meandering	Minor	m	1	1
	Appreciable		1.15	
	Severe		1.3	
$n=(n_b+n_1+n_2+n_3+n_4)m$				0.060

Project: FCDMC 2011C001
Stream: South Branch Casandro Wash
Location: Maricopa County, Arizona

Typical Photo of Reach Downstream of Vista Drive



Channel Conditions		Manning's n Adjustment		n Value
Channel Material	Concrete	n _b	0.012-0.018	0.03
	Firm Soil		0.025-0.032	
	Coarse Sand		0.026-0.035	
	Gravel		0.028-0.035	
	Cobble		0.030-0.050	
	Boulder		0.040-0.070	
Degree of Irregularity	Smooth	n ₁	0.000	
	Minor		0.001-0.005	
	Moderate		0.006-0.010	
	Severe		0.011-0.020	
Effects of Obstruction	Negligible	n ₂	0.000-0.004	
	Minor		0.005-0.015	
	Appreciable		0.020-0.030	
	Severe		0.040-0.060	
Vegetation	Small	n ₃	0.002-0.010	0.05
	Medium		0.010-0.025	
	Large		0.025-0.050	
	Very Large		0.050-0.100	
Variations in Channel Cross Section	Gradual	n ₄	0.000	
	Occ. Alt.		0.001-0.005	
	Frequently Alt.		0.010-0.015	
Intermediate Sum				0.08
Degree of Meandering	Minor	m	1	
	Appreciable		1.15	
	Severe		1.3	
$n=(n_b+n_1+n_2+n_3+n_4)m$				0.080

Project: FCDMC 2011C001
Stream: South Branch Casandro Wash
Location: Maricopa County, Arizona

Photo of Road Crossing at Vista Drive

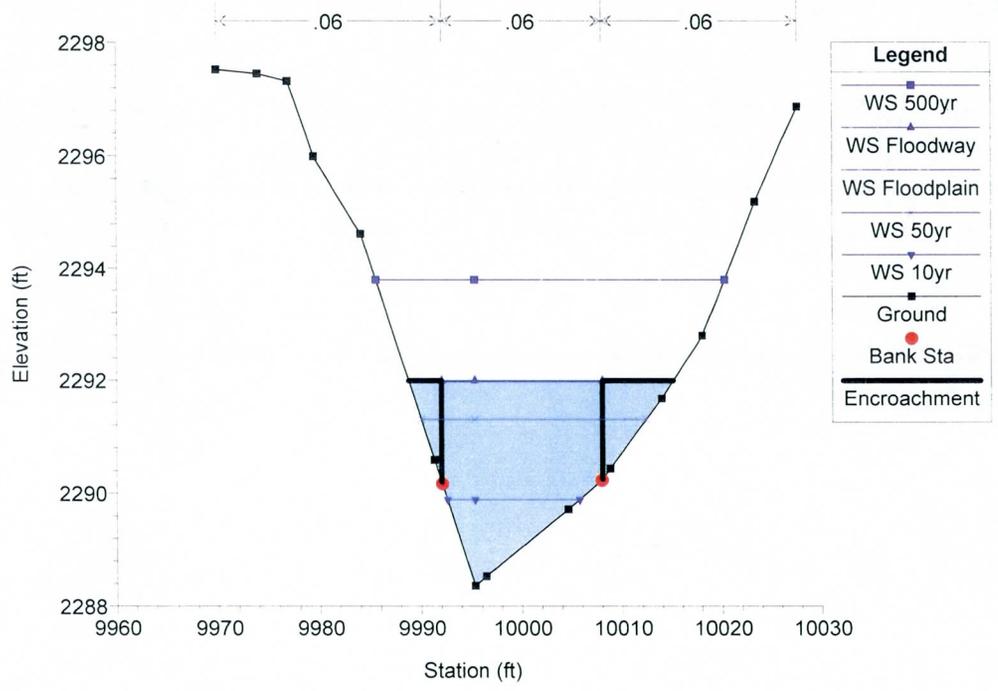


Channel Conditions		Manning's n Adjustment		n Value
Channel Material	Concrete	n _b	0.012-0.018	0.016
	Firm Soil		0.025-0.032	
	Coarse Sand		0.026-0.035	
	Gravel		0.028-0.035	
	Cobble		0.030-0.050	
	Boulder		0.040-0.070	
Degree of Irregularity	Smooth	n ₁	0.000	
	Minor		0.001-0.005	
	Moderate		0.006-0.010	
	Severe		0.011-0.020	
Effects of Obstruction	Negligible	n ₂	0.000-0.004	
	Minor		0.005-0.015	
	Appreciable		0.020-0.030	
	Severe		0.040-0.060	
Vegetation	Small	n ₃	0.002-0.010	
	Medium		0.010-0.025	
	Large		0.025-0.050	
	Very Large		0.050-0.100	
Variations in Channel Cross Section	Gradual	n ₄	0.000	
	Occ. Alt.		0.001-0.005	
	Frequently Alt.		0.010-0.015	
Intermediate Sum				0.016
Degree of Meandering	Minor	m	1	1
	Appreciable		1.15	
	Severe		1.3	
$n=(n_b+n_1+n_2+n_3+n_4)m$				0.016

