

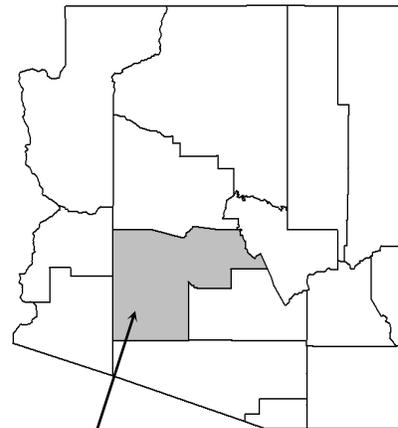
FLOOD INSURANCE STUDY



VOLUME 1 OF 31

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
AVONDALE, CITY OF	040038
BUCKEYE, TOWN OF	040039
CAREFREE, TOWN OF	040126
CAVE CREEK, TOWN OF	040129
CHANDLER, CITY OF	040040
EL MIRAGE, CITY OF	040041
FOUNTAIN HILLS, TOWN OF	040135
GILA BEND, TOWN OF	040043
GILBERT, TOWN OF	040044
GLENDALE, CITY OF	040045
GOODYEAR, CITY OF	040046
GUADALUPE, TOWN OF	040111
LITCHFIELD PARK, CITY OF	040128
MARICOPA COUNTY (UNINCORPORATED AREAS)	040037
MESA, CITY OF	040048
PARADISE VALLEY, TOWN OF	040049
PEORIA, CITY OF	040050
PHOENIX, CITY OF	040051
QUEEN CREEK, TOWN OF	040132
SCOTTSDALE, CITY OF	045012
SURPRISE, CITY OF	040053
TEMPE, CITY OF	040054
TOLLESON, CITY OF	040055
WICKENBURG, TOWN OF	040056
YOUNGTOWN, TOWN OF	040057



Maricopa County

NOTICE
This Preliminary FIS Report includes only revised flood profiles and Floodway Data Tables. See Notice to Flood Insurance Study Users page for additional details.

PRELIMINARY

FEBRUARY 26, 2016



Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
04013CV001D

**NOTICE TO
FLOOD INSURANCE STUDY USERS**

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

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

Users should refer to Section 10.0, Revisions Description, for further information. Section 10.0 is intended to present the most up-to-date information for specific portions of this FIS report. Therefore, users of this report should be aware that the information presented in Section 10.0 supersedes information in Sections 1.0 through 9.0 of the FIS report.

Initial Countywide FIS Effective Date: April 15, 1988

Revised Countywide Dates: September 29, 1989
September 4, 1991
December 3, 1993
September 30, 1995
July 19, 2001
September 30, 2005
October 16, 2013
November 4, 2015

This preliminary FIS report does not include unrevised Floodway Data Tables or unrevised Flood Profiles, and therefore does not include any additional report volumes. These Floodway Data Tables and Flood Profiles will appear in Volumes 3-7 and 9-31 of the final FIS report.

