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BUCKEYE AREA FLOOD DELINEATION STUDY FCD 90-69

PUBLIC NOTIFICATION AND FEMA FORMS RSD-1 DOCUMENT

Prepared By

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 West Durango Street
Phoenix, Arizona 85009
(602) 506-1501

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SECTION 1

INTRODUCTION

INTRODUCTION

The purpose of this report is to fulfill the Federal Emergency Management Agency's (FEMA) requirement for completion of the RSD-1 forms and to document the efforts made to notify the public of the Buckeye Area Delineation Study.

The Buckeye Flood Delineation Study (FCD 90-69) is a restudy of a large area that has existing approximate flood hazard delineations (zone A's). This restudy uses detailed hydrologic, hydraulic, topographic mapping, and field survey information to delineate ponding areas on the upstream side of the Roosevelt and Buckeye Canals, and the Southern Pacific Railroad. This restudy has resulted in changes to the existing zone A delineations. Changes in the ponding delineations are primarily a result of the use of the more detailed topographic mapping and field survey information. There are no water surface elevations or depths associated with the existing zone A delineations. Consequently it is impossible to say that there has been an increase in the water surface elevations.

Section 2 of this report documents the efforts undertaken to notify the public about the Buckeye Area Flood Delineation Study. A public meeting was held in the Town of Buckeye on May 18th, 1993 to explain the results and impacts of the delineation study. Also, on May 18th the study results were presented to the Buckeye Town Council during a regularly scheduled council meeting. The public was informed of the meeting through individual mailings to affected property owners, copies of the mailing list and letter are included in this section. Copies of notices and newspaper articles about the public meeting published in four local newspapers are also included. At the beginning of the study, legal advertisements informing the public about the study were placed in two newspapers. Also, all property owners located along the two canals and railroad were mailed letters informing them about the study when it began. Copies of this mailing list and letter are included in this section.

Sections 3 through 5 contain the required FEMA forms for the canals and the railroad. Every effort was made to answer all the questions on each of the forms. However, due to the nature of this study and the type of flooding that occurs in the study area, not every questions is applicable. In particular the type of flooding that occurs in the study area is ponding along the canal and railroad embankments, whereas the questions on the forms are oriented to riverine type flooding. Since the effective Flood Insurance Study (FIS) is an approximate study and this study is a detailed one, it was impossible to compare some of the results. The Buckeye Area Delineation Study has more in common with an original FIS study done by FEMA then it does with a typical Letter of Map Revision (LOMR).

The railroad trestles were numbered from east to west beginning with the first trestle west of Dean Road. The trestle numbers used are valid only within this study. The Bridge/Culvert forms, Form 7, were only filled out for those trestles that had ponding on the upstream side of the railroad.

SECTION 2

PUBLIC NOTIFICATION DOCUMANTATION

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009
Telephone (602) 506-1501
Fax (602) 506-4601
TDD (602) 506-5897

BOARD OF DIRECTORS
Betsey Bayless
James D. Bruner
Ed King
Tom Rawles
Mary Rose Garrido Wilcox

Neil S. Erwin, P.E., Chief Engineer and General Manager

NOTICE NOTICE NOTICE

FLOOD-PRONE PROPERTY IN BUCKEYE AREA

This notice has been mailed to persons on record as owning property in the vicinity of the Town of Buckeye and within the study area of a recently completed Flood Hazard Study.

The Flood Hazard Study involved mapping and hydraulic analysis of ponding areas located along the north side of the Roosevelt Irrigation District Canal, Southern Pacific Railroad tracks, and the Buckeye Canal (See attached map showing study boundaries). The study identified special flood hazard areas north of the canals and railroad tracks and delineated the boundaries of the floodplain for the 100-year peak flood.

The completed study and resulting maps will be used to review development so as to reduce or prevent possible flood damage to property and structures. The study results will be submitted to the Federal Emergency Management Agency (FEMA) for use in revising Flood Insurance Rate Maps for the area. Buildings located within the 100-year floodplain may be required by FEMA to have flood insurance coverage if they are financed by federally-insured loans.

Persons wishing to comment on the study results or review the study maps prior to their submission to FEMA are invited to attend an open house to be held Tuesday, May 18, 1993, from 6-8:30 P.M. in the Buckeye Town /County Complex Conference Room, Suite A, 100 North Apache Road in Buckeye.

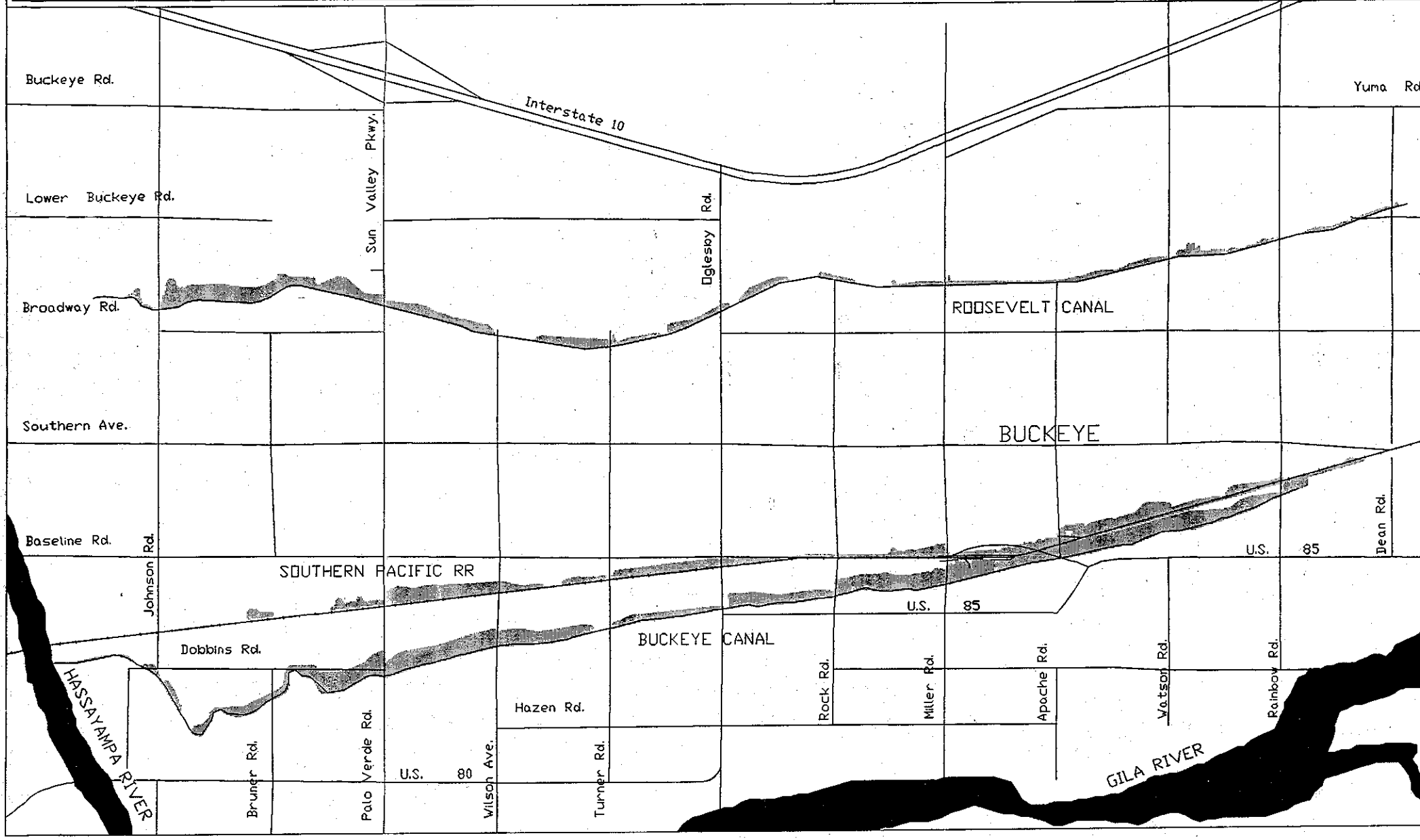
Information about the study can also be obtained by contacting Mr. Tim Murphy, Floodplain Management Branch, Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona 85009, phone: (602) 506-1501.

** This is a copy of the letter mailed to owners of property located within the ponding areas.*

Buckeye Area Flood Hazard Study
-Location Map-

Ponding Area

Not to Scale



** Copy of the map included with the letter mailed to property owners.*

Flood Control District
of Maricopa County

FACT SHEET

November 1992

Floodplain delineation

The Flood Control District is required by state law (ARS 48-3609) to delineate 100-year floodplains, and to regulate floodplain uses.

The floodplain delineation program began in 1973, when the Federal Emergency Management Agency (FEMA) completed several delineations. Since then, Federal budgeting has shifted the burden to the local level, forcing the District to become more active in this role. Since 1986, the District has delineated more than 1,150 miles of 100-year floodplain in nearly 40 studies.

The purpose of floodplain delineation is to identify potential flood hazard areas in order to safeguard life and property.
The benefits of floodplain delineation are:
- Identification of flood hazards before significant development occurs;
- Identification of flood hazards caused by existing development;
- Determination of areas in need of flood protection, and structures that may require flood insurance;
- Minimize loss of life and property by regulating floodplain development;
- Development of hydrological information to address existing and future drainage problems.

The District's fiscal policy, adopted by the Board of Directors in 1988, suggests that up to 2% of the annual budget be allocated for floodplain management. With these funds, staff identifies areas to be studied, contracts for studies, conducts public meetings in the study areas, and develops floodplain maps based on the best available technical information.

The Board approves the contracts for studies in public meetings, for which its agenda is posted in a public place. Because floodplain delineations follow stringent technical guidelines, however, the Board is not asked to act on the study results.

Instead, the floodplain studies are submitted for review and approval to FEMA, which ultimately will issue a Flood Insurance Rate Map (FIRM) on the basis of the study finding, after a 90-day review period for technical comments.

Community involvement is an important aspect of a floodplain delineation. City and town officials are advised, and public meetings are conducted at the outset of a study and/or when a floodplain map is developed in an attempt to advise residents that floodplains have been identified. The District uses any of several means to alert residents to its study results: articles and legal ads in local and regional newspapers, association newsletters, cable television, utility bills, and posters.

Floodplain delineation results in safer, wiser development of our resources, and can have monetary rewards, too. Our active floodplain delineation program is partly responsible for the 15% reduction in flood insurance premiums for residents of the unincorporated area of the county.

The District received national recognition for its progressive actions to protect life and property by identifying flood hazard areas and by enforcing floodplain regulations from the Association of State Floodplain Managers as recipient of its Local Award for Excellence in 1992.

Wilbur-Ellis Company
Box 1286
Fresno, CA 93715

Mary Ring
Po Box 276
Goodyear, AZ 85338

J & G Investments
3101 E Shea Blvd
Phoenix, AZ 85028

United Title Agency Of A
3030 N Central Ave
Phoenix, AZ 85012

Southern Rainbow Ltd Par
3150 N 24th St #108
Phoenix, AZ 85016

Albert Rodgers
Rr 1 Box 186
Buckeye, AZ 85326

Recorp-Arizona II
7000 E Shea Blvd #250
Scottsdale, AZ 85254

Recorp-Arizona II
7000 E Shea Blvd #250
Scottsdale, AZ 85254

Uslife Title Co Of Az Tr
2721 N Central Ave
Phoenix, AZ 85004

P J Farms Ltd
C/O Rt 1 Box 199
Buckeye, AZ 85326

Schult Mobile Home Corp
Po Box 151
Middlebury, IN 46540

James Berridge Jr.
44 E State Ave
Phoenix, AZ 85020

Buckeye Valley Industria
6900 E Camelback Rd #230
Scottsdale, AZ 85251

Alpha McKee & I Dorothy
920 E Baseline Rd
Buckeye, AZ 85326

Beatrice Rankin
920 E Baseline Rd
Buckeye, AZ 85326

Alpha Omega Smith McKee
920 E Baseline Rd
Buckeye, AZ 85326

Cpm Corp
4522 N 11th Ave
Phoenix, AZ 85013

Buddy & Claire Estes
329 Southtowne Pl
South Milwaukee, WI
53172

Claire & Buddy Estes
1624 Minnesota Ave
South Milwaukee, WI
53172

Luther & Mary Workman
413 3rd Ave E
Buckeye, AZ 85326

Paul Almendarez
A Susan
Hc 3 Box 255-R
Buckeye, AZ 85326

Lee & Jean Wood
412 3rd Ave E
Buckeye, AZ 85326

Charlie Floyd House
408 3rd Ave E
Buckeye, AZ 85326

Charlie House
408 3rd Ave E
Buckeye, AZ 85326

Henry & Royleen Williams
116 S 4th St
Buckeye, AZ 85326

Doris Hullinger
404 E Coronado St
Buckeye, AZ 85326

Edmond & Barbara Beard
406 4th Ave E
Buckeye, AZ 85326

Jose & Juana Beltran
Po Box 365
Buckeye, AZ 85326

Richard Villa Jr.
Po Box 693
Buckeye, AZ 85326

Guadalupe Villa
603 E Baseline Rd
Buckeye, AZ 85326

** Mailing list used for letter notifying property owners of the study results and public meeting.*

Dan Fuller & Marie Rose
Po Box 97
Litchfield Park, AZ
85340

Uslife Title Tr 530
2721 N Central Ave
Phoenix, AZ 85004

O J & Faye Murphy
300 NE 21st St
Fort Worth, TX 76106

Southern Pacific Co & O
9830 N 32nd St #B-106
Phoenix, AZ 85028

Ralph Watkins Jr.
2737 E Greenway Rd #4
Phoenix, AZ 85032

Strander Petroleum Inc
618 N 4th St
Buckeye, AZ 85326

Samuel Tr Wiggins
Sam Wiggins
Po Box 156
Buckeye, AZ 85326

Franklin & Patricia Hice
808 N 1st St
Buckeye, AZ 85326

Uslife Title Co Tr 530
2721 N Central Ave
Phoenix, AZ 85004

Buckeye Town Of
Po Box 157
Buckeye, AZ 85326

Hodges J L Farming Co In
Po Box 68
Buckeye, AZ 85326

Uslife Title Company Tr
2721 N Central Ave
Phoenix, AZ 85004

Arizona Public Service C
Po Box 2591
Phoenix, AZ 85002

J L Hodges Farming Co In
Po Box 68
Buckeye, AZ 85326

Lawrence Peabody
Po Box 84
Buckeye, AZ 85326

Lloyd & Virgie Schulz
Hco3 Box 16
Buckeye, AZ 85326

Hardesty Enterprises
Rr 2 Box 246
Buckeye, AZ 85326

Uslife Title Co Of Az Tr
2721 N Central Ave
Phoenix, AZ 85004

Brownie Johnson
101 5th Ave E
Buckeye, AZ 85326

Richard Lee Morris
June Betty
Rr 2 Box 955
Buckeye, AZ 85326

Richard & Betty Morris
Rr 2 Box 955
Buckeye, AZ 85326

Dym Inc
808 E Jackson Ave
Buckeye, AZ 85326

Timothy & April Rhodes
Rr 2 Box 985-A
Buckeye, AZ 85326

Arizona State Of
205 S 17th Ave
Phoenix, AZ 85007

Compton Commodities Inc
14507 W Main Ave
Casa Grande, AZ 85222

Randall Humphreys
Po Box 3340
Ontario, CA 91761

Us Life Title Co Tr 530
2721 N Central Ave
Phoenix, AZ 85004

S H & Buna Boyer
Po Box 294
Buckeye, AZ 85326

Ernest & Mary Parker
Rr 2 Box 953
Buckeye, AZ 85326

Us Life Title Tr 530
2721 N Central Ave
Phoenix, AZ 85004

Emory & Leona Sullivan
Rte Box 952a
Buckeye, AZ 85326

Robert Saylor
5810 W Royal Palm Rd
Glendale, AZ 85302

Arizona Machinery Co
Po Box 63
Avondale, AZ 85323

Us Life Title Co
2721 N Central Ave
Phoenix, AZ 85004

Uslife Title Co
2721 N Central Ave
Phoenix, AZ 85004

Wayne & Betty Cheatham
Rr 2 Box 936
Buckeye, AZ 85326

Water Consv Buckeye
Dist Drainage
Po Box 726
Buckeye, AZ 85326

Grand Canyon Ranch
1820 Mountain Granite
Way
Prescott, AZ 86301

B W C & D D
Po Box 726
Buckeye, AZ 85326

John Evans Jr.
3238 E Briarwood Ter
Phoenix, AZ 85044

A D & Eileen Anderson
7323 E Gainey Ranch Rd
#11
Scottsdale, AZ 85258

Gene Narramore
24301 E 96th St
Broken Arrow, OK 74014

Ralph Narramore
Po Box 51
Palo Verde, AZ 85343

A & H Dairy
Rr 2 Box 938
Buckeye, AZ 85326

Turner Jewell & Son Ltd
Rr 2 Box 940
Buckeye, AZ 85326

Irrigation Roosevelt
Po Box 1089
Buckeye, AZ 85326

Kakerlee Limited Partner
5900 E Edward Ave
Paradise Valley, AZ
85253

Water Cons Buckeye
Dist Drainage
Po Box 726
Buckeye, AZ 85326

William Bruce Heiden
Marie Helen
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Buckeye, AZ 85326

Lenore Koebrich
Po Box 53435
Phoenix, AZ 85072

Kimberly Sue Matelski
22201 W Lower Buckeye Rd
Buckeye, AZ 85326

Danny & Donna Eastman
Po Box 423
Buckeye, AZ 85326

Irving & Betty Ehlers
Rr 3 Box 188
Buckeye, AZ 85326

J G & Francis Baker
Po Box 541
Friona, TX 79035

Abundio Cabrera
22351 W Lower Buckeye Rd
Buckeye, AZ 85326

Lloyd & Lisa Akers
Box 553
Buckeye, AZ 85326

Robert & Gladyne Eastman
Po Box 271
Buckeye, AZ 85326

Roger & Pamela Middleton
22139 W Ripple Rd
Buckeye, AZ 85326

Glen & Judith Lundblad
Po Box 135
Lowry, MN 56349

Henry & Ione Wittman
Rr 1
Lake Lillian, MN 56253

Linus Boehmer
Mary Rose
223 Lakeside Ln
Pierre, SD 57501

David & Laura Ziler
22101 W Ripple Rd
Buckeye, AZ 85326

Philip Ryan
22051 W Ripple Rd
Buckeye, AZ 85326

Donald & Donna Farris
22035 W Ripple Rd
Buckeye, AZ 85326

Eugene & Suzanne Boik
22031 W Ripple Rd
Buckeye, AZ 85326

Donald & Gwynne Demoise
22011 W Ripple Rd
Buckeye, AZ 85326

Lawrence DeMoise
300 W Tulsa St
Chandler, AZ 85224

Jesus Gonzales
Sue Judy
21710 Lost River Dr
Diamond Bar, CA 91765

Lynn & Leann Withem
21931 W Ripple
Buckeye, AZ 85326

Mitsugi Yamamura
Po Box 444
Haiku, HI 96708

Alvin & Betty Lorimer
22202 W Lower Buckeye Rd
Buckeye, AZ 85326

Pnbg & D Partnership
3200 N Central Ave #1000
Phoenix, AZ 85012

William Brainard
1190 N Litchfield Rd
Litchfield Park, AZ
85340

Stotz Farms Inc
Po Box 63
Avondale, AZ 85323

Lytle Family
Po Box 1462
Wickenburg, AZ 85358

Martha Jane_ Youngker
Po Box 398
Buckeye, AZ 85326

K Youngker Charles
Po Box 1131
Buckeye, AZ 85326

Lazy Ranch
Po Box 1131
Buckeye, AZ 85326

C
S Farms Limited Partners
Po Box 1131
Buckeye, AZ 85326

Green Farms Ltd
Po Box 210707
Nashville, TN 37221

Benjamin Younker Jr.
Rr 2 Box 230
Buckeye, AZ 85326

Benjamin Youngker Jr.
Rr 2 Box 230
Buckeye, AZ 85326

J Bar Farms Ltd Partners
Rr 2 Box 230
Buckeye, AZ 85326

Roosevelt Irrigation Dis
Po Box 1089
Buckeye, AZ 85326

J Bar Farms Ltd Partship
Rr 2 Box 230
Buckeye, AZ 85326

243 Johnson Road Ltd
949 E Guadalupe Rd #2
Tempe, AZ 85283

B-G Farms
Rr 2 Box 230
Buckeye, AZ 85326

Thomas Tate Jr.
704 E Baseline Rd
Buckeye, AZ 85326

J B & Beatrice Hill
Po Box 522
Buckeye, AZ 85326

Walter Hegi
Po Box 747
Buckeye, AZ 85326

Daisy Ramon
603 E Baseline Rd
Buckeye, AZ 85326

George & Nora Huser
Po Box 947
Buckeye, AZ 85326

Charles Youngker
Po Box 1131
Buckeye, AZ 85326

Carol Scott
106 E Baseline Rd
Buckeye, AZ 85326

Benjamin Lopez
Angelina Villa
601 E Baseline Rd
Buckeye, AZ 85326

Paul & Frances Figueroa
Rr 2 Box 401
Buckeye, AZ 85326

Manuela Alcorta
314 2nd Ave W
Buckeye, AZ 85326

Jerry Spiering
203 3rd Ave West
Glendale, AZ 85306

Wal-Mart Stores Inc
702 SW 8th St Dept 8018
Bentonville, AR 72716

Flood Control District Studies Buckeye Area Floodplain

Buckeye residents are invited to view floodplain maps of the area at an open house to be held Tuesday, May 18, 1993, from 6-8:30 p.m. in the Town/County Complex Conference Room, Suite A, 100 North Apache Road, in Buckeye.

The maps are the result of a floodplain delineation study performed by the Flood Control District of Maricopa County on ponding areas located along the north side of the Roosevelt Irrigation District Canal, Southern Pacific Rail Road tracks and the Buckeye Canal. The study area is bounded by Dean Road on the east and the Hassayampa River on the west.

The public is invited to come by the Town/County Complex anytime during the two-and-a-half hour open house to hear details about the study, which is part of an on-going program by the Flood Control District to identify potential flood hazard areas within the County so as to safeguard lives and property.

The benefits of floodplain delineation include the identification of flood hazards before significant development occurs; identification of flood hazards caused by existing development; identification of areas in need of flood protection and of structures which may require flood insurance; and the development of hydrologic information to address existing and future drainage problems.

Mapping floodplains involves developing detailed topographic maps to determine where water goes and studying rainfall patterns to determine typical amounts of runoff. The study and resulting maps will be used to better manage the floodplain

Continued on Page 2

Flood Control
Continued From Page 1

so as to reduce or prevent flood damage and maintain the integrity of the floodplains. Study results also will be submitted to the Federal Emergency Management Agency for use in determining flood insurance rates for the area.

Questions or additional information regarding the study can be obtained by contacting Mr. Tim Murphy of the Flood Control District of Maricopa County, 2801 W. Durango Street, Phoenix, AZ 85009, telephone: 506-1501.

"THE DESERT SUN"
MAY 12, 1993

Flood Control District Announces Open House On Tuesday, May 18

Buckeye residents are invited to view floodplain maps of the area at an open house to be held Tuesday, May 18, from 6:00-8:30 p.m. in the Town/County Complex conference room.

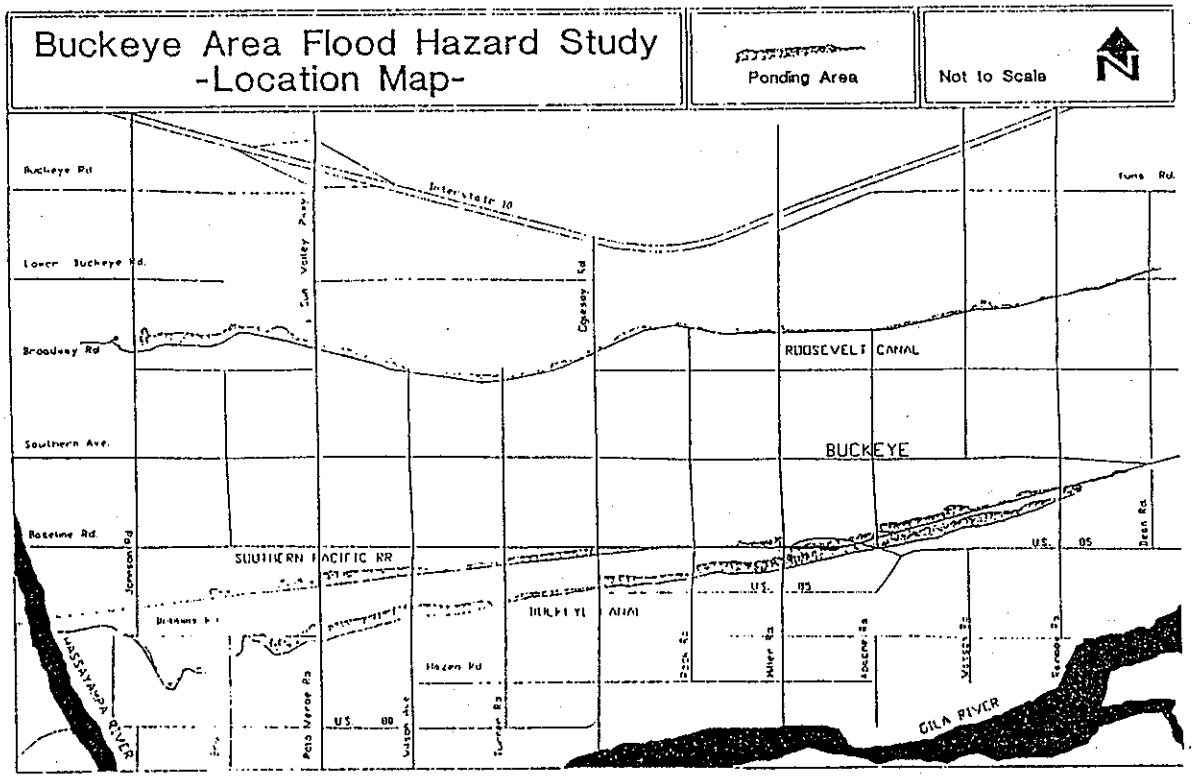
The maps are the result of a floodplain delineation study performed by the Flood Control District of Maricopa County on ponding areas located along the north side of the Roosevelt Irrigation District Canal, Southern Pacific Railroad tracks and the Buckeye Canal. The study is bounded by Dean Road on the east and the Hassayampa River on the west.

The public is invited to come by the Town/County Complex anytime during the 2 1/2 hour open house to hear details about the study, which is part of an on-going program by the Flood Control District to identify potential flood hazard areas within the County, so as to safeguard lives and property.

The benefits of floodplain delineation include the identification of flood hazards before significant development occurs; identification of flood hazards caused by existing development; identification of areas in need of flood protection and of structures which may require flood insurance; and the development of hydrologic information to address existing and future drainage problems.

Mapping floodplains involves developing detailed maps to determine where water goes and studying rainfall patterns to determine typical amounts of runoff. The study and resulting maps will be used to better manage the floodplain so as to reduce or prevent flood damage and maintain the integrity of the floodplains. Study results also will be submitted to the Federal Emergency Management Agency for use in determining flood insurance rates for the area.

Questions or additional information regarding the study can be obtained by contacting Tim Murphy of the Flood Control District of Maricopa County, 2801 W. Durango St., Phoenix, AZ 85009, telephone: 506-1501.



Flood Control District Studies Buckeye Area Floodplain

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The maps are the result of a floodplain delineation study performed by the Flood Control District of Maricopa County on ponding areas located along the north side of the Roosevelt Irrigation District Canal, Southern Pacific Rail Road tracks and the Buckeye Canal. The study area is bounded by Dean Road on the east and the Hassayampa River on the west.

The public is invited to come by the Town/County Complex anytime during the two-and-a-half hour open house to hear details about the study, which is part of an on-going program by the Flood Control District to identify potential flood hazard areas within the county so as to safegard lives and property.

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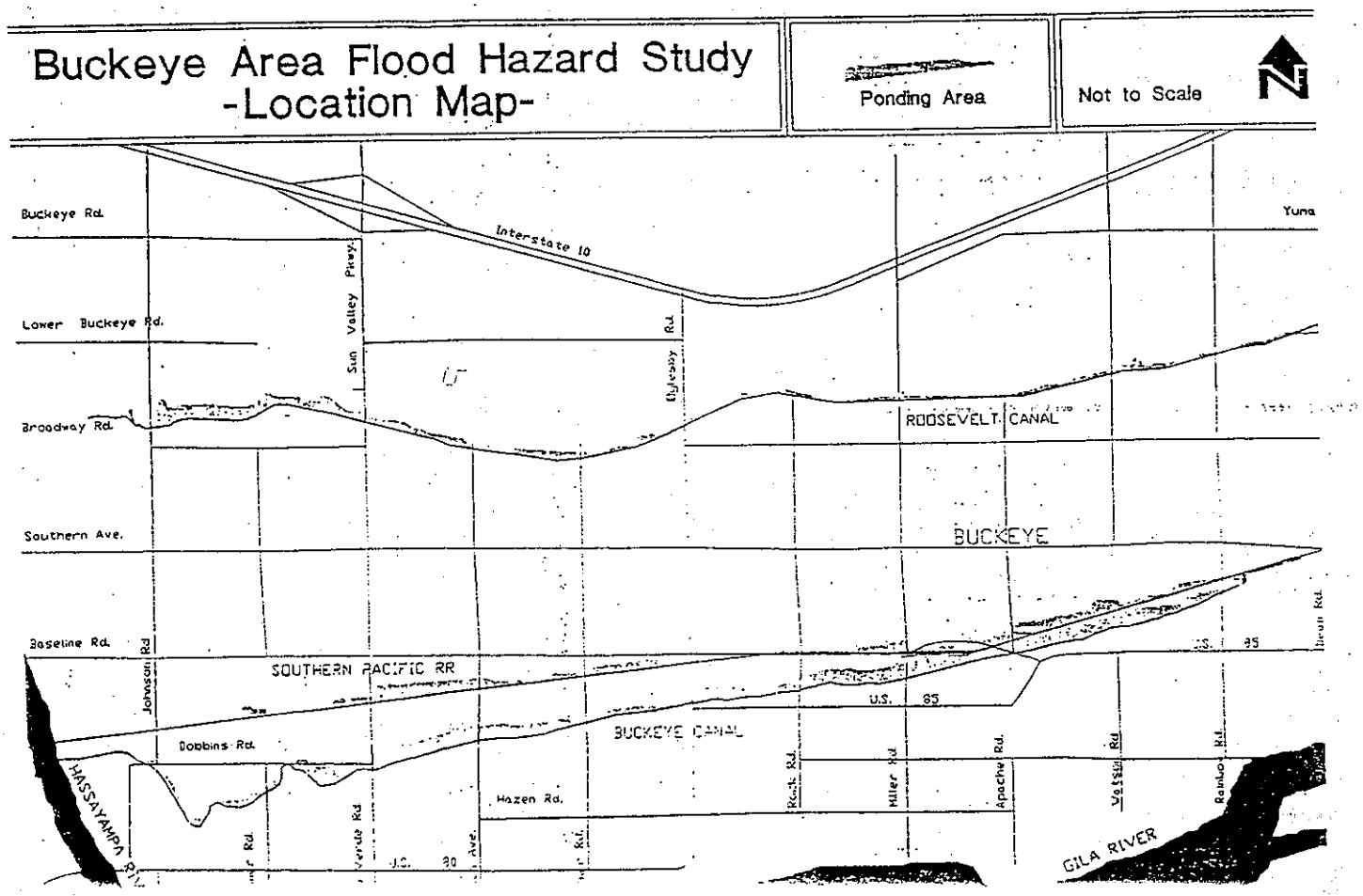
Questions or additional information regarding the study can be obtained by contacting Mr. Tim Murphy of the Flood Control District of Maricopa County, 2801 W. Durango Street, Phoenix, Arizona, 85009, telephone: 506-1501.



"BUCKEYE VALLEY NEWS"
MAY 13, 1993

Flood Control District

Buckeye Area Flood Hazard Study

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The public is invited to come by the Town/County Complex anytime between the hours of 6-8:30 P.M. to meet with Flood Control District representatives to discuss the study results.

The study involved mapping and hydraulic analysis of the ponding areas behind the canals and railroad tracks to determine the boundaries of the 100-year floodplain. Questions or additional information regarding the study can be obtained by calling Tim Murphy, Floodplain Management Branch, telephone 506-1501.

Published in the Buckeye Valley News May 13, 1993.

Flood Control District

BUCKEYE AREA FLOOD HAZARD STUDY

Buckeye residents are invited to view floodplain maps of the area at an open house to be held Tuesday, May 18, 1993, from 6-8:30 PM in the Buckeye Town/ County Complex Conference Room, Suite A, 100 North Apache Road.

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The study involved mapping and hydraulic analysis of the ponding areas behind the canals and railroad tracks to determine the boundaries of the 100-year floodplain. Questions or additional information regarding the study can be obtained by calling Tim Murphy, Floodplain Management Branch, telephone 506-1501.

"THE DESERT SUN"

MAY 12, 1993

Flood Control District

BUCKEYE AREA FLOOD HAZARD STUDY

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The maps are the result of a floodplain delineation study performed on ponding areas located along the north side of the Roosevelt Irrigation District Canal, Southern Pacific Railroad tracks, and the Buckeye Canal. The study area is bounded on the east by Dean Road and on the west By the Hassayamapa River.

The public is invited to come by the Town/County Complex anytime between the hours of 6-8:30 P.M. to meet with Flood Control District Representatives to discuss the study results.

The study involved mapping and hydraulic analysis of the ponding areas behind the canals and railroad tracks to determine the boundaries of the 100-year floodplain. Questions or additional information regarding the study can be obtained by calling Tim Murphy, Floodplain Management Branch, telephone 506-1501.

The West Valley View, Avondale, Arizona, May 12, 1993

Flood Control District

BUCKEYE AREA FLOOD HAZARD STUDY

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The maps are the result of a floodplain delineation study performed on ponding areas located along the north side of the Roosevelt Irrigation District Canal, Southern Pacific Railroad tracks, and the Buckeye Canal. The study area is bounded on the east by Dean Road and on the west by the Hassayampa River.

The public is invited to come by the Town/County Complex anytime between the hours of 6-8:30 p.m. to meet with Flood Control District representatives to discuss the study results.

The study involved mapping and hydraulic analysis of the ponding areas behind the canals and railroad tracks to determine the boundaries of the 100-year floodplain. Questions or additional information regarding the study can be obtained by calling Tim Murphy, Floodplain Management Branch, telephone 506-1501.

MKE

McLaughlin Kmetty Engineers, Ltd.

3030 North Central Avenue, Suite 402 Phoenix, Arizona 85012 (602) 248-7702 FAX (602) 248-7851

September 27, 1991

GEZA E. KMETTY
RONALD C. McLAUGHLIN
HALFORD E. ERICKSON
DOUGLAS T. SOVERN
WILLIAM R. KENDALL
RALPH L. TOREN
TERRENCE P. KENYON

DONALD L. ZIEMBA

Eddie Miller
12000 W. Northern
Peoria, AZ 85345

Parcel No.: 401-11-035

Re: Right of entry for surveying purposes

Dear Property Owners:

The Flood Control District of Maricopa County has contracted with McLaughlin Kmetty Engineers, Ltd., to perform a flood insurance study for the Buckeye Area. The purpose of this study is to determine flood related hazard zones and delineate areas that may be subject to inundation during a "100-year flood" event. According to records at the Maricopa County Assessor's office, you own one or more parcels of land within the limits of the study area.

The intent of this letter is to notify you of the commencement of surveying activities in support of the above mentioned study. In order to perform these surveys it may be necessary to enter your property. This activity should not result in any inconvenience or damage to property. If you have any objections to the entry onto your property, you must notify Mr. Tim Murphy of the Flood Control District at 262-1501. Otherwise it will be assumed that you consent to the entry onto your property.

The study and resulting maps will be used for floodplain management purposes and submitted to the Federal Emergency Management Agency for flood insurance information and revisions of Flood Insurance Rate Maps. This study should be available to the public in about 12 to 18 months.