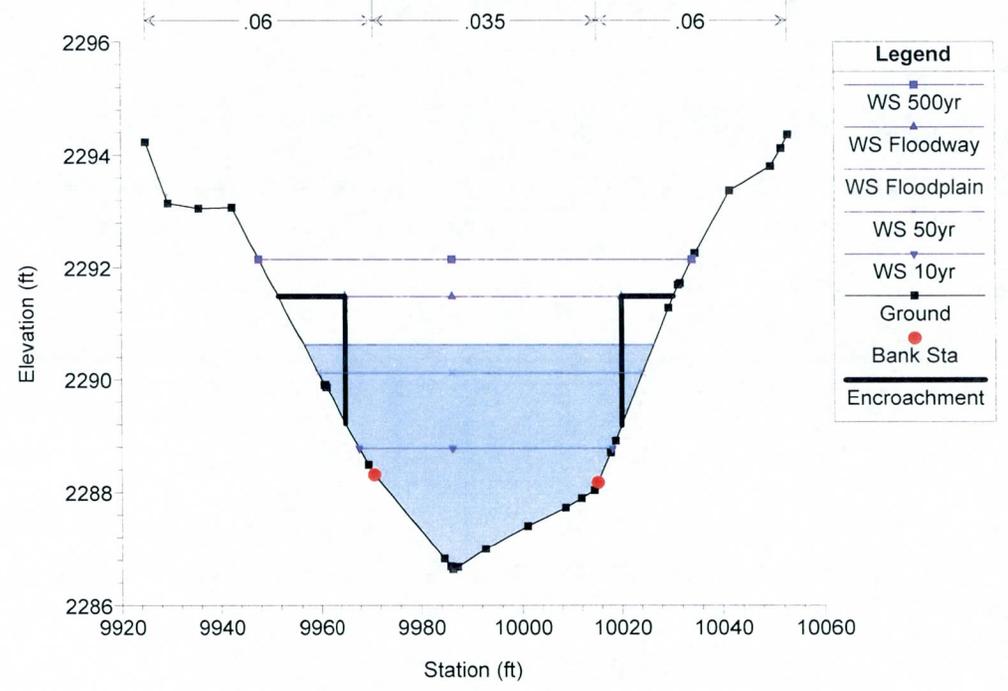
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
South Branch	0.924	Floodplain	400.00	2288.36	2291.98	2291.98	2293.01	0.032868	8.48	52.07	26.25	0.91
South Branch	0.924	Floodway	400.00	2288.36	2291.99	2291.99	2293.33	0.039054	9.28	43.27	16.00	0.99
South Branch	0.924	10yr	50.00	2288.36	2289.89	2289.89	2290.27	0.060228	4.96	10.08	13.17	1.00
South Branch	0.924	50yr	250.00	2288.36	2291.30	2291.30	2292.13	0.037354	7.45	35.61	22.37	0.92
South Branch	0.924	500yr	1000.00	2288.36	2293.79	2293.79	2295.35	0.027181	10.87	108.09	34.71	0.90
South Branch	0.893	Floodplain	400.00	2286.64	2290.63	2288.79	2290.73	0.000807	2.62	174.07	70.03	0.26
South Branch	0.893	Floodway	400.00	2286.64	2291.49	2288.79	2291.55	0.000372	2.09	210.56	55.00	0.18
South Branch	0.893	10yr	50.00	2286.64	2288.78	2287.60	2288.79	0.000241	0.81	62.72	50.39	0.12
South Branch	0.893	50yr	250.00	2286.64	2290.12	2288.40	2290.18	0.000578	1.98	139.90	64.81	0.21
South Branch	0.893	500yr	1000.00	2286.64	2292.15	2289.89	2292.40	0.001241	4.21	293.14	86.42	0.34
South Branch	0.880	Floodplain	400.00	2286.64	2290.33	2289.06	2290.62	0.002642	4.67	105.03	45.12	0.46
South Branch	0.880	Floodway	400.00	2286.64	2291.32	2289.03	2291.50	0.001125	3.66	135.21	34.39	0.32
South Branch	0.880	10yr	50.00	2286.64	2288.75	2287.48	2288.77	0.000452	1.22	47.61	32.09	0.17
South Branch	0.880	50yr	250.00	2286.64	2289.96	2288.54	2290.11	0.001594	3.34	90.26	41.34	0.35
South Branch	0.880	500yr	1000.00	2286.64	2290.81	2290.59	2292.10	0.010033	9.99	125.73	50.03	0.92
South Branch	0.859	Floodplain	400.00	2284.52	2290.40	2287.33	2290.46	0.000374	2.56	298.20	95.31	0.19
South Branch	0.859	Floodway	400.00	2284.52	2291.32	2287.28	2291.41	0.000363	2.79	219.70	37.59	0.19
South Branch	0.859	10yr	50.00	2284.52	2288.75	2285.63	2288.76	0.000028	0.55	157.49	69.66	0.05
South Branch	0.859	50yr	250.00	2284.52	2289.99	2286.81	2290.02	0.000208	1.81	260.05	90.60	0.14
South Branch	0.859	500yr	1000.00	2284.52	2291.28	2288.64	2291.49	0.001201	5.05	386.32	105.84	0.35
South Branch	0.840	Floodplain	400.00	2283.35	2290.41	2286.09	2290.43	0.000113	1.58	481.87	127.52	0.11
South Branch	0.840	Floodway	400.00	2283.35	2291.33	2286.04	2291.37	0.000142	1.93	308.13	45.00	0.12
South Branch	0.840	10yr	50.00	2283.35	2288.75	2284.45	2288.75	0.000006	0.31	290.22	104.03	0.02
South Branch	0.840	50yr	250.00	2283.35	2290.00	2285.58	2290.01	0.000059	1.09	430.51	121.69	0.08
South Branch	0.840	500yr	1000.00	2283.35	2291.29	2287.34	2291.38	0.000412	3.28	602.67	146.88	0.21
South Branch	0.829	Floodplain	400.00	2282.64	2290.34	2286.47	2290.41	0.000303	2.35	252.95	101.74	0.17
South Branch	0.829	Floodway	400.00	2282.64	2291.28	2286.47	2291.36	0.000226	2.24	206.46	33.00	0.15
South Branch	0.829	10yr	50.00	2282.64	2288.75	2284.38	2288.75	0.000016	0.44	138.08	51.71	0.04
South Branch	0.829	50yr	250.00	2282.64	2289.96	2285.88	2290.00	0.000157	1.62	217.06	87.65	0.12
South Branch	0.829	500yr	1000.00	2282.64	2291.00	2288.36	2291.32	0.001184	4.99	335.04	157.91	0.34
South Branch	0.824	Floodplain	335.00	2288.61	2289.99	2289.99	2290.37	0.003109	5.93	74.76	106.40	0.94
South Branch	0.824	Floodway	335.00	2288.61	2290.44	2290.44	2291.27	0.003278	7.52	46.95	29.00	1.02
South Branch	0.824	10yr	1.00	2288.61	2288.72	2288.72	2288.75	0.009946	1.44	0.69	11.28	1.03
South Branch	0.824	50yr	180.00	2288.61	2289.67	2289.67	2289.96	0.003282	4.99	44.81	80.43	0.92
South Branch	0.824	500yr	950.00	2288.61	2290.71	2290.71	2291.25	0.002661	7.49	174.33	156.02	0.94
South Branch	0.821	Floodplain	335.00	2288.20	2289.49	2289.49	2289.84	0.002871	5.38	76.74	109.75	0.89
South Branch	0.821	Floodway	335.00	2288.20	2289.71	2289.71	2290.38	0.003622	6.55	51.18	37.97	0.99
South Branch	0.821	10yr	1.00	2288.20	2288.28	2288.28	2288.30	0.009920	1.15	0.87	20.42	0.97
South Branch	0.821	50yr	180.00	2288.20	2289.17	2289.17	2289.46	0.003320	4.64	45.52	84.57	0.91
South Branch	0.821	500yr	950.00	2288.20	2290.22	2290.22	2290.79	0.002574	7.11	169.14	142.74	0.92
South Branch	0.817	Floodplain	335.00	2287.79	2289.04	2289.04	2289.44	0.003076	5.41	70.20	86.96	0.92
South Branch	0.817	Floodway	335.00	2287.79	2289.17	2289.17	2289.78	0.003747	6.27	53.45	44.40	1.01
South Branch	0.817	10yr	1.00	2287.79	2287.87	2287.87	2287.90	0.010333	1.32	0.76	14.54	1.02
South Branch	0.817	50yr	180.00	2287.79	2288.75	2288.75	2289.02	0.003117	4.41	45.78	79.32	0.88
South Branch	0.817	500yr	950.00	2287.79	2289.89	2289.89	2290.53	0.002505	7.18	157.26	118.31	0.91
South Branch	0.811	Floodplain	400.00	2286.32	2287.54	2287.54	2287.93	0.009350	5.13	80.27	103.52	0.98
South Branch	0.811	Floodway	400.00	2286.32	2288.49	2288.49	2289.36	0.008100	7.89	54.13	31.52	1.04
South Branch	0.811	10yr	50.00	2286.32	2286.88	2286.88	2287.00	0.015757	3.19	18.46	85.55	1.06
South Branch	0.811	50yr	250.00	2286.32	2287.30	2287.30	2287.60	0.010971	4.49	56.94	96.94	1.01
South Branch	0.811	500yr	1000.00	2286.32	2288.95	2288.23	2289.20	0.001728	4.24	255.75	137.18	0.50
South Branch	0.804	Floodplain	400.00	2280.86	2286.05	2284.79	2286.41	0.012603	5.23	91.90	35.25	0.45
South Branch	0.804	Floodway	400.00	2280.86	2286.73	2284.78	2287.23	0.021049	5.72	69.96	14.52	0.46
South Branch	0.804	10yr	50.00	2280.86	2283.14	2282.52	2283.26	0.017915	2.78	18.04	15.62	0.44
South Branch	0.804	50yr	250.00	2280.86	2285.11	2284.07	2285.41	0.013924	4.64	61.94	28.94	0.46
South Branch	0.804	500yr	1000.00	2280.86	2288.59	2286.71	2289.05	0.009827	6.35	202.80	49.54	0.43
South Branch	0.799	Floodplain	400.00	2279.55	2284.34	2284.34	2285.57	0.069729	9.20	46.60	19.46	0.95
South Branch	0.799	Floodway	400.00	2279.55	2284.47	2284.47	2285.96	0.093459	9.80	40.83	13.51	0.99
South Branch	0.799	10yr	50.00	2279.55	2281.63	2281.63	2282.13	0.104381	5.71	8.76	8.43	0.99
South Branch	0.799	50yr	250.00	2279.55	2283.53	2283.53	2284.53	0.072486	8.20	32.12	16.16	0.94
South Branch	0.799	500yr	1000.00	2279.55	2286.55	2286.55	2288.34	0.052017	11.55	99.92	29.15	0.90
South Branch	0.792	Floodplain	400.00	2277.74	2283.08	2282.05	2283.60	0.021725	5.87	71.70	26.20	0.56
South Branch	0.792	Floodway	400.00	2277.74	2283.80	2281.99	2284.20	0.015689	5.04	79.29	19.15	0.44

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
South Branch	0.792	10yr	50.00	2277.74	2280.18	2279.55	2280.33	0.022484	3.13	15.96	12.43	0.49
South Branch	0.792	50yr	250.00	2277.74	2282.22	2281.28	2282.60	0.022672	5.04	50.81	21.98	0.55
South Branch	0.792	500yr	1000.00	2277.74	2285.32	2284.11	2286.21	0.020530	7.98	142.52	37.10	0.59
South Branch	0.784	Floodplain	400.00	2276.72	2282.40	2280.98	2282.80	0.013262	5.35	85.07	29.66	0.46
South Branch	0.784	Floodway	400.00	2276.72	2282.99	2280.91	2283.44	0.017517	5.35	74.72	15.50	0.43
South Branch	0.784	10yr	50.00	2276.72	2279.48	2278.56	2279.57	0.012184	2.45	20.40	14.59	0.37
South Branch	0.784	50yr	250.00	2276.72	2281.53	2280.23	2281.82	0.012582	4.47	61.18	25.22	0.43
South Branch	0.784	500yr	1000.00	2276.72	2284.68	2283.07	2285.37	0.014201	7.38	165.75	40.90	0.51
South Branch	0.773	Floodplain	400.00	2275.89	2281.41	2280.36	2281.91	0.020657	5.85	74.62	27.48	0.53
South Branch	0.773	Floodway	400.00	2275.89	2281.90	2280.30	2282.40	0.019924	5.68	71.01	17.51	0.49
South Branch	0.773	10yr	50.00	2275.89	2278.61	2277.86	2278.74	0.019437	2.88	17.35	13.24	0.44
South Branch	0.773	50yr	250.00	2275.89	2280.60	2279.57	2280.96	0.020108	4.90	53.91	23.28	0.51
South Branch	0.773	500yr	1000.00	2275.89	2283.51	2282.36	2284.41	0.022219	8.18	140.56	35.32	0.60
South Branch	0.760	Floodplain	400.00	2274.96	2280.14	2278.99	2280.55	0.016675	5.36	83.11	32.58	0.50
South Branch	0.760	Floodway	400.00	2274.96	2280.33	2278.99	2280.85	0.023340	5.80	68.99	18.30	0.53
South Branch	0.760	10yr	50.00	2274.96	2277.44	2276.68	2277.54	0.014252	2.56	19.57	15.62	0.39
South Branch	0.760	50yr	250.00	2274.96	2279.36	2278.26	2279.65	0.015937	4.46	60.23	26.75	0.47
South Branch	0.760	500yr	1000.00	2274.96	2282.10	2280.94	2282.88	0.019772	7.80	169.76	71.20	0.58
South Branch	0.744	Floodplain	400.00	2274.17	2278.23	2277.67	2278.73	0.032685	5.64	71.78	38.13	0.66
South Branch	0.744	Floodway	400.00	2274.17	2278.38	2277.66	2278.82	0.026591	5.31	75.49	31.64	0.60
South Branch	0.744	10yr	50.00	2274.17	2276.61	2275.68	2276.67	0.008231	1.91	26.23	21.10	0.30
South Branch	0.744	50yr	250.00	2274.17	2277.93	2277.02	2278.19	0.020836	4.09	61.21	32.16	0.52
South Branch	0.744	500yr	1000.00	2274.17	2279.31	2279.31	2280.48	0.048675	8.93	124.05	57.41	0.86
South Branch	0.730	Floodplain	400.00	2273.97	2276.39	2275.85	2276.53	0.017637	3.25	134.51	109.22	0.46
South Branch	0.730	Floodway	400.00	2273.97	2276.54	2275.92	2276.73	0.019572	3.59	112.08	68.76	0.49
South Branch	0.730	10yr	50.00	2273.97	2275.22	2275.06	2275.28	0.040279	2.01	25.26	69.38	0.56
South Branch	0.730	50yr	250.00	2273.97	2275.93	2275.61	2276.07	0.026342	3.13	86.39	99.91	0.54
South Branch	0.730	500yr	1000.00	2273.97	2277.29	2276.58	2277.58	0.018910	4.59	238.11	119.60	0.52
South Branch	0.720	Floodplain	400.00	2271.61	2274.06	2274.06	2274.66	0.085344	6.21	64.65	55.65	0.99
South Branch	0.720	Floodway	400.00	2271.61	2274.05	2274.05	2274.66	0.087973	6.26	64.02	55.38	1.00
South Branch	0.720	10yr	50.00	2271.61	2272.84	2272.61	2272.97	0.042060	2.88	17.39	26.31	0.62
South Branch	0.720	50yr	250.00	2271.61	2273.97	2273.62	2274.24	0.041996	4.17	59.99	52.99	0.68
South Branch	0.720	500yr	1000.00	2271.61	2275.34	2275.15	2276.06	0.042045	7.01	155.09	81.99	0.78