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Unnamed Wash No. 1	Panels 1386P-1392P
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Wash 1 East	Panels 1426P-1427P
Wash 1 West	Panels 1428P-1432P
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Wash 2 East Tributary	Panels 1437P-1438P
Wash 2 West (North of the Central Arizona Project Canal)	Panels 1439P-1441P
Wash 2 West (South of the Central Arizona Project Canal)	Panels 1442P-1444P
Wash 2 West Tributary 1	Panels 1445P-1447P(e)
Wash 2 West Tributary 2	Panels 1448P-1450P
Wash 3 East	Panels 1451P-1455P
Wash 3 West	Panels 1456P-1461P
Wash 4 East	Panels 1462P-1463P
Wash 5 East	Panels 1464P-1467P
Wash 6 East	Panels 1468P-1470P
Wash 6 East South	Panel 1471P
Wash 7 East	Panel 1472P
Wash 7 East East Split	Panels 1473P-1474P
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Wash B Tributary	Panel 1530P
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Wash T2N-R5W-S27N	Panels 1553P-1555P
Wash T4N-R2W-S09N	Panels 1556P-1557P
Wash T4N-R2W-S15N	Panels 1558P-1559P
Wash T4N-R3W-S07W	Panels 1560P-1561P
Wash T4N-R3W-S08E	Panels 1562P-1565P
Wash T4N-R3W-S08W	Panels 1566P-1568P
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Wash T4N-R3W-S17	Panels 1576P-1578P
Wash T4N-R3W-S18E	Panels 1579P-1582P
Wash T4N-R3W-S18W	Panels 1583P-1586P
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Wash T5N-R3W-S01S	Panel 1595P
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Willow Springs Wash Tributary 2A	Panels 1684P-1686P
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Rio Verde Wash 10 Tributary 2	Panel 1787P
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Rio Verde Wash A Tributary 1	Panels 1811P-1813P
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Rio Verde Wash K	Panels 1850P-1864P
Rio Verde Wash K Split 1	Panels 1865P-1866P
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Rio Verde Wash K Split 3A	Panels 1870P-1874P
Rio Verde Wash K Split 4	Panel 1875P
Rio Verde Wash K Tributary 1	Panels 1876P-1878P
Rio Verde Wash K Tributary 4	Panels 1879P-1888P
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Rio Verde Wash K Tributary 7	Panels 1938P-1940P
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Rio Verde Wash K Tributary 13	Panels 1958P-1959P
Rio Verde Wash L	Panels 1960P-1967P
Rio Verde Wash P	Panels 1968P-1973P
Rio Verde Wash P Tributary 1	Panel 1974P
Rio Verde Wash P Tributary 2	Panel 1975P
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Sharman Wash	Panels 1981P-1982P
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Wash T1N-R5W-S10	Panels 1994P-1995P
Wash T1N-R5W-S15	Panels 1996P-1997P
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Wash T1N-R5W-S32	Panel 2002P
Wash T1N-R5W-S33E	Panel 2003P
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Wash T1N-R5W-S33W	Panels 2005P-2006P

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Wash T1N-R6W-S17	Panels 2011P-2012P
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Wash T1S-R6W-S05S	Panels 2042P-2043P
Wash T1S-R6W-S08	Panels 2044P-2048P
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Wash T2N-R6W-S36	Panels 2077P-2078P
Wash T2N-R6W-S36W	Panels 2079P-2080P
Wash T2N-R7W-S20W	Panels 2081P-2082P
Wash T2N-R7W-S32E	Panels 2083P-2084P
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Wash T5N-R5W-S1	Panel 2128P
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Wash T5N-R5W-S12	Panel 2134P
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Wash T5N-R5W-S13B	Panels 2136P-2137P
Wash T5N-R5W-S14	Panel 2138P
Wash T5N-R5W-S14B	Panel 2139P
Wash T5N-R5W-S22	Panel 2140P
Wash T5N-R5W-S23A	Panels 2141P-2142P
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Wash T5N-R5W-S23C	Panel 2147P
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Wittmann Wash Tributary 1 Breakout 2	Panel 2201P
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Wash T1S-R2W-S31B (I70)	Panel 2217P
Wash T1S-R3W-S24A (A60)	Panel 2218P
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Flood Insurance Rate Map Index
Flood Insurance Rate Map

**FLOOD INSURANCE STUDY
MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS**

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of Maricopa County, Arizona, including the Cities of Apache Junction, Avondale, Chandler, El Mirage, Glendale, Goodyear, Litchfield Park, Mesa, Peoria, Phoenix, Scottsdale, Surprise, Tempe, and Tolleson; the Towns of Buckeye, Carefree, Cave Creek, Fountain Hills, Gila Bend, Gilbert, Guadalupe, Paradise Valley, Queen Creek, Wickenburg, and Youngtown; and the unincorporated areas of Maricopa County (hereinafter referred to collectively as Maricopa County). This information will be used to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development.

The Town of Apache Junction is geographically located in Maricopa and Pinal Counties. The Town of Apache Junction is not included in the FIS report. See the separately published FIS report and Flood Insurance Rate Map (FIRM) for Pinal County, Arizona and Incorporated Areas for flood hazard information.

The City of Peoria is geographically located in Maricopa and Yavapai Counties. The City of Peoria is included in its entirety in this FIS report.

The Town of Queen Creek is geographically located in Maricopa and Pinal Counties. The Town of Queen Creek is included in both the Maricopa County and Pinal County FIS reports.

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

1.2 Authority and Acknowledgments

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

This FIS is based on previous FISs for the various incorporated communities and unincorporated areas within Maricopa County. Detailed information on the contractors who studied each area is provided below.