The Flood Control District and its representatives appreciate your help in assuring the accuracy of this study by allowing access to your property for the surveyors and by providing any information you may have regarding past flooding or related problems.

If you have any questions regarding this study or the right of entry, please contact Mr. Tim Murphy of the Flood Control District or Mr. Geza Kmetty of McLaughlin Kmetty Engineers.

Mr. Tim Murphy, Hydrologist, Flood Control District, (602) 262-1501.

Mr. Geza Kmetty, Principal, McLaughlin Kmetty Engineers, Ltd. (602) 248-7702.

Geza E. Kmetty, P.E.
Principal

** Copy of the letter mailed to owners of property located along the Roosevelt Canal, Buckeye Canal, or Southern Pacific Railroad. This letter was mailed at the beginning of the study.*

Henry Properties Ltd.
P.O. Box 66
Buckeye, Arizona 85326

Parcel No. 504-43-005B

Henry Properties Ltd. Ptn
Route 3 Box 468
Buckeye, Arizona 85326

Parcel No. 504-43-007

Phil Ladra Farms
P.O. Box 40
Litchfield Farms, AZ 85340

Parcel Nos.: 504-45-001G and 504-45-012A

Recorp-Arizona Assoc. II Ltd.
7000 East Shea Boulevard, Suite 250
Scottsdale, AZ 85254

Parcel Nos.: 504-45-006A; 504-45-006B; 504-45-008; 504-45-009; 504-65-005; 504-65-006

William Scudder Gookin Tr et al
4303 North Brown Avenue
Scottsdale, Arizona 85251

Parcel No.: 504-44-034D

US Life Title Tr 530
2721 North Central Avenue
Phoenix, AZ 85004

Parcel Nos.: 504-444-023A; 504-45-001E; 504-46-035A; 504-46-036M; 504-46-036N; 504-49-029; 504-65-002A; 504-65-002B; 401-01-029C; 401-07-009E; 401-07-009F; 401-07-003A; 401-07-002F; 401-08-003B; 401-08-006C; 401-17-010B; 401-27-009J; 401-27-011C; 400-16-002B; 400-17-003C; 400-18-031B; 400-18-037D; 400-19-019D; 400-19-015A; 400-19-016A; 400-19-018; 400-19-012; 400-19-013; 400-19-014; 400-19-008; 400-31-017E; 400-32-002C; 400-32-003C; 400-36-002D; 400-36-002G; 400-36-002H

J & G Investments
5128 North 68th Place
Scottsdale, AZ 85253

Parcel Nos.: 504-44-020D; 504-44-020E; 504-44-019A

89407-00\Parcels.002

** Copy of the mailing list used for the letter sent out at the beginning of the study.*

Southern Rainbow Ltd., Partnership
3150 North 24th Street, Suite 111
Phoenix, AZ 85016

Parcel Nos.: 504-44-009D; 504-44-021

Albert S. Rodgers
Route 1, Box 186
Buckeye, AZ 85326

Parcel Nos.: 504-44-009B; 504-44-023B; 504-44-024B

Mary W. Ring
P.O. Box 276
Goodyear, AZ 85338

Parcel No.: 504-44-008B

Puregro Company
P.O. Box 7600
Los Angeles, CA 90051

Parcel No.: 504-44-008A

Manuel Diaz Farms West Joint Venture
2747 East Camelback Road
Phoenix, AZ 85016

Parcel Nos.: 504-44-003; 504-44-034A

John and Patricia Fornes
Rt 1, Box 99
Buckeye, AZ 85326

Parcel Nos.: 504-45-017B; 504-46-035B; 504-46-036Q

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Buckeye Water Cons. & Drainage District
P.O. Box 726
Buckeye, AZ 85326

Parcel Nos.: 401-16-028B; 401-16-031B; 401-28-001A; 401-28-008B

Murray A. & Lola J. Johnson
Star Rt. 3 Box 105
Buckeye, AZ 85326

Parcel Nos.: 401-16-002A; 401-16-001B; 401-16-031A; 401-16-033; 401-27-011B; 401-27-015; 401-28-007B; 401-28-008E

Hassayampa Land & Cattle Co.
Star Rt. 3 Box 106-A
Palo Verde, AZ 85343

Parcel No.: 401-16-028A

Robert H. & Isla B. Parker
HCO 3 Box 106A
Palo Verde, AZ 85343

Parcel Nos.: 401-16-034; 401-16-035

Robert L. & Mary M. & Richard Saylor, et al
5810 W. Royal Palm Rd.
Glendale, AZ 85302

Parcel Nos.: 401-08-001; 401-17-001

John H. Evans Jr.
3238 E. Briarwood Terrance
Phoenix, AZ 85044

Parcel Nos.: 401-08-007G; 401-17-003A; 401-17-003B; 401-17-015

A.D. & Eileen W. Anderson
3500 E. Lincoln Dr. #25
Phoenix, AZ 85018

Parcel Nos.: 401-17-004C; 401-17-005A; 401-17-006; 401-17-007A

Ralph L. & Marguerite Narramore
Box 51
Palo Verde, AZ 85343

Parcel Nos.: 401-17-007B; 401-17-008B; 401-17-009

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A & H Dairy
Rt. 2 Box 938
Buckeye, AZ

Parcel Nos.: 401-17-010A; 401-17-011A

Turner & Turner Ltd.
C/O Jewel Turner
Rt. 2 Box 940
Buckeye, AZ 85326

Parcel No.: 401-17-012

Jean Parton
Wayne & Betty Cheatham
Rt. 2 Box 936
Buckeye, AZ 85326

Parcel No.: 401-10-004

E. Glenell & Karen B. Lackey
Box 157
Palo Verde, AZ 85343

Parcel No.: 401-11-001

Molly Briones Urtasun
4823 N. Larkin Dr.
Covina, CA 91722

Parcel No.: 401-11-004A

Pete R. & Irma G. Briones
Rt. 2 Box 935
Buckeye, AZ 85326

Parcel Nos.: 401-11-004B; 401-11-005

Adolph & Glenna S. Pendergast
P.O. Box 80
Palo Verde, AZ 85343

Parcel No.: 401-11-010

H. A. Properties Ltd., Partnership
P.O. Box 428
Buckeye, AZ 85326

Parcel Nos.: 401-11-019; 401-11-020; 401-11-032F

89407-00\Parcels.002

Eddie Miller
12000 W. Northern
Peoria, AZ 85345

Parcel No.: 401-11-035

Arizona Machinery Co.
P.O. Box 63
Avondale, AZ 85323

Parcel Nos.: 401-08-003A; 401-08-004

Beyer Land Co. Ltd., Partnership
P.O. Box 294
Buckeye, AZ 85326

Parcel Nos.: 401-07-002G; 401-07-002J; 401-07-003B; 401-08-006D; 401-08-006E

Farmers Gin Inc.
3825 S. 99th Avenue
Tolleson, AZ 85353

Parcel Nos.: 401-08-007D; 401-08-007E; 401-08-007F

State of Arizona
Department of Transportation
205 S. 17th Avenue, Rm. 330D
Phoenix, AZ 85007-3276

Parcel Nos.: 401-01-030B; 401-07-002K; 401-07-002P; 401-08-002Q; 401-07-002R; 401-07-007A; 504-28-006B; 504-28-008B

State of Arizona
Department of Transportation
206 S. 17th Avenue
Phoenix, AZ 85007-3276

Parcel Nos.: 504-28-006B; 504-28-008B

Randall J. & Robert M. Humphreys
1121 E. Philadelphia Avenue
Ontario, CA 91761

Parcel Nos.: 401-07-002M; 401-07-002N

Brownie Joe & Irene Johnson
101 5th Avenue East
Buckeye, AZ 85326

Parcel No.: 401-01-021B

89407-00\Parcels.002

Richard Lee & Betty June Morris
Rt. 2 Box 955
Buckeye, AZ 85326

Parcel Nos.: 401-01-021D; 401-01-021H

89407-00\Parcels.002

D.Y.M. Inc.
808 Jackson Avenue
Buckeye, AZ 85326

Parcel Nos.: 401-01-021G; 401-01-021J; 401-01-021K

Timothy C. & April A. Rhodes Tr
Rt. 2 Box 985-A
Buckeye, AZ 85326

Parcel Nos.: 401-01-029B; 401-01-030A

Sharon D. Hrubes
62326 Gail Ct.
Montrose, CO 81401

Parcel Nos.: 401-18-164; 401-18-167

Donald W. Murrow
3231 W. Roma Avenue
Phoenix, AZ 85017

Parcels No.: 401-18-173

Theodore S. Petersen
720 El Camino Real #305
Belmont, CA 94002

Parcel No.: 401-18-232

Dale L. & Nelda O'Neal
939 S. Belford
Holyoke, CO 80734

Parcel No.: 401-18-235

Harlan S. & D. Audrey Nassen
1381 Bonaventure Dr.
Melbourne, FL 32940

Parcel No.: 401-18-242

Gary & Alene J. Ritsema
2205 S. Holly Street #7
Denver, CO 80222

Parcel No.: 401-18-245

Dorothy Louise Sanders
P.O. Box 57
Palo Verde, AZ 85326

Parcel No.:401-19-001C

Tempe Leasing & Rental Co.
Star Rt. 1 Box 714
Buckeye, AZ 85326

Parcel Nos.: 401-19-016; 401-19-046; 401-19-047; 401-19-048

Wanda Bryant
Rt. 2 Box 900
Buckeye, AZ 85326

Parcel No.: 401-19-049

Willard R. & Betty J. Schroder
Rt. 2 Box 916
Buckeye, AZ 85326

Parcel Nos.: 401-19-058; 401-19-070C

Kermit E. & Susan K. Rankin
5900 E. Edward Lane
Paradise Valley, AZ 85253

Parcel No.: 401-27-009L

Pioneer Trust Co. Tr. 20490
2020 N. Central Avenue #170
Phoenix, AZ 85004

Parcel No.: 401-27-027B

George Y. & Susannah Y. Yeh
8601 N. Starling Lane
Phoenix, AZ 85028

Parcel No.: 401-27-027E

Monica J. Wrublik
Star Rt. 1 Box 714
Buckeye, AZ 85326

Parcel No.: 401-27-027J

Charles W. & Johnnie Barnett Burnes
104 Clanton Avenue
Buckeye, AZ 85326

Parcel No.: 401-27-027M

Jack B. & Louise Miller
7511 W. Wolf
Phoenix, AZ 85033

Parcel No.: 401-27-027Q; 401-27-027T

William J. & Joan T. Skousen, et al
414 E. Southern Avenue
Mesa, AZ 85204

Parcel No.: 401-27-027R

Roosevelt Irrigation District
P.O. Box 95
Buckeye, AZ 85326

Parcel Nos.: 401-19-070B

Roosevelt Irrigation District
Box 1089
Buckeye, AZ 85326

Parcel Nos.: 504-30-025; 504-30-026; 504-30-028; 504-31-008; 504-31-012

Buckeye Valley Industrial Properties
6900 E. Camelback Rd., Suite 230
Scottsdale, AZ 85251

Parcel Nos.: 504-46-023A; 504-46-025

Schult Mobile Home Corporation
P.O. Box 151
Middlebury, IN 46540

Parcel No.: 504-46-023B

James A. Berridge, Jr. & Janice L. Berridge, TR etal
44 E. State
Phoenix, AZ 85020

Parcel No.: 504-46-023C

Alpha O. McKee & Dorothy I. Hunter
920 E. Baseline Rd.
Buckeye, AZ 85326

Parcel Nos.: 504-46-033A; 504-46-033B; 504-46-036F

Harold Dean Tilley
704 E. Baseline Rd.
Buckeye, AZ 85326

Parcel No.: 504-49-013

Elva Olive Dean
718 E. Baseline Rd
Buckeye, AZ 85326

Parcel No.: 504-49-014

Maria Esquivel
1814 Railroad
Buckeye, AZ 85326

Parcel Nos.: 504-49-017B; 504-49-017C

Elmer Syvester & Evla Anne Brown
829 E. Baseline Rd.
Buckeye, AZ 85326

Parcel Nos.: 504-49-026A; 504-49-026B; 504-49-026C

Charlene Hatten & Mary D. Davis
Box 682
Snowflake, AZ 85937

Parcel No.: 504-49-026A

Edmond & Barbara Jean Beard
208 4th Avenue East
Buckeye, AZ 85326

Parcel No.: 504-49-027B

Edwin L. & Fairy W. Eng
607 Date Circle
Buckeye, AZ 85326

Parcel No.: 504-49-030F

George R. Wilson, Jr. & Carmen Wilson
202 Apache Rd.
Buckeye, AZ 85326

Parcel Nos.: 504-49-030G; 504-49-030N; 504-49-030J

Dan R. & Rose Marie Fuller
Box 97
Litchfield Park, AZ 85340

Parcel No.: 400-16-002A

O.J. & Faye Murphy
300 N. E. 21st Street
Ft. Worth, TX 76106

Parcel No.: 400-17-003D

Town of Buckeye
508 Monroe Avenue
Buckeye, AZ 85326

Parcel Nos.: 400-17-003E; 400-18-037C

Southern Pacific Cooperative
9830 N. 32nd Street, Suite B-106
Phoenix, AZ 85028

Parcel No.: 400-17-097O

Strander Petroleum, Inc.
618 N. 4th Street
Buckeye, AZ 85326

Parcel Nos.: 400-18-031A; 400-18-036

J.L. Hodges Farming Company, Inc.
c/o Dan Eastman
P.O. Box 68
Buckeye, AZ 85326

Parcel No.: 400-31-017A

Hardesty Enterprises
Rt. 2 Box 246
Buckeye, AZ 85326

Parcel Nos.: 400-31-017B; 400-31-017C; 400-32-003B

Empire Machinery Company
P.O. Box 2985
Phoenix, AZ 85062

Parcel No.: 400-31-017D

Lloyd S. & Virgie M. Schulz
HCD 3 Box 16
Buckeye, AZ 85326

Parcel No.: 400-32-002B

Arizona Grain, Inc.
P.O. Box T
Casa Grande, AZ 85222

Parcel No.: 400-36-004

City Hill & Anthony H. Scott
Rt. 3 Box 432
Buckeye, AZ 85326

Parcel No.: 504-21-015

Ronald H. Streety
2613 S. 22nd Avenue
Buckeye, AZ 85326

Parcel No.: 504-21-248

B-G Farms
Rt. 2 Box 230
Buckeye, AZ 85326

Parcel Nos.: 504-29-006; 504-29-007; 504-29-008; 504-29-009A; 504-29-009B; 504-29-010A; 504-29-010B

C & S Farms Limited Partnership
17414 S. 130th Dr.
Sun City West, AZ 85326

Parcel Nos.: 504-27-17F; 504-27-023A; 504-27-023B; 504-28-006A; 504-28-008A

Lazy Y Ranch
P.O. Box 1131
Buckeye, AZ 85326

Parcel Nos.: 504-27-025; 504-27-027; 504-27-028A

Charles F. Youngker & Son, Ltd. Ptn.
P.O. Box 1131
Buckeye, AZ 85326

Parcel Nos.: 504-26-011; 504-26-013

Martha Jane Youngker
P.O. Box 398
Buckeye, AZ 85326

Parcel Nos.: 504-23-007; 504-23-008; 504-23-009; 504-24-006A; 504-24-006B; 504-24-006C; 504-24-007; 504-24-008A; 504-24-009; 504-24-010A; 504-24-010B; 504-24-010C; 504-24-011; 504-24-012; 504-26-012; 504-26-014

PMBG&D Partnership
% Pamela S. Steinberg
3200 N. Central Ave., Ste. 1000
Phoenix, AZ 85012

Parcel Nos.: 504-22-026B; 504-22-026D

Buckeye Rural Fire Depatment
St. Route Box 75
Palo Verde, AZ 95342

Parcel No.: 504-22-026C

William C. & Barbara L.Brainard, etal
1190 N. Litchfield Rd.
Litchfield Park, AZ 85340

Parcel Nos.: 504-22-034; 504-22-033;502-22-034

89407-00\Parcels.002

AFFIDAVIT OF PUBLICATION

INVOICE NO. 91715

ANNOUNCEMENT OF INTENT TO PERFORM FLOOD ELEVATION STUDY

The Flood Control District of Maricopa County (FCDMC) has contracted McLaughlin Kmetty Engineers, Ltd. to perform a floodplain delineation for the Town of Buckeye, Arizona and the Buckeye Area.

This study will examine and evaluate the flood hazard areas in the community to determine the flood elevation for those areas. These elevation will then be used to determine the flood insurance rates used by the Federal Emergency Management Agency.

This announcement is intended to inform all interested persons and communities of the commencement of this study so that they may have an opportunity to bring any relevant technical information to the attention of FCDMC/FEMA, so that they could be considered during the course of this study. Your comments should be addressed to Mr. Pedro Caiza or Mr. Tim Murphy, Hydrologists at the Flood Control District of Maricopa County.

Published: Arizona Republic, October 2,9, 1991.

The Arizona Republic/The Phoenix Gazette

STATE OF ARIZONA
COUNTY OF MARICOPA } SS.

JOAN LOHR, being first duly sworn, upon oath deposes and says: That she is the legal advertising manager of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published at Phoenix, Arizona, by Phoenix Newspapers Inc., which also publishes The Arizona Republic and The Phoenix Gazette, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates as indicated.

The Arizona Republic
~~The Phoenix Gazette~~

Oct. 2, 9, 1991

Joan Lohr

Sworn to before me this

9th day of

October A.D. 19 91

OFFICIAL SEAL
MARY LEE BOOHER
NOTARY PUBLIC STATE OF ARIZONA
MARICOPA COUNTY
My Comm. Expires March 17, 1995

Mary Lee Booher
Notary Public

PUBLIC NOTICE

ANNOUNCEMENT OF INTENT
TO PERFORM FLOOD ELEVATION
STUDY

The Flood Control District of Maricopa County (FCDMC) has contracted McLaughlin Kmetty Engineers, Ltd. to perform a floodplain delineation for the Town of Buckeye, Arizona and the Buckeye area.

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Published in the Buckeye Valley News October 3, 10, 1991.

AFFIDAVIT OF PUBLICATION

I, Lisa Roberts Publisher of the Buckeye Valley News, published weekly at Buckeye, Maricopa County, Arizona, do solemnly swear that a copy of Public Notice Announcement of Intent to Perform Flood Elevation Study McLaughlin Kmetty Engineers, Ltd. as per clipping attached, was published in the regular and entire issue of said newspaper, for two consecutive weeks, commencing with the issue dated Oct. 3, 19 91, and ending with the issue dated October 10, 19 91

Lisa Roberts
(Signature)

Subscribed and sworn to before me this 17th day of October 19 91

Sharon L. Butler
My Commission Expires
My Commission Expires May 14, 1993
, 19
(Notary Public)

File: Town of Buckeye

FLOOD CONTROL DISTRICT
of
Maricopa County

3335 West Durango Street • Phoenix, Arizona 85009
Telephone (602) 262-1501

D. E. Sagramoso, P.E., Chief Engineer and General Manager

BOARD OF DIRECTORS
Betsey Bayless
James D. Bruner
Carole Carpenter
Tom Freestone
Ed Pastor

MAY 0 9 1991

Fred Carpenter, Town Manager
Town of Buckeye
715 Monroe
Buckeye, Arizona 85326

Subject: Buckeye FIS

Dear Mr. Carpenter:

The District has been authorized to perform a flood insurance study in the Buckeye area. The purpose of the study is to identify areas that may be susceptible to flooding during a regulatory event including a re-evaluation of the existing 100-year delineations within the Town of Buckeye.

From a description of the work to be performed (preliminary scope of work), a consultant has been chosen and a detailed scope of work is being prepared to perform portions of the study later this year.

The consultant will place a notice of the study in a local publication and advertise for technical information or potential flood problem areas to be incorporated into the study.

Should you or your Town Council desire a briefing on this project, please let me know. Whether or not a pre-study briefing is held, we will be coordinating with you at the time we receive the preliminary flood study work maps from the consultant. After we have reviewed the study maps for compliance with FEMA flood study standards and criteria, we will contact you to request that we be given the opportunity to present the preliminary results to the Town at a meeting to which concerned citizens and property owners are included.

Sincerely,

D. E. Sagramoso, P.E.
Floodplain Administrator

Ron Nevitt

Ron Nevitt,
Floodplain Representative

copy to: Jim Morris, ADWR

Tim & Joe met recently with Mr. Carpenter & personally notified him of study. Noted change in address and filed referenced letter in community file.

5-22-91

SECTION 3

ROOSEVELT CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTOR AND COMMUNITY OFFICIAL FORM**	*O.M.B. Burden No 3067-0148* *Expires July 31, 1994*	*FEMA USE ONLY*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

1. OVERVIEW

1. The basis for this revision request is (are): *(check all that apply)*
   - ☐ Physical change
     - ☐ Existing
     - ☐ Proposed
   - ☒ Improved methodology
   - ☒ Improved data
   - ☐ Floodway revision
   - ☒ Other This is the first detailed study of the area.

   Explain New study done because existing delineation is from an approximate study.

2. Flooding Source: Roosevelt Canal
3. Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69
4. FEMA zone designations affected: A, B, X
   (example: A, AH, AO, A1-A30, A99, AE, V, V1-30, VE, B, C, D, X)
5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	County	State	Map No.	Panel No.	Effective Date
EX: 480301	Katy,City	Harris, Fort Bend	TX	480301	0005D	02/08/83
040037	Maricopa County	Maricopa	AZ	04013C	2015 E	9-4-91
040037	Maricopa County	Maricopa	AZ	04013C	2025 E	9-4-91
040037	Maricopa County	Maricopa	AZ	04013C	2040 D	4-15-88
040037	Maricopa County	Maricopa	AZ	04013C	2050 E	9-4-91

6. The area of revision encompasses the following types of flooding, structures, and associated disciplines: *(check all that apply)*

Types of Flooding
- ☐ Riverine
- ☐ Coastal
- ☐ Alluvial Fan
- ☒ Shallow Flooding *(e.g. Zones AO and AH)*
- ☐ Lakes

Affected by wind/wave action
- ☐ Yes
- ☐ No

Structures
- ☐ Channelization
- ☐ Levee/Floodwall
- ☐ Bridge/Culvert
- ☐ Dam
- ☐ Coastal
- ☐ Fill
- ☐ Pump Station
- ☒ None
- ☐ Channel Relocation
- ☐ Excavation
- ☐ Other *(describe)*

Disciplines*
- ☒ Water Resources
  - ☒ Hydrology
  - ☒ Hydraulics
  - ☐ Sediment Transport
  - ☐ Interior Drainage
- ☐ Structural
- ☐ Geotechnical
- ☒ Land Surveying
- ☐ Other *(describe)*

☐ Other(describe) _____

*** Attach completed "Certification by Registered Professional Engineer and/or Land Surveyor" Form for each discipline checked. (Form 2)**

2. FLOODWAY INFORMATION

7. Does the affected flooding source have a floodway designated on the effective FIRM or FBFM? ☐ Yes ☒ No
8. Does the revised floodway delineation differ from that shown on the effective FIRM or FBFM ☐ Yes ☐ No

   If yes, give reason: N/A

Attach copy of either a public notice distributed by the community stating the community's intent to revise the floodway or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions.

9. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP? ☐ Yes ☐ No

If yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

3. PROPOSED ENCROACHMENTS

10. With floodways:

1A. Does the revision request involve fill, new construction, substantial improvement, or other development in the floodway? ☐ Yes ☐ No N/A

1B. If yes, does the development cause the 100-year water surface elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No N/A

11. Without floodways:

2A. Does the revision request involve fill, new construction, substantial improvement, or other development in the 100-year floodplain? ☐ Yes ☒ No

2B. If yes, does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the 100-year water surface elevation to increase at any location by more than one foot (*or other surcharge limit if community or state has adopted more stringent criteria*)? ☐ Yes ☐ No

If the answer to either Items 1B or 2B is yes, please provide documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

4. REVISION REQUESTOR ACKNOWLEDGMENT

12. Having read NFIP Regulations, 44 CFR Ch. I, parts 59, 60, 61, and 72, I believe that the proposed revision ☒ is ☐ is not in compliance with the requirements of the aforementioned NFIP Regulations.

5. COMMUNITY OFFICIAL ACKNOWLEDGMENT

13. Was this revision request reviewed by the community for compliance with the community's adopted floodplain management ordinances? ☒ Yes ☐ No

14. Does this revision request have the endorsement of the community? ☒ Yes ☐ No

If no to either of the above questions, please explain: _____

Please note that community acknowledgment and /or notification is required for all requests as outlined in Section 65.4 (b) of the NFIP Regulations.

6. OPERATION AND MAINTENANCE

15. Does the physical change involve a flood control structure (e.g., levees, floodwalls, channelization, basins, dams)? ☐ Yes ☒ No

If yes, please provide the following information for each of the new flood control structures:

A. Inspection of the flood control project will be conducted periodically by _____ (entity)

N/A

_____ with a maximum interval of _____ months between inspections.

B. Based on the results of scheduled periodic inspections, appropriate maintenance of the flood control facilities

N/A will be conducted by _____ (entity)

to ensure the integrity and degree of flood protection of the structure.

C. A formal plan of operation, including documentation of the flood warning system, specific actions and assignments of responsibility by individual name or title, and provisions for testing the plan at intervals

N/A not less than one year, ☐ has ☐ has not been prepared for the flood control structure.

D. The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the _____
N/A (Name)

flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Attach operation and maintenance plans

7. REQUESTED RESPONSE FROM FEMA

16. After examining the pertinent NFIP regulations and reviewing the document entitled "Appeals, Revisions, and Amendments to Flood Insurance Maps: A guide for Community Officials," dated January 1990, this request is for a:

_____a. CLOMR — A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision *(LOMR or PMR)*, or proposed hydrology changes *(see 44 CFR Ch. I, Parts 60, 65, and 72)*.

_____b. LOMR — A letter from FEMA officially revising the current NFIP map to show changes to floodplains, floodways, or flood elevations. LOMRs typically depict decreased flood hazards. *(See 44 CFR Ch. I Parts 60 and 65.)*

X c. PMR — A reprinted NFIP map incorporating changes to floodplains, floodways, or flood elevations. Because of the time and cost involved to change, reprint, and redistribute an NFIP map, a PMR is usually processed when a revision reflects increased flood hazards or large-scope changes. *(See 44 CFR Ch. I, Parts 60 and 65.)*

_____d. Other: Describe_____

8. FORMS INCLUDED

17. Form 2 entitled, "Certification By Registered Professional Engineer and/or Land Surveyor" must be submitted.

The following forms should be included with this request if (check the included forms):

• Hydrologic analysis for flooding source differs from that used to develop FIRM	☒ Hydrologic Analysis Form (Form 3)
• Hydraulic analysis for riverine flooding differs from that used to develop FIRM	☒ Riverine Hydraulic Analysis Form (Form 4)
• The request is based on updated topographic information or a revised floodplain or floodway delineation is requested	☒ Riverine /Coastal Mapping Form (Form 5)
• The request involves any type of channel modification	☐ Channelization Form (Form 6)
• The request involves new bridge or culvert or revised analysis of an existing bridge or culvert	☐ Bridge/Culvert Form (Form 7)
• The request involves a new revised levee/floodwall system	☐ Levee/Floodwall System Analysis Form (Form 8)
• The request involves analysis of coastal flooding	☐ Coastal Analysis Form (Form 9)
• The request involves coastal structures credited as providing protection from the 100-year flood	☐ Coastal Structures (Form 10)
• The request involves an existing, proposed, or modified dam	☐ Dam Form (Form 11)
• The request involves structures credited as providing protection from the 100-year flood on an alluvial fan	☐ Alluvial Fan Flooding Form (Form 12)

9. INITIAL REVIEW FEE

18. The minimum initial review fee for the appropriate request category has been included. ☐ Yes ☐ No

Initial fee amount: $ _____

METHOD OF PAYMENT (Check one box)

☐ PAYMENT ENCLOSED ☐ VISA ☐ MASTERCARD

Check or money order only.
Make payable to
National Flood Insurance Program

CARD NUMBER

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

EXP. Date

Signature

or

19. This request is for a project that is for public benefit and is intended to reduce the flood hazard to existing development in identified flood hazard areas as opposed to planned floodplain development. ☐ Yes ☐ No

or

20. This request is to correct an error or to include the effects of natural changes within the areas of special flood hazards. ☐ Yes ☐ No

Note: I understand that my signature indicates that all information submitted in support of this request is correct.

Ron Nevitt
Signature of Revision Requester

Printed Name and Title of Revision Requester

Flood Control District of Maricopa County
Company Name

4-28-94
Date

Note: Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.

Ron Nevitt
Signature of Community Official

RON NEVITT, FLOODPLAIN REPRESENTATIVE
Printed Name and Title of Community Official

MARICOPA COUNTY, AZ
Community Name

4-28-94
Date

Does this request impact any other communities? ☒ Yes ☐ No

See attached letter from the Town of Buckeye.

If yes, attach letters from all affected jurisdictions acknowledging revision request and approving changes to floodway, if applicable.

Note: Although a photograph of physical changes is not required, it may be helpful for FEMA's review.

Town of Buckeye

March 31, 1994

Mr. Timothy M. Murphy
Flood Control District of
Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

RE: BUCKEYE AREA FLOOD DELINEATION STUDY (FCD 90-69)

Dear Tim:

The Town of Buckeye has no objections to the submittal of the Buckeye Area Flood Delineation Study to the Federal Emergency Management Agency (FEMA) for their review and approval. We understand that the Flood Control District will act as the lead Agency in this submittal and that FEMA's approval of the study results will revise the Flood Insurance Rate Maps (FIRMs) within the Town of Buckeye as well as outside the town limits. We feel that the results of the detailed study done by McLaughlin Kmetty Engineers for the District will provide a better floodplain management tool than the existing approximate study does. We understand the impacts the study results will have on floodplain management within the Town of Buckeye.

Upon FEMA's approval, please provide the Town of Buckeye with final copies of the study reports and delineation drawings.

Should you have any questions, please contact me at 386-4691.

Sincerely,

Fred Carpenter
Town Manager

FLOOD CONTROL DISTRICT
RECEIVED
APR 04 '94
CHENG | P&PM
ADMIN | HYDRO
FIN MGT | LMGT
C&O | FILE
ENGR | TMM
REMARKS

100 North Apache • P.O. Box 157 • Buckeye, Arizona 85326 • Fax (602) 386-7832 • (602) 386-4691

ARIZONA DEPARTMENT OF WATER RESOURCES
15 South 15th Avenue, Phoenix, Arizona 85007
Telephone (602) 542-1553
Fax (602 256-0506

FIFE SYMINGTON
Governor

ELIZABETH ANN RIEKE
Director

August 19, 1992

FLOOD CONTROL DISTRICT
RECEIVED
AUG 24 1992
CH ENG | P & PM
PAC
REMARKS

Mr. John Matticks
Assistant Administrator
Office of Risk Assessment
Federal Insurance Administration
Federal Emergency Management Agency
Washington, D.C. 20472

Dear Mr. Matticks:

This is to confirm that this Department has been reviewing the hydrology for all flood studies completed within Arizona with the exception of Maricopa and Pima Counties. The staffs of both county's Flood Control Districts have the technical expertise to adequately review hydrologic and hydraulic analysis.

Please continue to accept Pima County and Maricopa County studies as if we had reviewed them. If special problems or questions arise with either county, we will, of course, be available for coordination purposes.

We will continue to review flood insurance study technical documentation for other Arizona communities which lack either staff or technical expertise to adequately review hydrologic and hydraulic analyses.

If you have any questions or comments, please don't hesitate to contact me at (602) 542-1541.

Sincerely,

Dan R. Lawrence, P.E.
Chief Engineer

cc: Mr. Pedro Calza, MCFCD
Mr. David Smutzer, PCDOT&FCD

FEMA USE ONLY

FORM 2

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.

2. I am licensed with an expertise in hydraulics
[example: water resources (hydrology, hydraulics, sediment transport, interior drainage)* structural, geotechnical, land surveying.]

3. I have 11 years experience in the expertise listed above.

4. I have [xx] prepared [ ] reviewed the attached supporting data and analyses related to my expertise.

5. I [x] have [ ] have not visited and physically viewed the project.

6. In my opinion, the following analyses and/or design, were performed in accordance with sound engineering practices:
Determination of water surface elevation, flood zones, floodplain mapping and analysis of problem areas.

7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. [ ] Viewed all phases of actual construction.
b. [ ] Compared plans and specifications with as-built survey information.
c. [ ] Examined plans and specifications and compared with completed projects.
d. [xx] Other N/A

8. All information submitted in support of this request is 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: Frank Edward Brown
(please print or type)

Title: Civil Engineer
(please print or type)

Registration No. 23969 Expiration Date: 03/31/96

State Arizona

Type of License P.E. (Civil)

Frank Edward Brown
Signature

2/15/93
Date

Registered Professional Engineer (Civil) CERTIFICATE NO. 23969 FRANK EDWARD BROWN Date Signed 2/15/93 ARIZONA, U.S.A.

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

Statement to be attached to FEMA Form 2,
Certification by Registered Professional Engineer
Signed by Frank Edward Brown, P.E.

The flooding source is ponded water behind the railroad embankment and the two canal embankments. The technical basis for the ponded water surface elevations came from calculations prepared by George V. Sabol Consulting Engineers, who was the primary preparer of the separate Hydrology Report. These calculations are comprised of stage-storage-discharge rating curves and HEC-1 reservoir routing analyses. Weir flow rating curves for embankment overtopping were refined by Mr. Brown in some areas in order to provide more detail for floodplain mapping purposes.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
22969
FRANK EDWARD
BROWN
Date Signed 2-17-93
ARIZONA, U.S.A.

89407-00\PECert.002

FEMA USE ONLY

FORM 2

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.

2. I am licensed with an expertise in hydrology and hydraulics
[example: water resources (hydrology, hydraulics, sediment transport, interior drainage)* structural, geotechnical, land surveying.]

3. I have 23 years experience in the expertise listed above.

4. I have [X] prepared [ ] reviewed the attached supporting data and analyses related to my expertise.

5. I [X] have [ ] have not visited and physically viewed the project.

6. In my opinion, the following analyses and/or design, were performed in accordance with sound engineering practices:
flood hydrology

7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. [ ] Viewed all phases of actual construction.
b. [ ] Compared plans and specifications with as-built survey information.
c. [ ] Examined plans and specifications and compared with completed projects.
d. [X] Other N/A

8. All information submitted in support of this request is 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: George V. Sabol
(please print or type)

Title: President
(please print or type)

Registration No. 17928 Expiration Date: 30 June 1994

State Arizona

Type of License Civil

Signature

23 February 1993
Date

Registered Professional Engineer (Civil) CERTIFICATE NO. 17928 GEORGE V. SABOL Date Signed 23 Feb 93 ARIZONA, U.S.A.

(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

Statement to be attached to FEMA Form 2,

Certification by Registered Professional Engineer

Signed by George V. Sabol, P.E.

The data that were compiled and used in the preparation of the Hydrology Report, Buckeye Floodplain Delineation Study, are the most practical data that are available and are accurate to the best of the certifier's knowledge. The hydrologic analyses were performed in accordance with sound engineering practices, as applicable to Maricopa County, Arizona. The Hydrology Report presents the flood hydrology for this study that is representative of existing hydrologic conditions, and portrays, to the standard of the profession, the flood potential for the study area.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
17929
GEORGE V.
SABOL
Date Signed 26 Feb 93
ARIZONA, U.S.A.

FEMA USE ONLY

FORM 2

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.

2. I am licensed with an expertise in Land Surveying
[example: water resources (hydrology, hydraulics, sediment transport, interior drainage)* structural, geotechnical, land surveying.]

3. I have 18 years experience in the expertise listed above.

4. I have ☐ prepared ☒ reviewed the attached supporting data and analyses related to my expertise.

5. I ☒ have ☐ have not visited and physically viewed the project.

6. In my opinion, the following analyses and/or design, were performed in accordance with sound engineering practices:
Survey Horizontal and Vertical Mapping Control and ERM Elev.