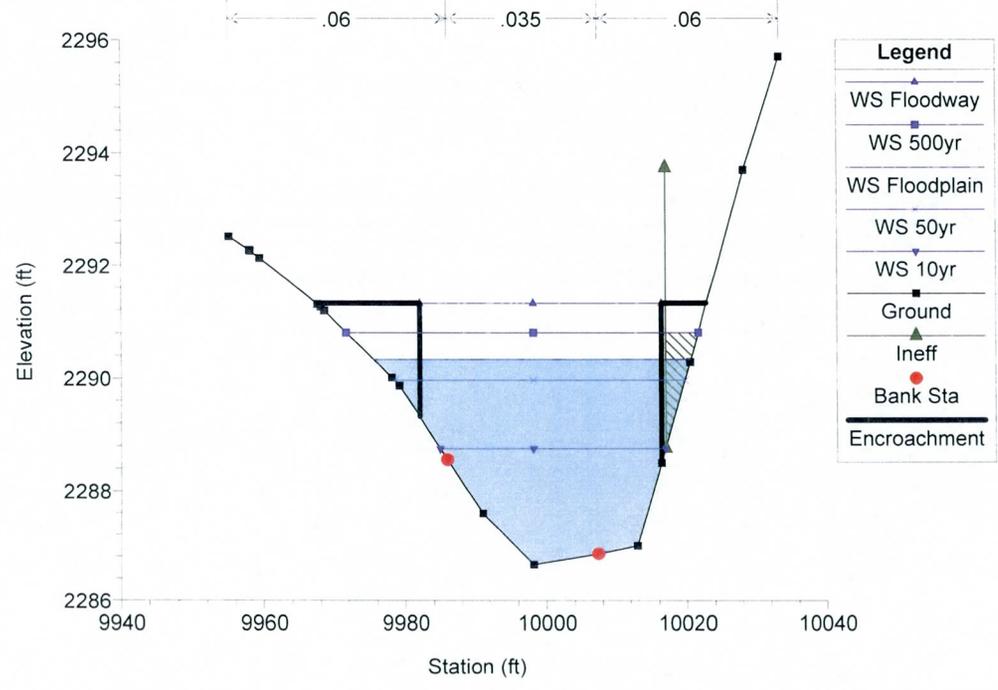
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.924



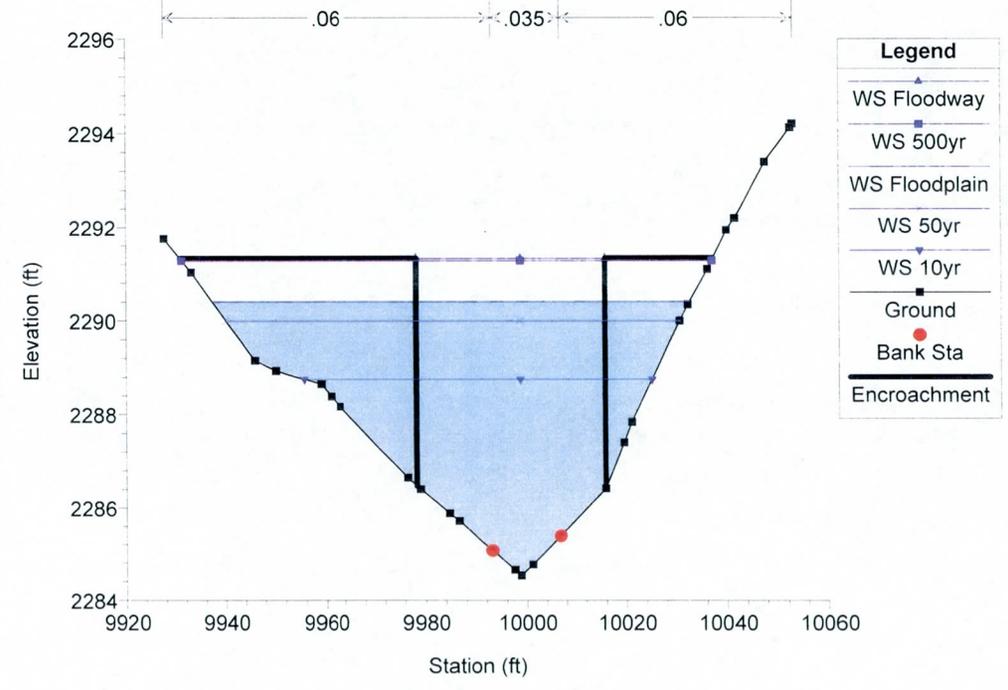
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.859



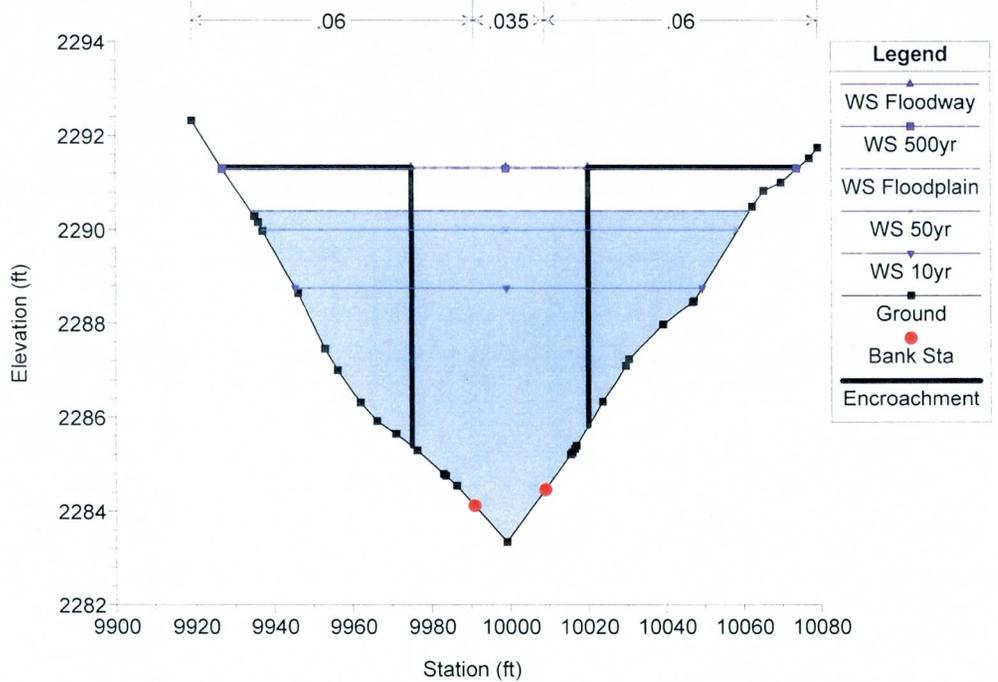
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.880



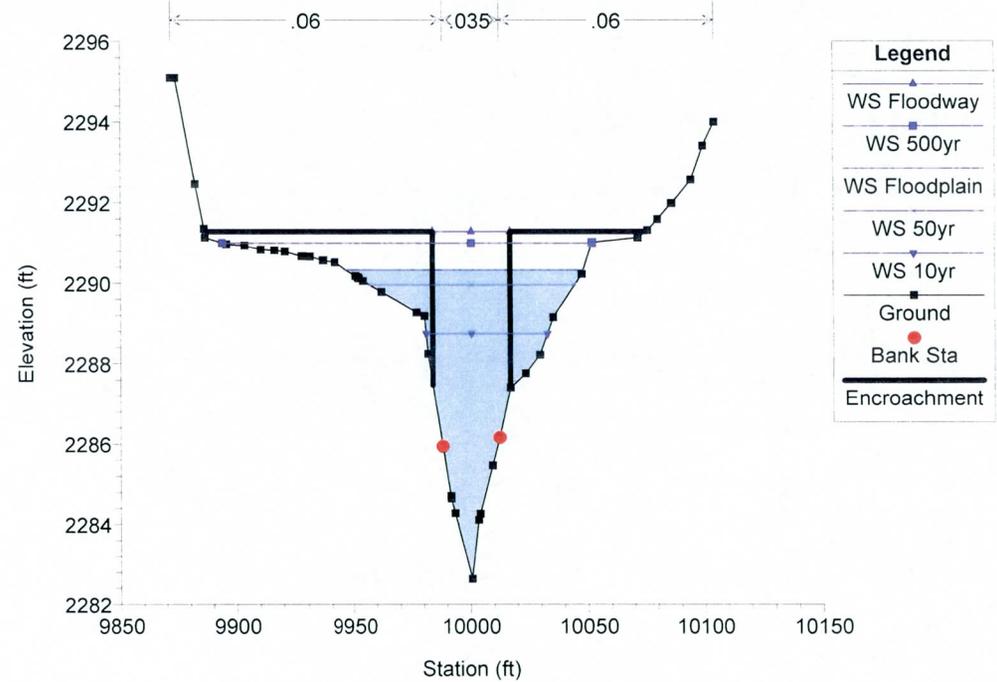
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.859