The original hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers (USACE), Los Angeles District, for the Federal Emergency Management Agency (FEMA), under Interagency Agreement Nos. IAA-H-15-72 and IAA-H-15-73. This study was completed in 1973.

Additional hydrologic and hydraulic analyses for many streams within the county were performed by Harris-Toups Associates under Contract No. H-4008. This work was

completed in February 1978 and January 1979.

Hydrologic and hydraulic analyses for Cave Creek (downstream of Cave Creek Dam) and for East Fork of Cave Creek were revised by Cella, Barr, Evans, and Associates, under Contract No. H-4607. This work was completed in October 1980.

Additional hydrologic and hydraulic analyses for portions of the Agua Fria and New Rivers, and Skunk Creek were performed by the USACE under contract to the Flood Control District of Maricopa County (FCDMC) Hydrologic and hydraulic analyses for portions of the Salt and Gila Rivers were performed by Harris-Toups Associates in October 1977. The 1-percent-annual-chance flood for portions of the above streams, as well as the 0.2-percent-annual-chance flood for the Agua Fria River, was computed by Dames & Moore using data provided by the USACE, Los Angeles District. Approximate floodplain boundaries and boundaries for areas subject to sheet flow were delineated by Dames & Moore.

Hydraulic analyses for portions of the following streams were taken from the effective Flood Insurance Studies for the incorporated communities (FEMA, September 30, 1982; FEMA, August 3, 1982; FEMA, February 15, 1980; FEMA, unpublished; FEMA, July 16, 1980; U.S. Department of Housing and Urban Development, December 1, 1978; FEMA, 1979; FEMA, September 30, 1983; FEMA, September 22, 1981; FEMA, October 18, 1983; FEMA, May 15, 1980; FEMA, 1986; FEMA, January 16, 1981; FEMA, June 1, 1984; FEMA, December 4, 1984; FEMA, March 1, 1983; FEMA, December 14, 1982; FEMA, January 16, 1980; FEMA, March 24, 1983; U.S. Department of Housing and Urban Development, November 15, 1978): Agua Fria River, Gila River, Hassayampa River, New River, Salt River, Skunk Creek, Scatter Wash, Aguila Farm Channel, Andora Hills Wash, Atchison, Topeka & Santa Fe Railway Channel, Casandro Wash, South Branch, Casandro Wash, Cave Creek, East Fork of Cave Creek, Dreamy Draw Wash East, Echo Canyon Wash, Flynn Lane Wash, Flying E Wash, Galloway Wash, Granite Reef Wash, Grapevine Wash, Grass Wash, Hospital Wash, Indian Bend Wash, Indian Bend Wash-Low Flow Channel, Little San Domingo Wash, Lower El Mirage Wash, Martinez Wash, Mockingbird Wash, Moon Valley Wash, Myrtle Avenue Wash, Ocotillo Wash, Powder House Wash, Rowe Wash, Tenth Street Wash, Wash B, Willow Springs Wash, and Weekes Wash.

The hydrologic and hydraulic analyses for portions of the Agua Fria, New, Gila, and Salt Rivers, Skunk Creek, and Scatter Wash included in the restudy were performed by the USACE, Los Angeles District, for FEMA, under Interagency Agreement No. EMW-E-0941, Project Order No. 10. This work was completed in March 1986.

Revised hydrologic and hydraulic analyses for Sols Wash, which passes through the Town of Wickenburg and extends to the county boundary between Maricopa and Yavapai Counties, were performed by Cella Barr Associates (CBA), for FEMA, under Contract No. EMW-85-C-1909. This restudy was completed in December 1986.

Revised hydraulic analyses for a portion of Consolidated Canal were performed by Greiner Engineering Sciences, Inc. for the City of Mesa in 1984 (Greiner Engineering Sciences, 1984).

Revised hydraulic analyses for a portion of the Agua Fria River in El Mirage were performed by Engineering and Surveying of Arizona, Inc., in November 1984

(Engineering and Surveying of Arizona, Inc., 1986).

Revised hydraulic analyses for flooding along a portion of the Atchison, Topeka & Santa Fe Railway in the City of Chandler were performed in July 1980 (Harris-Toups Associates, 1984).

Revised hydraulic analyses for a portion of East Fork of Cave Creek in the City of Phoenix were performed by Erie and Associates, Inc., for the Coral Gables Estates Unit Six Subdivision in November 1985 (Erie and Associates, Inc., 1985).