7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. ☐ Viewed all phases of actual construction.
b. ☐ Compared plans and specifications with as-built survey information.
c. ☐ Examined plans and specifications and compared with completed projects.
d. ☒ Other N/A

8. All information submitted in support of this request is 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: Larry Maldonado
(please print or type)

Title: President
(please print or type)

Registration No. 16863 Expiration Date: Current

State Arizona

Type of License Land Surveyor

Larry Maldonado
Signature

4-6-93
Date

REGISTERED LAND SURVEYOR CERTIFICATE NO. 16863 LARRY M. MALDONADO Date Signed 4-7-93 ARIZONA, U.S.A.

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

Statement to be attached to FEMA Form 2,

Certification by Registered Professional Land Surveyor

Signed by Larry Maldonado, P.E., L.S.

The data that was compiled and used in the preparation of the Survey Horizontal and Vertical Mapping Control and ERM Elevations, Buckeye Floodplain Delineation Study, are the most practical data that are available and are accurate to the best of the certifier's knowledge. The survey control was performed in accordance with sound Land Surveying practices, as applicable to Maricopa County, Arizona.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
16863
LARRY M.
MALDONADO
Date Signed 4-7-93
ARIZONA, U.S.A.

(MS) FEMA

FEDERAL EMERGENCY MANAGEMENT AGENCY **HYDROLOGIC ANALYSIS FORM**	O.M.B. Burden No. 3067-0148 *Expires July 31, 1994*	*FEMA USE ONLY*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.67 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Roosevelt Canal
(One form for each flooding source)

Project Name /Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. HYDROLOGIC ANALYSIS IN FIS

☒ Approximate study stream (Zone A)
☐ Detailed study stream (briefly explain methodology)_____

2. REASON FOR NEW HYDROLOGIC ANALYSIS

☒ No existing analysis
☐ Improved data *(see data revision on page 3)*
☐ Changed physical conditions of watershed *(explain)*

☐ Alternative methodology *(justify why the revised model is better than model used in the effective FIS)*

☐ Evaluation of proposed conditions (CLOMRs only) (explain)

☐ Other

If a computer program/model was used in revising the hydrologic analysis, please provide a diskette with the input files for the 10-, 50-, 100 - and 500-year recurrence intervals.

Only the 100-year recurrence interval need be included for SFHAs designated as Zone A.

3. APPROVAL OF ANALYSIS

☒ Approval of hydrologic analysis, including the resulting peak discharge value (s) has been provided by the appropriate local, state, or Federal Agency. (i.e., Flood Control District of Maricopa County)
Attach evidence of approval.

☐ Approval of the hydrologic analysis is not required by any local, State, or Federal Agency.

4. REVIEW OF RESULTS

Stream: Roosevelt Canal

Comparison of 100-year Discharges

Location:	Drainage area (Sq mi.)	FIS (cfs):	Revised (cfs):

For a summary of some of the 100-year discharges see Table 1 at the end of this section. See the Hydrology Report for all the hydrologic modeling results.

Note: When revised discharges are not significantly different than FIS discharges, FEMA may require a confidence limits analysis on attachment D at a later date to complete the review.

As is often the case with revision requests, only a portion of a stream may actually be revised or be affected by a revision. Therefore, transition to the unrevised portion is important to maintain the continuity of the study. NFIP regulations stipulate that such a transition must be assured. What is the transition from the proposed discharges to the effective discharges? Please explain how the transition was made *(attach separate sheet if necessary)*

N/A

ATTACH A COMPLETED REVIEW OF RESULTS PAGE FOR EACH FLOODING SOURCE.

Is the new hydrologic analysis being developed solely to revise the flow values presented in the FIS *(i.e. no changed hydraulic conditions)*? ☐ Yes ☒ No

If yes, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

FEMA does not normally revise NFIP maps solely due to insignificant flow changes where changes in 100-year water surface elevation are less than 1.0 foot.

5. HISTORICAL FLOODING INFORMATION

Is historical data available for the flooding source? ☐ Yes ☒ No

If yes, provide the following:

Location along flooding source: _____

Maximum peak discharge: _____ cfs

Second highest peak discharge: _____ cfs

Source of information: _____

6. GAGE RECORD INFORMATION

Location of nearest gage to project site *(along flooding source or similar watershed; specify)*

N/A There are no stream gages along the flooding source or in nearby similar watersheds.

Gaging Station: _____

Drainage area at gage: _____ mi^2

Number of years of data: _____

7. DATA REVISION

Please use the following table to list all the data and/or parameters affected by this request and identify them as new data (*New*) or as revising existing data (*Revised*). *(If necessary, attach a separate sheet.)*

Data Parameter	New	Revised	Data Source
Subbasin Areas	☒	☐	USGS Mapping
Lag Time, L, Lca, Slope, Kn	☒	☐	USGS Mapping
Green & Ampt Parameters	☒	☐	FCDMC Hydrologic Manual
Routing Reach Parameters	☒	☐	FCDMC Hydrologic Manual
	☐	☐	

- Data source can be from a Federal, State, or local government agency, or from a private source. Some State and local governments may have less strict data requirements than Federal agencies, in which case the hydrologic data may not be accepted by FEMA unless it is demonstrated that the data give a better estimate of the flood discharge.
- Attach documentation corroborating each data source *(i.e., certified statement, report, bibliographical reference to a published document)*. In the case of a published document or a government report, providing copies of the cover and pertinent pages may be helpful.

8. METHODOLOGY FOR NEW ANALYSIS

☐ Statistical Analysis of Gage Records (*use Attachment A*)

☐ Regional Regression Equations *(use Attachment B)*

☒ Precipitation/Runoff Model *(use Attachment C)*

☐ Other *(specify; attach backup computations and supporting data)* _____

ATTACHMENT A: STATISTICAL ANALYSIS OF GAGE RECORDS

Gaging Station: N/A

Gage Location (latitude and longitude): _____

	FIS:	Revised:
1. Number of years of data	_____	_____
Systematic	_____	_____
Historical	_____	_____
2. Homogeneous data	☐ Yes ☐ No	☐ Yes ☐ No
3. Data adjustments	☐ Yes ☐ No	☐ Yes ☐ No
4. Number of high outliers	_____	_____
Low outliers	_____	_____
Zero events	_____	_____
5. Generalized skew	_____	_____
6. Station skew	_____	_____
7. Adopted skew	_____	_____
8. Probability distribution used (justify if log-Pearson III was not used)	_____	_____
9. Transfer equations to ungaged sites		☐ Yes ☐ No

If yes, specify method

_____

_____

_____

10. Expected probability* ☐ Yes ☐ No

11. Comparison of results with other analyses ☐ Yes ☐ No

If yes, describe comparison

_____

_____

_____

*FEMA does not accept expected probability analyses for the purpose of reflecting flood hazard information in a FIS.

If any data is not available, indicate by N/A.

Attach analysis including plot of flood frequency curve.

ATTACHMENT B: REGIONAL REGRESSION EQUATIONS

1. Bibliographical Reference:
N/A

(Attach a copy of title page, table of contents, and pertinent pages including equations.)

2. Gaged or ungaged stream: _____

3. Hydrologic region(s): _____
Attach backup map.

4. Provide parameters, values, and source of data used to define parameters.

		FIS:		Revised:	
5.	Urbanized conditions calculations	☐ Yes	☐ No	☐ Yes	☐ No
6	Percent of watershed urbanization	_____		_____	
7.	Is the watershed controlled?	☐ Yes	☐ No	☐ Yes	☐ No
8.	Comparison with other analyses	☐ Yes	☐ No	☐ Yes	☐ No

If the answer to 5, 7, or 8 is yes, explain methodology in Comments.

If data is not available, indicate by N/A.

Comments

Attach computation and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT C: PRECIPITATION/RUNOFF MODEL

		FIS:	Revised
1.	Method or model used:	N/A	HEC-1
	Version:	N/A	4.0
	Date:	N/A	September, 1990
2.	Source of rainfall depth:	N/A	NOAA Atlas 2
3.	Source of rainfall distribution:	N/A	FCDMC Hydrologic Manual
4.	Rainfall duration:	N/A	6 & 24 Hour
5.	Areal adjustment to precipitation (%):	N/A	Depends upon Subbasin Area
6.	Hydrograph development method:	N/A	S-Graph
7.	Loss rate method:	N/A	Green & Ampt
	Source of soils information:	N/A	SCS Soil Survey
	Source of land use information	N/A	Aerial Photos
8.	Channel routing method:	N/A	Normal Depth
9.	Reservoir routing:	☐ Yes ☐ No	☒ Yes ☐ No
10.	Baseflow considerations:	☐ Yes ☐ No	☐ Yes ☒ No

If yes, explain how baseflow was determined:

11.	Snowmelt considerations:	☐ Yes ☐ No	☐ Yes ☒ No
12.	Model calibration:	☐ Yes ☐ No	☒ Yes ☐ No

If yes, explain how calibration was performed See Page IV-9 of the Hydrology Report.

13. Future land use condition: ☐ Yes ☒ No

If yes, explain why

NOTE: FEMA policy is to base flooding on existing conditions.
If data is not available, indicate by N/A.

Attach precipitation/runoff model, hydrologic model schematic, curve number calculations, time of concentration calculations, and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT D: CONFIDENCE LIMITS EVALUATION

Stream: N / A

Select one location for Confidence Limits Evaluation (*describe location*): _____

_____

Discharges for selected location:

Exceedance Probability		FIS	Revised
10%	(10-year)	_____ cfs	_____ cfs
2%	(50-year)	_____ cfs	_____ cfs
1%	(100-year)	_____ cfs	_____ cfs
0.2%	(500-year)	_____ cfs	_____ cfs

1% (100-year) Flood Confidence Intervals

90% Confidence Interval: 5% limit _____ cfs

95% limit _____ cfs

50% Confidence Interval: 25% limit _____ cfs

75% limit _____ cfs

If the value of the 100-year frequency flood in the FIS is beyond the 50% confidence interval but within the 90% confidence interval, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

An example of confidence limits analysis can be found in Appendix 9 of Bulletin 17B.

Attach Confidence Limits Analysis.

TABLE 1

Summary of Peak Discharges at Key Locations

Flooding Source and Location	Subwatershed Group	Drainage Area (Sq. Mi.)	100-Year Peak Discharges[1] (cfs)
Roosevelt Canal			
Johnson Rd. to Bruner Rd.	F	1.33	294
Bruner Rd. to Palo Verde Rd.	G	3.83	1,144
Palo Verde Rd. to Wilson Ave.	H	2.76	1,218
Wilson Ave. to Turner Rd.	I	3.13	1,399
Oglesby Rd.	J	1.37	832
Rooks Rd. to Miller Rd.	K	1.67	1,078
Miller Rd. to Cemetery Rd. (Apache)	L	1.90	1,139
Cemetery Rd. (Apache) to Watson Rd.	N	1.80	1,419
Watson Rd. to Rainbow Rd.	O	2.19	1,373
Rainbow Rd. to Dean Rd.	P	1.31	840
Southern Pacific Railroad			
West of Johnson Rd.	E	0.28	171
Johnson Rd. to east of Bruner Road	F	4.59	541
East of Bruner Rd. to Palo Verde Rd.	G	6.26	1,457
Palo Verde Rd. to Wilson Ave.	H	5.20	951
Wilson Ave. to Turner Rd.	I	5.28	1,074
Turner Rd. to Oglesby Rd.	J	3.50	828
Oglesby Rd. to Rooks Rd.	K	5.18	1,173
Rooks Rd. to Miller Rd.	L	3.20	1,180
Miller Rd. to Cemetery Rd. (Apache)	M	2.42	522
Cemetery Rd. (Apache) to Watson Rd.	N	4.06	776
Watson Rd. to Rainbow Rd.	O	4.41	1,172
Rainbow Rd. to Dean Rd.	P	3.47	973
Buckeye Canal			
West of Johnson Rd.	E	0.52	255
Johnson Rd. to east of Bruner Rd.	F	5.74	666
East of Bruner Rd. to Palo Verde Rd.	G	6.61	843
Palo Verde Rd. to Wilson Ave.	H	5.78	889
Wilson Ave. to Turner Rd.	I	5.79	1,008
Turner Rd. to Oglesby Rd.	J	3.93	780
Oglesby Rd. to east of Rooks Rd.	K	5.59	1,103
East of Rooks Rd. to Miller Rd.	L	3.49	439
Miller Rd. to Cemetery Rd. (Apache)	M	2.56	287
Cemetery Rd. (Apache) to Watson Rd.	N	4.23	770
Watson Rd. to Rainbow Rd.	O	4.55	851
Rainbow Rd. to Dean Rd.	P	3.54	710

1. The 100-year peak discharge value reported is for the flow routed through or over the railroad and canals.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1994*	**FEMA USE ONLY**

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Roosevelt Canal
(One form for each flooding source)

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. REACH TO BE REVISED

~~Downstream limit~~: Eastern limit: Dean Rd. (FIRM PANEL 2050)

~~Upstream limit~~: Western limit: Hassayampa River (FIRM PANEL 2015)

2. EFFECTIVE FIS

☐ Not studied

☒ Studied by approximate methods

~~Downstream limit~~ of study Eastern limit: ?

~~Upstream limit~~ of study Western limit: Hassayampa River

☐ Studied by detailed methods

Downstream limit of study N/A

Upstream limit of study

☐ Floodway delineated

Downstream limit of Floodway N/A

Upstream limit of Floodway

3. HYDRAULIC ANALYSIS

Why is the hydraulic analysis different from that used to develop the FIRM. *(Check all that apply)*

☐ Not studied in FIS

☒ Improved hydrologic data/analysis. Explain: The effective FIS is an approximate study and no hydrologic data is available. An HEC-1 hydrologic model was developed for the watershed. This allowed for a more accurate determination and routing of the rainfall runoff volume.

☒ Improved hydraulic analysis. Explain: The hydraulic analysis uses recent survey data and the HEC-1 hydrologic model results to determine the elevation and area of ponding along the upstream side of the canal.

☐ Flood control structure. Explain:

☒ Other. Explain: A detailed survey was done along the canal banks and upstream of the canal.

Full input and output listings along with files on diskette *(if available)* for each of the models listed below and summary of the source of input parameters used in the models must be provided. The summary must include a complete description of any changes made from model to model (*e.g. duplicate effective model to corrected effective model)*. Only the Duplicate Effective and the Revised or Post-Project Conditions models must be submitted. See instructions for directions on when other models may be required. Only the 100-year flood profile is required for SFHAs with a Zone A designation. For areas which do not have detailed flooding, a hydraulic model is not required; however BFE's may not be added to the revised FIRM.

☐ Duplicate Effective Model — Natural ☐ Floodway ☐

Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models *(10-, 50-, 100-, and 500-year multi-profile runs and the floodway run)* must be obtained and then reproduced on the requestor's equipment to produce the duplicate effective model. This is required to assure that the effective model input data has been transferred correctly to the requestor's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

☐ Corrected Effective Model — Natural ☐ Floodway ☐

The corrected effective model is the model that corrects any errors that occur in the duplicate effective model, adds any additional cross sections to the duplicate effective model, or incorporates more detailed topographic information than that used in the currently effective model. The corrected effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

☐ Existing or Pre-Project Conditions Model — Natural ☐ Floodway ☐

The duplicate effective or corrected model is modified to produce the existing or pre-project conditions model to reflect any modifications that have occurred within the floodplain since the date of the effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the corrected effective or duplicate effective model.

☐ Revised or Post-Project Conditions Model — Natural ☐ Floodway ☐

The existing or pre-project conditions model *(or duplicate effective or corrected effective model, as appropriate)* is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for proposed project this model should reflect proposed conditions.

☐ Other: Please attach a sheet describing all other models or calculations submitted. — Natural ☐ Floodway ☐

4. MODEL PARAMETERS *(from model used to revise 100-year water surface elevation)*

1. Discharges:

	Upstream Limit	Downstream Limit
10-year		
50-year		
100-year		
500-year		

Attach diagram showing changes in 100-year discharge

2. Explain how the starting water surface elevations were determined N/A
Only ponded flooding occurs

3. Give range of friction loss coefficients (*Manning's "N"*) Channel ..... N/A

Overbanks ..... N/A

If friction loss coefficients are different anywhere along the revised reach from those used to develop the FIRM, give location, value used in the effective FIS, and revised values and an explanation as to how the revised values were determined.

Location	FIS	Revised

Explain:

4. Describe how the cross section geometry data were determined *(e.g., field survey, topographic map, taken from previous study)* and list cross sections that were added.

Geometric data for the railroad and canal analyses were determined by field surveys. The geometric data for delineating the ponding areas were determined by field surveys and topographic mapping.

5. Explain how reach lengths for channel and overbanks were determined:

N/A

5. RESULTS (*from model used to revise 100-year water surface elevations*)

1. Do the results indicate:

a. Water surface elevations higher than end points of cross sections? ☐ Yes ☒ No

b. Supercritical depth? ☐ Yes ☒ No

c. Critical depth? ☐ Yes ☒ No

d. Other unique situations ☐ Yes ☒ No

If yes to any of the above, attach an explanation that discusses the situation and how it is presented on the profiles, tables, and maps.

2. What is the maximum change in energy gradient between cross-sections? N/A

Specify location

3. What is the distance between the cross-sections in 2 above? N/A

Specify location

4. What is the maximum distance between cross-sections? N/A

Specify location

5. Floodway determination

a. What is the maximum surcharge allowed by the community or State? 1.0 foot

b. What is the maximum surcharge for the revised conditions? N/A foot

Specify location

c. What is the maximum velocity? N/A fps

Specify location

Explain:

d. Are there any negeative surcharge values at any cross-section ☐ Yes ☒ No

If yes, the floodway may need to widen. If it is not widened, please explain and indicate the maximum negative surcharge.

6. Is the discharge value used to determine the floodway anywhere different from that used to determine the natural 100-year flood elevations? ..... ☐ Yes ☒ No

If Yes, explain:

7. Do 100-year water surface elevations increase at any location? ..... ☐ Yes ☒ No

If yes, please attach a list of the locations where the increases occur, state whether or not the increases are located on the requestor's property, and provide an explanation of the reason for the increases.

The existing FIS is an approximate study and water surface elevations aren't given.

Please attach a completed comparison table entitled: Water Surface Elevation Check (See page 6)

6. REVISED FIRM/FBFM AND FLOOD PROFILES

A. The revised water surface elevations tie into those computed by the effective FIS Model *(10-, 50-, 100-, and 500-year)*, downstream of the project at cross-section_____ within_____feet and upstream of the project at cross section_____within_____feet.

N/A There aren't any existing water surface elevations in the effective FIS

B. The revised floodway elevations tie into those computed by the effective FIS model, dowstream of the project at cross section_____within_____feet and upstream of the project at cross section_____ within_____feet.

N/A There aren't any existing floodways.

C. Attach profiles, at the same vertical and horizontal scale as the profiles in the effective FIS report, showing stream bed and profiles of all floods studied (without encroachment). Also, label all cross sections, road crossings (including low chord and top-of-road data), culverts, tributaries, corporate limits, and study limits. If channel distance has changed, the stationing should be revised for all profile sheets. See the Hydraulic Report.

D. Attach a Floodway Data Table showing data for each cross section listed in the published Floodway Data Table in the FIS report. N/A There aren't any floodways.

Proceed to Riverine /Coastal Mapping Form

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]

COMMENTS:

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

Sheet ____ of ____

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE/COASTAL MAPPING FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1994*	*FEMA USE ONLY*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: ROOSEVELT CANAL

Project Name/Identifier: BUCKEYE AREA FLOOD DELINEATION STUDY FCD 90-69

1. MAPPING CHANGES

1. A topographic work map of suitable scale, contour interval, and planimetric definition must be submitted showing *(indicate N/A when not applicable)*:

		Included		
A.	Revised approximate 100-year floodplain boundaries (Zone A)	☐ Yes	☒ No	☐ N/A
B.	Revised detailed 100- and 500-year floodplain boundaries	☒ Yes	☐ No	☐ N/A
C.	Revised 100-year floodway boundaries	☐ Yes	☐ No	☒ N/A
D.	Location and alignment of all cross sections used in the revised hydraulic model with stationing control indicated	☐ Yes	☐ No	☒ N/A
E.	Stream alignments, road and dam alignments	☒ Yes	☐ No	☐ N/A
F.	Current community boundaries	☒ Yes	☐ No	☐ N/A
G.	Effective 100- and 500-year floodplain and 100-year floodway boundaries from the FIRM/FBFM reduced or enlarged to the scale of the topographic work map	☐ Yes	☒ No	☐ N/A
H.	Tie-ins between the effective and revised 100- and 500-year floodplains and 100-year floodway boundaries	☒ Yes	☐ No	☐ N/A
I.	The requestor's property boundaries and community easements	☐ Yes	☐ No	☒ N/A
J.	The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
K.	Location and description of reference marks	☒ Yes	☐ No	☐ N/A
L.	Vertical datum (example: NGVD, NAVD etc.)	☒ Yes	☐ No	☐ N/A
M.	Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
N.	Location and alignment of all coastal transects used to revise the coastal analyses	☐ Yes	☐ No	☒ N/A

If any of the items above are marked no or N/A, please explain: The effective FIS only has approximate 100-year floodplains (Zone A). For the detailed revised study the 100-year floodplains have primarily been identified as zone AH's.

2. What is the source and date of the updated topographic information *(example: orthophoto maps, July 1985; field survey, May 1979, beach profiles, June 1987, etc.)*? _____

3. What is the scale and contour interval of the following workmaps?
   a. Effective FIS _____ scale _____ Contour interval
   b. Revision Request 1" = 400' scale Field Survey and 2' & 10' Contour interval

   NOTE: Revised topographic information must be of equal or greater detail.

4. Attach an annotated FIRM and FBFM at the scale of the effective FIRM and FBFM showing the revised 100-year and 500-year floodplains and the 100-year floodway boundaries and how they tie into those shown on the effective FIRM and FBFM downstream and upstream of the revision or adjacent to the area of revision for coastal studies.

   Attach additional pages if needed.

5. Flood Boundaries and 100-year water surface elevations:

Has the 100-year floodplain been shifted or increased or the 100-year water surface elevation increased at any location on property other than the requestor's or community's? ☐ Yes ☐ No

If yes, please give the location of shift or increase and an explanation for the increase.

Since this is a **restudy** of a large area that has existing A zone delineations (which don't have elevations), it is impossible to say that there has been an increase in the water surface elevations. Any changes in the delineation limits are probably due to the use of more detailed topographic mapping supplemented by the field survey data. The efforts put forth to notify the public about this **restudy** and its results are detailed in the public notification documentation section.

a. Have the affected property owners been notified of this shift or increase and the effect it will have on their property? ..... ☐ Yes ☐ No

If yes, please attach letters from these property owners stating they have no objections to the revised flood boundaries if a LOMR is being requested.

b. What is the number of insurable structures that will be impacted by this shift or increase? _____

6. Have the floodway boundaries shifted or increased at any location compared to those shown on the effective FBFM or FIRM? ..... ☐ Yes ☒ No

If yes, explain:

_____

_____

_____

7. If a V- zone has been designated, has it been delineated to extend landward to the heel of the primary frontal dune? N/A ☐ Yes ☐ No

If no, explain:

_____

_____

_____

8. Manual or digital map submission:

☒ Manual

☐ Digital

Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance of submission as possible.

2. EARTH FILL PLACEMENT

1. The fill is: ☐ Existing ☐ Proposed N/A

2. Has fill been/will be placed in the regulatory floodway? ..... ☐ Yes ☐ No N/A
If yes, please attach completed Riverine Hydraulic Analysis Form.

3. Has fill been/will be placed in floodway fringe *(area between the floodway and 100-year floodplain boundaries)*? ..... ☐ Yes ☐ No N/A

If yes, then complete A, B, C, and D below.

A. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ..... ☐ Yes ☐ No N/A

If yes, justify steeper slopes_____

B. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? *(Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)* ..... ☐ Yes ☐ No N/A

If no, describe erosion protection provided_____

C. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No N/A

D. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No N/A

If yes, provide certification of fill compaction (item C. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer.

4. Has fill been/will be placed in a V-zone? ☐ Yes ☐ No N/A

If yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall? ☐ Yes ☐ No N/A

If yes, attach the coastal structures form.

SECTION 4

BUCKEYE CANAL

FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTOR AND COMMUNITY OFFICIAL FORM**	*O.M.B. Burden No 3067-0148* *Expires July 31, 1994*	*FEMA USE ONLY*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

1. OVERVIEW

1. The basis for this revision request is (are): *(check all that apply)*
   - ☐ Physical change
     - ☐ Existing
     - ☐ Proposed
   - ☒ Improved methodology
   - ☒ Improved data
   - ☐ Floodway revision
   - ☒ Other This is the first detailed study of the area.

   Explain New study done because existing delineation is from an approximate study.

2. Flooding Source: Buckeye Canal
3. Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69
4. FEMA zone designations affected: A, B, X
   (example: A, AH, AO, A1-A30, A99, AE, V, V1-30, VE, B, C, D, X)
5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	County	State	Map No.	Panel No.	Effective Date
EX: 480301	Katy,City	Harris, Fort Bend	TX	480301	0005D	02/08/83
040037	Maricopa County	Maricopa	AZ	04013C	2480 E	9-4-91
040037	Maricopa County	Maricopa	AZ	04013C	2485 E	9-4-91
040037	Maricopa County	Maricopa	AZ	04013C	2505 E	9-4-91
040037	Maricopa County	Maricopa	AZ	04013C	2040 D	4-15-88
040037	Maricopa County	Maricopa	AZ	04013C	2050 E	9-4-91

6. The area of revision encompasses the following types of flooding, structures, and associated disciplines: *(check all that apply)*

Types of Flooding
- ☐ Riverine
- ☐ Coastal
- ☐ Alluvial Fan
- ☒ Shallow Flooding *(e.g. Zones AO and AH)*
- ☐ Lakes

Affected by wind/wave action
- ☐ Yes
- ☐ No

Structures
- ☐ Channelization
- ☐ Levee/Floodwall
- ☐ Bridge/Culvert
- ☐ Dam
- ☐ Coastal
- ☐ Fill
- ☐ Pump Station
- ☒ None
- ☐ Channel Relocation
- ☐ Excavation
- ☐ Other *(describe)*

Disciplines*
- ☒ Water Resources
  - ☒ Hydrology
  - ☒ Hydraulics
  - ☐ Sediment Transport
  - ☐ Interior Drainage
- ☐ Structural
- ☐ Geotechnical
- ☒ Land Surveying
- ☐ Other *(describe)*

☐ Other(describe)_____

* **Attach completed "Certification by Registered Professional Engineer and/or Land Surveyor" Form for each discipline checked. (Form 2)**

2. FLOODWAY INFORMATION

7. Does the affected flooding source have a floodway designated on the effective FIRM or FBFM? ☐ Yes ☒ No
8. Does the revised floodway delineation differ from that shown on the effective FIRM or FBFM ☐ Yes ☐ No
   If yes, give reason: N/A

Attach copy of either a public notice distributed by the community stating the community's intent to revise the floodway or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions.

9. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP? ☐ Yes ☐ No

If yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

3. PROPOSED ENCROACHMENTS

10. With floodways:

1A. Does the revision request involve fill, new construction, substantial improvement, or other development in the floodway? ☐ Yes ☐ No N/A

1B. If yes, does the development cause the 100-year water surface elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No N/A

11. Without floodways:

2A. Does the revision request involve fill, new construction, substantial improvement, or other development in the 100-year floodplain? ☐ Yes ☒ No

2B. If yes, does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the 100-year water surface elevation to increase at any location by more than one foot (*or other surcharge limit if community or state has adopted more stringent criteria*)? ☐ Yes ☐ No

If the answer to either Items 1B or 2B is yes, please provide documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

4. REVISION REQUESTOR ACKNOWLEDGMENT

12. Having read NFIP Regulations, 44 CFR Ch. I, parts 59, 60, 61, and 72, I believe that the proposed revision ☒ is ☐ is not in compliance with the requirements of the aforementioned NFIP Regulations.

5. COMMUNITY OFFICIAL ACKNOWLEDGMENT

13. Was this revision request reviewed by the community for compliance with the community's adopted floodplain management ordinances? ☒ Yes ☐ No

14. Does this revision request have the endorsement of the community? ☒ Yes ☐ No

If no to either of the above questions, please explain: _____

Please note that community acknowledgment and /or notification is required for all requests as outlined in Section 65.4 (b) of the NFIP Regulations.

6. OPERATION AND MAINTENANCE

15. Does the physical change involve a flood control structure (e.g., levees, floodwalls, channelization, basins, dams)? ☐ Yes ☒ No

If yes, please provide the following information for each of the new flood control structures:

A. Inspection of the flood control project will be conducted periodically by _____ (entity)
N/A

_____ with a maximum interval of _____ months between inspections.

B. Based on the results of scheduled periodic inspections, appropriate maintenance of the flood control facilities
N/A will be conducted by _____ (entity)

to ensure the integrity and degree of flood protection of the structure.

C. A formal plan of operation, including documentation of the flood warning system, specific actions and
N/A assignments of responsibility by individual name or title, and provisions for testing the plan at intervals not less than one year, ☐ has ☐ has not been prepared for the flood control structure.

D. The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the _____ (Name)

N/A

flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Attach operation and maintenance plans

7. REQUESTED RESPONSE FROM FEMA

16. After examining the pertinent NFIP regulations and reviewing the document entitled "Appeals, Revisions, and Amendments to Flood Insurance Maps: A guide for Community Officials," dated January 1990, this request is for a:

_____a. CLOMR — A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision *(LOMR or PMR)*, or proposed hydrology changes *(see 44 CFR Ch. I, Parts 60, 65, and 72)*.

_____b. LOMR — A letter from FEMA officially revising the current NFIP map to show changes to floodplains, floodways, or flood elevations. LOMRs typically depict decreased flood hazards. *(See 44 CFR Ch. I Parts 60 and 65.)*

X c. PMR — A reprinted NFIP map incorporating changes to floodplains, floodways, or flood elevations. Because of the time and cost involved to change, reprint, and redistribute an NFIP map, a PMR is usually processed when a revision reflects increased flood hazards or large-scope changes. *(See 44 CFR Ch. I, Parts 60 and 65.)*

_____d. Other: Describe_____

8. FORMS INCLUDED

17. Form 2 entitled, "Certification By Registered Professional Engineer and/or Land Surveyor" must be submitted.

The following forms should be included with this request if (check the included forms):

• Hydrologic analysis for flooding source differs from that used to develop FIRM	☒ Hydrologic Analysis Form (Form 3)
• Hydraulic analysis for riverine flooding differs from that used to develop FIRM	☒ Riverine Hydraulic Analysis Form (Form 4)
• The request is based on updated topographic information or a revised floodplain or floodway delineation is requested	☒ Riverine /Coastal Mapping Form (Form 5)
• The request involves any type of channel modification	☐ Channelization Form (Form 6)
• The request involves new bridge or culvert or revised analysis of an existing bridge or culvert	☐ Bridge/Culvert Form (Form 7)
• The request involves a new revised levee/floodwall system	☐ Levee/Floodwall System Analysis Form (Form 8)
• The request involves analysis of coastal flooding	☐ Coastal Analysis Form (Form 9)
• The request involves coastal structures credited as providing protection from the 100-year flood	☐ Coastal Structures (Form 10)
• The request involves an existing, proposed, or modified dam	☐ Dam Form (Form 11)
• The request involves structures credited as providing protection from the 100-year flood on an alluvial fan	☐ Alluvial Fan Flooding Form (Form 12)

9. INITIAL REVIEW FEE

18. The minimum initial review fee for the appropriate request category has been included. ☐ Yes ☐ No

Initial fee amount: $ _____

METHOD OF PAYMENT (Check one box)

☐ PAYMENT ENCLOSED ☐ VISA ☐ MASTERCARD

Check or money order only.
Make payable to
National Flood Insurance Program

CARD NUMBER

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

EXP. Date

Signature

or

19. This request is for a project that is for public benefit and is intended to reduce the flood hazard to existing development in identified flood hazard areas as opposed to planned floodplain development. ☐ Yes ☐ No

or

20. This request is to correct an error or to include the effects of natural changes within the areas of special flood hazards. ☐ Yes ☐ No

Note: I understand that my signature indicates that all information submitted in support of this request is correct.

Ron Nevitt
Signature of Revision Requester

Printed Name and Title of Revision Requester

Flood Control District of Maricopa County
Company Name

4-28-94
Date

Note: Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.

Ron Nevitt
Signature of Community Official

RON NEVITT, FLOODPLAIN REPRESENTATIVE
Printed Name and Title of Community Official

MARICOPA COUNTY, AZ
Community Name

4-28-94
Date

Does this request impact any other communities? ☒ Yes ☐ No

See attached letter from the Town of Buckeye

If yes, attach letters from all affected jurisdictions acknowledging revision request and approving changes to floodway, if applicable.

Note: Although a photograph of physical changes is not required, it may be helpful for FEMA's review.

Town of Buckeye

March 31, 1994

Mr. Timothy M. Murphy
Flood Control District of
Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

RE: BUCKEYE AREA FLOOD DELINEATION STUDY (FCD 90-69)

Dear Tim:

The Town of Buckeye has no objections to the submittal of the Buckeye Area Flood Delineation Study to the Federal Emergency Management Agency (FEMA) for their review and approval. We understand that the Flood Control District will act as the lead Agency in this submittal and that FEMA's approval of the study results will revise the Flood Insurance Rate Maps (FIRMs) within the Town of Buckeye as well as outside the town limits. We feel that the results of the detailed study done by McLaughlin Kmetty Engineers for the District will provide a better floodplain management tool than the existing approximate study does. We understand the impacts the study results will have on floodplain management within the Town of Buckeye.

Upon FEMA's approval, please provide the Town of Buckeye with final copies of the study reports and delineation drawings.

Should you have any questions, please contact me at 386-4691.

Sincerely,

Fred Carpenter
Town Manager

FLOOD CONTROL DISTRICT
RECEIVED
APR 04 '94
CHENG | P&PM
HYDRO
ADMIN | LMGT
FINANCE | FILE
C&O | 1 | TMM
ENGR
REMARKS

100 North Apache • P.O. Box 157 • Buckeye, Arizona 85326 • Fax (602) 386-7832 • (602) 386-4691

ARIZONA DEPARTMENT OF WATER RESOURCES

15 South 15th Avenue, Phoenix, Arizona 85007
Telephone (602) 542-1553
Fax (602 256-0506

FIFE SYMINGTON
Governor

ELIZABETH ANN RIEKE
Director

August 19, 1992

FLOOD CONTROL DISTRICT
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REMARKS

Mr. John Matticks
Assistant Administrator
Office of Risk Assessment
Federal Insurance Administration
Federal Emergency Management Agency
Washington, D.C. 20472

Dear Mr. Matticks:

This is to confirm that this Department has been reviewing the hydrology for all flood studies completed within Arizona with the exception of Maricopa and Pima Counties. The staffs of both county's Flood Control Districts have the technical expertise to adequately review hydrologic and hydraulic analysis.

Please continue to accept Pima County and Maricopa County studies as if we had reviewed them. If special problems or questions arise with either county, we will, of course, be available for coordination purposes.

We will continue to review flood insurance study technical documentation for other Arizona communities which lack either staff or technical expertise to adequately review hydrologic and hydraulic analyses.

If you have any questions or comments, please don't hesitate to contact me at (602) 542-1541.

Sincerely,

Dan R. Lawrence, P.E.
Chief Engineer

cc: Mr. Pedro Calza, MCFCD
Mr. David Smutzer, PCDOT&FCD

FEMA USE ONLY

FORM 2

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.

2. I am licensed with an expertise in hydraulics
[example: water resources (hydrology, hydraulics, sediment transport, interior drainage)* structural, geotechnical, land surveying.]

3. I have 11 years experience in the expertise listed above.

4. I have [xx] prepared [ ] reviewed the attached supporting data and analyses related to my expertise.

5. I [x] have [ ] have not visited and physically viewed the project.

6. In my opinion, the following analyses and/or design, were performed in accordance with sound engineering practices:
Determination of water surface elevation, flood zones, floodplain mapping and analysis of problem areas.