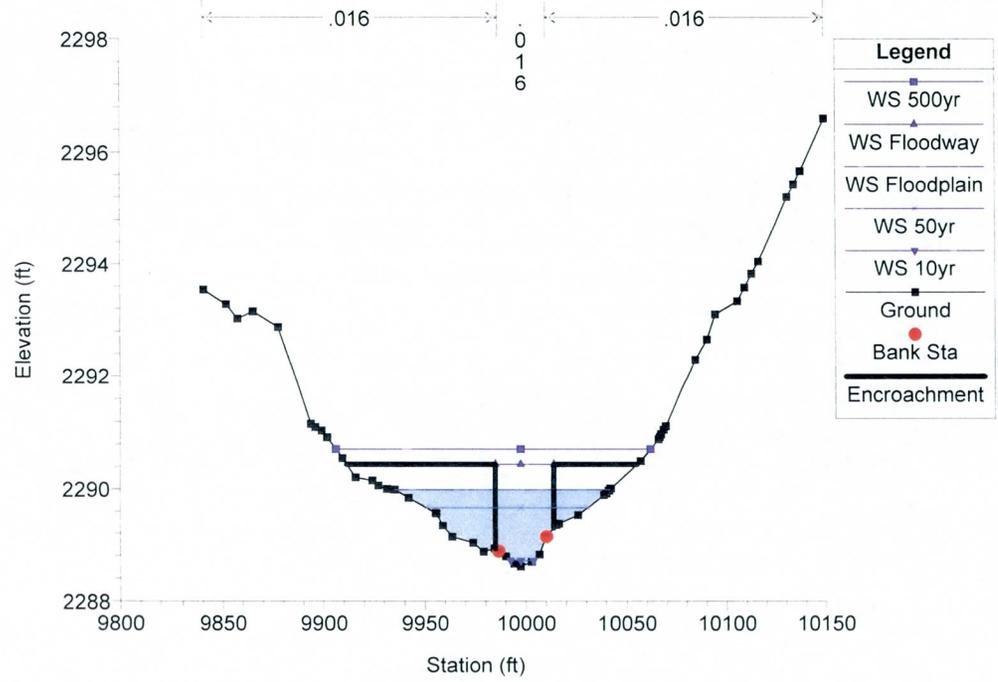
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.840



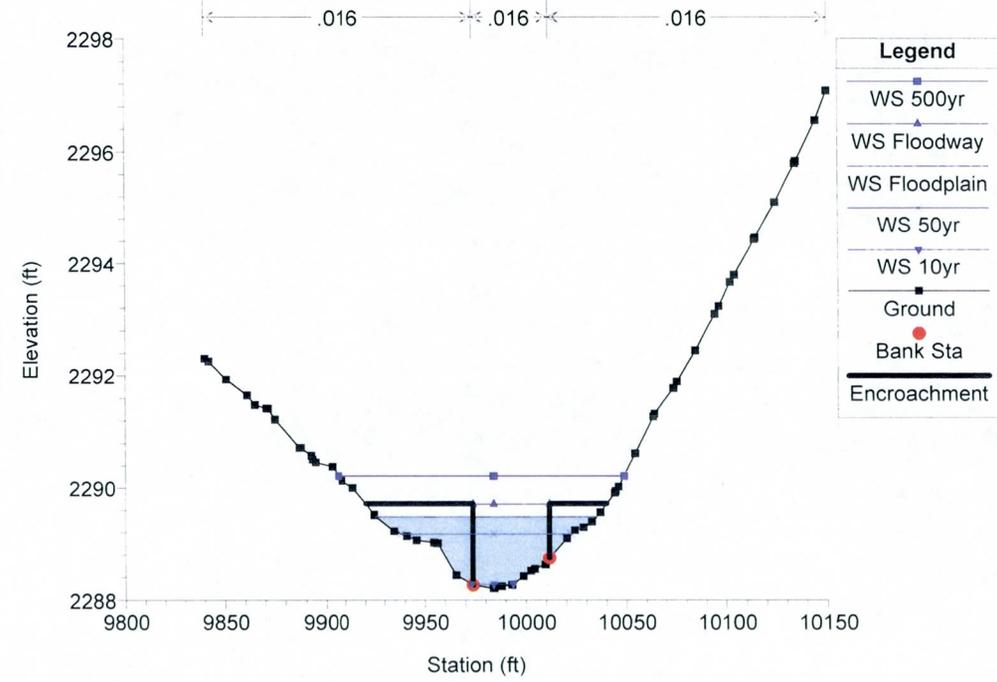
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.820



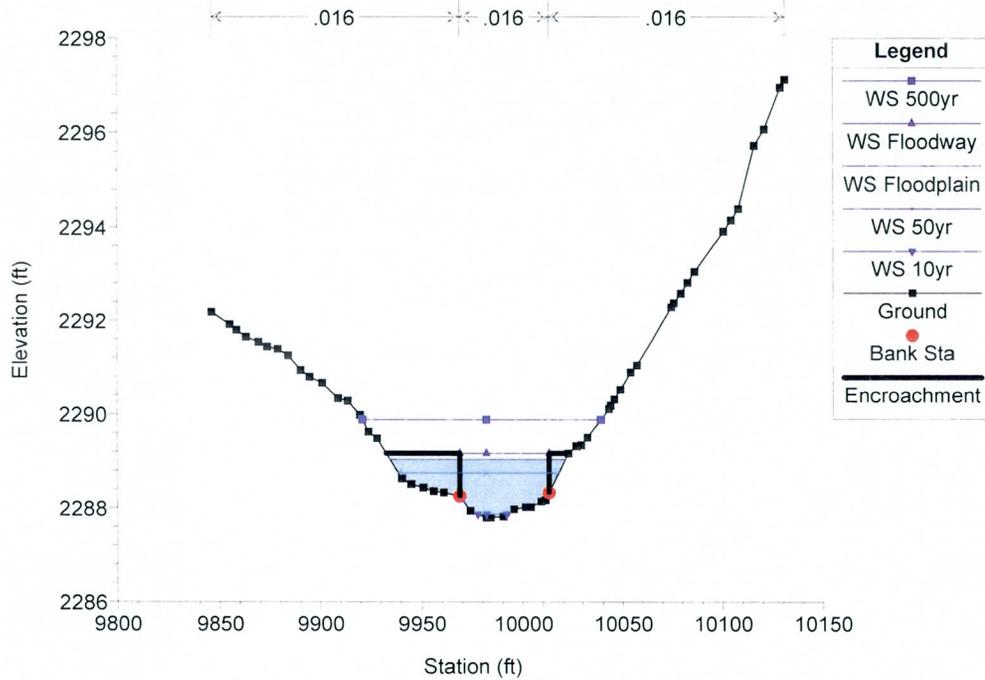
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.824



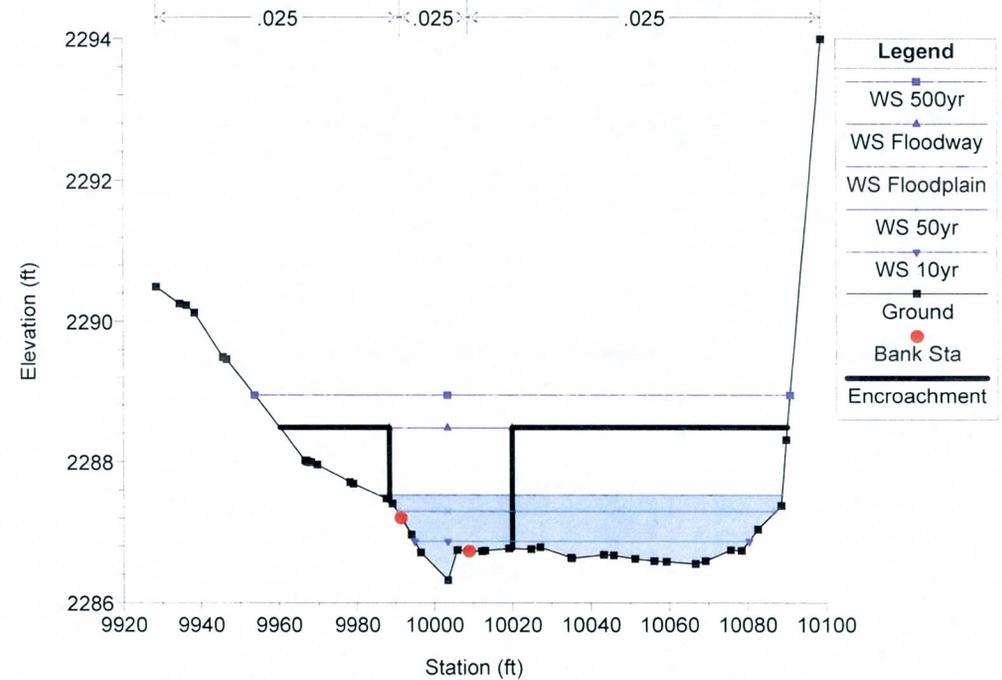
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.821