This study was revised in 1986 to incorporate either new or revised hydrologic and hydraulic analyses for several flooding sources throughout the county. FEMA decided to include flooding information through the incorporated communities to provide the county with a more usable FIRM.

The hydraulic analyses for Stagecoach Pass Wash from a point approximately 1,350 feet downstream of North 84th Street to a point approximately 600 feet downstream of North 84th Street were performed by Map-IX Mainland, for FEMA, under Contract No. EMF-2003-CO-0047, Task Order 009. The work was in February 2007.

The hydraulic analyses for Stagecoach Pass Wash Overflow from the confluence with Stagecoach Pass Wash to a point approximately 200 feet downstream of North Indian Camp Trail were performed by Map-IX Mainland, for FEMA, under Contract No. EMF-2003-CO-0047, Task Order 009. The work was completed in February 2007.

Base map information shown on this FIRM was derived from multiple sources. Base map files were provided in digital format by the Maricopa County Department of Public Works, Flood Control District. Orthophoto images were produced at a scale of 1:6,000 using HARN for control. Aerial photography is dated December 2000 to December 2007.

1.3 Coordination

The FCDMC assisted in the selection of the areas that were studied by detailed methods and the selection of preliminary floodway limits. The Arizona Department of Transportation provided highway maps used for the preparation of base maps covering undeveloped areas studied only by approximate methods. This study was also coordinated with the Special Studies Section of the Water Resources Division of the U.S. Geological Survey (USGS), Tucson, Arizona (U.S. Department of the Interior, 1982). On May 31, 1977, results of the study were reviewed at the final consultation and coordination meeting, which was attended by residents of the county and representatives of the FCDMC and FEMA.

2.0 **AREA STUDIED**

2.1 Scope of Study

This FIS covers the geographic area of Maricopa County, Arizona.

The flooding sources studied by detailed methods are shown in Table 1. The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development or proposed construction.

Portions of some flooding sources were studied by approximate methods and are shown in Table 2. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Maricopa County.

The Stagecoach Pass Wash Overflow for the levee failure scenario was studied by approximate methods.

Table 1. Detailed Study Flooding Sources

16 East (McMicken Wash)	Bonita Dike Channel
191st Avenue Wash	Buchanan Wash
ADOT U.S. 60 Channel	Buckeye Feeder Canal
Agua Fria River	Bullard Wash
Agua Fria River Dike Ponding Areas-West Side	Bullard Wash West Tributary
Aguila Farm Channel	Bulldozer Wash
Amir Wash	Calamity Wash
Andora Hills Wash	Caliente Wash
Andora Hills Wash Split 1	Camelback Wash
Andora Hills Wash Split 2	Camp Creek Tributary A
Apache Creek	Camp Creek Tributary A1
Apache Wash	Camp Creek Tributary A2
Apache Wash Split Flow Area	Camp Creek Tributary B
Apache Wash Tributary 1	Camp Creek Tributary B1
Apache Wash Tributary 2	Camp Creek Tributary B2
Apache Wash Tributary 3	Camp Creek Tributary C
Apache Wash Tributary 4	Camp Creek Tributary C1
Apache Wash Tributary 5	Camp Creek Tributary C2
Apache Wash Tributary 6	Camp Creek Tributary C3
Apache Wash Tributary 7	Camp Creek Tributary D
Apache Wash West Fork	Casandro Wash
Apache Wash West Fork Tributary 1	Casandro Wash South Branch
Apache Wash West Fork Tributary 2	Caterpillar Tank Wash
Arrow Wash	Cave Creek
Ashbrook Wash	Cave Creek Tributary
Atchison Topeka & Santa Fe Railroad Channel	Cave Creek Tributary Tributary
Atchison Topeka & Santa Fe Railroad Ponding	Cave Creek Tributary 1
Balboa Wash	Cave Creek Tributary 1A
Basins 1 through 6 - Alluvial Fan	Cave Creek Tributary 1B
Beardsley Canal Wash	Cave Creek Tributary 1C
Beardsley Wash North	Cave Creek Tributary 1D
Beardsley Wash South	Cave Creek Unnamed Central Tributary
Beardsley Wash South Breakout	Cave Creek Wash
Bedrock Wash	Cemetery Wash
Bedrock Wash North Fork	Cemetery Wash Tributary R-1
Bender Wash	Cemetery Wash Tributary R-2
Bender Wash North Tributary	Cemetery Wash Tributary R-3
Black Wash	Centennial Wash
Blue Tank Wash	Centennial Wash Left Overbank