7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. [ ] Viewed all phases of actual construction.
b. [ ] Compared plans and specifications with as-built survey information.
c. [ ] Examined plans and specifications and compared with completed projects.
d. [xx] Other N/A

8. All information submitted in support of this request is 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: Frank Edward Brown
(please print or type)

Title: Civil Engineer
(please print or type)

Registration No. 23969 Expiration Date: 03/31/96

State Arizona

Type of License P.E. (Civil)

Frank Edward Brown
Signature

2/15/93
Date

Registered Professional Engineer (Civil) CERTIFICATE NO. 23969 FRANK EDWARD BROWN Date Signed 2/15/93 ARIZONA, U.S.A.

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

Statement to be attached to FEMA Form 2,
Certification by Registered Professional Engineer
Signed by Frank Edward Brown, P.E.

The flooding source is ponded water behind the railroad embankment and the two canal embankments. The technical basis for the ponded water surface elevations came from calculations prepared by George V. Sabol Consulting Engineers, who was the primary preparer of the separate Hydrology Report. These calculations are comprised of stage-storage-discharge rating curves and HEC-1 reservoir routing analyses. Weir flow rating curves for embankment overtopping were refined by Mr. Brown in some areas in order to provide more detail for floodplain mapping purposes.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
22969
FRANK EDWARD
BROWN
Date Signed 2-17-93
ARIZONA, U.S.A.

89407-00\PECert.002

FEMA USE ONLY

FORM 2

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.

2. I am licensed with an expertise in hydrology and hydraulics
[example: water resources (hydrology, hydraulics, sediment transport, interior drainage)* structural, geotechnical, land surveying.]

3. I have 23 years experience in the expertise listed above.

4. I have [X] prepared [ ] reviewed the attached supporting data and analyses related to my expertise.

5. I [X] have [ ] have not visited and physically viewed the project.

6. In my opinion, the following analyses and/or design, were performed in accordance with sound engineering practices:
flood hydrology

7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. [ ] Viewed all phases of actual construction.
b. [ ] Compared plans and specifications with as-built survey information.
c. [ ] Examined plans and specifications and compared with completed projects.
d. [X] Other N/A

8. All information submitted in support of this request is 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: George V. Sabol
(please print or type)

Title: President
(please print or type)

Registration No. 17928 Expiration Date: 30 June 1994

State Arizona

Type of License Civil

Signature

23 February 1993
Date

*Specify Subdiscipline

(Optional)

Note: Insert not applicable (N/A) when statement does not apply.

Statement to be attached to FEMA Form 2,

Certification by Registered Professional Engineer

Signed by George V. Sabol, P.E.

The data that were compiled and used in the preparation of the Hydrology Report, Buckeye Floodplain Delineation Study, are the most practical data that are available and are accurate to the best of the certifier's knowledge. The hydrologic analyses were performed in accordance with sound engineering practices, as applicable to Maricopa County, Arizona. The Hydrology Report presents the flood hydrology for this study that is representative of existing hydrologic conditions, and portrays, to the standard of the profession, the flood potential for the study area.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
17928
GEORGE V.
SABOL
Date Signed 26 Feb 93
ARIZONA, U.S.A.

FEMA USE ONLY

FORM 2

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.

2. I am licensed with an expertise in Land Surveying
[example: water resources (hydrology, hydraulics, sediment transport, interior drainage)* structural, geotechnical, land surveying.]

3. I have 18 years experience in the expertise listed above.

4. I have ☐ prepared ☒ reviewed the attached supporting data and analyses related to my expertise.

5. I ☒ have ☐ have not visited and physically viewed the project.

6. In my opinion, the following analyses and/or design, were performed in accordance with sound engineering practices:
Survey Horizontal and Vertical Mapping Control and ERM Elev.

7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. ☐ Viewed all phases of actual construction.
b. ☐ Compared plans and specifications with as-built survey information.
c. ☐ Examined plans and specifications and compared with completed projects.
d. ☒ Other N/A

8. All information submitted in support of this request is 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: Larry Maldonado
(please print or type)

Title: President
(please print or type)

Registration No. 16863 Expiration Date: Current

State Arizona

Type of License Land Surveyor

Larry Maldonado
Signature

4-6-93
Date

REGISTERED LAND SURVEYOR CERTIFICATE NO. 16863 LARRY M. MALDONADO Date Signed 4-7-93 ARIZONA, U.S.A.

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

Statement to be attached to FEMA Form 2,

Certification by Registered Professional Land Surveyor

Signed by Larry Maldonado, P.E., L.S.

The data that was compiled and used in the preparation of the Survey Horizontal and Vertical Mapping Control and ERM Elevations, Buckeye Floodplain Delineation Study, are the most practical data that are available and are accurate to the best of the certifier's knowledge. The survey control was performed in accordance with sound Land Surveying practices, as applicable to Maricopa County, Arizona.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
16863
LARRY M.
MALDONADO
Date Signed 4-7-93
ARIZONA, U. S. A.

(MS) FEMA

FEDERAL EMERGENCY MANAGEMENT AGENCY **HYDROLOGIC ANALYSIS FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1994*	*FEMA USE ONLY*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.67 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Buckeye Canal
(One form for each flooding source)

Project Name /Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. HYDROLOGIC ANALYSIS IN FIS

☒ Approximate study stream (Zone A)
☐ Detailed study stream (briefly explain methodology)_____

2. REASON FOR NEW HYDROLOGIC ANALYSIS

☒ No existing analysis
☐ Improved data *(see data revision on page 3)*
☐ Changed physical conditions of watershed *(explain)*

☐ Alternative methodology *(justify why the revised model is better than model used in the effective FIS)*

☐ Evaluation of proposed conditions (CLOMRs only) (explain)

☐ Other

If a computer program/model was used in revising the hydrologic analysis, please provide a diskette with the input files for the 10-, 50-, 100 - and 500-year recurrence intervals.

Only the 100-year recurrence interval need be included for SFHAs designated as Zone A.

3. APPROVAL OF ANALYSIS

☒ Approval of hydrologic analysis, including the resulting peak discharge value (s) has been provided by the appropriate local, state, or Federal Agency. (i.e., Flood Control District of Maricopa County)
Attach evidence of approval.

☐ Approval of the hydrologic analysis is not required by any local, State, or Federal Agency.

ATTACHMENT C: PRECIPITATION/RUNOFF MODEL

		FIS:	Revised
1.	Method or model used:	N/A	HEC-1
	Version:	N/A	4.0
	Date:	N/A	September, 1990
2.	Source of rainfall depth:	N/A	NOAA Atlas 2
3.	Source of rainfall distribution:	N/A	FCDMC Hydrologic Manual
4.	Rainfall duration:	N/A	6 & 24 Hour
5.	Areal adjustment to precipitation (%):	N/A	Depends upon Subbasin Area
6.	Hydrograph development method:	N/A	S-Graph
7.	Loss rate method:	N/A	Green & Ampt
	Source of soils information:	N/A	SCS Soil Survey
	Source of land use information	N/A	Aerial Photos
8.	Channel routing method:	N/A	Normal Depth
9.	Reservoir routing:	☐ Yes ☐ No	☒ Yes ☐ No
10.	Baseflow considerations:	☐ Yes ☐ No	☐ Yes ☒ No

If yes, explain how baseflow was determined:

11.	Snowmelt considerations:	☐ Yes ☐ No	☐ Yes ☒ No
12.	Model calibration:	☐ Yes ☐ No	☒ Yes ☐ No

If yes, explain how calibration was performed See Page IV-9 of the Hydrology Report.

13. Future land use condition: ☐ Yes ☒ No

If yes, explain why

NOTE: FEMA policy is to base flooding on existing conditions.
If data is not available, indicate by N/A.

Attach precipitation/runoff model, hydrologic model schematic, curve number calculations, time of concentration calculations, and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT D: CONFIDENCE LIMITS EVALUATION

Stream: N/A

Select one location for Confidence Limits Evaluation (*describe location*): _____

_____

Discharges for selected location:

Exceedance Probability		FIS	Revised
10%	(10-year)	_____ cfs	_____ cfs
2%	(50-year)	_____ cfs	_____ cfs
1%	(100-year)	_____ cfs	_____ cfs
0.2%	(500-year)	_____ cfs	_____ cfs

1% (100-year) Flood Confidence Intervals

90% Confidence Interval: 5% limit _____ cfs

95% limit _____ cfs

50% Confidence Interval: 25% limit _____ cfs

75% limit _____ cfs

If the value of the 100-year frequency flood in the FIS is beyond the 50% confidence interval but within the 90% confidence interval, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

An example of confidence limits analysis can be found in Appendix 9 of Bulletin 17B.

Attach Confidence Limits Analysis.

TABLE 1

Summary of Peak Discharges at Key Locations

Flooding Source and Location	Subwatershed Group	Drainage Area (Sq. Mi.)	100-Year Peak Discharges[1] (cfs)
Roosevelt Canal			
Johnson Rd. to Bruner Rd.	F	1.33	294
Bruner Rd. to Palo Verde Rd.	G	3.83	1,144
Palo Verde Rd. to Wilson Ave.	H	2.76	1,218
Wilson Ave. to Turner Rd.	I	3.13	1,399
Oglesby Rd.	J	1.37	832
Rooks Rd. to Miller Rd.	K	1.67	1,078
Miller Rd. to Cemetery Rd. (Apache)	L	1.90	1,139
Cemetery Rd. (Apache) to Watson Rd.	N	1.80	1,419
Watson Rd. to Rainbow Rd.	O	2.19	1,373
Rainbow Rd. to Dean Rd.	P	1.31	840
Southern Pacific Railroad			
West of Johnson Rd.	E	0.28	171
Johnson Rd. to east of Bruner Road	F	4.59	541
East of Bruner Rd. to Palo Verde Rd.	G	6.26	1,457
Palo Verde Rd. to Wilson Ave.	H	5.20	951
Wilson Ave. to Turner Rd.	I	5.28	1,074
Turner Rd. to Oglesby Rd.	J	3.50	828
Oglesby Rd. to Rooks Rd.	K	5.18	1,173
Rooks Rd. to Miller Rd.	L	3.20	1,180
Miller Rd. to Cemetery Rd. (Apache)	M	2.42	522
Cemetery Rd. (Apache) to Watson Rd.	N	4.06	776
Watson Rd. to Rainbow Rd.	O	4.41	1,172
Rainbow Rd. to Dean Rd.	P	3.47	973
Buckeye Canal			
West of Johnson Rd.	E	0.52	255
Johnson Rd. to east of Bruner Rd.	F	5.74	666
East of Bruner Rd. to Palo Verde Rd.	G	6.61	843
Palo Verde Rd. to Wilson Ave.	H	5.78	889
Wilson Ave. to Turner Rd.	I	5.79	1,008
Turner Rd. to Oglesby Rd.	J	3.93	780
Oglesby Rd. to east of Rooks Rd.	K	5.59	1,103
East of Rooks Rd. to Miller Rd.	L	3.49	439
Miller Rd. to Cemetery Rd. (Apache)	M	2.56	287
Cemetery Rd. (Apache) to Watson Rd.	N	4.23	770
Watson Rd. to Rainbow Rd.	O	4.55	851
Rainbow Rd. to Dean Rd.	P	3.54	710

1. The 100-year peak discharge value reported is for the flow routed through or over the railroad and canals.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS FORM**	*O.M.B. Burden No 3067-0148* *Expires July 31, 1994*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Buckeye Canal
(One form for each flooding source)

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. REACH TO BE REVISED

~~Downstream limit~~: Eastern limit: Dean Road (FIRM Panel 2050)

~~Upstream limit~~: Western limit: Hassayampa River (FIRM Panel 2480)

2. EFFECTIVE FIS

☐ Not studied

☒ Studied by approximate methods

~~Downstream limit of~~ study Eastern limit:

~~Upstream limit~~ of study Western limit: Hassayampa River

☐ Studied by detailed methods

Downstream limit of study N/A

Upstream limit of study

☐ Floodway delineated

Downstream limit of Floodway N/A

Upstream limit of Floodway

3. HYDRAULIC ANALYSIS

Why is the hydraulic analysis different from that used to develop the FIRM. *(Check all that apply)*

☐ Not studied in FIS

☒ Improved hydrologic data/analysis. Explain: The effective FIS is an approximate study and no hydrologic data is available. An HEC-1 hydrologic model was developed for the area. This allowed for a more accurate determination & routing of the rainfall runoff volume.

☒ Improved hydraulic analysis. Explain: The hydraulic analysis uses recent survey data and the HEC-1 hydrologic model results to determine the elevation and area of Ponding along the upstream side of the canal.

☐ Flood control structure. Explain:

☐ Other. Explain: A detailed survey was done along the canal banks and upstream of the canal.

Full input and output listings along with files on diskette *(if available)* for each of the models listed below and summary of the source of input parameters used in the models must be provided. The summary must include a complete description of any changes made from model to model (*e.g. duplicate effective model to corrected effective model*). Only the Duplicate Effective and the Revised or Post-Project Conditions models must be submitted. See instructions for directions on when other models may be required. Only the 100-year flood profile is required for SFHAs with a Zone A designation. For areas which do not have detailed flooding, a hydraulic model is not required; however BFE's may not be added to the revised FIRM.

☐ Duplicate Effective Model — Natural ☐ Floodway ☐

Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models *(10-, 50-, 100-, and 500-year multi-profile runs and the floodway run)* must be obtained and then reproduced on the requestor's equipment to produce the duplicate effective model. This is required to assure that the effective model input data has been transferred correctly to the requestor's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

☐ Corrected Effective Model — Natural ☐ Floodway ☐

The corrected effective model is the model that corrects any errors that occur in the duplicate effective model, adds any additional cross sections to the duplicate effective model, or incorporates more detailed topographic information than that used in the currently effective model. The corrected effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

☐ Existing or Pre-Project Conditions Model — Natural ☐ Floodway ☐

The duplicate effective or corrected model is modified to produce the existing or pre-project conditions model to reflect any modifications that have occurred within the floodplain since the date of the effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the corrected effective or duplicate effective model.

☐ Revised or Post-Project Conditions Model — Natural ☐ Floodway ☐

The existing or pre-project conditions model *(or duplicate effective or corrected effective model, as appropriate)* is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for proposed project this model should reflect proposed conditions.

☐ Other: Please attach a sheet describing all other models or calculations submitted. — Natural ☐ Floodway ☐

4. MODEL PARAMETERS *(from model used to revise 100-year water surface elevation)*

1. Discharges:

	Upstream Limit	Downstream Limit
10-year		
50-year		
100-year		
500-year		

Attach diagram showing changes in 100-year discharge

2. Explain how the starting water surface elevations were determined N/A
Only ponded flooding occurs

3. Give range of friction loss coefficients (*Manning's "N"*) Channel ..... N/A

Overbanks ..... N/A

If friction loss coefficients are different anywhere along the revised reach from those used to develop the FIRM, give location, value used in the effective FIS, and revised values and an explanation as to how the revised values were determined.

Location	FIS	Revised

Explain:

4. Describe how the cross section geometry data were determined *(e.g., field survey, topographic map, taken from previous study)* and list cross sections that were added.

Geometric data for the railroad and canal analyses were determined by field surveys. The geometric data for delineating the ponding areas were determined by field surveys and topographic mapping.

5. Explain how reach lengths for channel and overbanks were determined:

N/A

5. RESULTS (*from model used to revise 100-year water surface elevations*)

1. Do the results indicate:

a. Water surface elevations higher than end points of cross sections? ..... ☐ Yes ☒ No

b. Supercritical depth? ..... ☐ Yes ☒ No

c. Critical depth? ..... ☐ Yes ☒ No

d. Other unique situations ..... ☐ Yes ☒ No

If yes to any of the above, attach an explanation that discusses the situation and how it is presented on the profiles, tables, and maps.

2. What is the maximum change in energy gradient between cross-sections? ..... N/A

Specify location .....

3. What is the distance between the cross-sections in 2 above? ..... N/A

Specify location .....

4. What is the maximum distance between cross-sections? ..... N/A

Specify location .....

5. Floodway determination

a. What is the maximum surcharge allowed by the community or State? ..... 1.0 foot

b. What is the maximum surcharge for the revised conditions? ..... N/A foot

Specify location .....

c. What is the maximum velocity? ..... N/A fps

Specify location .....

Explain:

d. Are there any negeative surcharge values at any cross-section ☐ Yes ☒ No

If yes, the floodway may need to widen. If it is not widened, please explain and indicate the maximum negative surcharge.

5. RESULTS *(Cont'd)*

6. Is the discharge value used to determine the floodway anywhere different from that used to determine the natural 100-year flood elevations? ..... ☐ Yes ☒ No

If Yes, explain:

7. Do 100-year water surface elevations increase at any location? ..... ☐ Yes ☒ No

If yes, please attach a list of the locations where the increases occur, state whether or not the increases are located on the requestor's property, and provide an explanation of the reason for the increases.

The existing FIS is an approximate study and water surface elevations aren't given.

Please attach a completed comparison table entitled: Water Surface Elevation Check (See page 6)

6. REVISED FIRM/FBFM AND FLOOD PROFILES

A. The revised water surface elevations tie into those computed by the effective FIS Model *(10-, 50-, 100-, and 500-year)*, downstream of the project at cross-section_____ within_____feet and upstream of the project at cross section_____within_____feet.

N/A There aren't any existing water surface elevations in the effective FIS

B. The revised floodway elevations tie into those computed by the effective FIS model, dowstream of the project at cross section_____within_____feet and upstream of the project at cross section_____ within_____feet.

N/A There aren't any existing floodways.

C. Attach profiles, at the same vertical and horizontal scale as the profiles in the effective FIS report, showing stream bed and profiles of all floods studied (without encroachment). Also, label all cross sections, road crossings (including low chord and top-of-road data), culverts, tributaries, corporate limits, and study limits. If channel distance has changed, the stationing should be revised for all profile sheets. See the Hydraulic Report.

D. Attach a Floodway Data Table showing data for each cross section listed in the published Floodway Data Table in the FIS report. N/A There aren't any floodways.

Proceed to Riverine /Coastal Mapping Form

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]

COMMENTS:

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

Sheet _____ of _____

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE/COASTAL MAPPING FORM**	O.M.B. Burden No. 3067-0148 Expires July 31, 1994	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: BUCKEYE CANAL

Project Name/Identifier: BUCKEYE AREA FLOOD DELINEATION STUDY FCD 90-69

1. MAPPING CHANGES

1. A topographic work map of suitable scale, contour interval, and planimetric definition must be submitted showing *(indicate N/A when not applicable)*:

		Included		
A.	Revised approximate 100-year floodplain boundaries (Zone A)	☐ Yes	☒ No	☐ N/A
B.	Revised detailed 100- and 500-year floodplain boundaries	☒ Yes	☐ No	☐ N/A
C.	Revised 100-year floodway boundaries	☐ Yes	☐ No	☒ N/A
D.	Location and alignment of all cross sections used in the revised hydraulic model with stationing control indicated	☐ Yes	☐ No	☒ N/A
E.	Stream alignments, road and dam alignments	☒ Yes	☐ No	☐ N/A
F.	Current community boundaries	☒ Yes	☐ No	☐ N/A
G.	Effective 100- and 500-year floodplain and 100-year floodway boundaries from the FIRM/FBFM reduced or enlarged to the scale of the topographic work map	☐ Yes	☒ No	☐ N/A
H.	Tie-ins between the effective and revised 100- and 500-year floodplains and 100-year floodway boundaries	☒ Yes	☐ No	☐ N/A
I.	The requestor's property boundaries and community easements	☐ Yes	☐ No	☒ N/A
J.	The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
K.	Location and description of reference marks	☒ Yes	☐ No	☐ N/A
L.	Vertical datum (example: NGVD, NAVD etc.)	☒ Yes	☐ No	☐ N/A
M.	Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
N.	Location and alignment of all coastal transects used to revise the coastal analyses	☐ Yes	☐ No	☒ N/A

If any of the items above are marked no or N/A, please explain: The effective FIS only has approximate 100-year floodplains (Zone A). For the detailed revised study the 100-year floodplains have primarily been identified as zone AH's.

2. What is the source and date of the updated topographic information *(example: orthophoto maps, July 1985; field survey, May 1979, beach profiles, June 1987, etc.)*? _____

3. What is the scale and contour interval of the following workmaps?
   a. Effective FIS _____ scale _____ Contour interval
   b. Revision Request 1" = 400' scale Field Survey and 2' & 10' Contour interval

NOTE: Revised topographic information must be of equal or greater detail.

4. Attach an annotated FIRM and FBFM at the scale of the effective FIRM and FBFM showing the revised 100-year and 500-year floodplains and the 100-year floodway boundaries and how they tie into those shown on the effective FIRM and FBFM downstream and upstream of the revision or adjacent to the area of revision for coastal studies.

Attach additional pages if needed.

5. Flood Boundaries and 100-year water surface elevations:

Has the 100-year floodplain been shifted or increased or the 100-year water surface elevation increased at any location on property other than the requestor's or community's? ☐ Yes ☐ No

If yes, please give the location of shift or increase and an explanation for the increase.

Since this is a **restudy** of a large area that has existing A zone delineations (which don't have elevations), it is impossible to say that there has been an increase in the water surface elevations. Any changes in the delineation limits are probably due to the use of more detailed topographic mapping supplemented by the field survey data. The efforts put forth to notify the public about this **restudy** and its results are detailed in the public notification documentation section.

a. Have the affected property owners been notified of this shift or increase and the effect it will have on their property? ..... ☐ Yes ☐ No

If yes, please attach letters from these property owners stating they have no objections to the revised flood boundaries if a LOMR is being requested.

b. What is the number of insurable structures that will be impacted by this shift or increase?_____

6. Have the floodway boundaries shifted or increased at any location compared to those shown on the effective FBFM or FIRM? ..... ☐ Yes ☒ No

If yes, explain:

7. If a V-zone has been designated, has it been delineated to extend landward to the heel of the primary frontal dune? N/A ☐ Yes ☐ No

If no, explain:

8. Manual or digital map submission:

☒ Manual

☐ Digital

Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance of submission as possible.

2. EARTH FILL PLACEMENT

1. The fill is: ☐ Existing ☐ Proposed N/A

2. Has fill been/will be placed in the regulatory floodway? ..... ☐ Yes ☐ No N/A
If yes, please attach completed Riverine Hydraulic Analysis Form.

3. Has fill been/will be placed in floodway fringe *(area between the floodway and 100-year floodplain boundaries)*? ..... ☐ Yes ☐ No N/A

If yes, then complete A, B, C, and D below.

A. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ..... ☐ Yes ☐ No N/A

If yes, justify steeper slopes_____

B. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? *(Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)* ..... ☐ Yes ☐ No N/A

If no, describe erosion protection provided_____

C. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No N/A

D. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No N/A

If yes, provide certification of fill compaction (item C. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer.

4. Has fill been/will be placed in a V-zone? ☐ Yes ☐ No N/A

If yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall? ☐ Yes ☐ No N/A

If yes, attach the coastal structures form.

SECTION 5

SOUTHERN PACIFIC RAILROAD

FEDERAL EMERGENCY MANAGEMENT AGENCY
REVISION REQUESTOR AND COMMUNITY OFFICIAL FORM

O.M.B. Burden No 3067-0148
Expires July 31, 1994

FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

1. OVERVIEW

1. The basis for this revision request is (are): *(check all that apply)*
   - ☐ Physical change
     - ☐ Existing
     - ☐ Proposed
   - ☒ Improved methodology
   - ☒ Improved data
   - ☐ Floodway revision
   - ☒ Other This is the first detailed study of the area.

   Explain New study done because existing information is from an approximate study.

2. Flooding Source: Southern Pacific Railroad
3. Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69
4. FEMA zone designations affected: A, B, X
   (example: A, AH, AO, A1-A30, A99, AE, V, V1-30, VE, B, C, D, X)
5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	County	State	Map No.	Panel No.	Effective Date
EX: 480301	Katy,City	Harris, Fort Bend	TX	480301	0005D	02/08/83
040037	Maricopa County	Maricopa	AZ	04013C	2480E	9-4-91
040037	Maricopa County	Maricopa	AZ	04013C	2485E	9-4-91
040037	Maricopa County	Maricopa	AZ	04013C	2025E	9-4-91
040037	Maricopa County	Maricopa	AZ	04013C	2040D	4-15-88
040037	Maricopa County	Maricopa	AZ	04013C	2050E	9-4-91

6. The area of revision encompasses the following types of flooding, structures, and associated disciplines: *(check all that apply)*

Types of Flooding
- ☐ Riverine
- ☐ Coastal
- ☐ Alluvial Fan
- ☒ Shallow Flooding *(e.g. Zones AO and AH)*
- ☐ Lakes

Affected by wind/wave action
- ☐ Yes
- ☐ No

Structures
- ☐ Channelization
- ☐ Levee/Floodwall
- ☒ Bridge/Culvert
- ☐ Dam
- ☐ Coastal
- ☐ Fill
- ☐ Pump Station
- ☐ None
- ☐ Channel Relocation
- ☐ Excavation
- ☐ Other *(describe)*

Disciplines*
- ☒ Water Resources
  - ☒ Hydrology
  - ☒ Hydraulics
  - ☐ Sediment Transport
  - ☐ Interior Drainage
- ☐ Structural
- ☐ Geotechnical
- ☒ Land Surveying
- ☐ Other *(describe)*

☐ Other(describe) _____

* **Attach completed "Certification by Registered Professional Engineer and/or Land Surveyor" Form for each discipline checked. (Form 2)**

2. FLOODWAY INFORMATION

7. Does the affected flooding source have a floodway designated on the effective FIRM or FBFM? ☐ Yes ☒ No
8. Does the revised floodway delineation differ from that shown on the effective FIRM or FBFM ☐ Yes ☐ No
   If yes, give reason: N/A

Attach copy of either a public notice distributed by the community stating the community's intent to revise the floodway or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions.

9. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP? ☐ Yes ☐ No

If yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

3. PROPOSED ENCROACHMENTS

10. With floodways:

1A. Does the revision request involve fill, new construction, substantial improvement, or other development in the floodway? ☐ Yes ☐ No N/A

1B. If yes, does the development cause the 100-year water surface elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No N/A

11. Without floodways:

2A. Does the revision request involve fill, new construction, substantial improvement, or other development in the 100-year floodplain? ☐ Yes ☒ No

2B. If yes, does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the 100-year water surface elevation to increase at any location by more than one foot (*or other surcharge limit if community or state has adopted more stringent criteria*)? ☐ Yes ☐ No

If the answer to either Items 1B or 2B is yes, please provide documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

4. REVISION REQUESTOR ACKNOWLEDGMENT

12. Having read NFIP Regulations, 44 CFR Ch. I, parts 59, 60, 61, and 72, I believe that the proposed revision ☒ is ☐ is not in compliance with the requirements of the aforementioned NFIP Regulations.

5. COMMUNITY OFFICIAL ACKNOWLEDGMENT

13. Was this revision request reviewed by the community for compliance with the community's adopted floodplain management ordinances? ☒ Yes ☐ No

14. Does this revision request have the endorsement of the community? ☒ Yes ☐ No

If no to either of the above questions, please explain: _____

Please note that community acknowledgment and /or notification is required for all requests as outlined in Section 65.4 (b) of the NFIP Regulations.

6. OPERATION AND MAINTENANCE

15. Does the physical change involve a flood control structure (e.g., levees, floodwalls, channelization, basins, dams)? ☐ Yes ☒ No

If yes, please provide the following information for each of the new flood control structures:

A. Inspection of the flood control project will be conducted periodically by _____ (entity)

N/A

_____ with a maximum interval of _____ months between inspections.

B. Based on the results of scheduled periodic inspections, appropriate maintenance of the flood control facilities

N/A will be conducted by _____ (entity)

to ensure the integrity and degree of flood protection of the structure.

C. A formal plan of operation, including documentation of the flood warning system, specific actions and

N/A assignments of responsibility by individual name or title, and provisions for testing the plan at intervals not less than one year, ☐ has ☐ has not been prepared for the flood control structure.

D. The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the _____ (Name)

N/A

flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Attach operation and maintenance plans

7. REQUESTED RESPONSE FROM FEMA

16. After examining the pertinent NFIP regulations and reviewing the document entitled "Appeals, Revisions, and Amendments to Flood Insurance Maps: A guide for Community Officials," dated January 1990, this request is for a:

_____a. CLOMR — A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision *(LOMR or PMR)*, or proposed hydrology changes *(see 44 CFR Ch. I, Parts 60, 65, and 72)*.

_____b. LOMR — A letter from FEMA officially revising the current NFIP map to show changes to floodplains, floodways, or flood elevations. LOMRs typically depict decreased flood hazards. *(See 44 CFR Ch. I Parts 60 and 65.)*

X c. PMR — A reprinted NFIP map incorporating changes to floodplains, floodways, or flood elevations. Because of the time and cost involved to change, reprint, and redistribute an NFIP map, a PMR is usually processed when a revision reflects increased flood hazards or large-scope changes. *(See 44 CFR Ch. I, Parts 60 and 65.)*

_____d. Other: Describe _____

8. FORMS INCLUDED

17. Form 2 entitled, "Certification By Registered Professional Engineer and/or Land Surveyor" must be submitted.

The following forms should be included with this request if (check the included forms):

• Hydrologic analysis for flooding source differs from that used to develop FIRM	☒ Hydrologic Analysis Form (Form 3)
• Hydraulic analysis for riverine flooding differs from that used to develop FIRM	☒ Riverine Hydraulic Analysis Form (Form 4)
• The request is based on updated topographic information or a revised floodplain or floodway delineation is requested	☒ Riverine /Coastal Mapping Form (Form 5)
• The request involves any type of channel modification	☐ Channelization Form (Form 6)
• The request involves new bridge or culvert or revised analysis of an existing bridge or culvert	☒ Bridge/Culvert Form (Form 7)
• The request involves a new revised levee/floodwall system	☐ Levee/Floodwall System Analysis Form (Form 8)
• The request involves analysis of coastal flooding	☐ Coastal Analysis Form (Form 9)
• The request involves coastal structures credited as providing protection from the 100-year flood	☐ Coastal Structures (Form 10)
• The request involves an existing, proposed, or modified dam	☐ Dam Form (Form 11)
• The request involves structures credited as providing protection from the 100-year flood on an alluvial fan	☐ Alluvial Fan Flooding Form (Form 12)

9. INITIAL REVIEW FEE

18. The minimum initial review fee for the appropriate request category has been included. ☐ Yes ☐ No

Initial fee amount: $ _____

METHOD OF PAYMENT (Check one box)

☐ PAYMENT ENCLOSED ☐ VISA ☐ MASTERCARD

Check or money order only.
Make payable to
National Flood Insurance Program

CARD NUMBER

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

EXP. Date

Signature

or

19. This request is for a project that is for public benefit and is intended to reduce the flood hazard to existing development in identified flood hazard areas as opposed to planned floodplain development. ☐ Yes ☐ No

or

20. This request is to correct an error or to include the effects of natural changes within the areas of special flood hazards. ☐ Yes ☐ No

Note: I understand that my signature indicates that all information submitted in support of this request is correct.

Ron Nevitt
Signature of Revision Requester

Printed Name and Title of Revision Requester

Flood Control District of Maricopa County
Company Name

4-28-94
Date

Note: Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.

Ron Nevitt
Signature of Community Official

RON NEVITT, FLOODPLAIN REPRESENTATIVE
Printed Name and Title of Community Official

MARICOPA COUNTY, AZ
Community Name

4-28-94
Date

Does this request impact any other communities? ☒ Yes ☐ No

See attached letter from the Town of Buckeye.

If yes, attach letters from all affected jurisdictions acknowledging revision request and approving changes to floodway, if applicable.

Note: Although a photograph of physical changes is not required, it may be helpful for FEMA's review.

Town of Buckeye

March 31, 1994

Mr. Timothy M. Murphy
Flood Control District of
Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

RE: BUCKEYE AREA FLOOD DELINEATION STUDY (FCD 90-69)

Dear Tim:

The Town of Buckeye has no objections to the submittal of the Buckeye Area Flood Delineation Study to the Federal Emergency Management Agency (FEMA) for their review and approval. We understand that the Flood Control District will act as the lead Agency in this submittal and that FEMA's approval of the study results will revise the Flood Insurance Rate Maps (FIRMs) within the Town of Buckeye as well as outside the town limits. We feel that the results of the detailed study done by McLaughlin Kmetty Engineers for the District will provide a better floodplain management tool than the existing approximate study does. We understand the impacts the study results will have on floodplain management within the Town of Buckeye.

Upon FEMA's approval, please provide the Town of Buckeye with final copies of the study reports and delineation drawings.

Should you have any questions, please contact me at 386-4691.

Sincerely,

Fred Carpenter
Town Manager

FLOOD CONTROL DISTRICT
RECEIVED
APR 04 '94

CHENG		P & PM	
		HYDRO	
ADMIN		LMGT	
FIN & A		FILE	
C&O	/	TMM	
ENGR			

REMARKS

100 North Apache • P.O. Box 157 • Buckeye, Arizona 85326 • Fax (602) 386-7832 • (602) 386-4691

ARIZONA DEPARTMENT OF WATER RESOURCES
15 South 15th Avenue, Phoenix, Arizona 85007
Telephone (602) 542-1553
Fax (602 256-0506

FIFE SYMINGTON
Governor

ELIZABETH ANN RIEKE
Director

August 19, 1992

FLOOD CONTROL DISTRICT
RECEIVED
AUG 24 1992
CH ENG | P & PM
REMARKS

Mr. John Matticks
Assistant Administrator
Office of Risk Assessment
Federal Insurance Administration
Federal Emergency Management Agency
Washington, D.C. 20472

Dear Mr. Matticks:

This is to confirm that this Department has been reviewing the hydrology for all flood studies completed within Arizona with the exception of Maricopa and Pima Counties. The staffs of both county's Flood Control Districts have the technical expertise to adequately review hydrologic and hydraulic analysis.

Please continue to accept Pima County and Maricopa County studies as if we had reviewed them. If special problems or questions arise with either county, we will, of course, be available for coordination purposes.

We will continue to review flood insurance study technical documentation for other Arizona communities which lack either staff or technical expertise to adequately review hydrologic and hydraulic analyses.

If you have any questions or comments, please don't hesitate to contact me at (602) 542-1541.

Sincerely,

Dan R. Lawrence, P.E.
Chief Engineer

cc: Mr. Pedro Calza, MCFCD
Mr. David Smutzer, PCDOT&FCD

FEMA USE ONLY

FORM 2

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.

2. I am licensed with an expertise in hydraulics
[example: water resources (hydrology, hydraulics, sediment transport, interior drainage)* structural, geotechnical, land surveying.]

3. I have 11 years experience in the expertise listed above.

4. I have [xx] prepared [ ] reviewed the attached supporting data and analyses related to my expertise.

5. I [x] have [ ] have not visited and physically viewed the project.

6. In my opinion, the following analyses and/or design, were performed in accordance with sound engineering practices:
Determination of water surface elevation, flood zones, floodplain mapping and analysis of problem areas.

7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. [ ] Viewed all phases of actual construction.
b. [ ] Compared plans and specifications with as-built survey information.
c. [ ] Examined plans and specifications and compared with completed projects.
d. [xx] Other N/A

8. All information submitted in support of this request is 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: Frank Edward Brown
(please print or type)

Title: Civil Engineer
(please print or type)

Registration No. 23969 Expiration Date: 03/31/96

State Arizona

Type of License P.E. (Civil)

Frank Edward Brown
Signature

2/15/93
Date

Registered Professional Engineer (Civil) CERTIFICATE NO. 23969 FRANK EDWARD BROWN Date Signed 2/15/93 ARIZONA, U.S.A.

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

Statement to be attached to FEMA Form 2,
Certification by Registered Professional Engineer
Signed by Frank Edward Brown, P.E.

The flooding source is ponded water behind the railroad embankment and the two canal embankments. The technical basis for the ponded water surface elevations came from calculations prepared by George V. Sabol Consulting Engineers, who was the primary preparer of the separate Hydrology Report. These calculations are comprised of stage-storage-discharge rating curves and HEC-1 reservoir routing analyses. Weir flow rating curves for embankment overtopping were refined by Mr. Brown in some areas in order to provide more detail for floodplain mapping purposes.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
23969
FRANK EDWARD BROWN
Date Signed 2-17-93
ARIZONA, U.S.A.

89407-00\PECert.002

FEMA USE ONLY

FORM 2

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.

2. I am licensed with an expertise in hydrology and hydraulics
[example: water resources (hydrology, hydraulics, sediment transport, interior drainage)* structural, geotechnical, land surveying.]