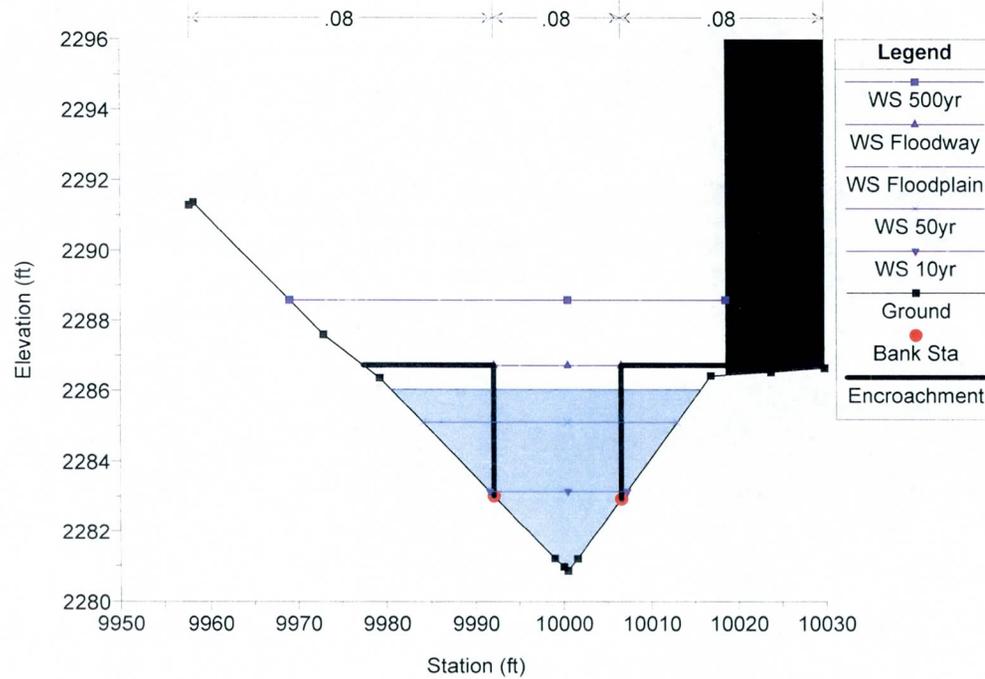
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.817



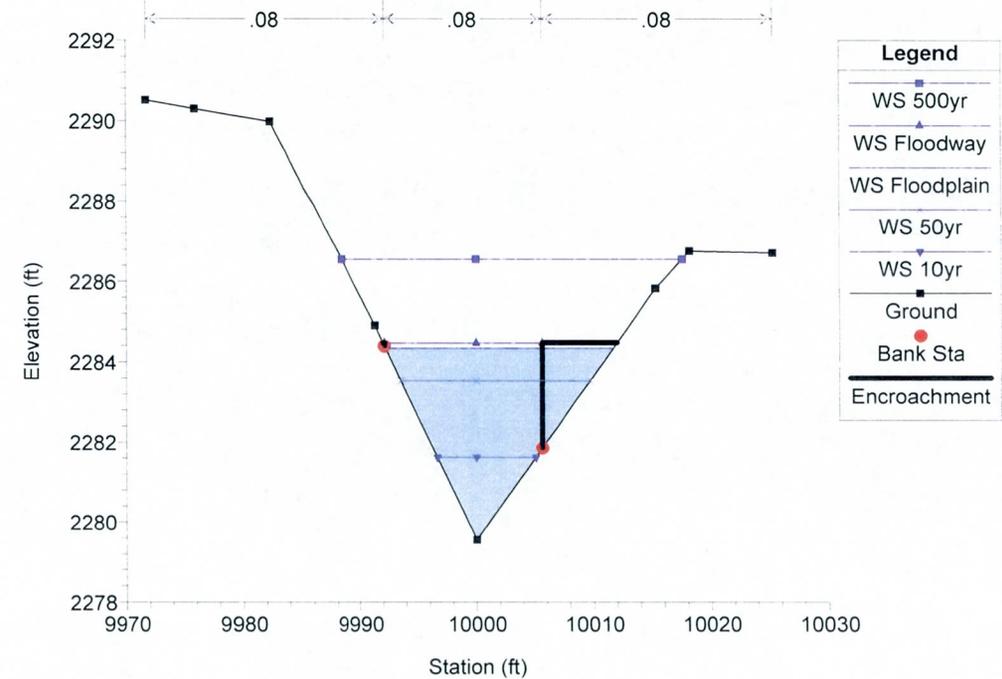
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.817



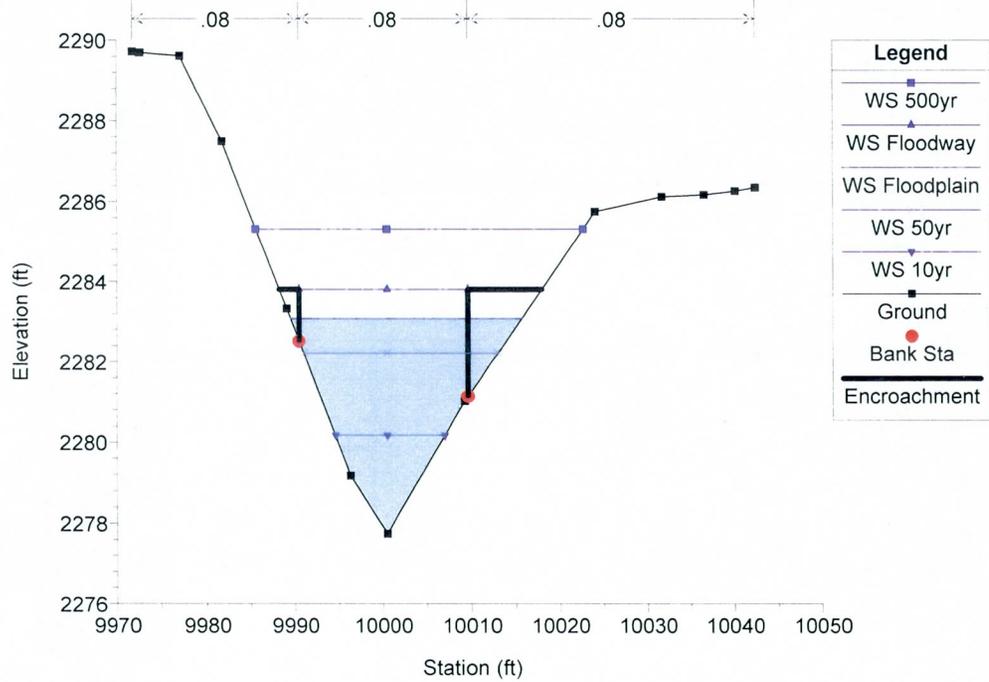
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.804



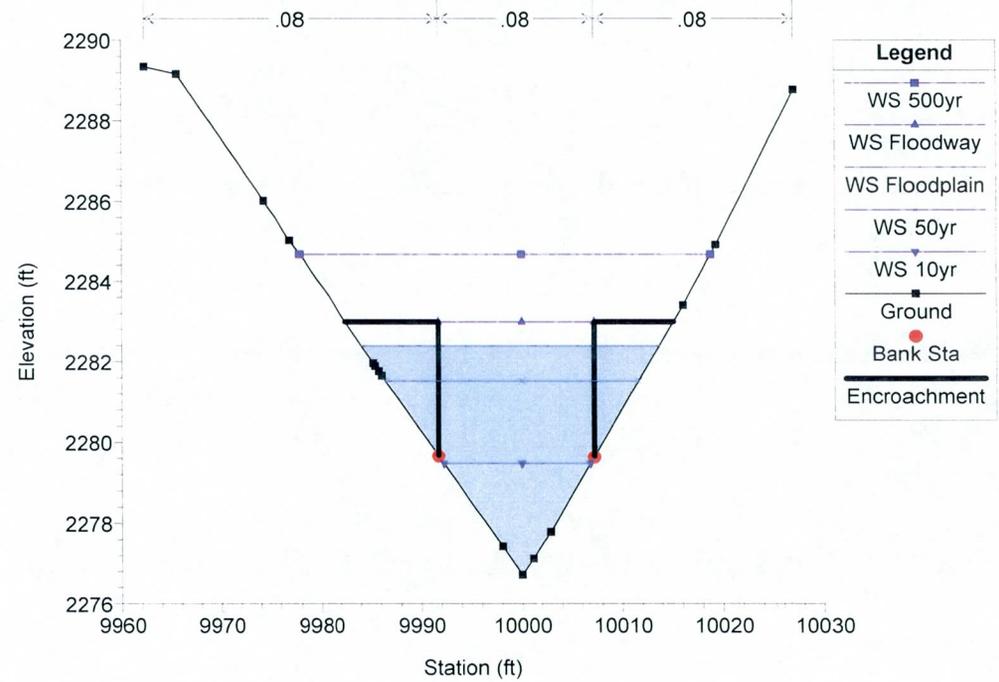
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.799



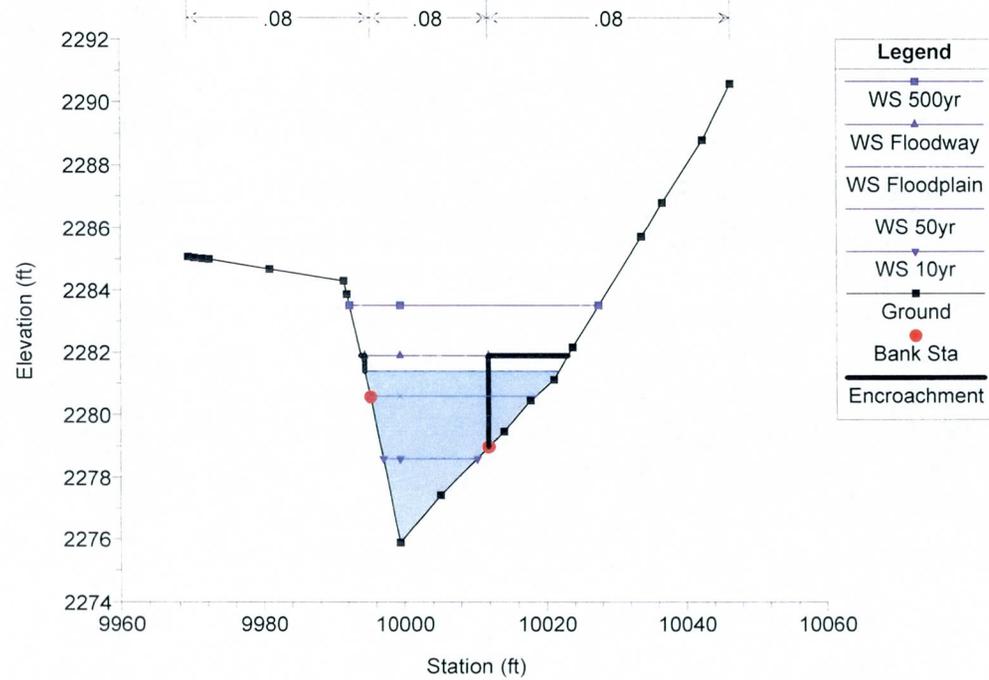
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.792