Table 1. Detailed Study Flooding Sources (Continued)

Centennial Wash North Branch	Desert Lake Wash East Fork
Cereus Wash	Desert Lake Wash Tributary 2
Cholla Wash	Dickey Wash
Cholla Wash North Fork	Diversion Dike Wash
Chukar Wash	Doe Peak Wash
Circle City Area Wash 1	Doe Peak Wash East Fork
Circle City Area Wash 2	Doe Peak Wash South Fork
Circle City Area Wash 2 Along Atchison, Topeka & Santa Fe Railway	Dreamy Draw Wash East
Circle City Area Wash 3	Dreamy Draw Wash West
Circle City Area Wash 4	East Fork of Cave Creek
Circle City Area Wash 4 Along Atchison, Topeka & Santa Fe Railway	East Garambullo Wash
Circle City Area Wash 5	East Maricopa Floodway
Circle City Area Wash 6	East Maricopa Floodway, Ponding
Circle City Area Wash 7	Eastern Canal East Embankment Flooding
Citrus Valley Wash	Eastern Canal, Ponding
Cline Creek	Eastern Canal (Watershed 1)
Cline Creek Split 3	Eastern Pima Wash
Colony Wash	Echo Canyon Wash
Consolidated Canal, Ponding	Emerald Wash
Consolidated Canal (Watershed 2)	Escalante Wash
Consolidated Canal (Watershed 3) (Including overflow from Watersheds 1 & 4)	Evans Wash
Cottonwood Creek	Fan 6A
Cottonwood Creek Tributary 1	Fan 6A North
Cottonwood Creek Tributary 2	Fan 6A South
Coyote Pass Wash	Fan 6C
Cyprus Point Wash	Fan 6C North Branch
Daggs Wash	Flemming Springs Wash
Daggs Wash East Split Flow	Flying E Wash
Daggs Wash West Breakout	Flynn Lane Wash
Dale Creek Wash	Fountain Channel
Deadman Wash	Four Mile Wash
Deadman Wash Stream No. 4	Four Mile Wash – W1
Deadman Wash Stream No. 7	Four Mile Wash – W2
Deadman Wash Stream No. 12	Galloway Wash
Delaney Wash	Galloway Wash Middle Branch
Delaney Wash North Split	Galloway Wash Middle Branch Tributary
Delaney Wash South Split	Galloway Wash North Tributary
Desert Hills Wash	Galloway Wash South Branch
Desert Hills Wash Tributary	Galloway Wash South Branch Split 1
Desert Hills Wash Tributary 1	Galloway Wash Split 1
Desert Hills Wash Tributary 2	Galloway Wash Split 2
Desert Hills Wash Tributary 3	Galloway Wash Tributary 2
Desert Hills Wash Tributary 4	Galloway Wash Tributary 2A
Desert Hills Wash Tributary 5	Galloway Wash Tributary 2B
Desert Hills Wash Tributary 6	Galloway Wash Unnamed Tributary
Desert Lake Wash	Garambullo Wash
	Gavilan Peak Wash
	Gila Bend Canal
	Gila Bend Canal Wash

Table 1. Detailed Study Flooding Sources (Continued)