3. I have 23 years experience in the expertise listed above.

4. I have [X] prepared [ ] reviewed the attached supporting data and analyses related to my expertise.

5. I [X] have [ ] have not visited and physically viewed the project.

6. In my opinion, the following analyses and/or design, were performed in accordance with sound engineering practices:
flood hydrology

7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. [ ] Viewed all phases of actual construction.
b. [ ] Compared plans and specifications with as-built survey information.
c. [ ] Examined plans and specifications and compared with completed projects.
d. [X] Other N/A

8. All information submitted in support of this request is 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: George V. Sabol
(please print or type)

Title: President
(please print or type)

Registration No. 17928 Expiration Date: 30 June 1994

State Arizona

Type of License Civil

Signature

23 February 1993
Date

Registered Professional Engineer (Civil) CERTIFICATE NO. 17928 GEORGE V. SABOL Date Signed 26 Feb ARIZONA, U.S.A.

(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

Statement to be attached to FEMA Form 2,

Certification by Registered Professional Engineer

Signed by George V. Sabol, P.E.

The data that were compiled and used in the preparation of the Hydrology Report, Buckeye Floodplain Delineation Study, are the most practical data that are available and are accurate to the best of the certifier's knowledge. The hydrologic analyses were performed in accordance with sound engineering practices, as applicable to Maricopa County, Arizona. The Hydrology Report presents the flood hydrology for this study that is representative of existing hydrologic conditions, and portrays, to the standard of the profession, the flood potential for the study area.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
17929
GEORGE V.
SABOL
Date Signed 26 Feb 93
ARIZONA, U.S.A.

FEMA USE ONLY

FORM 2

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.

2. I am licensed with an expertise in Land Surveying
[example: water resources (hydrology, hydraulics, sediment transport, interior drainage)* structural, geotechnical, land surveying.]

3. I have 18 years experience in the expertise listed above.

4. I have ☐ prepared ☒ reviewed the attached supporting data and analyses related to my expertise.

5. I ☒ have ☐ have not visited and physically viewed the project.

6. In my opinion, the following analyses and/or design, were performed in accordance with sound engineering practices:
Survey Horizontal and Vertical Mapping Control and ERM Elev.

7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. ☐ Viewed all phases of actual construction.
b. ☐ Compared plans and specifications with as-built survey information.
c. ☐ Examined plans and specifications and compared with completed projects.
d. ☒ Other N/A

8. All information submitted in support of this request is 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: Larry Maldonado
(please print or type)

Title: President
(please print or type)

Registration No. 16863 Expiration Date: Current

State Arizona

Type of License Land Surveyor

Larry Maldonado
Signature

4-6-93
Date

REGISTERED LAND SURVEYOR CERTIFICATE NO. 16863 LARRY M. MALDONADO Date Signed 4-7-93 ARIZONA, U.S.A.

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

Statement to be attached to FEMA Form 2,

Certification by Registered Professional Land Surveyor

Signed by Larry Maldonado, P.E., L.S.

The data that was compiled and used in the preparation of the Survey Horizontal and Vertical Mapping Control and ERM Elevations, Buckeye Floodplain Delineation Study, are the most practical data that are available and are accurate to the best of the certifier's knowledge. The survey control was performed in accordance with sound Land Surveying practices, as applicable to Maricopa County, Arizona.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
16863
LARRY M.
MALDONADO
Date Signed 4-7-93
ARIZONA, U.S.A.

(MS) FEMA

FEDERAL EMERGENCY MANAGEMENT AGENCY **HYDROLOGIC ANALYSIS FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1994*	*FEMA USE ONLY*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.67 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad
(One form for each flooding source)

Project Name /Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. HYDROLOGIC ANALYSIS IN FIS

☒ Approximate study stream (Zone A)
☐ Detailed study stream (briefly explain methodology)_____

2. REASON FOR NEW HYDROLOGIC ANALYSIS

☒ No existing analysis
☐ Improved data *(see data revision on page 3)*
☐ Changed physical conditions of watershed *(explain)*

☐ Alternative methodology *(justify why the revised model is better than model used in the effective FIS)*

☐ Evaluation of proposed conditions (CLOMRs only) (explain)

☐ Other

If a computer program/model was used in revising the hydrologic analysis, please provide a diskette with the input files for the 10-, 50-, 100 - and 500-year recurrence intervals.

Only the 100-year recurrence interval need be included for SFHAs designated as Zone A.

3. APPROVAL OF ANALYSIS

☒ Approval of hydrologic analysis, including the resulting peak discharge value (s) has been provided by the appropriate local, state, or Federal Agency. (i.e., Flood Control District of Maricopa County)
Attach evidence of approval.

☐ Approval of the hydrologic analysis is not required by any local, State, or Federal Agency.

Stream: Southern Pacific Railroad

Comparison of 100-year Discharges

Location:	Drainage area (Sq mi.)	FIS (cfs):	Revised (cfs):

For a summary of some of the 100-year discharges see Table 1 at the end of this section. See the Hydrology Report for all the hydrologic modeling results.

Note: When revised discharges are not significantly different than FIS discharges, FEMA may require a confidence limits analysis on attachment D at a later date to complete the review.

As is often the case with revision requests, only a portion of a stream may actually be revised or be affected by a revision. Therefore, transition to the unrevised portion is important to maintain the continuity of the study. NFIP regulations stipulate that such a transition must be assured. What is the transition from the proposed discharges to the effective discharges? Please explain how the transition was made *(attach separate sheet if necessary)*

N/A

ATTACH A COMPLETED REVIEW OF RESULTS PAGE FOR EACH FLOODING SOURCE.

Is the new hydrologic analysis being developed solely to revise the flow values presented in the FIS *(i.e. no changed hydraulic conditions)*? ☐ Yes ☒ No

If yes, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

FEMA does not normally revise NFIP maps solely due to insignificant flow changes where changes in 100-year water surface elevation are less than 1.0 foot.

5. HISTORICAL FLOODING INFORMATION

Is historical data available for the flooding source? ☐ Yes ☒ No

If yes, provide the following:

Location along flooding source: _____

Maximum peak discharge: _____ cfs

Second highest peak discharge: _____ cfs

Source of information: _____

6. GAGE RECORD INFORMATION

Location of nearest gage to project site *(along flooding source or similar watershed; specify)*

N/A There are no stream gages along the flooding source or in nearby similar watersheds.

Gaging Station: _____

Drainage area at gage: _____ mi^2

Number of years of data: _____

7. DATA REVISION

Please use the following table to list all the data and/or parameters affected by this request and identify them as new data (*New*) or as revising existing data (*Revised*). *(If necessary, attach a separate sheet.)*

Data Parameter	New	Revised	Data Source
Subbasin Areas	☒	☐	USGS Mapping
Lag Time, L, Lca, Slope, Kn	☒	☐	USGS Mapping
Green & Ampt Parameters	☒	☐	FCDMC Hydrologic Manual
Routing Reach Parameters	☒	☐	FCDMC Hydrologic Manual
	☐	☐	

- Data source can be from a Federal, State, or local government agency, or from a private source. Some State and local governments may have less strict data requirements than Federal agencies, in which case the hydrologic data may not be accepted by FEMA unless it is demonstrated that the data give a better estimate of the flood discharge.
- Attach documentation corroborating each data source *(i.e., certified statement, report, bibliographical reference to a published document)*. In the case of a published document or a government report, providing copies of the cover and pertinent pages may be helpful.

8. METHODOLOGY FOR NEW ANALYSIS

☐ Statistical Analysis of Gage Records (*use Attachment A*)

☐ Regional Regression Equations *(use Attachment B)*

☒ Precipitation/Runoff Model *(use Attachment C)*

☐ Other *(specify; attach backup computations and supporting data)* _____

ATTACHMENT A: STATISTICAL ANALYSIS OF GAGE RECORDS

Gaging Station: N/A

Gage Location (latitude and longitude):

	FIS:	Revised:
1. Number of years of data		
Systematic		
Historical		
2. Homogeneous data	☐ Yes ☐ No	☐ Yes ☐ No
3. Data adjustments	☐ Yes ☐ No	☐ Yes ☐ No
4. Number of high outliers		
Low outliers		
Zero events		
5. Generalized skew		
6. Station skew		
7. Adopted skew		
8. Probability distribution used (justify if log-Pearson III was not used)		
9. Transfer equations to ungaged sites		☐ Yes ☐ No

If yes, specify method

10. Expected probability* ☐ Yes ☐ No

11. Comparison of results with other analyses ☐ Yes ☐ No

If yes, describe comparison

*FEMA does not accept expected probability analyses for the purpose of reflecting flood hazard information in a FIS.

If any data is not available, indicate by N/A.

Attach analysis including plot of flood frequency curve.

ATTACHMENT B: REGIONAL REGRESSION EQUATIONS

1. Bibliographical Reference:

N/A

(Attach a copy of title page, table of contents, and pertinent pages including equations.)

2. Gaged or ungaged stream: _____

3. Hydrologic region(s): _____
Attach backup map.

4. Provide parameters, values, and source of data used to define parameters.

		FIS:		Revised:	
5.	Urbanized conditions calculations	☐ Yes	☐ No	☐ Yes	☐ No
6	Percent of watershed urbanization	_____		_____	
7.	Is the watershed controlled?	☐ Yes	☐ No	☐ Yes	☐ No
8.	Comparison with other analyses	☐ Yes	☐ No	☐ Yes	☐ No

If the answer to 5, 7, or 8 is yes, explain methodology in Comments.

If data is not available, indicate by N/A.

Comments

Attach computation and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT C: PRECIPITATION/RUNOFF MODEL

		FIS:	Revised
1.	Method or model used:	N/A	HEC-1
	Version:	N/A	4.0
	Date:	N/A	September, 1990
2.	Source of rainfall depth:	N/A	NOAA Atlas 2
3.	Source of rainfall distribution:	N/A	FCDMC Hydrologic Manual
4.	Rainfall duration:	N/A	6 & 24 Hour
5.	Areal adjustment to precipitation (%):	N/A	Depends upon SubbaSin Area
6.	Hydrograph development method:	N/A	S-Graph
7.	Loss rate method:	N/A	Green & Ampt
	Source of soils information:	N/A	SCS Soil Survey
	Source of land use information	N/A	Aerial Photos
8.	Channel routing method:	N/A	Normal Depth
9.	Reservoir routing:	☐ Yes ☐ No	☒ Yes ☐ No
10.	Baseflow considerations:	☐ Yes ☐ No	☐ Yes ☒ No

If yes, explain how baseflow was determined:

11.	Snowmelt considerations:	☐ Yes ☐ No	☐ Yes ☒ No
12.	Model calibration:	☐ Yes ☐ No	☒ Yes ☐ No

If yes, explain how calibration was performed See Page IV-9 of the Hydrology Report.

13. Future land use condition: ☐ Yes ☒ No

If yes, explain why

NOTE: FEMA policy is to base flooding on existing conditions.
If data is not available, indicate by N/A.

Attach precipitation/runoff model, hydrologic model schematic, curve number calculations, time of concentration calculations, and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT D: CONFIDENCE LIMITS EVALUATION

Stream: N / A

Select one location for Confidence Limits Evaluation (*describe location*): _____

_____

Discharges for selected location:

Exceedance Probability		FIS	Revised
10%	(10-year)	_____ cfs	_____ cfs
2%	(50-year)	_____ cfs	_____ cfs
1%	(100-year)	_____ cfs	_____ cfs
0.2%	(500-year)	_____ cfs	_____ cfs

1% (100-year) Flood Confidence Intervals

90% Confidence Interval: 5% limit _____ cfs

95% limit _____ cfs

50% Confidence Interval: 25% limit _____ cfs

75% limit _____ cfs

If the value of the 100-year frequency flood in the FIS is beyond the 50% confidence interval but within the 90% confidence interval, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

An example of confidence limits analysis can be found in Appendix 9 of Bulletin 17B.

Attach Confidence Limits Analysis.

TABLE 1

Summary of Peak Discharges at Key Locations

Flooding Source and Location	Subwatershed Group	Drainage Area (Sq. Mi.)	100-Year Peak Discharges[1] (cfs)
Roosevelt Canal			
Johnson Rd. to Bruner Rd.	F	1.33	294
Bruner Rd. to Palo Verde Rd.	G	3.83	1,144
Palo Verde Rd. to Wilson Ave.	H	2.76	1,218
Wilson Ave. to Turner Rd.	I	3.13	1,399
Oglesby Rd.	J	1.37	832
Rooks Rd. to Miller Rd.	K	1.67	1,078
Miller Rd. to Cemetery Rd. (Apache)	L	1.90	1,139
Cemetery Rd. (Apache) to Watson Rd.	N	1.80	1,419
Watson Rd. to Rainbow Rd.	O	2.19	1,373
Rainbow Rd. to Dean Rd.	P	1.31	840
Southern Pacific Railroad			
West of Johnson Rd.	E	0.28	171
Johnson Rd. to east of Bruner Road	F	4.59	541
East of Bruner Rd. to Palo Verde Rd.	G	6.26	1,457
Palo Verde Rd. to Wilson Ave.	H	5.20	951
Wilson Ave. to Turner Rd.	I	5.28	1,074
Turner Rd. to Oglesby Rd.	J	3.50	828
Oglesby Rd. to Rooks Rd.	K	5.18	1,173
Rooks Rd. to Miller Rd.	L	3.20	1,180
Miller Rd. to Cemetery Rd. (Apache)	M	2.42	522
Cemetery Rd. (Apache) to Watson Rd.	N	4.06	776
Watson Rd. to Rainbow Rd.	O	4.41	1,172
Rainbow Rd. to Dean Rd.	P	3.47	973
Buckeye Canal			
West of Johnson Rd.	E	0.52	255
Johnson Rd. to east of Bruner Rd.	F	5.74	666
East of Bruner Rd. to Palo Verde Rd.	G	6.61	843
Palo Verde Rd. to Wilson Ave.	H	5.78	889
Wilson Ave. to Turner Rd.	I	5.79	1,008
Turner Rd. to Oglesby Rd.	J	3.93	780
Oglesby Rd. to east of Rooks Rd.	K	5.59	1,103
East of Rooks Rd. to Miller Rd.	L	3.49	439
Miller Rd. to Cemetery Rd. (Apache)	M	2.56	287
Cemetery Rd. (Apache) to Watson Rd.	N	4.23	770
Watson Rd. to Rainbow Rd.	O	4.55	851
Rainbow Rd. to Dean Rd.	P	3.54	710

1. The 100-year peak discharge value reported is for the flow routed through or over the railroad and canals.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS FORM**	*O.M.B. Burden No 3067-0148* *Expires July 31, 1994*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad
(One form for each flooding source)

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. REACH TO BE REVISED

~~Downstream~~ limit: Eastern limit: Dean Road (FIRM Panel 2050)

~~Upstream~~ limit: Western limit: Hassayampa River (FIRM Panel 2480)

2. EFFECTIVE FIS

☒ Not studied

☐ Studied by approximate methods

Downstream limit of study _____

Upstream limit of study _____

☐ Studied by detailed methods

Downstream limit of study _____

Upstream limit of study _____

☐ Floodway delineated

Downstream limit of Floodway _____

Upstream limit of Floodway _____

3. HYDRAULIC ANALYSIS

Why is the hydraulic analysis different from that used to develop the FIRM. *(Check all that apply)*

☒ Not studied in FIS

☐ Improved hydrologic data/analysis. Explain: _____

☐ Improved hydraulic analysis. Explain: _____

☐ Flood control structure. Explain: _____

☐ Other. Explain: _____

Full input and output listings along with files on diskette *(if available)* for each of the models listed below and summary of the source of input parameters used in the models must be provided. The summary must include a complete description of any changes made from model to model (*e.g. duplicate effective model to corrected effective model*). Only the Duplicate Effective and the Revised or Post-Project Conditions models must be submitted. See instructions for directions on when other models may be required. Only the 100-year flood profile is required for SFHAs with a Zone A designation. For areas which do not have detailed flooding, a hydraulic model is not required; however BFE's may not be added to the revised FIRM.

☐ Duplicate Effective Model — Natural ☐ Floodway ☐

Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models *(10-, 50-, 100-, and 500-year multi-profile runs and the floodway run)* must be obtained and then reproduced on the requestor's equipment to produce the duplicate effective model. This is required to assure that the effective model input data has been transferred correctly to the requestor's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

☐ Corrected Effective Model — Natural ☐ Floodway ☐

The corrected effective model is the model that corrects any errors that occur in the duplicate effective model, adds any additional cross sections to the duplicate effective model, or incorporates more detailed topographic information than that used in the currently effective model. The corrected effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

☐ Existing or Pre-Project Conditions Model — Natural ☐ Floodway ☐

The duplicate effective or corrected model is modified to produce the existing or pre-project conditions model to reflect any modifications that have occurred within the floodplain since the date of the effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the corrected effective or duplicate effective model.

☐ Revised or Post-Project Conditions Model — Natural ☐ Floodway ☐

The existing or pre-project conditions model *(or duplicate effective or corrected effective model, as appropriate)* is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for proposed project this model should reflect proposed conditions.

☐ Other: Please attach a sheet describing all other models or calculations submitted. — Natural ☐ Floodway ☐

4. MODEL PARAMETERS *(from model used to revise 100-year water surface elevation)*

1. Discharges:

	Upstream Limit	Downstream Limit
10-year		
50-year		
100-year		
500-year		

Attach diagram showing changes in 100-year discharge

2. Explain how the starting water surface elevations were determined N/A
Only ponded flooding occurs

3. Give range of friction loss coefficients (*Manning's "N"*) Channel ..... N/A

Overbanks ..... N/A

If friction loss coefficients are different anywhere along the revised reach from those used to develop the FIRM, give location, value used in the effective FIS, and revised values and an explanation as to how the revised values were determined.

Location	FIS	Revised

Explain:

4. Describe how the cross section geometry data were determined *(e.g., field survey, topographic map, taken from previous study)* and list cross sections that were added.

Geometric data for the railroad and canal analyses were determined by field surveys. The geometric data for delineating the ponding areas were determined by field surveys and topographic mapping.

5. Explain how reach lengths for channel and overbanks were determined:

N/A

5. RESULTS (*from model used to revise 100-year water surface elevations*)

1. Do the results indicate:

a. Water surface elevations higher than end points of cross sections? ☐ Yes ☒ No

b. Supercritical depth? ☐ Yes ☒ No

c. Critical depth? ☐ Yes ☒ No

d. Other unique situations ☐ Yes ☒ No

If yes to any of the above, attach an explanation that discusses the situation and how it is presented on the profiles, tables, and maps.

2. What is the maximum change in energy gradient between cross-sections? N/A

Specify location

3. What is the distance between the cross-sections in 2 above? N/A

Specify location

4. What is the maximum distance between cross-sections? N/A

Specify location

5. Floodway determination

a. What is the maximum surcharge allowed by the community or State? 1.0 foot

b. What is the maximum surcharge for the revised conditions? N/A foot

Specify location

c. What is the maximum velocity? N/A fps

Specify location

Explain:

d. Are there any negeative surcharge values at any cross-section ☐ Yes ☒ No

If yes, the floodway may need to widen. If it is not widened, please explain and indicate the maximum negative surcharge.

6. Is the discharge value used to determine the floodway anywhere different from that used to determine the natural 100-year flood elevations? ..... ☐ Yes ☒ No

If Yes, explain:

7. Do 100-year water surface elevations increase at any location? ..... ☐ Yes ☒ No

If yes, please attach a list of the locations where the increases occur, state whether or not the increases are located on the requestor's property, and provide an explanation of the reason for the increases.

The existing FIS is an approximate study and water surface elevations aren't given.

Please attach a completed comparison table entitled: Water Surface Elevation Check (See page 6)

6. REVISED FIRM/FBFM AND FLOOD PROFILES

A. The revised water surface elevations tie into those computed by the effective FIS Model *(10-, 50-, 100-, and 500-year)*, downstream of the project at cross-section_____ within_____feet and upstream of the project at cross section_____within_____feet.

N/A There aren't any existing water surface elevations in the effective FIS

B. The revised floodway elevations tie into those computed by the effective FIS model, dowstream of the project at cross section_____within_____feet and upstream of the project at cross section_____ within_____feet.

N/A There aren't any existing floodways.

C. Attach profiles, at the same vertical and horizontal scale as the profiles in the effective FIS report, showing stream bed and profiles of all floods studied (without encroachment). Also, label all cross sections, road crossings (including low chord and top-of-road data), culverts, tributaries, corporate limits, and study limits. If channel distance has changed, the stationing should be revised for all profile sheets. See the Hydraulic Report.

D. Attach a Floodway Data Table showing data for each cross section listed in the published Floodway Data Table in the FIS report. N/A There aren't any floodways.

Proceed to Riverine /Coastal Mapping Form

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]

COMMENTS:

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE/COASTAL MAPPING FORM**	O.M.B. Burden No. 3067-0148 Expires July 31, 1994	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: SOUTHERN PACIFIC RAILROAD

Project Name/Identifier: BUCKEYE AREA FLOOD DELINEATION STUDY FCD 90-69

1. MAPPING CHANGES

1. A topographic work map of suitable scale, contour interval, and planimetric definition must be submitted showing *(indicate N/A when not applicable)*:

		Included		
A.	Revised approximate 100-year floodplain boundaries (Zone A)	☐ Yes	☒ No	☐ N/A
B.	Revised detailed 100- and 500-year floodplain boundaries	☒ Yes	☐ No	☐ N/A
C.	Revised 100-year floodway boundaries	☐ Yes	☐ No	☒ N/A
D.	Location and alignment of all cross sections used in the revised hydraulic model with stationing control indicated	☐ Yes	☐ No	☒ N/A
E.	Stream alignments, road and dam alignments	☒ Yes	☐ No	☐ N/A
F.	Current community boundaries	☒ Yes	☐ No	☐ N/A
G.	Effective 100- and 500-year floodplain and 100-year floodway boundaries from the FIRM/FBFM reduced or enlarged to the scale of the topographic work map	☐ Yes	☒ No	☐ N/A
H.	Tie-ins between the effective and revised 100- and 500-year floodplains and 100-year floodway boundaries	☒ Yes	☐ No	☐ N/A
I.	The requestor's property boundaries and community easements	☐ Yes	☐ No	☒ N/A
J.	The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
K.	Location and description of reference marks	☒ Yes	☐ No	☐ N/A
L.	Vertical datum (example: NGVD, NAVD etc.)	☒ Yes	☐ No	☐ N/A
M.	Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
N.	Location and alignment of all coastal transects used to revise the coastal analyses	☐ Yes	☐ No	☒ N/A

If any of the items above are marked no or N/A, please explain: The effective FIS only has approximate 100-year floodplains (Zone A). For the detailed revised study the 100-year floodplains have primarily been identified as zone AH's.

2. What is the source and date of the updated topographic information *(example: orthophoto maps, July 1985; field survey, May 1979, beach profiles, June 1987, etc.)*? _____

3. What is the scale and contour interval of the following work maps?
   a. Effective FIS _____ scale _____ Contour interval
   b. Revision Request 1" = 400' scale Field Survey and 2' & 10' Contour interval

NOTE: Revised topographic information must be of equal or greater detail.

4. Attach an annotated FIRM and FBFM at the scale of the effective FIRM and FBFM showing the revised 100-year and 500-year floodplains and the 100-year floodway boundaries and how they tie into those shown on the effective FIRM and FBFM downstream and upstream of the revision or adjacent to the area of revision for coastal studies.

Attach additional pages if needed.

5. Flood Boundaries and 100-year water surface elevations:

Has the 100-year floodplain been shifted or increased or the 100-year water surface elevation increased at any location on property other than the requestor's or community's? ☐ Yes ☐ No

If yes, please give the location of shift or increase and an explanation for the increase.

Since this is a **restudy** of a large area that has existing A zone delineations (which don't have elevations), it is impossible to say that there has been an increase in the water surface elevations. Any changes in the delineation limits are probably due to the use of more detailed topographic mapping supplemented by the field survey data. The efforts put forth to notify the public about this **restudy** and its results are detailed in the public notification documentation section.

a. Have the affected property owners been notified of this shift or increase and the effect it will have on their property? ..... ☐ Yes ☐ No

If yes, please attach letters from these property owners stating they have no objections to the revised flood boundaries if a LOMR is being requested.

b. What is the number of insurable structures that will be impacted by this shift or increase?_____

6. Have the floodway boundaries shifted or increased at any location compared to those shown on the effective FBFM or FIRM? ..... ☐ Yes ☒ No

If yes, explain:

7. If a V- zone has been designated, has it been delineated to extend landward to the heel of the primary frontal dune? N/A ☐ Yes ☐ No

If no, explain:

8. Manual or digital map submission:

☒ Manual

☐ Digital

Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance of submission as possible.

2. EARTH FILL PLACEMENT

1. The fill is: ☐ Existing ☐ Proposed N/A

2. Has fill been/will be placed in the regulatory floodway? ..... ☐ Yes ☐ No N/A
If yes, please attach completed Riverine Hydraulic Analysis Form.

3. Has fill been/will be placed in floodway fringe *(area between the floodway and 100-year floodplain boundaries)*? ..... ☐ Yes ☐ No N/A

If yes, then complete A, B, C, and D below.

A. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ..... ☐ Yes ☐ No N/A

If yes, justify steeper slopes_____

B. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? *(Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)* ..... ☐ Yes ☐ No N/A

If no, describe erosion protection provided_____

C. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No N/A

D. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No N/A

If yes, provide certification of fill compaction (item C. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer.

4. Has fill been/will be placed in a V-zone? ☐ Yes ☐ No N/A

If yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall? ☐ Yes ☐ No N/A

If yes, attach the coastal structures form.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1994*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 3 Approximately 2,423 ft. west of Dean Rd. (Sheet 15)
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 30.5 ft. long wood railroad trestle

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)

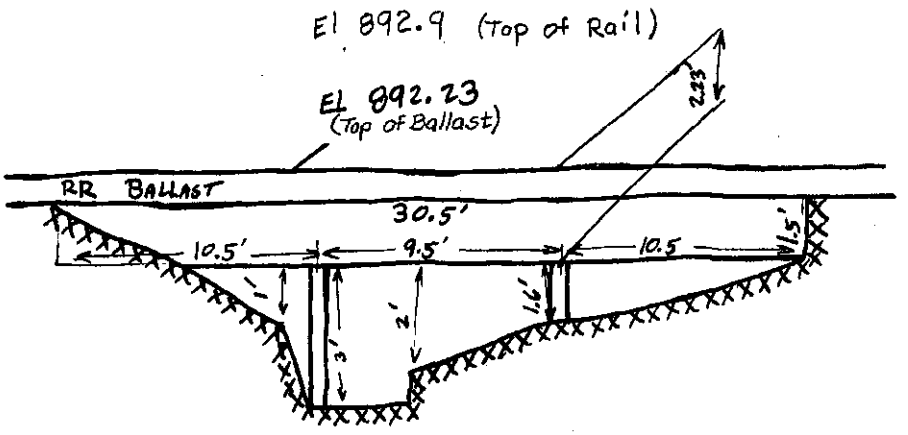
3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)
   Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

   Details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

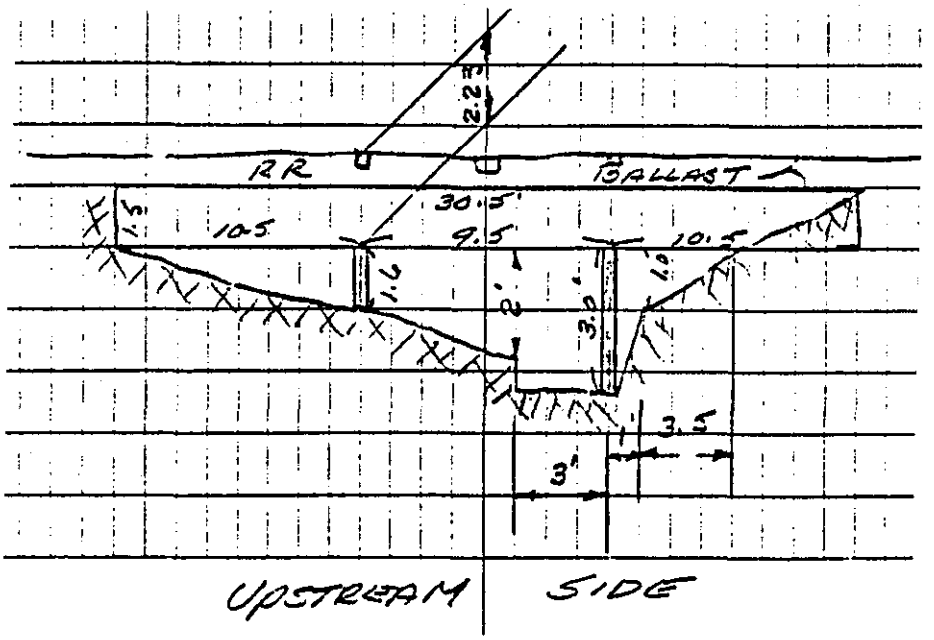
Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

TRESTLE #3



DOWNSTREAM SIDE

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



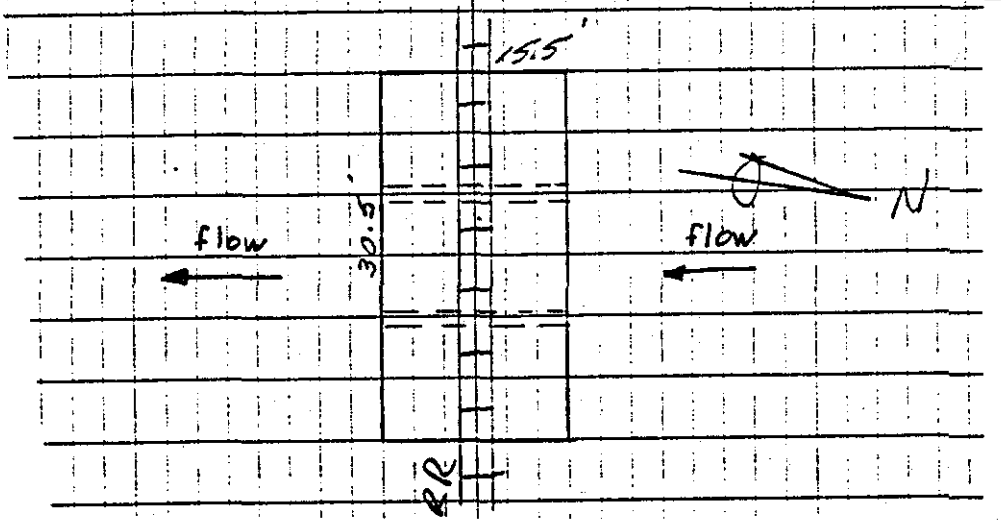
UPSTREAM SIDE

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

DEAN RD (0+00W) TO RAINBOW RD (54+43W)

STA 24+23W (879.02)

30.5' x 15.5' WOOD TRESTLE #3



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	15.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	28.3 ft²

Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	N/A No overtopping	N/A No overtopping
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	892.9 (Top of Rail)	892.9 (Top of Rail)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	891.3 (Sheet 15)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		195 cfs	0	195 cfs

The maximum depth of flow over the roadway/railroad (ft.) ..... zero.