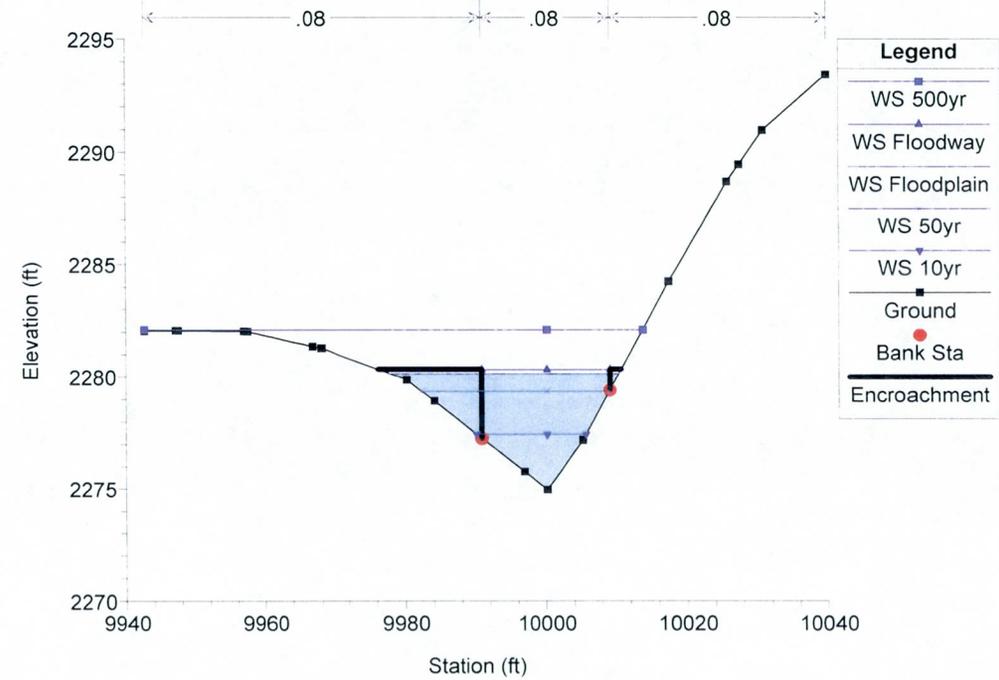
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.78



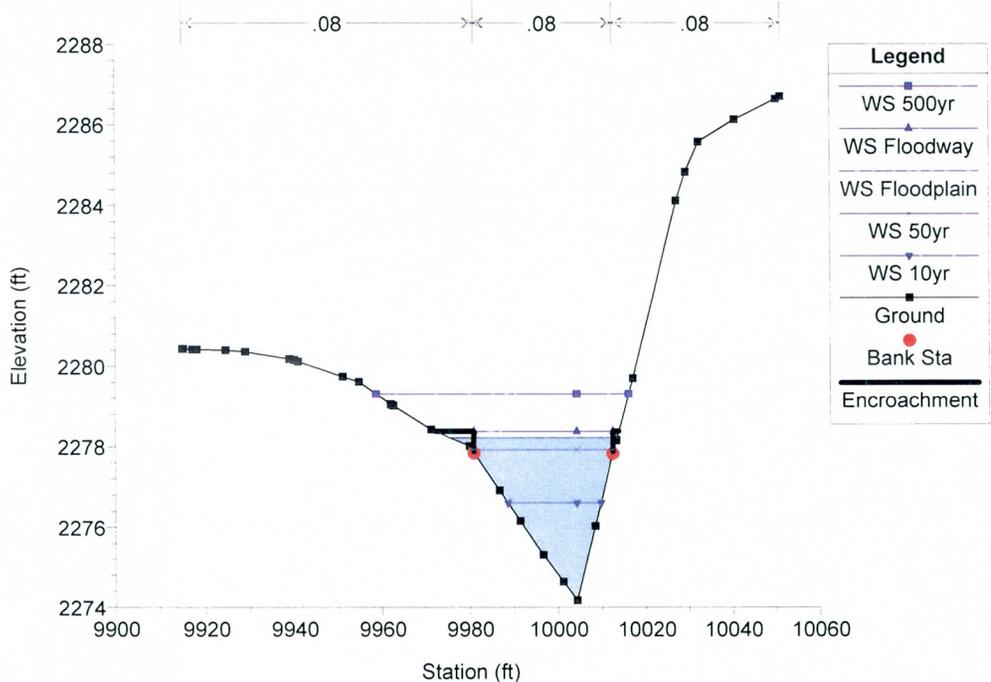
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.773



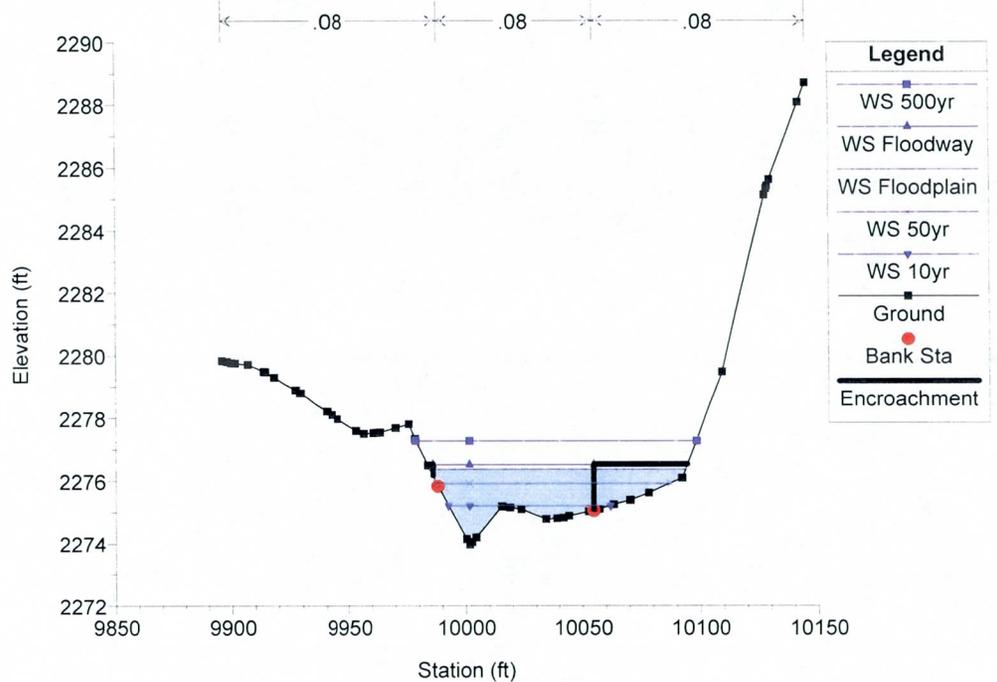
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.760



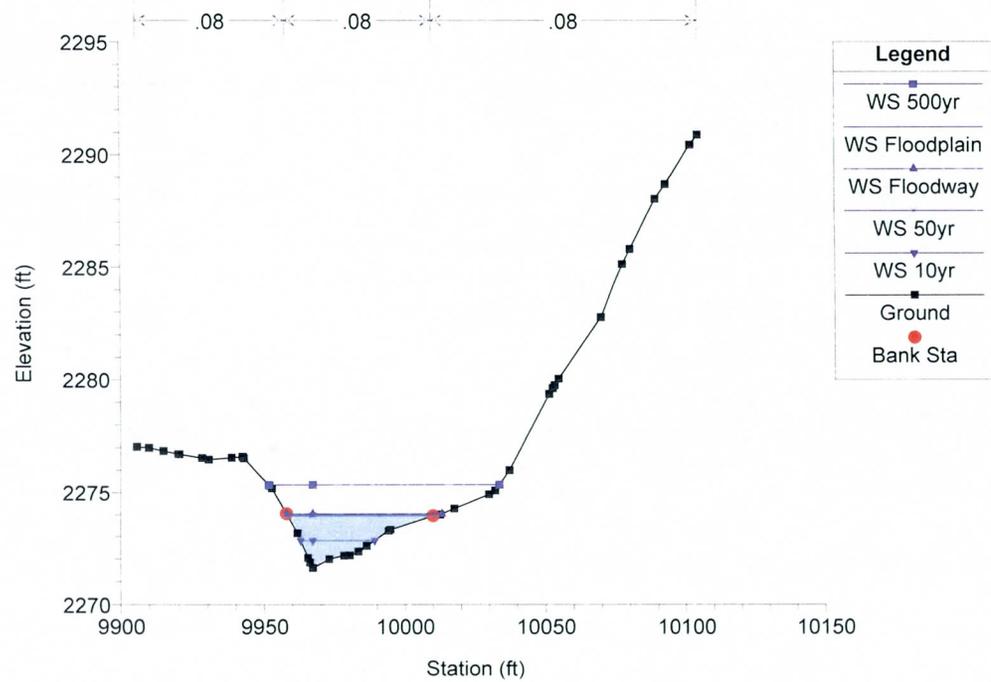
Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.744



Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.730



Kemper LOMR Plan: Without Culvert Model 2/7/2012
 River = Casandro Wash Reach = South Branch RS = 0.720



CHECK-RAS Program: NT Check
Manning's n Value and Transition Loss Coefficient Review

Project File: C:\Users\Hari.JEFULLER\Documents\Projects\Ted\Kemper draft
 submittal\20120208_submittal\CD\HECRAS\KemperLOMR.prj
 Plan File: C:\Users\Hari.JEFULLER\Documents\Projects\Ted\Kemper draft
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 Selected profiles: Floodplain;Floodway
 Date: 2/7/2012
 Time: 12:17:58 PM

SECNO	STRUCTURE	NLOB	NCHL	NROB	CNTR	EXP

Casandro Wash, South Branch						
.924		0.06	0.06	0.06	0.1	0.3
.893		0.06	0.035	0.06	0.1	0.3
.88		0.06	0.035	0.06	0.1	0.3
.859		0.06	0.035	0.06	0.1	0.3
.84		0.06	0.035	0.06	0.1	0.3
.829		0.06	0.035	0.06	0.1	0.3
.824		0.016	0.016	0.016	0.1	0.3
.821		0.016	0.016	0.016	0.1	0.3
.817		0.016	0.016	0.016	0.1	0.3
.811		0.025	0.025	0.025	0.1	0.3
.804		0.08	0.08	0.08	0.1	0.3
.799		0.08	0.08	0.08	0.1	0.3
.792		0.08	0.08	0.08	0.1	0.3
.784		0.08	0.08	0.08	0.1	0.3
.773		0.08	0.08	0.08	0.1	0.3
.76		0.08	0.08	0.08	0.1	0.3
.744		0.08	0.08	0.08	0.1	0.3
.73		0.08	0.08	0.08	0.1	0.3
.72		0.08	0.08	0.08	0.1	0.3

---Summary of Statistics---

	Minimum	Maximum
Left Overbank n Value:	0.016	0.08
Right Overbank n Value:	0.016	0.08
Channel n Value:	0.016	0.08
Contraction Coefficient:	0.1	0.1
Expansion Coefficient:	0.3	0.3

ROUGHNESS COEFFICIENT CHECK

RS: 0.924
 NT RC 05 The left overbank n value of 0.06 and the right overbank n value of 0.06 are less than or equal to the channel n value of 0.06
 The overbank n values should be reevaluated.

RS: 0.824
 NT RC 01 Left overbank n value is less than 0.035
 The n value for overbank is usually larger than 0.035.
 The n value should be reevaluated.

RS: 0.824
 NT RC 01 Right overbank n value is less than 0.035
 The n value for overbank is usually larger than 0.035.

The n value should be reevaluated.

RS: 0.824

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 0.824

NT RC 05 The left overbank n value of 0.016 and the right overbank n value
of 0.016 are less than or equal to the channel n value of 0.016
The overbank n values should be reevaluated.

RS: 0.821

NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 0.821

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 0.821

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 0.821

NT RC 05 The left overbank n value of 0.016 and the right overbank n value
of 0.016 are less than or equal to the channel n value of 0.016
The overbank n values should be reevaluated.

RS: 0.817

NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 0.817

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 0.817

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 0.817

NT RC 05 The left overbank n value of 0.016 and the right overbank n value
of 0.016 are less than or equal to the channel n value of 0.016
The overbank n values should be reevaluated.

RS: 0.811

NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 0.811

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 0.811

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 0.811
NT RC 05 The left overbank n value of 0.025 and the right overbank n value of 0.025 are less than or equal to the channel n value of 0.025
The overbank n values should be reevaluated.

RS: 0.804
NT RC 05 The left overbank n value of 0.08 and the right overbank n value of 0.08 are less than or equal to the channel n value of 0.08
The overbank n values should be reevaluated.

RS: 0.799
NT RC 05 The left overbank n value of 0.08 and the right overbank n value of 0.08 are less than or equal to the channel n value of 0.08
The overbank n values should be reevaluated.

RS: 0.792
NT RC 05 The left overbank n value of 0.08 and the right overbank n value of 0.08 are less than or equal to the channel n value of 0.08
The overbank n values should be reevaluated.

RS: 0.784
NT RC 05 The left overbank n value of 0.08 and the right overbank n value of 0.08 are less than or equal to the channel n value of 0.08
The overbank n values should be reevaluated.

RS: 0.773
NT RC 05 The left overbank n value of 0.08 and the right overbank n value of 0.08 are less than or equal to the channel n value of 0.08
The overbank n values should be reevaluated.

RS: 0.76
NT RC 05 The left overbank n value of 0.08 and the right overbank n value of 0.08 are less than or equal to the channel n value of 0.08
The overbank n values should be reevaluated.

RS: 0.744
NT RC 05 The left overbank n value of 0.08 and the right overbank n value of 0.08 are less than or equal to the channel n value of 0.08
The overbank n values should be reevaluated.

RS: 0.73
NT RC 05 The left overbank n value of 0.08 and the right overbank n value of 0.08 are less than or equal to the channel n value of 0.08
The overbank n values should be reevaluated.

*** MODELLER NOTES ***

The manning n values have been reviewed using field observations and arials and have been determined to be appropriate.

TRANSITION LOSS COEFFICIENT CHECK

ROUGHNESS COEFFICIENT AT STRUCTURES

---END---

CHECK-RAS Program, XS Check
Cross Section Location and Alignment Review

Project File: C:\Users\Hari.JEFULLER\Documents\Projects\Ted\Kemper draft
 submittal\20120208_submittal\CD\HECRAS\KemperLOMR.prj
 Plan File: C:\Users\Hari.JEFULLER\Documents\Projects\Ted\Kemper draft
 submittal\20120208_submittal\CD\HECRAS\KemperLOMR.p05
 Geometry File: C:\Users\Hari.JEFULLER\Documents\Projects\Ted\Kemper draft
 submittal\20120208_submittal\CD\HECRAS\KemperLOMR.g03
 Flow File: C:\Users\Hari.JEFULLER\Documents\Projects\Ted\Kemper draft
 submittal\20120208_submittal\CD\HECRAS\KemperLOMR.f04
 Report File: C:\Users\Hari.JEFULLER\Documents\Projects\Ted\Kemper draft
 submittal\20120208_submittal\CD\HECRAS\KemperLOMR.xls
 Selected profiles: Floodplain;Floodway
 Date: 2/7/2012
 Time: 12:17:35 PM

SECNO	Len Lob	Len Chl	Len Rob	TopWdthAct	Q Total	Flow Code

Casandro Wash, South Branch						
.924	152.36	161.98	145.61	26.25	400	C
.893	74.89	71.51	64.8	70.03	400	
.88	99.86	108.98	117.7	41.5	400	
.859	117.41	102.99	86.26	95.31	400	
.84	76.57	58.21	50.41	127.52	400	
.829	29.33	26.47	17.88	101.74	400	
.824	19.86	15.63	15.89	106.4	335	C
.821	14.13	16.72	16.11	109.75	335	C
.817	19.47	32.39	40.37	86.96	335	C
.811	36.41	36.88	37.04	103.52	400	C
.804	35.91	30.44	25.73	35.25	400	B
.799	33.71	33.36	33.05	19.46	400	C
.792	34.7	45.59	54.54	26.2	400	
.784	62.86	55.01	42.24	29.66	400	
.773	78.22	71.91	60.67	27.48	400	
.76	72.64	80.79	89.19	32.58	400	
.744	73.01	88.77	92.56	38.13	400	
.73	81.33	56.21	43.47	109.22	400	
.72	52.39	44.37	27.8	55.65	400	C

B=blocked obstruction XS SC 05
 C=critical depth XS SC 03
 D=divided flow XS SC 01
 E=cross section extended XS SC 02
 K=known water-surface XS SC 04

DISTANCE CHECK

SPACING CHECK

INEFFECTIVE FLOW CHECK

DISCHARGE CHECK

RS: 0.824
 XS DC 01 Discharge decreases in the downstream direction.

LOCATION CHECK

BOUNDARY CONDITION CHECK

XS BC 02 The name of the stream is Casandro Wash, South Branch
Known WS = 2273.92 is specified as the downstream boundary
for profile Floodplain

XS BC 02 The name of the stream is Casandro Wash, South Branch
Normal S = 0.0105 is specified as the upstream boundary
for profile Floodplain

XS BC 02 The name of the stream is Casandro Wash, South Branch
Known WS = 2273.92 is specified as the downstream boundary
for profile Floodway

XS BC 02 The name of the stream is Casandro Wash, South Branch
Normal S = 0.0105 is specified as the upstream boundary
for profile Floodway

XS BC 03 Maximum number of iterations is 0
It should not be less than 20.

**** Modeler Notes ****

The starting water surface is specified at downstream boundary. Hence, the iterations
are zero at this location.