Gila River	Luke Wash
Granite Falls Wash	Luke Wash East Main Split
Grapevine Wash	Luke Wash East Main Tributary
Grass Wash	Luke Wash East Sub Tributary
Greystone Wash	Luke Wash Minor Tributary
Hacker Wash	Malta Drain
Hacker Wash Diversion	Mangrum Wash
Happy Valley Wash	Martinez Wash
Hartman Wash	McCormick Ranch Lakes East Branch
Hartman Wash Unnamed Tributary	McCormick Ranch Lakes West Branch
Hassayampa River	McMicken Dam Outlet Channel
Hassayampa River Tributary 1E	McMicken Dam Outlet Wash
Hassayampa River Tributary 1E1	Mesquite Tank Wash
Hassayampa River Tributary 3E	Mockingbird Wash
Hassayampa River Tributary 4E	Monarch Wash
Hassayampa River Tributary 4E Tributary	Moon Valley Wash
Hassayampa River Tributary 4E West Fork	Moon Valley Wash Diversion Channel
Hesperus Wash	Moon Valley Wash North Branch
Holly Wash	Moon Valley Wash North Split
Hospital Wash	Moon Valley Wash South Branch
I-8 Wash East	Morgan City Wash
I-8 Wash West	Mountain Wash
Indian Bend Wash	Myrtle Avenue Wash
Indian Bend Wash Low Flow Channel	New River
Interstate 10 Wash	New River East Split
Iona Wash	New River Middle Split
Iona Wash East	New River West Split
Iona Wash East Split 1	New River West Tributary 5
Iona Wash East Split 2	New River West Tributary 10
Iona Wash North	New River West Tributary 15
Iona Wash North West Split	New River West Tributary 20
Iona Wash West	New River West Tributary 20 Tributary 5
Iona Wash (Zone AO)	New River West Tributary 20 Tributary 10
Jacklin Wash	New River West Tributary 25
Jackrabbit Trail Wash	New River West Tributary 30
Jackrabbit Wash	New River West Tributary 35
Jackrabbit Wash Unnamed Tributary	New River West Tributary 40
Jenny Lin Wash	New River West Tributary 45
Kelley Road Wash	New River West Tributary 50
Kingstree Wash	New River West Tributary 50 Tributary 5
Laser Drain	New River West Tributary 55
Lazy G Wash	New River West Tributary 55 Tributary 5
Legend Wash	New River West Tributary 55 Tributary 10
Litchfield Park Detention Facility	New River West Tributary 55 Tributary 15
Little San Domingo Wash	New River West Tributary 55 Tributary 20
Local Urban Runoff (City of Tempe)	New River West Tributary 55 Tributary 30
Logan Wash	North Colony Wash
Lower El Mirage Wash	North Inlet Canal
Lower El Mirage Wash Tributary	Northeast Side of Southern Pacific Railroad

Table 1. Detailed Study Flooding Sources (Continued)

Ocotillo Wash	Rawhide Wash Tributary 3
Ocotillo Wash Split 1	Rawhide Wash Tributary 4
Ocotillo Wash Tributary 1	Rio Verde Wash A
Ocotillo Wash Tributary 1A	Rio Verde Wash A Split 1
Ocotillo Wash Tributary 2	Rio Verde Wash A Split 3
Ocotillo Wash Tributary 3	Rio Verde Wash A Split 4
Ocotillo Wash Tributary 4	Rio Verde Wash A Split 8
Ocotillo Wash Tributary 5	Rio Verde Wash A Split 9
Ocotillo Wash Tributary 6	Rio Verde Wash A Tank Spillway
Osborn Road Wash	Rio Verde Wash A Tributary 1
Ox Wash	Rio Verde Wash A Tributary 2
Oxford Wash	Rio Verde Wash D
Padelford Wash	Rio Verde Wash F
Padelford Wash Split 1	Rio Verde Wash F Split 6
Padelford Wash Split 2	Rio Verde Wash F Tributary 2
Padelford Wash Split 3	Rio Verde Wash I
Padelford Wash Split 4	Rio Verde Wash I Split 4
Padelford Wash Split 5	Rio Verde Wash I Tributary 1
Padelford Wash Tributary A	Rio Verde Wash I Tributary 3
Padelford Wash Tributary B	Rio Verde Wash J
Padelford Wash Tributary C	Rio Verde Wash K
Paradise Wash	Rio Verde Wash K Split 1
Paradise Wash West Fork	Rio Verde Wash K Split 3
Perryville Road Wash	Rio Verde Wash K Split 3A
Phillips Wash	Rio Verde Wash K Split 4
Photo View Wash	Rio Verde Wash K Tributary 1
Photo View Wash Breakout 1	Rio Verde Wash K Tributary 4
Photo View Wash Breakout 2	Rio Verde Wash K Tributary 4A
Photo View Wash Breakout 3	Rio Verde Wash K Tributary 6
Pioneer Cemetery Wash	Rio Verde Wash K Tributary 6 Split 1
Powder House Wash	Rio Verde Wash K Tributary 6 Split 2
Powder House Wash Tributary 1	Rio Verde Wash K Tributary 6 Split 3
Powder House Wash Tributary 2	Rio Verde Wash K Tributary 6A
Powder Wash	Rio Verde Wash K Tributary 6A1
Powerline Wash	Rio Verde Wash K Tributary 6A2
Prospect Wash	Rio Verde Wash K Tributary 6A3
Pyrite Wash	Rio Verde Wash K Tributary 6B
Queen Creek Wash	Rio Verde Wash K Tributary 6C
Quilotosa Wash	Rio Verde Wash K Tributary 6D
Quilotosa Wash East Split	Rio Verde Wash K Tributary 6D1
Rainbow Wash	Rio Verde Wash K Tributary 7
Rainbow Wash Tributary	Rio Verde Wash K Tributary 8
Ranieri Tank Wash	Rio Verde Wash K Tributary 9
Ranieri Tank Wash Tributary 1	Rio Verde Wash K Tributary 10
Ranieri Tank Wash Tributary 2	Rio Verde Wash K Tributary 11
Ranieri Tank Wash Tributary 3	Rio Verde Wash K Tributary 11A
Rattler Wash	Rio Verde Wash K Tributary 11B
Rawhide Wash	Rio Verde Wash K Tributary 12
Rawhide Wash Tributary 1	Rio Verde Wash K Tributary 13
Rawhide Wash Tributary 2	Rio Verde Wash L