Weir length (ft.) ..... zero

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face	"	"

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		30.5 ft (Trestle #3 only)
Downstream face		

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

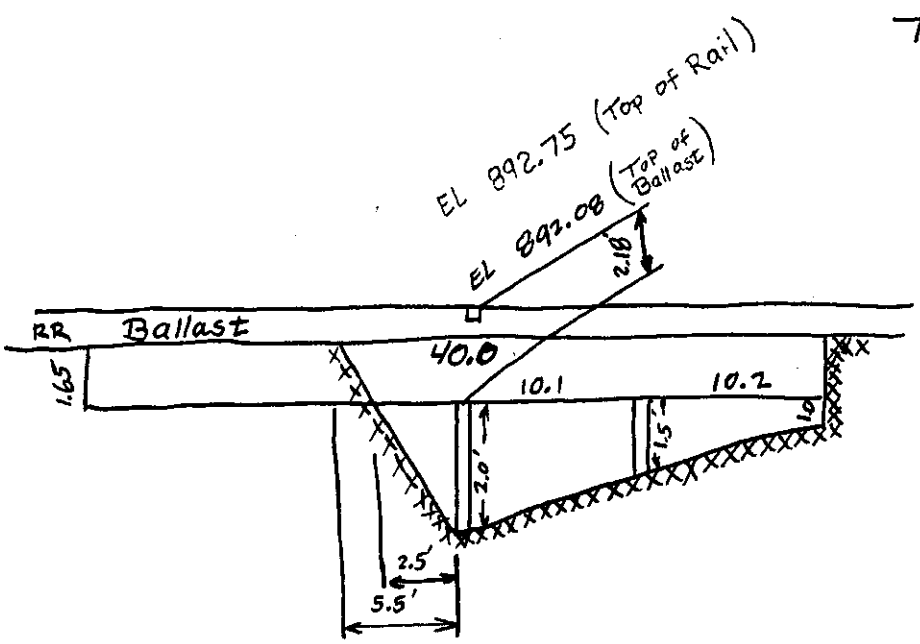
   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

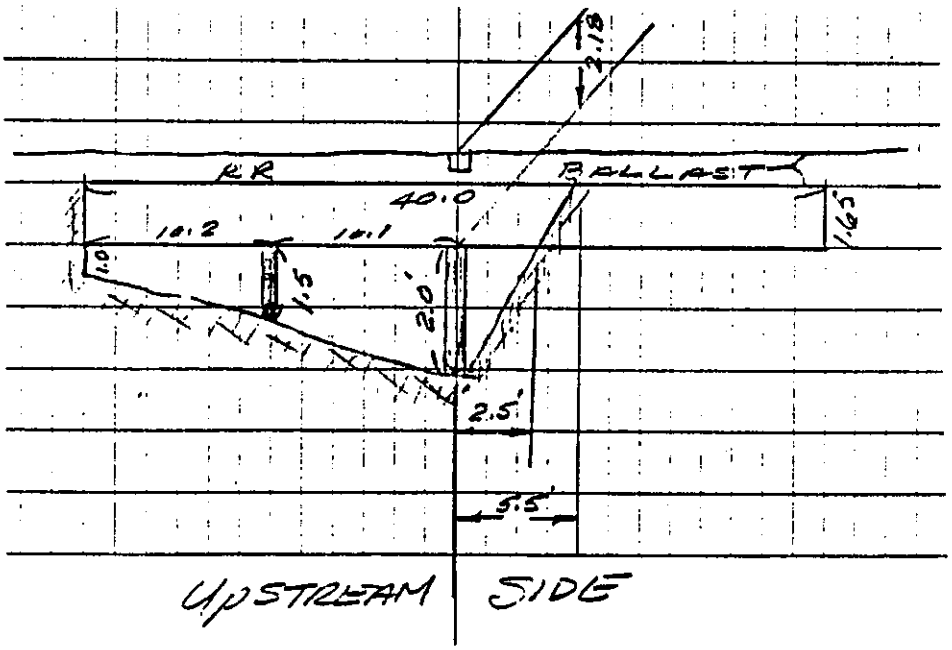
Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Trestle #4



DOWN STREAM SIDE

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



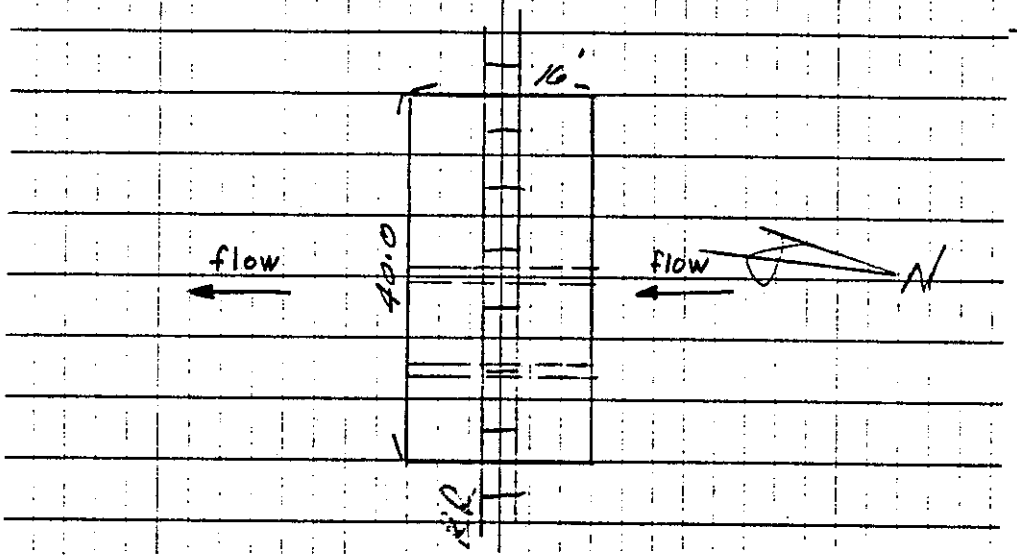
UPSTREAM SIDE

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

DEAN RD (0+00W) TO RAINBOW RD (54+43W)

STA 49+63W (878.53)

40.0' x 16.0' WOOD TRESTLE #4



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	16 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	30.1 ft² Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	N/A No Overtopping	N/A No Overtopping
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	892.75 (Top of Rail)	892.75 (Top of Rail)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	891.3 (Sheet 14)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		203 cfs	0	203 cfs

The maximum depth of flow over the roadway/railroad (ft.) ..... N/A

Weir length (ft.) ..... N/A

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		40 ft (Trestle #4 only)
Downstream face		

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport *(including scour and deposition)* can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions *(such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions)*, is there a potential for debris and sediment transport *(including scour and deposition)* to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment *(bed material)* load?
   _____cfs *(attach gradation curve)*

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	O.M.B. Burden No. 3067-0148 Expires July 31, 1994	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 5 Approximately 1,888 ft. west of Rainbow Rd.
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

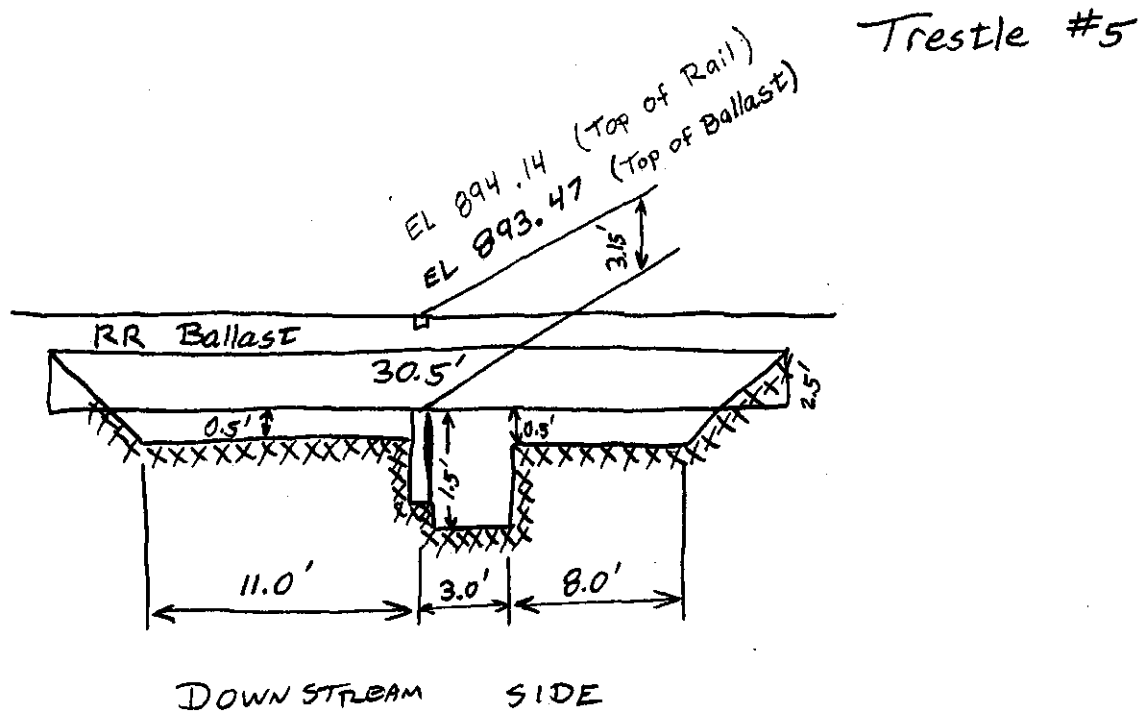
1. Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 30.5 ft long wood railroad trestle
2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)
3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

   Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

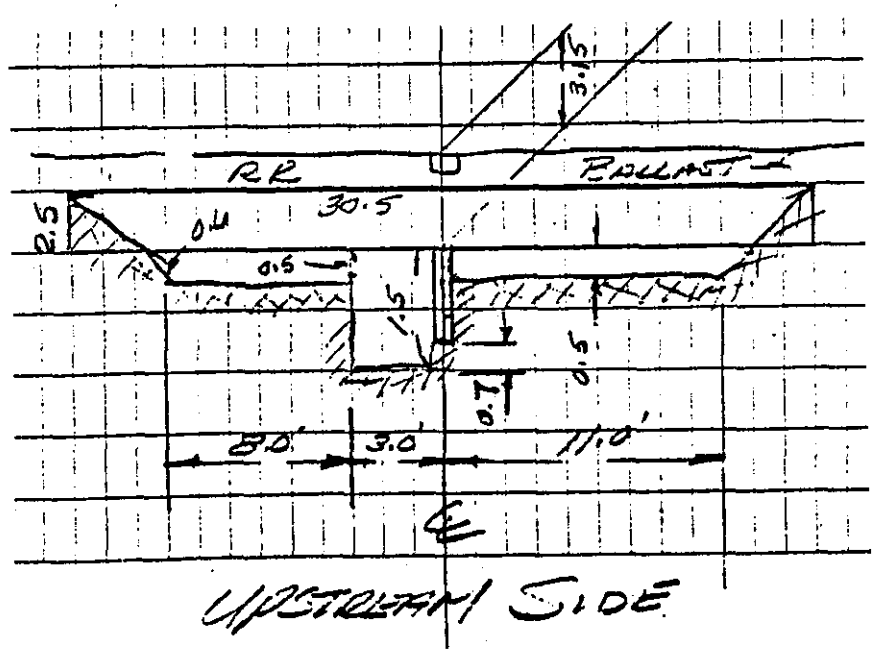
   Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.



Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.

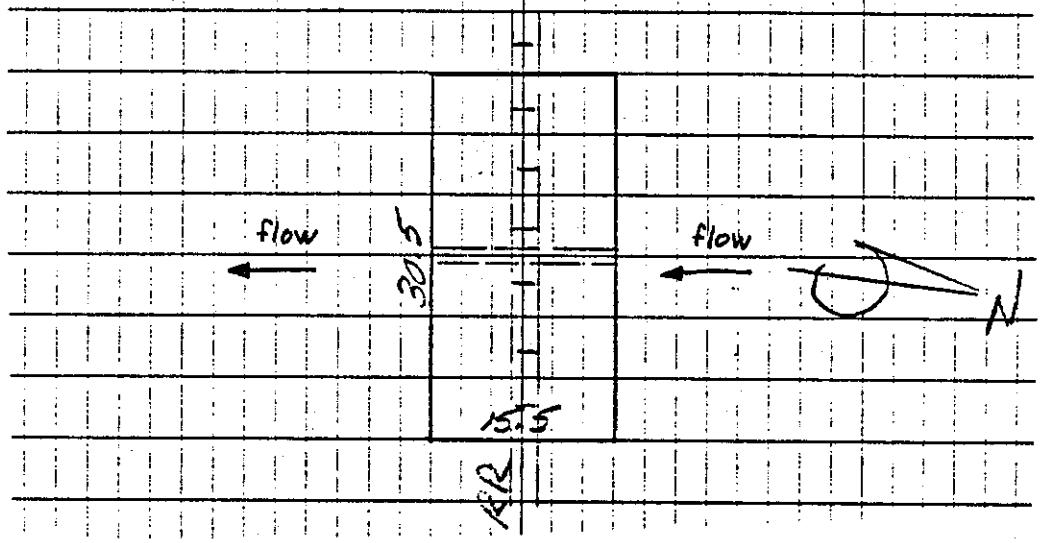


Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

RAINBOW RD (0+00W) TO WATSON RD (55+38W)

STA 18+88W (878.09)

30.5' x 15.5' WOOD TRESTLE #5



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	15.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	13.9 ft² Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	N/A No Overtopping	N/A No Overtopping
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	894.14 (Top of Rail)	894.14 (Top of Rail)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	893.0 (Sheet 14)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		114 cfs	0	114 cfs

The maximum depth of flow over the roadway/railroad (ft.) ..... N/A

Weir length (ft.) ..... N/A

Top Widths	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths	Effective Flow	Effective and Ineffective Flow
Upstream face		30.5 ft (Trestle #5 only)
Downstream face		

3. ANALYSIS (Cont'd)

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport *(including scour and deposition)* can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions *(such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions)*, is there a potential for debris and sediment transport *(including scour and deposition)* to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment *(bed material)* load?
   _____cfs *(attach gradation curve)*

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

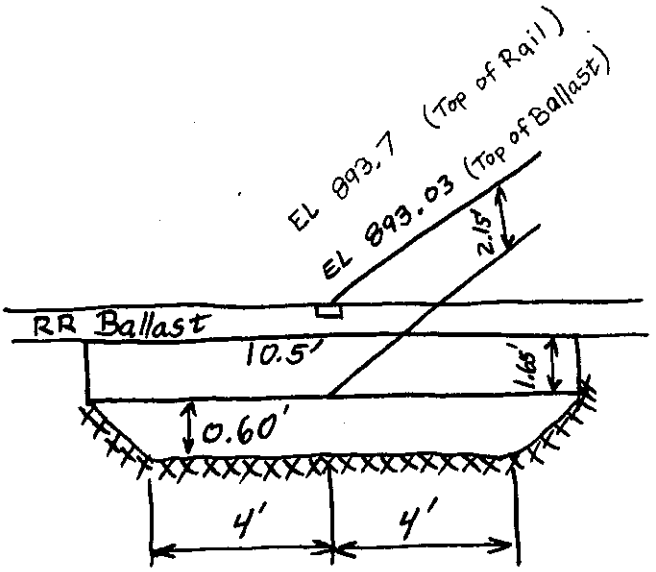
   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

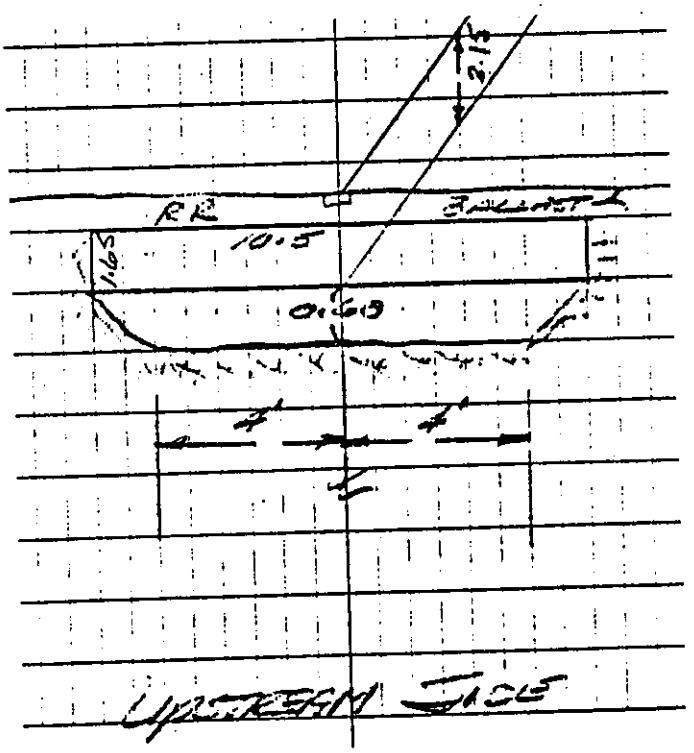
Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Trestle #6



Downstream Side

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



UPSTREAM FACE

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	N/A No Overtopping	N/A No Overtopping
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	893.7 (Top of Rail)	893.7 (Top of Rail)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	Depth = 1.0 ft (zone A, sheet 14)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		38 cfs	0	38 cfs

The maximum depth of flow over the roadway/railroad (ft.) ..... N/A

Weir length (ft.) ..... N/A

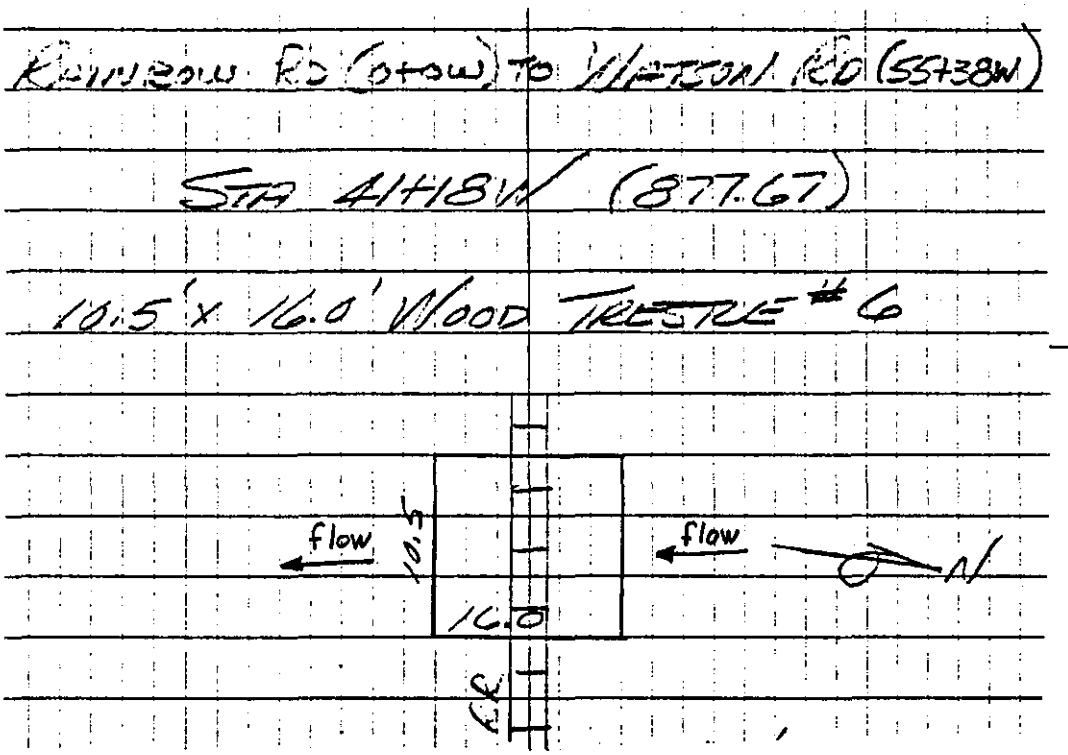
Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		10.5 ft (Trestle #6 only)
Downstream face		

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	16.0 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	4.8 ft²

Appendix J, Hydrology Report

3. ANALYSIS (Cont'd)

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport *(including scour and deposition)* can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions *(such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions)*, is there a potential for debris and sediment transport *(including scour and deposition)* to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment *(bed material)* load?
   _____cfs *(attach gradation curve)*

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	O.M.B. Burden No. 3067-0148 Expires July 31, 1994	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 7 Approximately 1,013 ft. west of Watson Rd. (Sheet #14)
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 30.5 ft long wood railroad trestle

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

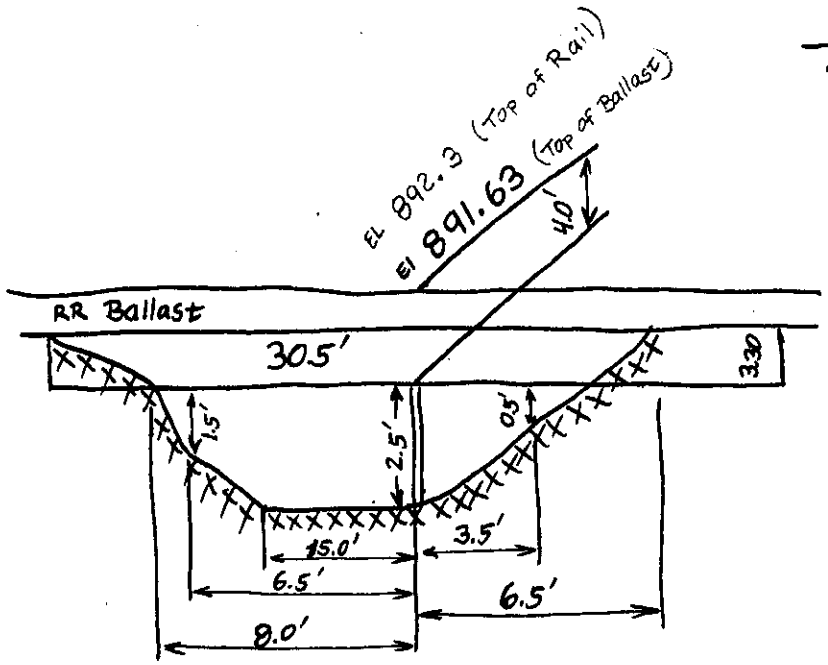
Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

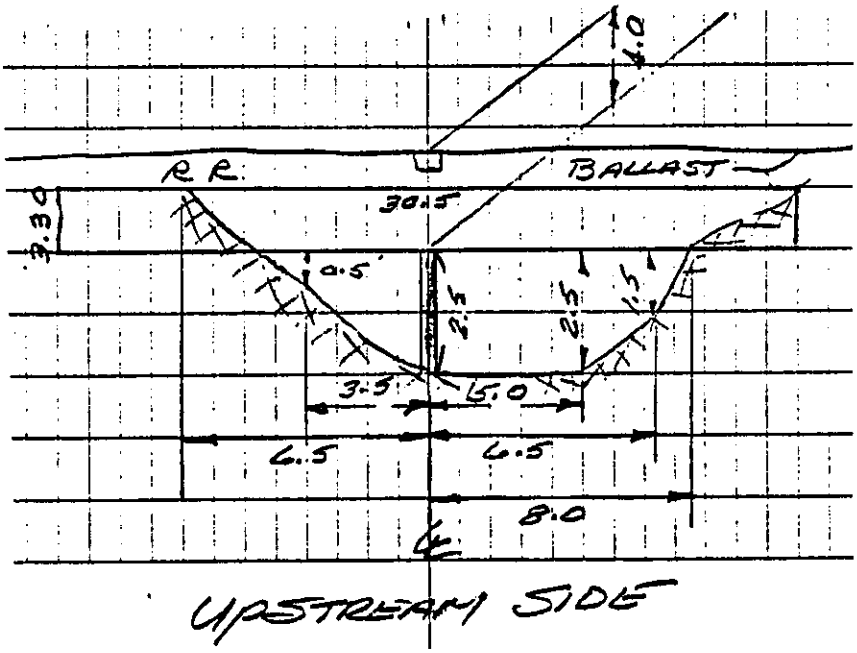
Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Trestle #7



Downstream Side

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



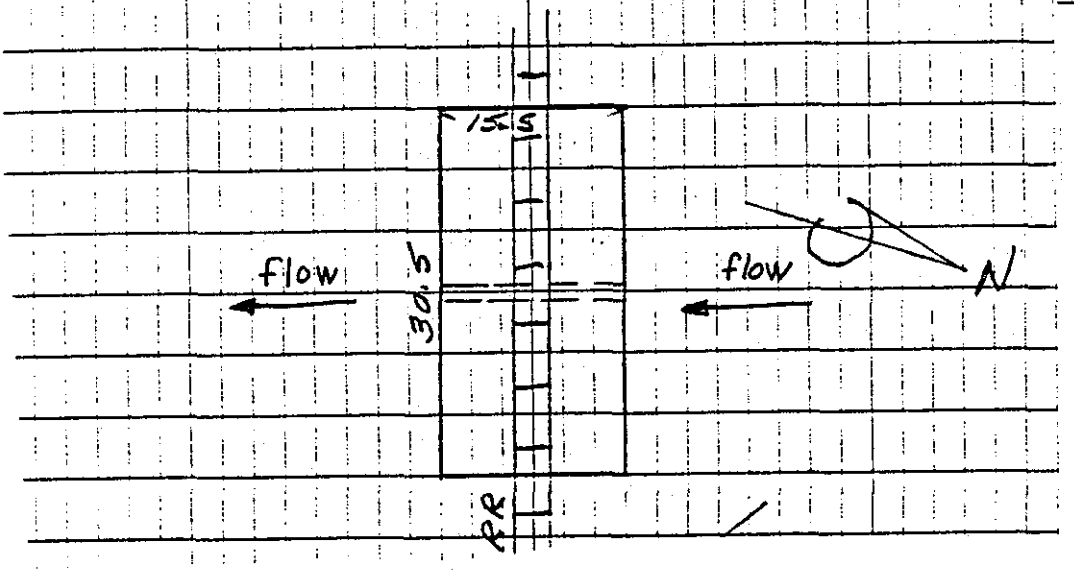
UPSTREAM SIDE

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

WATSON RD (0+00W) TO APACHE RD (55+03W)

STA 10+13W (877.20)

30.5' x 15.5' WOOD TRESTLE #7



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	15.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	19.6 ft² Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	N/A No Overtopping	N/A No Overtopping
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	892.3 (Top of Rail)	892.3 (Top of Rail)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	Depth = 2' (Zone A, Sheet 14)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		211 cfs	0	211 cfs

The maximum depth of flow over the roadway/railroad (ft.) ..... N/A

Weir length (ft.) ..... N/A

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		30.5 ft (Trestle #7 only)
Downstream face		

3. ANALYSIS (Cont'd)

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1994*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 8 Approximately 5,144 ft west of Watson Rd. (Sheet #13)
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 30.5 ft long wood railroad trestle

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	889.89 (At Trestle # 8)	889.52 (At Apache Road)
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	889.89 (Top of Rail At Trestle # 8)	889.52 (Top of Road At Apache Road)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	890.4 (Sheet #13)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		510 cfs	1153 cfs	1663 cfs

The maximum depth of flow over the roadway/railroad (ft.) ..... 0.88 ft (At Apache Rd)

Weir length (ft.) ..... 2100 ft

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		30.5 ft (Trestle #8 only) 2100 ft (Trestle & Weir flow)
Downstream face		

3. ANALYSIS (Cont'd)

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1994*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

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Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 9 Approximately 1,659 ft. west of Apache Rd. (Sheet #13)
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway)
One 10.5 ft long wood railroad trestle

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

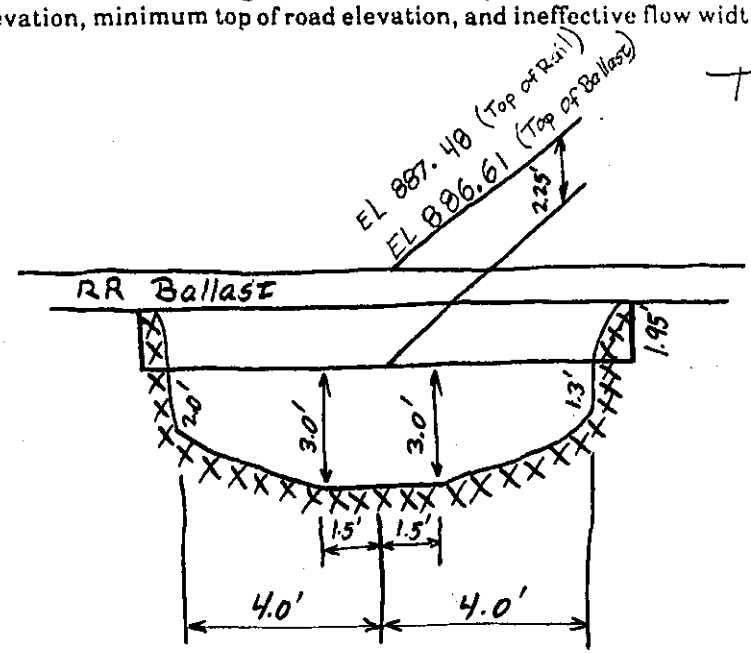
Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

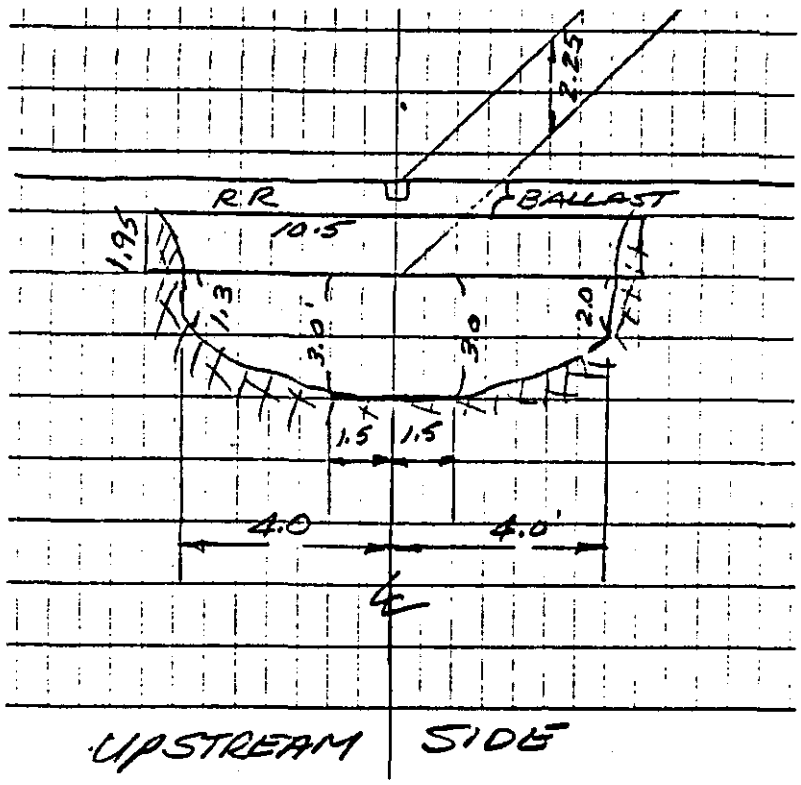
Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Trestle #9



Downstream side

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



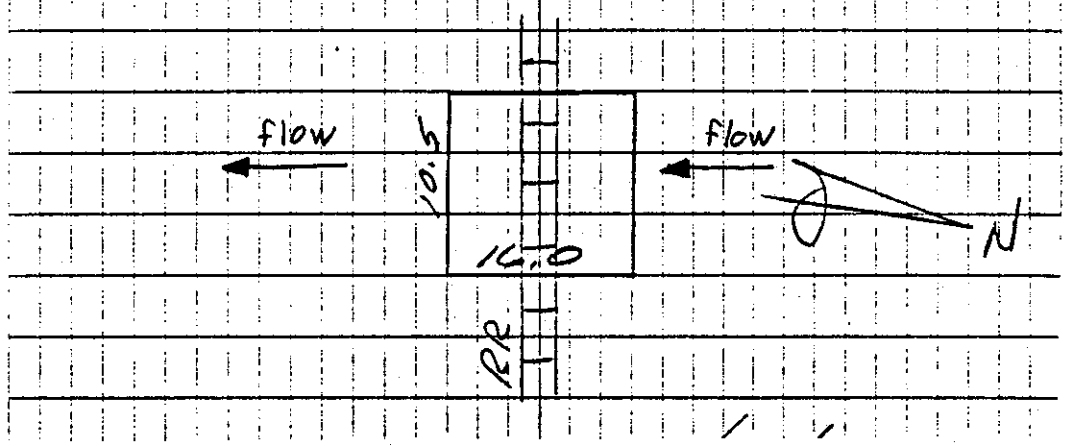
UPSTREAM SIDE

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

APACHE RD (0+00W) TO MILLER RD (53+56W)

STA 16+59W (876.04)

10.5' x 16.0' WOOD TRESTLE #9



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	16.0 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	20.7 ft² Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	887.48 (At trestle #9)	887.07 (Low point 1,014 ft West of Trestle #9)
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	887.48 (Top of Rail At Trestle #9)	887.07 (Top of Rail 1,014 ft West of Trestle #9)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	887.6 (sheet 13)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow (Includes 477 cfs from Subbasin 47, see the Hydraulics Report)
Amount of flow through/over the structure (s) (cfs)		212 cfs	787 cfs	999 cfs

The maximum depth of flow over the roadway/railroad (ft.) ..... 0.53 ft (1,014 ft West of Trestle #9)

Weir length (ft.) ..... 2200 ft (sheet #13)

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face	"	"

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		10.5 ft (Trestle #9 only) 2200 ft (Trestle + Weir flow)
Downstream face		

3. ANALYSIS (Cont'd)

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport *(including scour and deposition)* can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions *(such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions)*, is there a potential for debris and sediment transport *(including scour and deposition)* to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment *(bed material)* load?
   _____cfs *(attach gradation curve)*

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	O.M.B. Burden No. 3067-0148 Expires July 31, 1994	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

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Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 10 Approximately 2,540 ft. west of Miller Rd. (sheet 12)
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway)
One 10.5 ft long wood railroad trestle

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

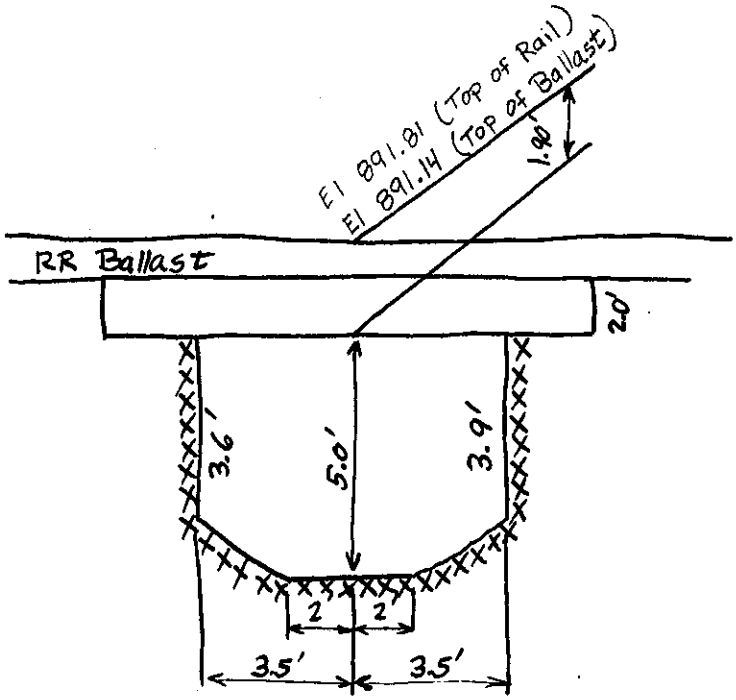
Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

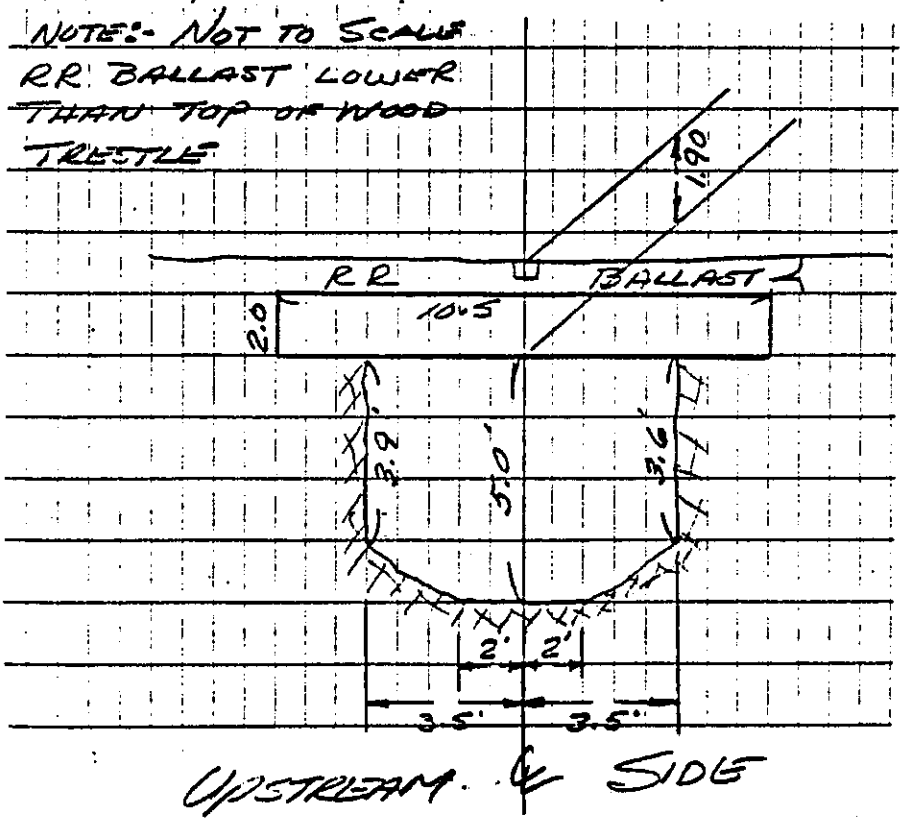
Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Trestle #10



Downstream Side

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



UPSTREAM ℄ SIDE

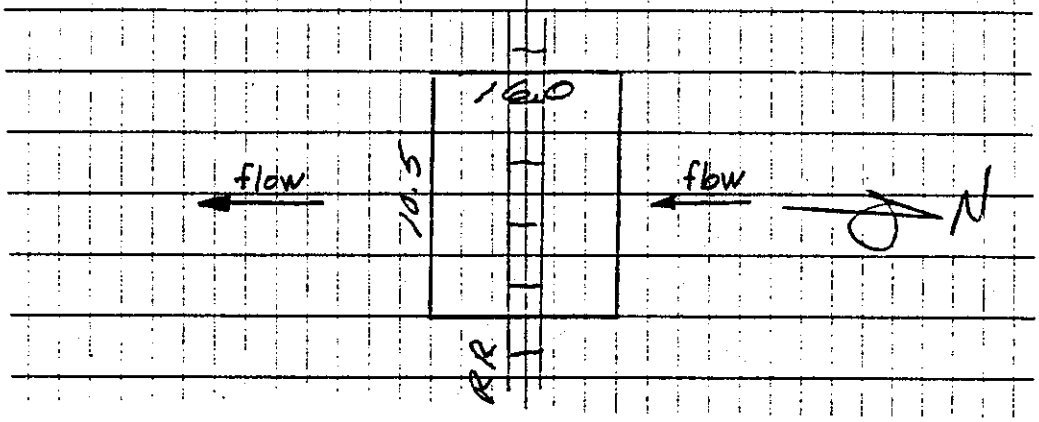
Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

SOUTHERN PACIFIC RR 65

MILLER RD (0+00W) TO ROOKS RD (52+77W)

STA 25+40W (874.86)

10.5' x 16.0' W/OOD TRESTLE #10



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	10.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	33.2 ft² Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	889.41 (Low Point 2,540 ft East of Trestle #10)	891.81 (At Trestle #10)
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	889.41 (Top of Rail 2,540 ft East of Trestle # 10)	891.81 (Top of Rail At Trestle #10)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	890.3 (sheet 12)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow (Doesn't include 477 cfs diverted across Miller Rd. See the Hydraulics Report.)
Amount of flow through/over the structure (s) (cfs)		300 cfs	403 cfs	703 cfs

The maximum depth of flow over the roadway/railroad (ft.) ..... 0.89 ft. (2,540 East of Trestle #10)

Weir length (ft.) ..... 1,150 ft. (Sheet #13)

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face	"	"

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		10.5 ft (Trestle #10 only)
Downstream face		

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1994*	FEMA USE ONLY

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Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 11 Approximately 1,302 ft. west of Rooks Rd. (Sheet #12)
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 30.5 ft long wood railroad trestle