LATERAL WEIRS CHECK

---END---

CHECK-RAS Program: Floodway Check
 Encroachment Method, Starting WSEL, Floodway Width, and Surcharge Review

Project File: C:\Users\Hari.JEFULLER\Documents\Projects\Ted\Kemper draft
 submittal\20120208_submittal\CD\HECRAS\KemperLOMR.prj
 Plan File: C:\Users\Hari.JEFULLER\Documents\Projects\Ted\Kemper draft
 submittal\20120208_submittal\CD\HECRAS\KemperLOMR.p05
 Geometry File: C:\Users\Hari.JEFULLER\Documents\Projects\Ted\Kemper draft
 submittal\20120208_submittal\CD\HECRAS\KemperLOMR.g03
 Flow File: C:\Users\Hari.JEFULLER\Documents\Projects\Ted\Kemper draft
 submittal\20120208_submittal\CD\HECRAS\KemperLOMR.f04
 Report File: C:\Users\Hari.JEFULLER\Documents\Projects\Ted\Kemper draft
 submittal\20120208_submittal\CD\HECRAS\KemperLOMR.fw
 Selected profiles: Floodplain;Floodway
 Date: 2/7/2012
 Time: 12:17:02 PM

SECNO	Method	Surcharge	EncStaL	EncStaR	LStaEff	RStaEff	Structure

Casandro Wash, South Branch							
0.924					9988.78	10015.02	
0.924	1	0.02	9992	10008	9992	10008	
0.893					9956.45	10026.48	
0.893	1	0.86	9965	10020	9965	10020	
0.88					9975.5	10017	
0.88	1	0.99	9982	10016.39	9982	10016.39	
0.859					9937.34	10032.64	
0.859	19	0.92	9978.21	10015.8	9978.21	10015.8	
0.84					9934.14	10061.66	
0.84	1	0.92	9975	10020	9975	10020	
0.829					9946.49	10048.23	
0.829	1	0.94	9984	10017	9984	10017	
0.824					9935.38	10041.77	
0.824	1	0.46	9985	10014	9985	10014	
0.821					9925.36	10035.11	
0.821	19	0.22	9973.68	10011.65	9973.68	10011.65	
0.817					9934.37	10021.33	
0.817	19	0.13	9968.54	10012.94	9968.54	10012.94	
0.811					9985.34	10088.86	
0.811	19	0.95	9988.48	10020	9988.48	10020	
0.804					9980.49	10015.74	
0.804	1	0.68	9992.1	10006.62	9992.1	10006.62	
0.799					9992.23	10011.7	
0.799	19	0.13	9992.15	10005.66	9992.15	10005.66	
0.792					9989.51	10015.71	
0.792	19	0.72	9990.49	10009.64	9990.49	10009.64	
0.784					9984.04	10013.7	
0.784	19	0.59	9991.71	10007.21	9991.71	10007.21	
0.773					9994.34	10021.82	
0.773	19	0.49	9994.35	10011.86	9994.35	10011.86	
0.76					9977.82	10010.4	
0.76	19	0.19	9990.85	10009.15	9990.85	10009.15	
0.744					9975.29	10013.42	
0.744	19	0.15	9980.93	10012.57	9980.93	10012.57	
0.73					9984.55	10093.77	
0.73	1	0.15	9986	10054.76	9986	10054.76	
0.72					9957.87	10013.51	
0.72	1	-0.01	9957.9	10013.5	9957.92	10013.3	

ENCROACHMENT METHOD CHECK

FLOODWAY WIDTH CHECK

RS: 0.924
 FW FW 03 The right channel bank station may not be at the proper

location.

RS: 0.893
FW FW 03 The Left channel bank station may not be at the proper location.

RS: 0.88
FW FW 03 The Left channel bank station may not be at the proper location.

RS: 0.88
FW FW 03 The right channel bank station may not be at the proper location.

RS: 0.859
FW FW 03 The Left channel bank station may not be at the proper location.

RS: 0.84
FW FW 03 The Left channel bank station may not be at the proper location.

RS: 0.829
FW FW 03 The right channel bank station may not be at the proper location.

RS: 0.824
FW FW 03 The Left channel bank station may not be at the proper location.

RS: 0.824
FW FW 03 The right channel bank station may not be at the proper location.

RS: 0.821
FW FW 03 The Left channel bank station may not be at the proper location.

RS: 0.821
FW FW 03 The right channel bank station may not be at the proper location.

RS: 0.784
FW FW 03 The right channel bank station may not be at the proper location.

RS: 0.76
FW FW 03 The right channel bank station may not be at the proper location.

RS: 0.73
FW FW 03 The Left channel bank station may not be at the proper location.

*** Modeller Notes ***

The bank stations have been reviewed and determined appropriate.

SURCHARGE CHECK

DISCHARGE CHECK

STARTING WATER-SURFACE ELEVATION CHECK

FW SW 04 The name of the stream is Casandro Wash
Encroachment method 1 is used.

Total conveyance for the natural profile is 1369.2
Total conveyance for the floodway profile is 1348.6
The difference in conveyance between the floodway profile and the
natural profile is more than 1%.
Normal Depth option with the same energy slope as the natural
profile must be used for the floodway profile and rerun the plan.
This message is not applicable for the revisions.

*** Modeller Notes ***

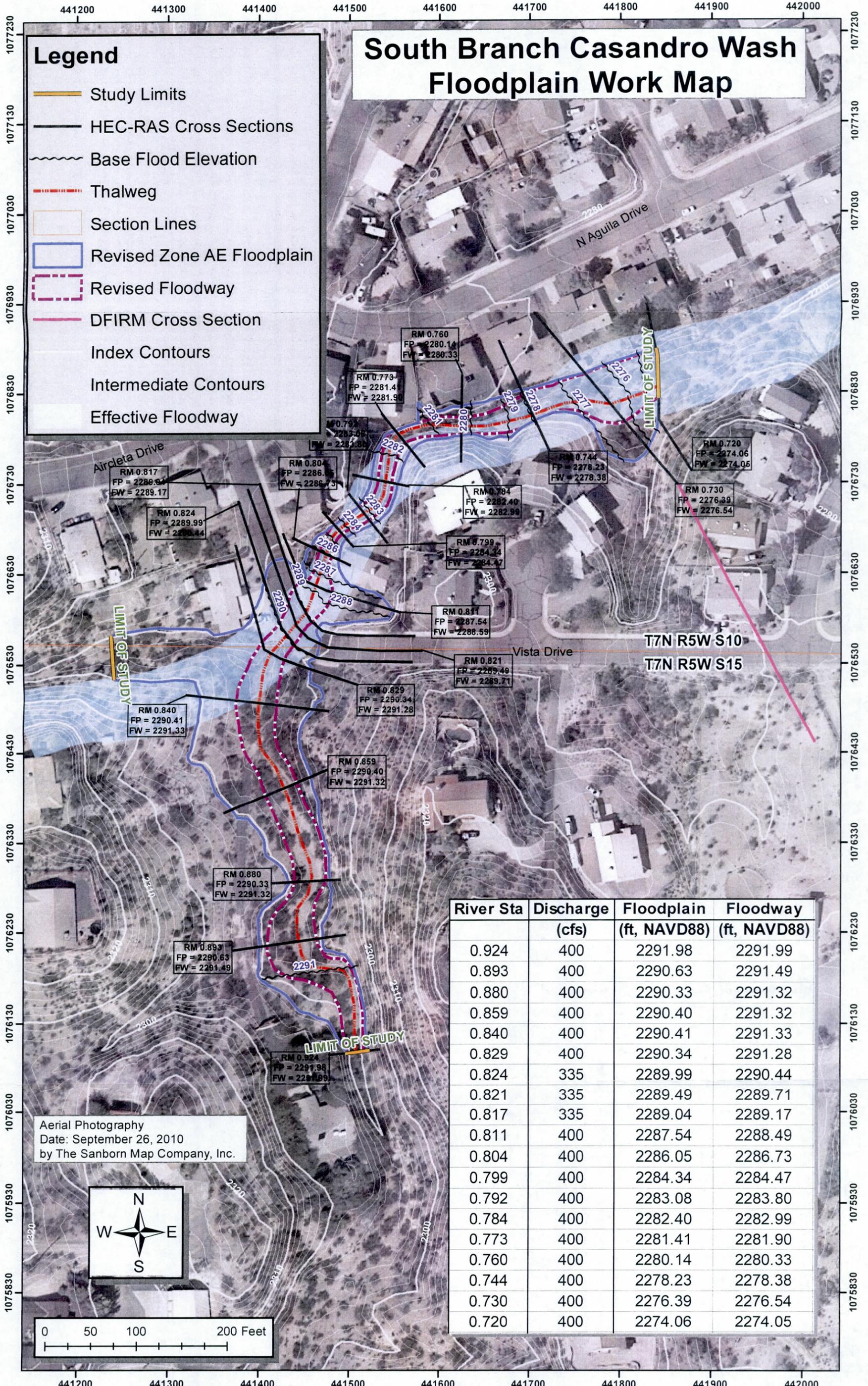
The message is not applicable as it is a revision.

---END---

South Branch Casandro Wash Floodplain Work Map

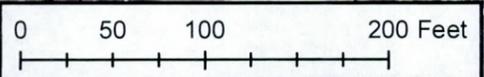
Legend

-  Study Limits
-  HEC-RAS Cross Sections
-  Base Flood Elevation
-  Thalweg
-  Section Lines
-  Revised Zone AE Floodplain
-  Revised Floodway
-  DFIRM Cross Section
-  Index Contours
-  Intermediate Contours
-  Effective Floodway



River Sta	Discharge (cfs)	Floodplain (ft, NAVD88)	Floodway (ft, NAVD88)
0.924	400	2291.98	2291.99
0.893	400	2290.63	2291.49
0.880	400	2290.33	2291.32
0.859	400	2290.40	2291.32
0.840	400	2290.41	2291.33
0.829	400	2290.34	2291.28
0.824	335	2289.99	2290.44
0.821	335	2289.49	2289.71
0.817	335	2289.04	2289.17
0.811	400	2287.54	2288.49
0.804	400	2286.05	2286.73
0.799	400	2284.34	2284.47
0.792	400	2283.08	2283.80
0.784	400	2282.40	2282.99
0.773	400	2281.41	2281.90
0.760	400	2280.14	2280.33
0.744	400	2278.23	2278.38
0.730	400	2276.39	2276.54
0.720	400	2274.06	2274.05

Aerial Photography
Date: September 26, 2010
by The Sanborn Map Company, Inc.





Appendix F

Supporting Documentation for Erosion/Sediment Transport

There is no applicable information related to Erosion/Sediment Transport.