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

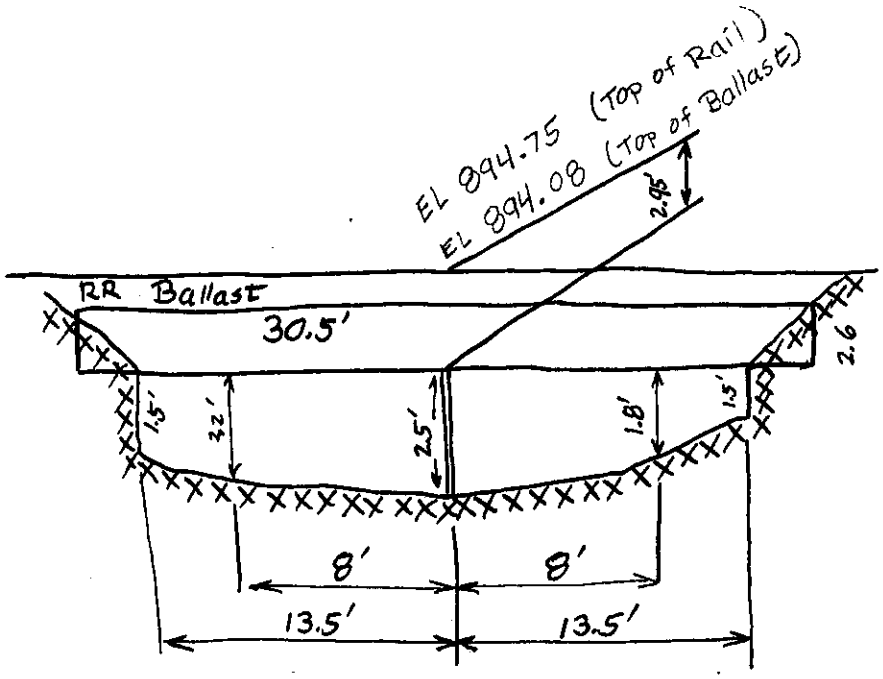
Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

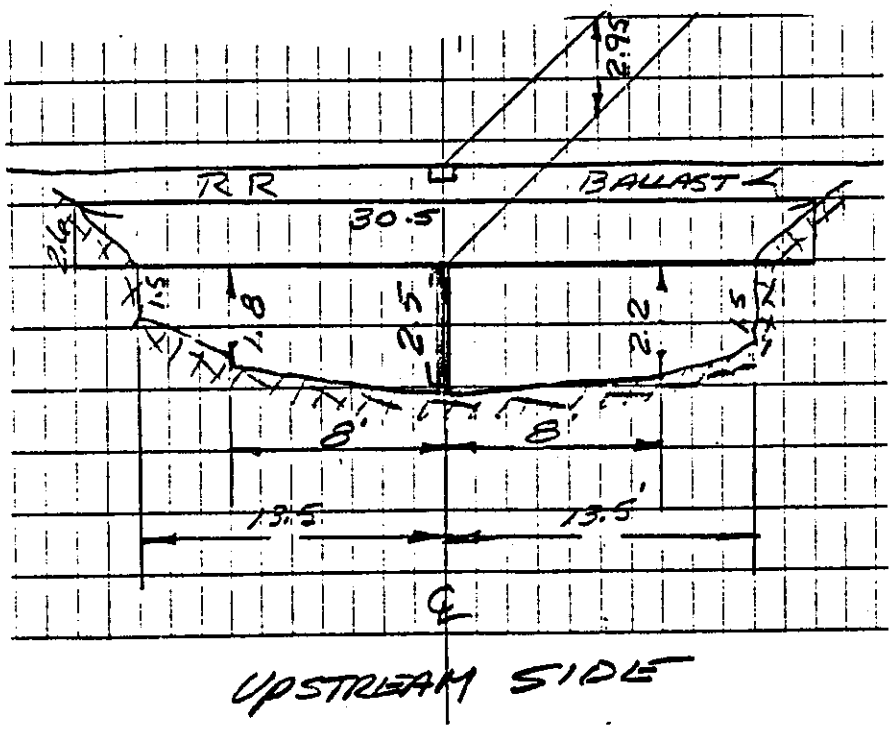
Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Trestle #11



Down stream Side

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



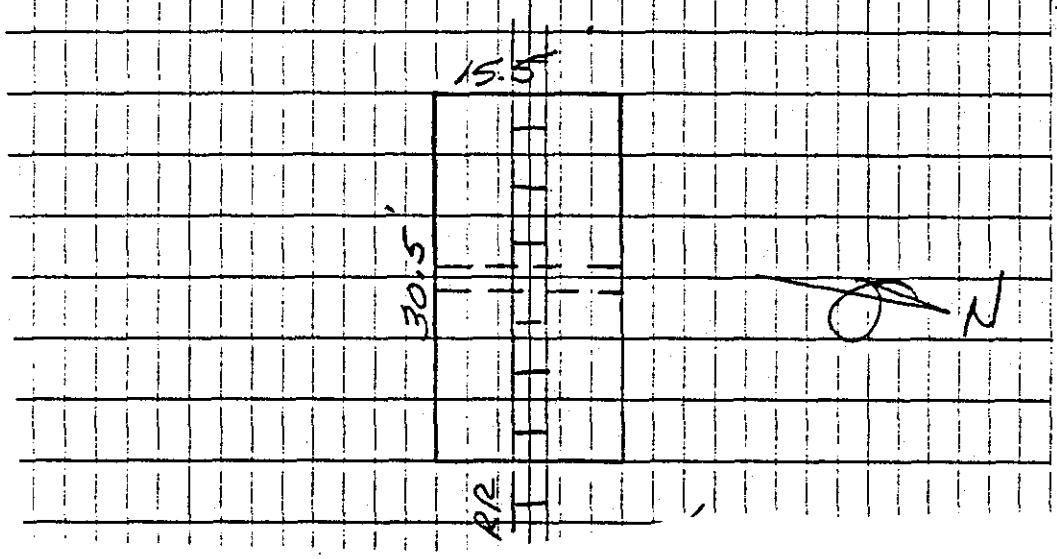
UPSTREAM SIDE

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

ROOKS RD (0+00W) TO OGLESBY RD (51+77W)

STA 13+02W (874.09)

30.5' x 15.5' WOOD TRESTLE #1



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	30.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	53 ft²

Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	N/A No Overtopping	N/A No Overtopping
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	894.75 (Top of Rail At Trestle #11)	894.75 (Top of Rail At Trestle #11)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	891.8	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		323 cfs	0	323 cfs

The maximum depth of flow over the roadway/railroad (ft.) ..... N/A No Overtopping

Weir length (ft.) ..... N/A

Top Widths	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths	Effective Flow	Effective and Ineffective Flow
Upstream face		30.5 ft. (Trestle #11)
Downstream face		

3. ANALYSIS (Cont'd)

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1994*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 12 Approximately 4,012 ft. west of Rooks Rd.
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 45.0 ft long wood railroad trestle

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

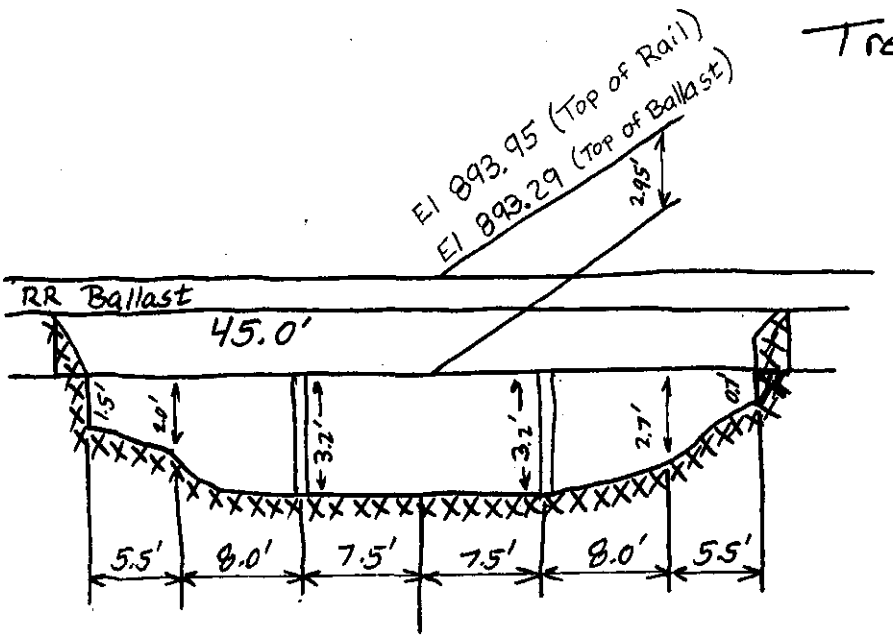
Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

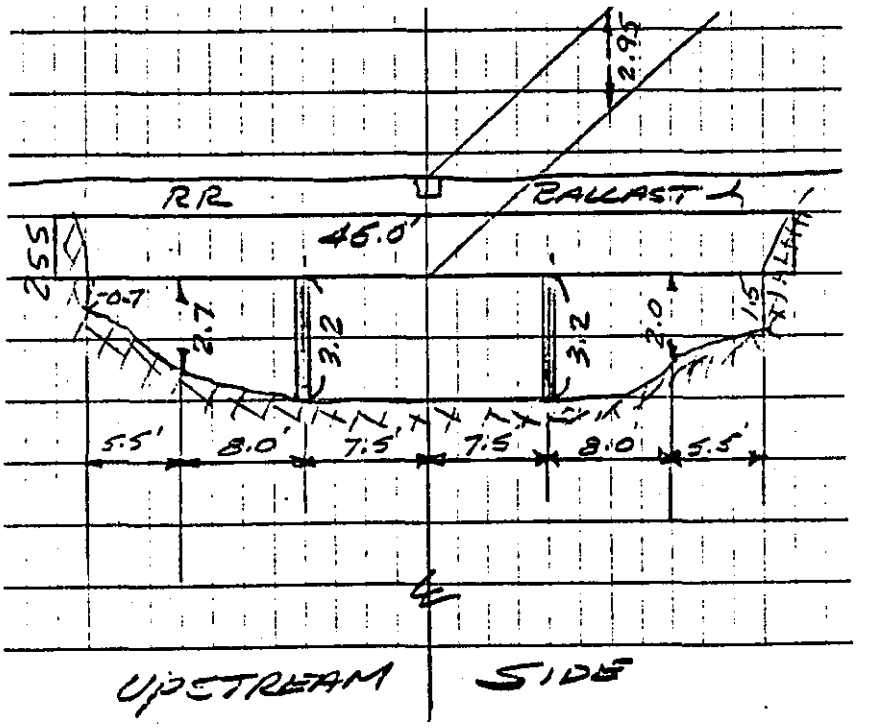
Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Trestle #12



Downstream Side

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



UPSTREAM SIDE

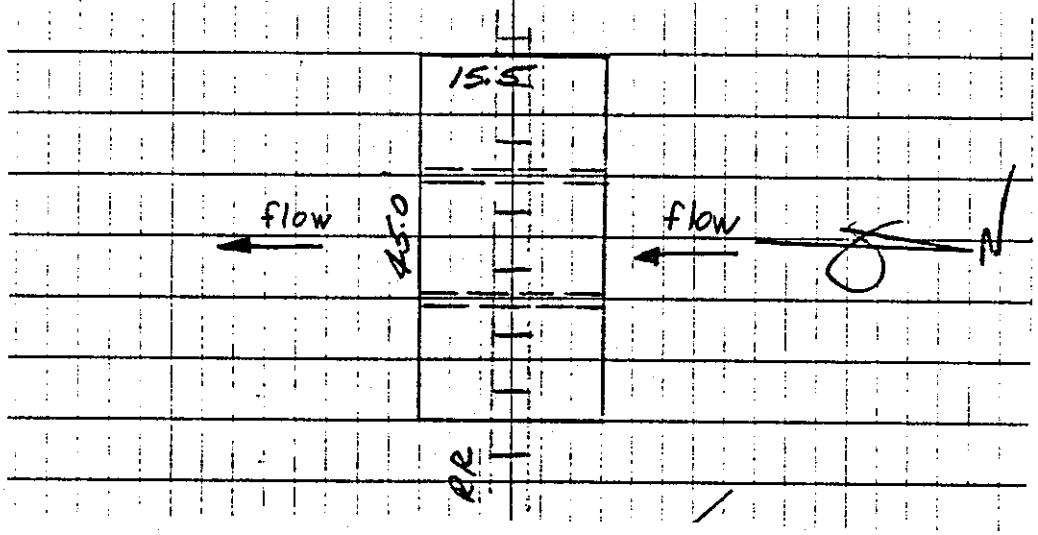
Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

SOUTHERN PACIFIC RR 69

ROOK RD (0+00W) TO OBLEBY RD (51+77W)

STA 40+12 W (873.58)

45.0' x 15.5' WOOD TRESTLE # 12



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	45.0 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	104.6 ft²

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	N/A No Overtopping	N/A No Overtopping
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	893.95 (Top of Rail At Trestle # 12)	893.95 (Top of Rail At Trestle #12)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	891.8	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		850 cfs		850 cfs

The maximum depth of flow over the roadway/railroad (ft.) ..... N/A No Overtopping

Weir length (ft.) ..... N/A

Top Widths	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths	Effective Flow	Effective and Ineffective Flow
Upstream face		40.5 ft Trestle #12
Downstream face		

3. ANALYSIS (Cont'd)

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	O.M.B. Burden No. 3067-0148 Expires July 31, 1994	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 13 Approximately 2,477 ft. west of Ogiesby Rd. (Sheet 11)
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1. Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway)
   One 30.5 ft long wood railroad trestle
2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)
3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

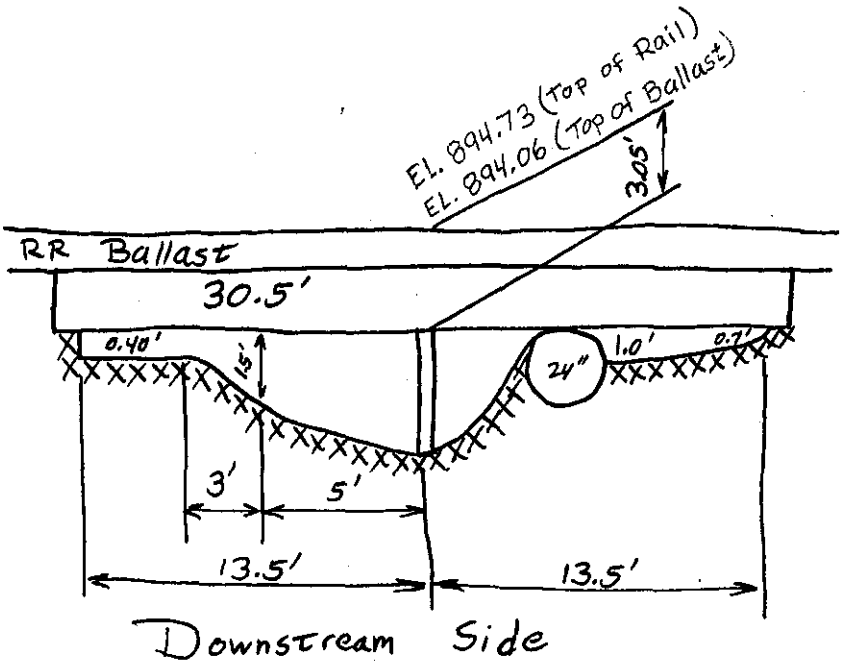
   Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

   Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

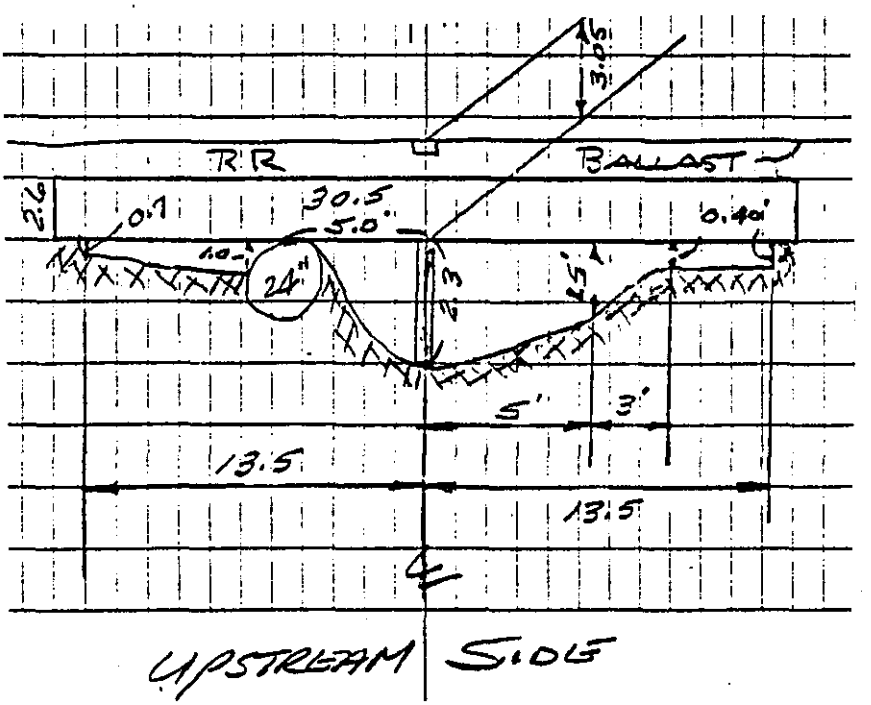
Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

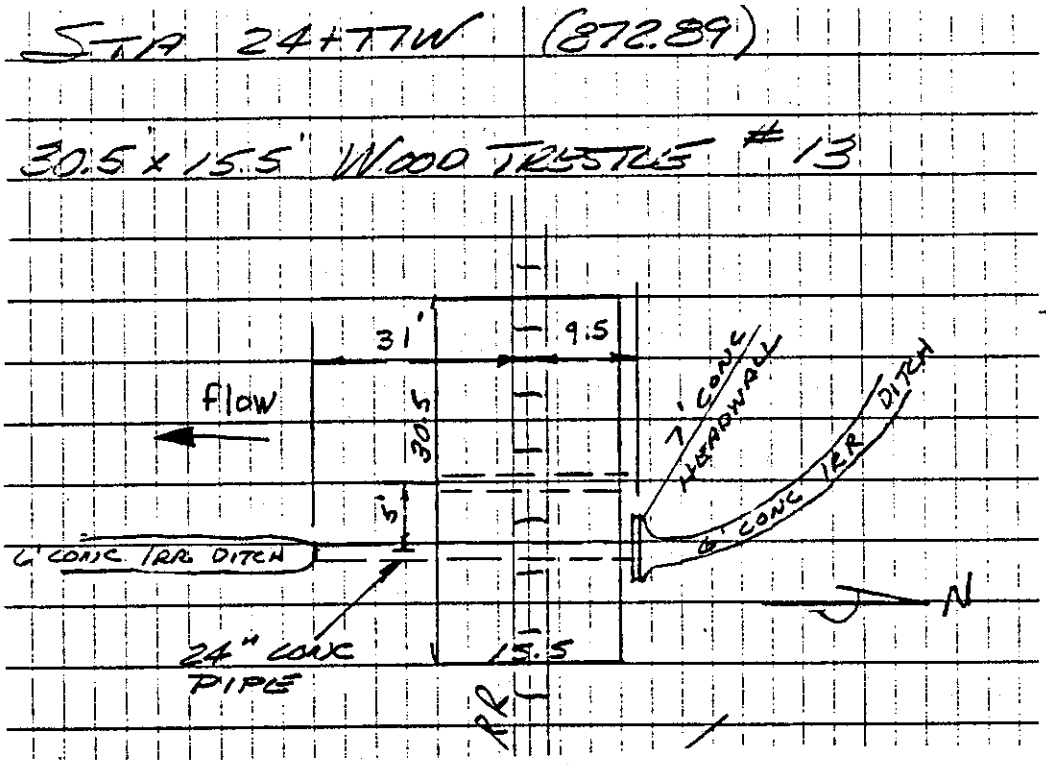
Trestle #13



Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	30.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	29.4 ft² Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	N/A No Overtopping	N/A No Overtopping
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	894.73 (At trestle # 13)	894.73 (At trestle #13)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	893.6 (sheet #11)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		255 cfs	0	255 cfs

The maximum depth of flow over the roadway/railroad (ft.) ..... N/A No Overtopping

Weir length (ft.) ..... N/A

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		30.5 ft (Trestle 13)
Downstream face		

3. ANALYSIS (Cont'd)

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport *(including scour and deposition)* can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions *(such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions)*, is there a potential for debris and sediment transport *(including scour and deposition)* to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment *(bed material)* load?
   _____cfs *(attach gradation curve)*

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	O.M.B. Burden No. 3067-0148 Expires July 31, 1994	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

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Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 14 Approximately 1,615 ft. west of Turner Rd.
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1. Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 19.5 ft long wood railroad trestle
2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)
3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

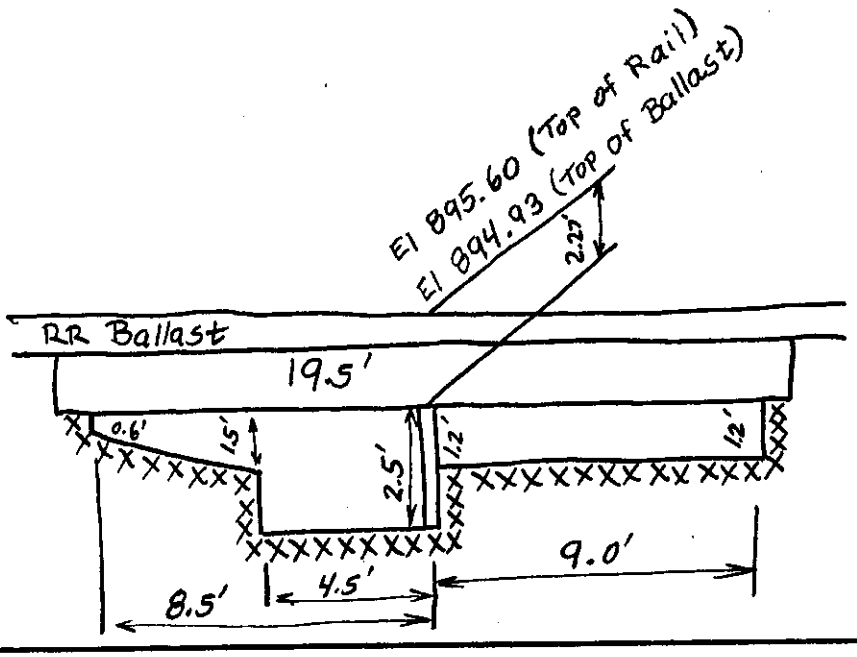
   Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

   Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

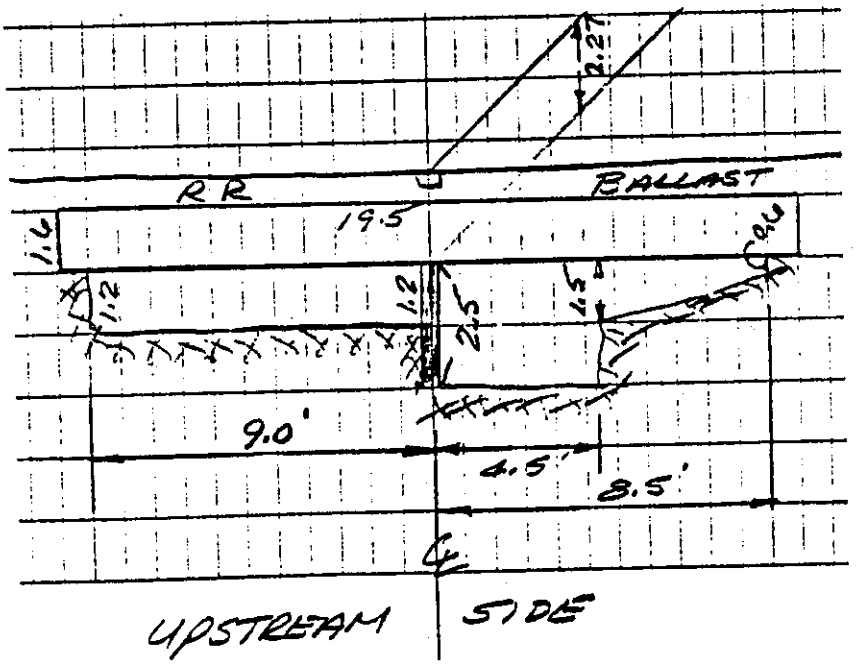
Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Trestle #14



Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.

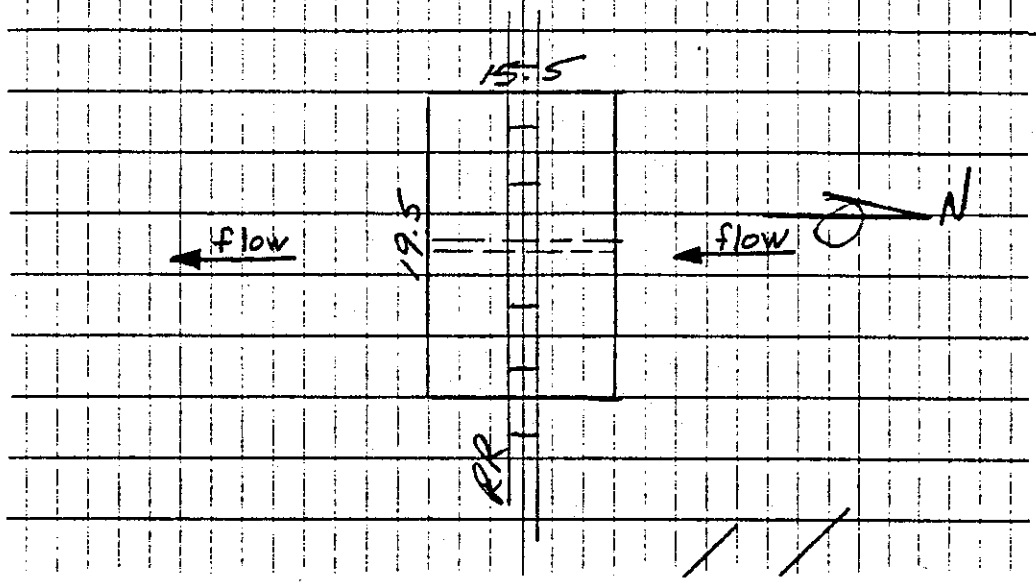


Sketch the plan view of the structure(s). Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

TURNER RD (GTOW) TO WILSON AVE (53+22W)

STA 16+15 W (872.05)

19.5' x 15.5' WOOD TRESTLE # 14



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	19.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	26.4 ft² Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	N/A No Overtopping	N/A No Overtopping
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	895.60 (Top of Rail At Trestle #14)	895.60 (Top of Rail At Trestle #14)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	893.6 (sheet #11)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		173 cfs	0	173 cfs

The maximum depth of flow over the roadway/railroad (ft.) ..... N/A No Overtopping

Weir length (ft.) ..... N/A

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		19.5 ft (Trestle #14)
Downstream face		

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	O.M.B. Burden No. 3067-0148 Expires July 31, 1994	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 15 Approximately 1,320 ft. west of Wilson Ave.
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 15.5 ft long wood railroad trestle

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)

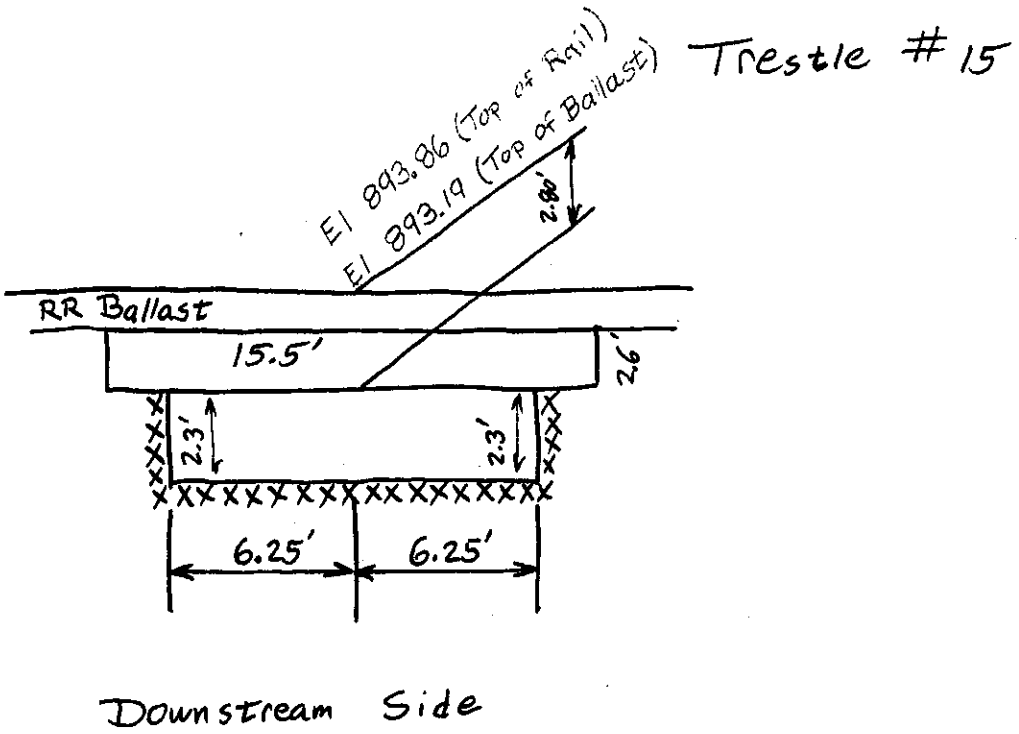
3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

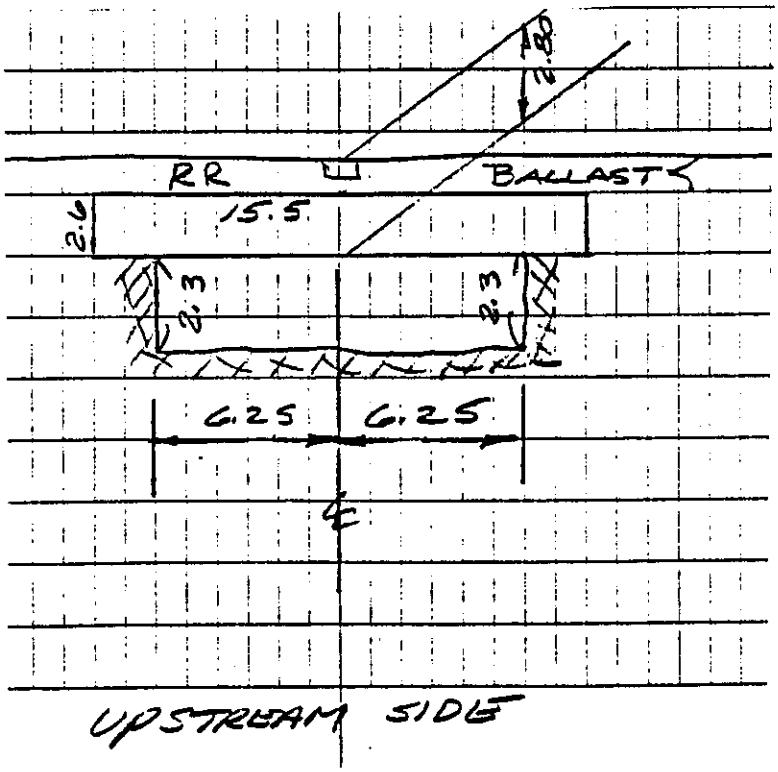
Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.



Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



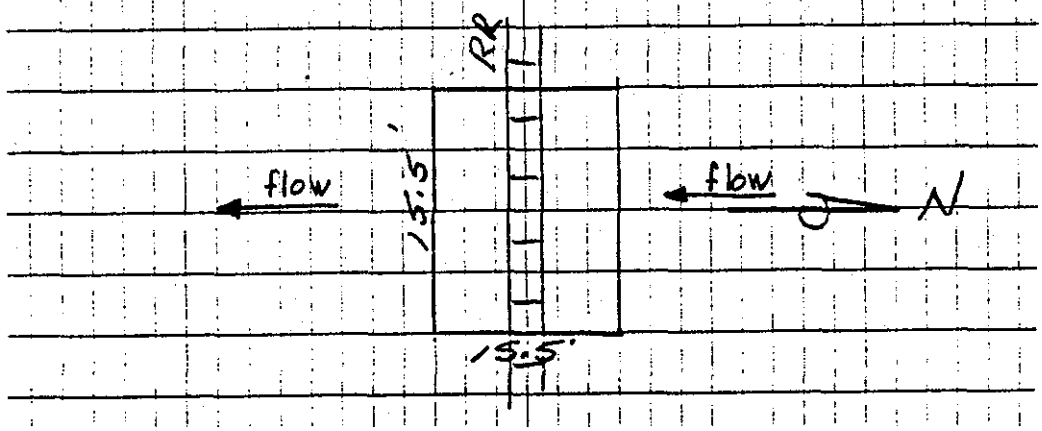
Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

SOUTHERN PACIFIC RR 75

WILSON AVE (OTOW) TO PALO VERDE RD (53+64W)

STA 13+20W (871.10)

15.5' X 15.5' WOOD TRESTLE #15



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	15.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	28.8 ft² Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	893.86	893.34
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	893.86 (Top of Rail At Trestle # 15)	893.34 (3386 ft west of Trestle #15)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	893.6 (sheet #10)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		300 cfs (Trestle # 15 only)	96 cfs (3386 ft west of Trestle #15)	*

* See Section 4.7 Appendix 2 of the Hydraulics Report for an explanation of the flow distribution associated with Trestle 15 and subbasin 54.

The maximum depth of flow over the roadway/railroad (ft.) ..... 0.26 ft (3386 ft west of trestle 15)

Weir length (ft.) ..... 1550 ft

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		15.5 ft (Trestle #15)
Downstream face		

3. ANALYSIS (Cont'd)

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport *(including scour and deposition)* can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions *(such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions)*, is there a potential for debris and sediment transport *(including scour and deposition)* to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment *(bed material)* load?
   _____cfs *(attach gradation curve)*

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	O.M.B. Burden No. 3067-0148 Expires July 31, 1994	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

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Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 16 Approximately 3,442 ft. west of Wilson Ave.
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway)
One 19.5 ft long wood railroad trestle

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

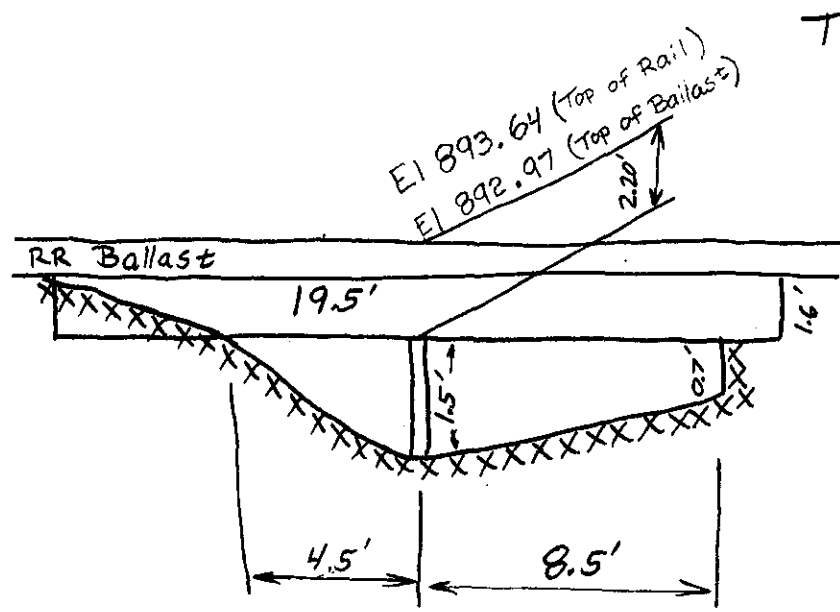
Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

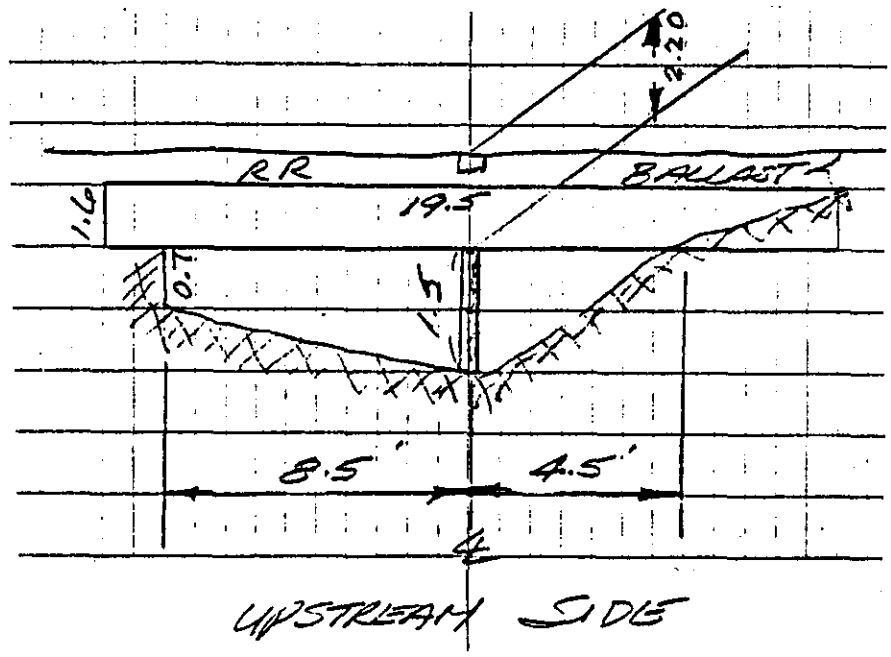
Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Trestle #16



Downstream Side

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



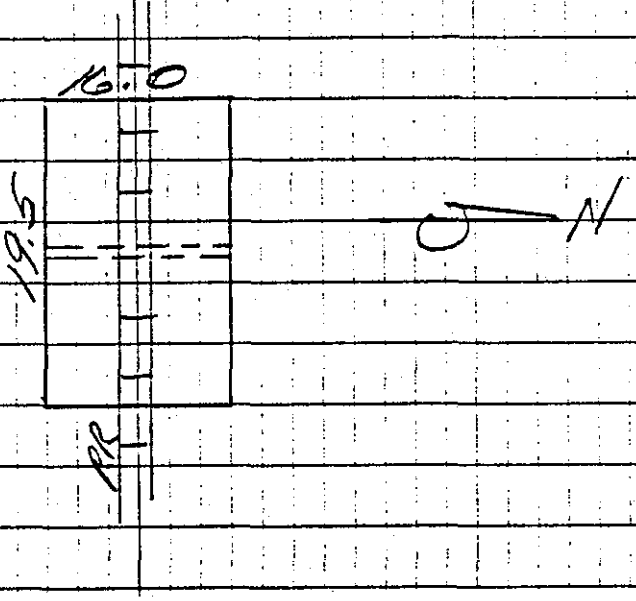
UPSTREAM SIDE

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

WILSON AVE (OTHW) TO PALO VERDE (53+64W)

STA 34+42W (870.70)

19.5' x 16.0' WOOD TRESTLE #16



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	19.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	11.8 ft²

Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	893.64	893.34
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	893.64 (Top of Rail At trestle #16)	893.34 (584 ft west of trestle #16)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	893.6 (Sheet #10)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		105 cfs (Trestle #16 only)	96 cfs (584 ft west of Trestle #16)	*

* See Section 4.7, Appendix 2 of the Hydraulics Report for an explanation of the flow distribution associated with Trestle #16 and Subbasin 54.

The maximum depth of flow over the roadway/railroad (ft.) ..... 0.26 ft (584 ft west of Trestle 16)

Weir length (ft.) ..... 1550 ft

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		19.5 ft (Trestle #16)
Downstream face		

3. ANALYSIS (Cont'd)

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	O.M.B. Burden No. 3067-0148 Expires July 31, 1994	FEMA USE ONLY

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Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 17 Approximately 4,706 ft. west of Wilson Ave.
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 30.5 ft long wood railroad trestle

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

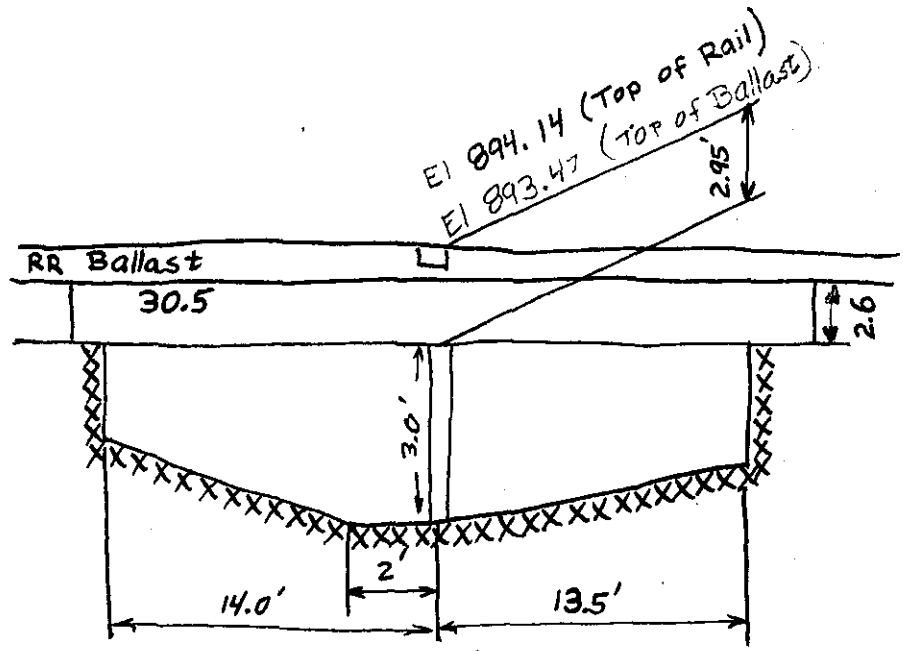
Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

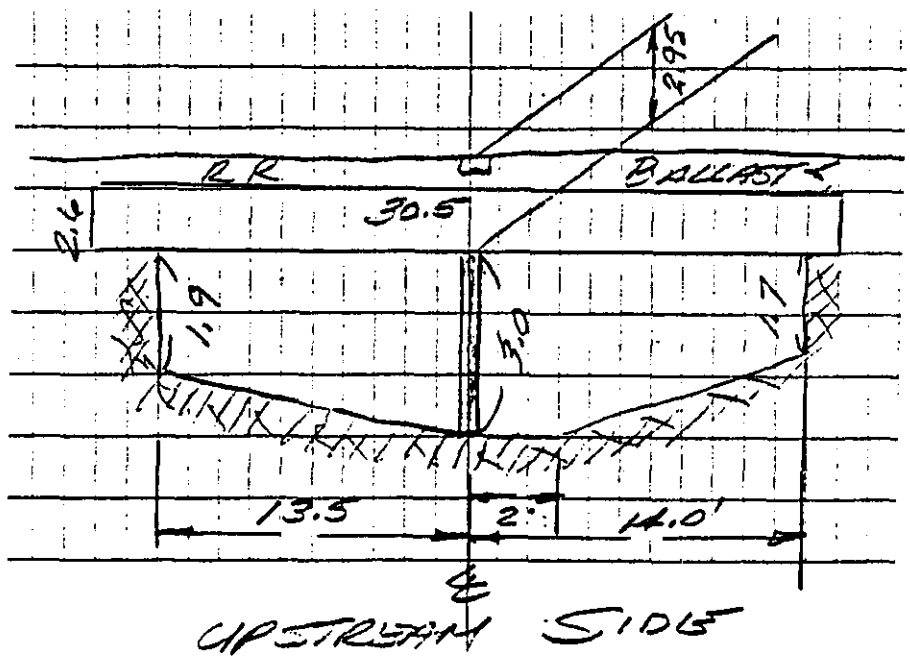
Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Trestle # 17



Downstream Side

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



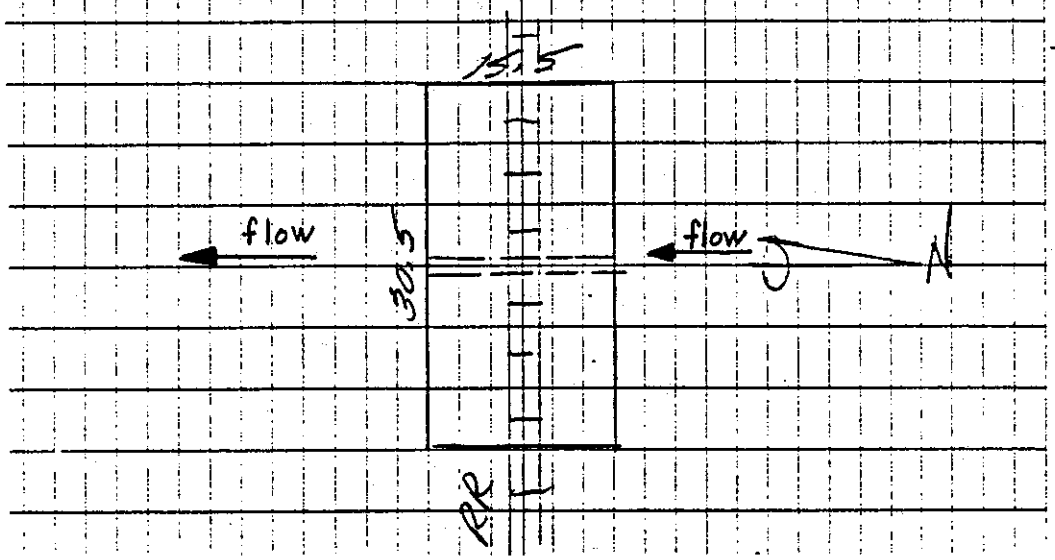
UPSTREAM SIDE

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

WILSON AVE (0+00W) TO PACO VERDE RD (53+64W)

STA 47+06W (870.46)

30.5' x 15.5' WOOD TRESTLE #17



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	15.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	64.6 ft² Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	893.34	894.14
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	893.34 (680 ft east of Trestle #17)	894.14 (Top of Rail At Trestle #17)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	893.6 (sheet #10)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		645 cfs (Trestle #17 only)	96 cfs (680 ft east of Trestle #17)	*

* See section 4.7, Appendix 2 of the Hydraulics Report for an explanation of the flow distribution associated with Trestle #17 and subbasin 54.

The maximum depth of flow over the roadway/railroad (ft.) ..... 0.26 ft (680 ft east of Trestle 17)

Weir length (ft.) ..... 1550 ft

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		30.5 ft (Trestle #17)

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		
Downstream face		

3. ANALYSIS (Cont'd)

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport *(including scour and deposition)* can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions *(such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions)*, is there a potential for debris and sediment transport *(including scour and deposition)* to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment *(bed material)* load?
   _____cfs *(attach gradation curve)*

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	O.M.B. Burden No. 3067-0148 Expires July 31, 1994	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 18 Approximately 1,289 ft. west of Palo Verde Rd.
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 75.5 ft long wood railroad trestle

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

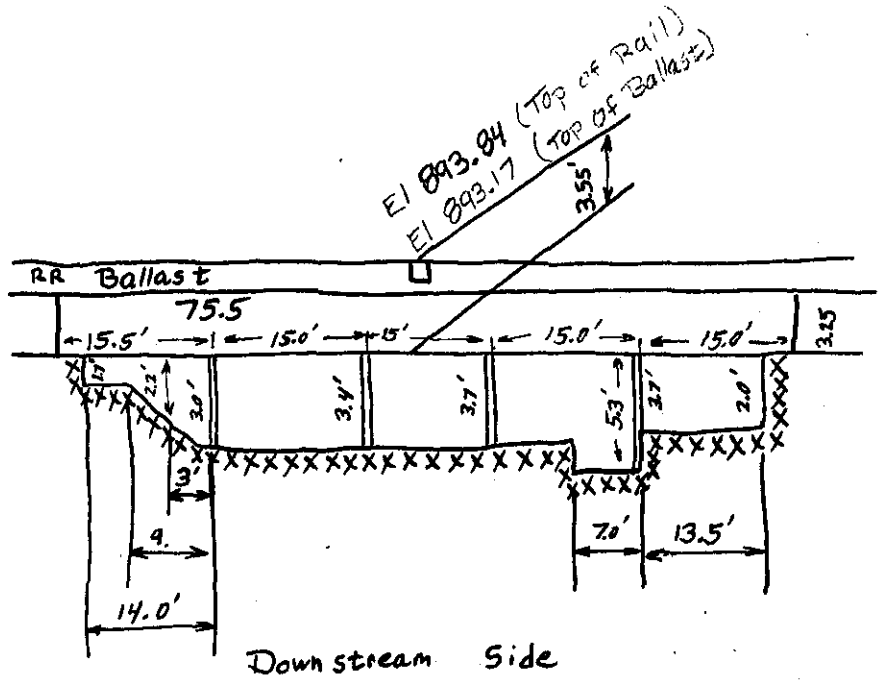
Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

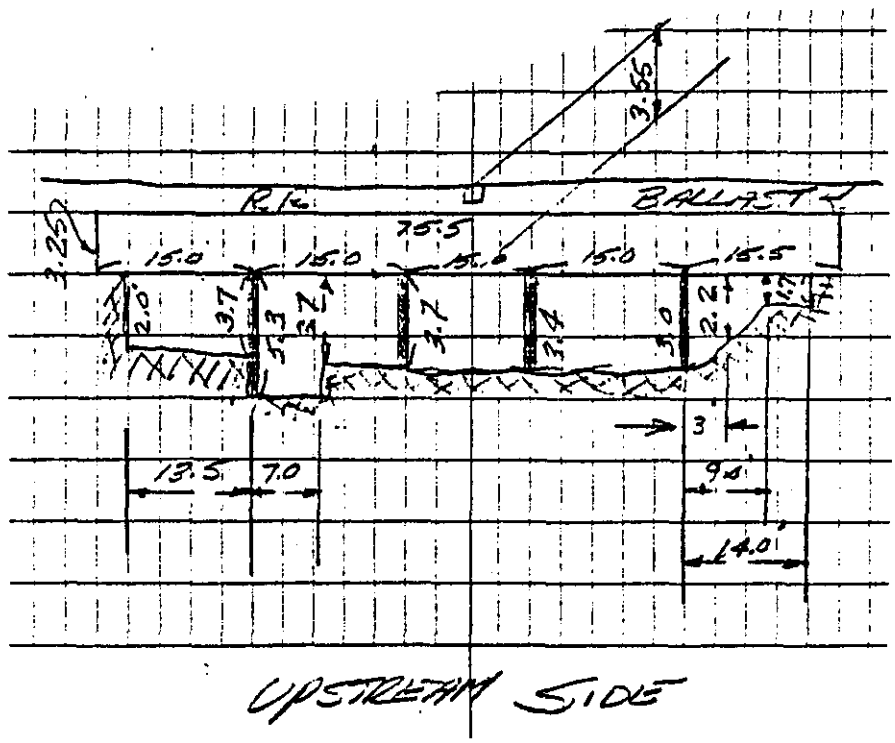
Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

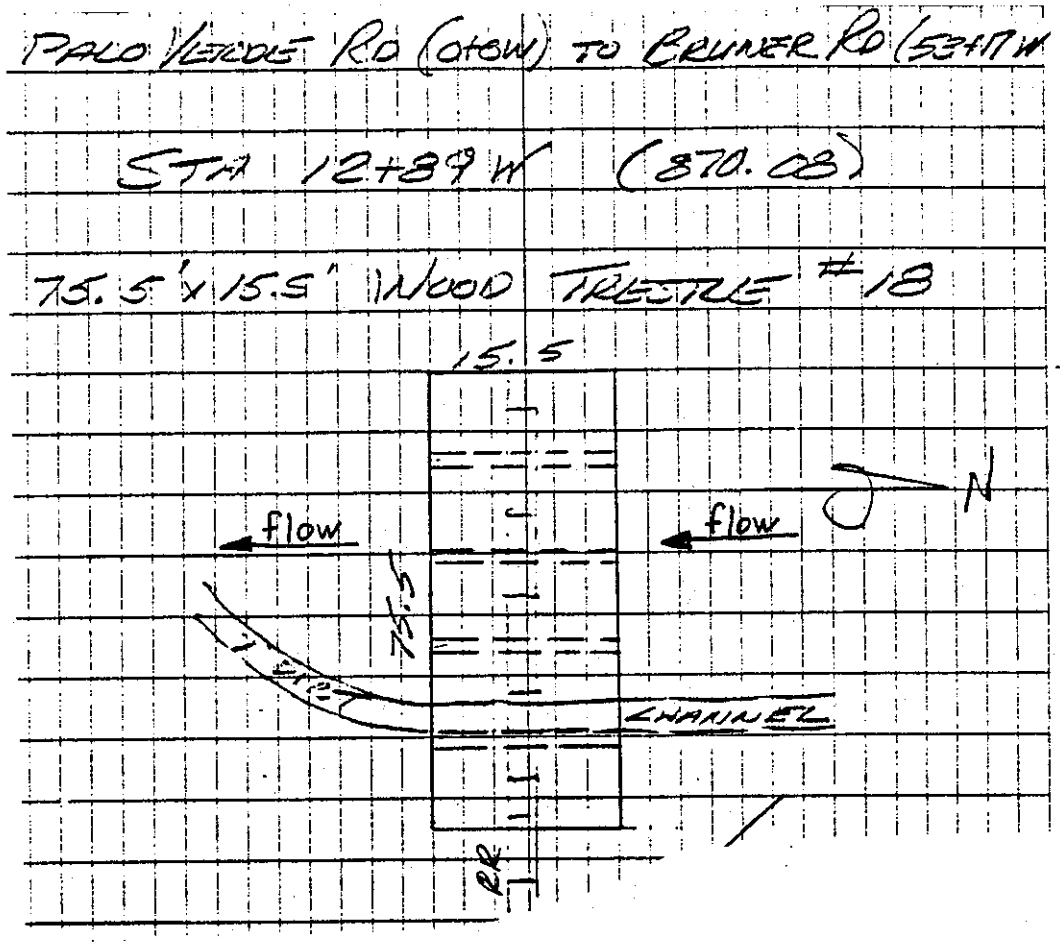
Trestle #18



Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



Sketch the plan view of the structure(s). Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	15.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	218.6 ft² Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	N/A	N/A
Downstream face	No Overtopping	No Overtopping

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	893.84 (Top of Rail At Trestle #18)	893.84 (Top of Rail At Trestle #18)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	890.2	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		1630 cfs (Trestle #18 only)	0	

The maximum depth of flow over the roadway/railroad (ft.) ..... N/A No Overtopping

Weir length (ft.) ..... N/A

Top Widths	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths	Effective Flow	Effective and Ineffective Flow
Upstream face		75.5 ft (Trestle #18 only)
Downstream face		

3. ANALYSIS (Cont'd)

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport *(including scour and deposition)* can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions *(such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions)*, is there a potential for debris and sediment transport *(including scour and deposition)* to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment *(bed material)* load?
   _____cfs *(attach gradation curve)*

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1994*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle #19 Approximately 2,219 ft. west of Pab Verde Rd.
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 30.5 ft long wood railroad trestle

2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)

3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

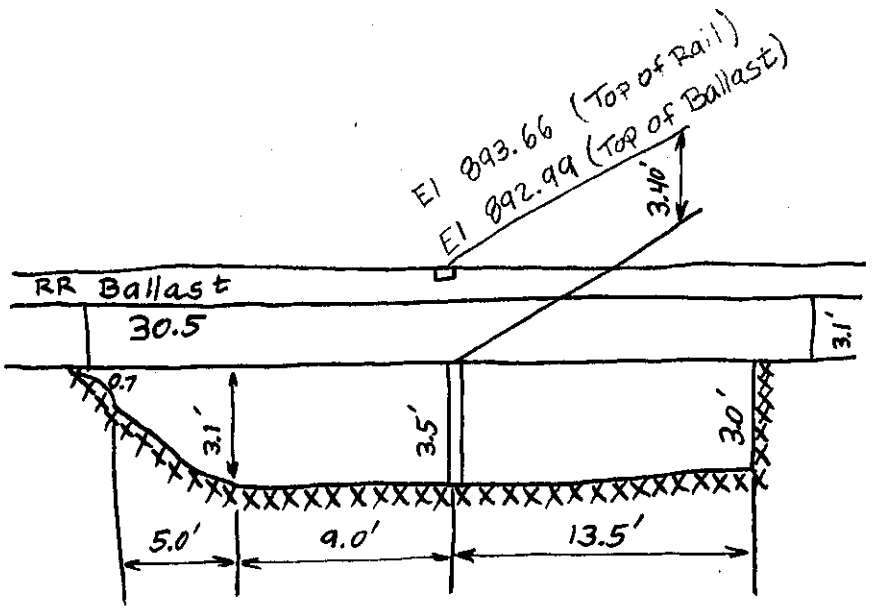
Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

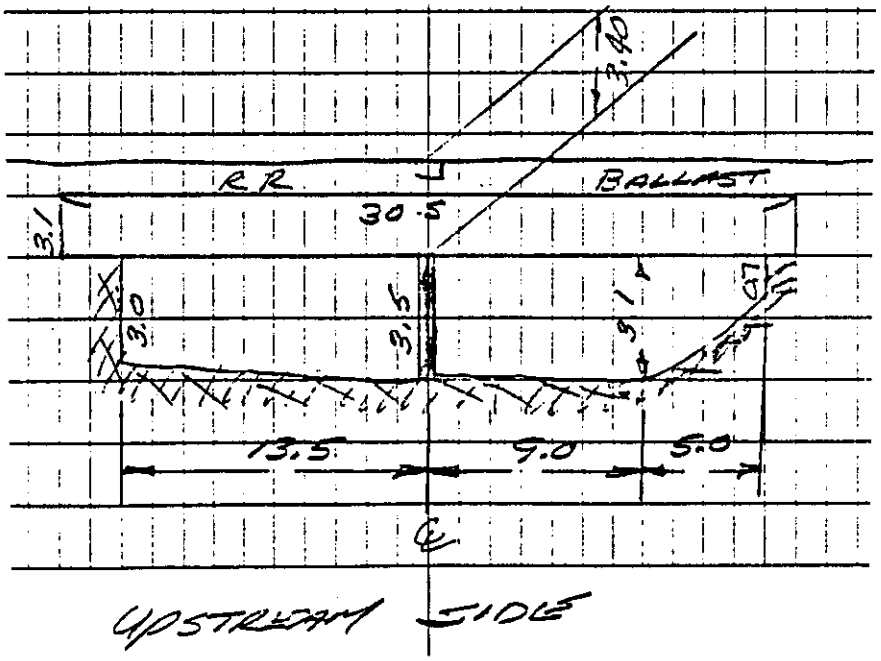
Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Trestle #19



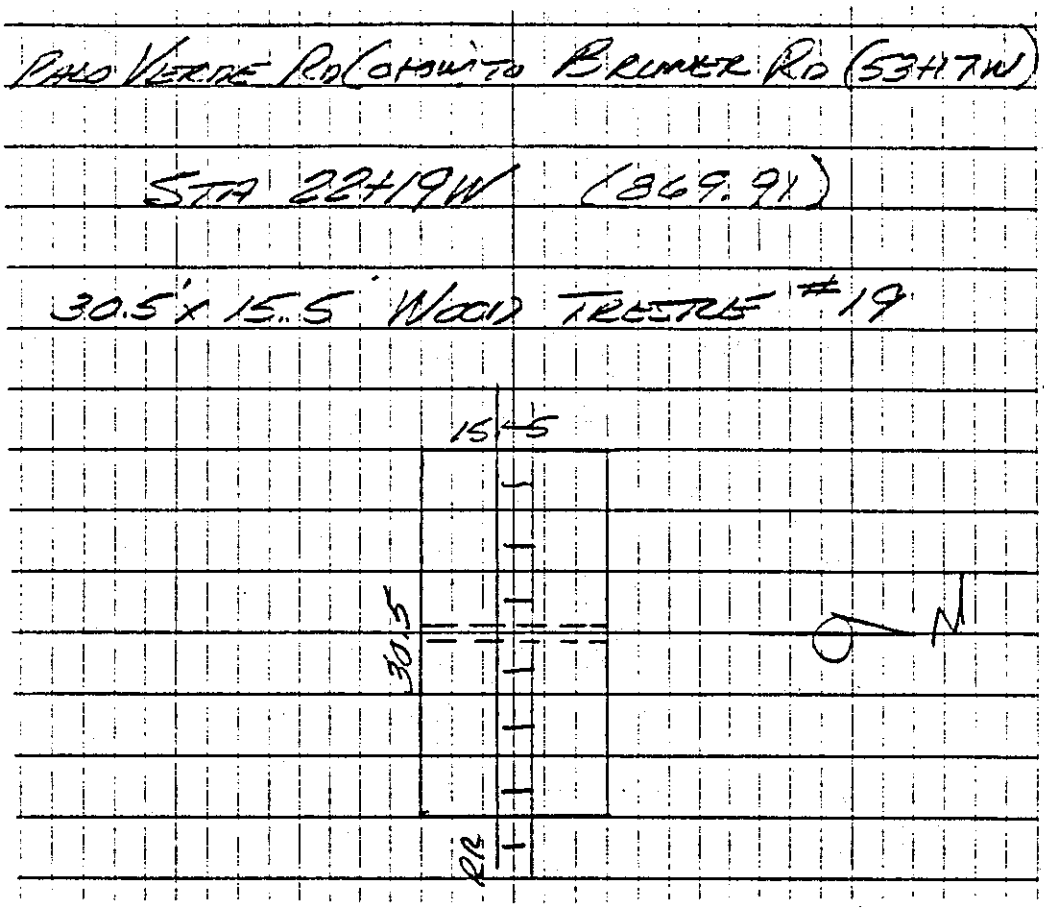
Downstream Side

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



UPSTREAM SIDE

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	15.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	79.9 ft² Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	N/A No Overtopping	N/A No Overtopping
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	893.66 (Top of Rail At Trestle #19)	893.66 (Top of Rail At Trestle #19)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	890.2 (sheet 10)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		533 cfs (Trestle #19 only)	0	

The maximum depth of flow over the roadway/railroad (ft.) ..... N/A No Overtopping

Weir length (ft.) ..... N/A

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		30.5 ft (Trestle #19 only)
Downstream face		

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	O.M.B. Burden No. 3067-0148 Expires July 31, 1994	FEMA USE ONLY

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Community Name: Maricopa County, Arizona

Flooding Source: Southern Pacific Railroad

Project Name/Identifier: Buckeye Area Flood Delineation Study FCD 90-69

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Southern Pacific Railroad
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Trestle # 21 Approximately 753 west of Bruner Rd. (Sheet #9)
3. This revision reflects *(check one of the following)*:
   - ☐ New bridge/culvert not modeled in the FIS
   - ☐ Modified bridge/culvert previously modeled in the FIS
   - ☐ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) This is the first detailed study of the area.

2. BACKGROUND

Provide the following information about the structure:

1. Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) One 60.5 ft long wood railroad trestle
2. Entrance geometry of culvert/type of bridge opening (e.g. 30° - 75° wing walls with square top edge, sloping embankments and vertical abutments)
3. Hydraulic model used to analyze the structure (*e.g., HEC-2 with special bridge routine, WSPRO, HY8*)

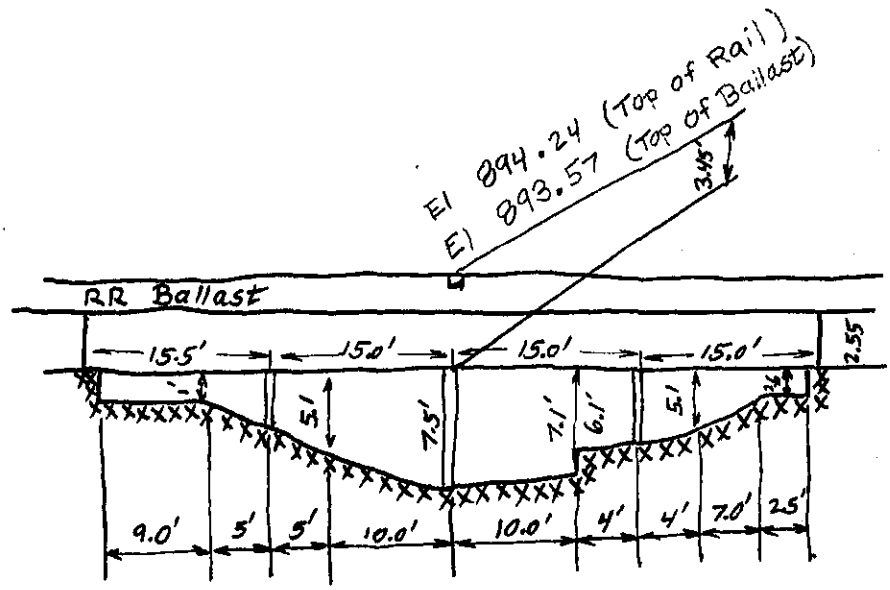
   Since flooding occurs as the result of ponding against the raised embankments of the railroad, the level-pool reservoir routing routine of HEC-1 was used to determine water surface elevations based upon stage-storage-discharge data. The rating curves for the trestles are comprised of flow through the trestle and flow overtopping the railroad. The flow through the trestle was determined using the orifice equation and the overtopping flow was modeled as a broad-crested weir.

   Complete details on the approach and results of the hydraulic analysis are contained in Section 4 of the Hydraulic Report. Photographs and survey data of the railroad structures are in Appendix A of the Hydrology Report.

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

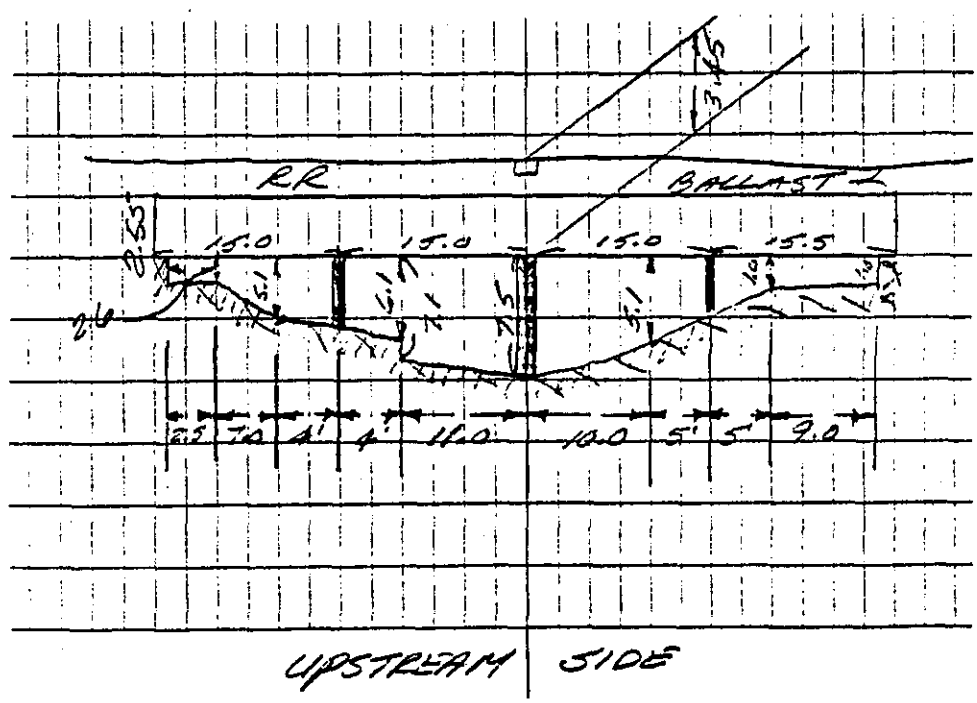
Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

Trestle # 21



Downstream Side

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.



UPSTREAM SIDE

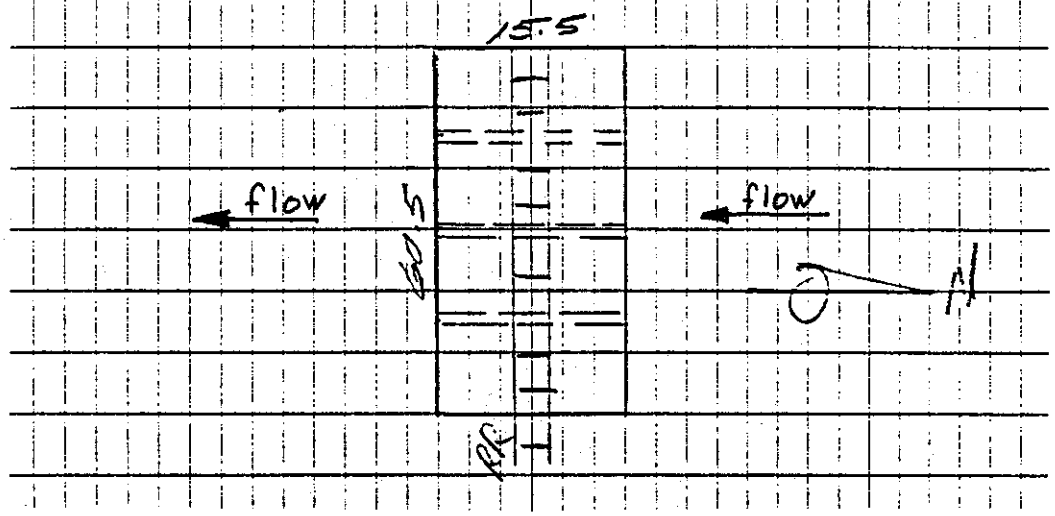
Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

SOUTHERN PACIFIC RR 87

BRINER RD (OTAW) TO JOHNSON RD (54+41 W)

STA 7+53 W (262.18)

60.5' x 15.5' WOOD TRESTLE #21



Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	15.5 ft
Calculated culvert/bridge area (ft²) by the hydraulic model, if applicable	
Total culvert/bridge area (ft²)	250.3 ft² Appendix J, Hydrology Report

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	N/A (No Overtopping)	N/A (No Overtopping)
Downstream face		

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	894.24 (Top of Rail At Trestle #21)	894.24 (Top of Rail At Trestle #21)
Downstream face		

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	887.4 (sheet 9)	N/A
Downstream face		

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)		391 cfs (Trestle #21)	0	

The maximum depth of flow over the roadway/railroad (ft.) ..... N/A no overtopping

Weir length (ft.) ..... N/A

Top Widths

	Floodplain	Floodway
Upstream face	N/A	N/A
Downstream face		

Top Widths

	Effective Flow	Effective and Ineffective Flow
Upstream face		60.5 ft (Trestle #21 only)
Downstream face		

Loss Coefficients

See Appendix 2 of Section 4 of the Hydraulic Report.

Entrance loss coefficient _____

Manning's "n" value assigned to the structure(s) _____

Friction loss coefficient through structure (s) _____

Other loss coefficients (e.g., bend manhole, etc.) _____

Total loss coefficient _____

Weir coefficient _____

Pier coefficient _____

Contraction loss coefficient _____

Expansion loss coefficient _____

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport (*including scour and deposition*) can affect the 100-year water surface elevations? ..... ☐ Yes ☐ No

   B Based on the conditions (*such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions*), is there a potential for debris and sediment transport (*including scour and deposition*) to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment (*bed material*) load?
   _____cfs (*attach gradation curve*)

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition This is an existing railroad trestle that was originally built around 1910. The field survey shows the existing condition of the trestle and the sediment accumulation since it was built. The analysis of the trestle reflects the existing condition of the trestle as it was found in the field. Due to the long time span from construction of the trestle to now, some seventy years, it was felt that there wouldn't be a drastic rise in the amount of sediment at the trestle. To have accounted for more sediment then was found for the existing condition was felt to be overly restrictive. Sediment transport and scour analysis weren't done since they are above and beyond the scope of work for a floodplain delineation study.

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert? _____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) N/A (PONDING AREA)

Comments *(explain any unusual situations)*:

Since only ponding occurs on the upstream side of the railroad some of the questions in this form aren't applicable. In particular, the downstream side of the railroad wasn't studied. This is because the flow quickly spreads out and there isn't a defined drainage course downstream of the railroad.

The survey data for the trestles comes from Appendix A of the Hydrology Report, and from Section 2 of the Study Documentation located in the Hydraulics Report.

A description of the hydraulic analysis is located in the Hydraulics Report, Study Documentation Section 4.

The numbers used to identify the railroad trestles are only valid for this study.

Attach analysis.

See the Hydraulics Report.