Table 1. Detailed Study Flooding Sources (Continued)

Rio Verde Wash P	Soda Springs Wash
Rio Verde Wash P Tributary 1	Sols Wash
Rio Verde Wash P Tributary 2	Sols Wash Tributary AH2
Rio Verde Wash 7	Sols Wash Tributary AH3
Rio Verde Wash 10	Sols Wash Tributary AH3 Unnamed Tributary
Rio Verde Wash 10 Split 4	Sols Wash Tributary AH4
Rio Verde Wash 10 Split 7	Sols Wash Tributary AH5
Rio Verde Wash 10 Split 7 Tributary 1	Sonoqui Wash
Rio Verde Wash 10 Tributary 1	Sonoran Wash
Rio Verde Wash 10 Tributary 2	Southwest Side of Southern Pacific Railroad
Rio Verde Wash 10 Tributary 2 Split 1	Stagecoach Pass Wash
Rio Verde Wash 10 Tributary 3	Stagecoach Pass Wash Unnamed Tributary
Rio Verde Wash 10 Tributary 4	Star Wash
Rio Verde Wash 11	Star Wash Tributary A
Rio Verde Wash 11 Split 1	Star Wash Tributary B
Rio Verde Wash 11 Split 2	Star Wash Tributary C
Rio Verde Wash 11 Split 8	Star Wash Tributary D
Rio Verde Wash 12	Star Wash Tributary E
Rio Verde Wash 12 Split 3	Sunburst Wash
Rio Verde Wash 12 Split 6	Sunland Avenue Tributary
River Creek	Sunny Cove Wash
Rock Springs Creek	Sunny Cove Wash (Upper Reach)
Rodeo Wash	Sunset Wash (Lower and Upper Reaches)
Rodeo Wash Tributary	Sweat Canyon Wash
Rodger Creek	Sycamore Wash
Roosevelt Canal	Table Mountain Wash
Roosevelt Irrigation District Canal Split Flow	Table Mountain Wash Tributary 6
Rough Rider Wash	Tank Wash
Rowe Wash	Tank Wash South Branch
Salt River	Tenth Street Wash
Salt River South Split	Tractor Wash
San Domingo Wash	Tributary C-6
Sand Tank Wash	Tributary C-8
Sauceda Wash	Tributary X1
Scatter Wash	Tributary X1 Overflow
Scatter Wash South Branch	Tributary X1 Splitflow
Scott Avenue Wash	Tributary X2
Sharman Wash	Tributary X3
Skunk Creek	Tributary X4A
Skunk Creek Breakout	Tributary X4B
Skunk Creek Tributary 6B	Tributary X5
Skunk Creek Tributary 6B North	Trilby Wash
Skunk Creek Tributary 6C	Trilby Wash Middle Channel
Skunk Creek Tributary 10A	Trilby Wash West Channel
Skunk Creek Tributary 10B	Tulip Wash
Skunk Creek Tributary 12	Turtleback Wash
Skunk Creek Tributary 27.161	Tuthill Dike Wash
Skunk Tank Wash	Twin Buttes Wash
Skyline Wash	Twin Peaks Lane Wash
	Twin Peaks Wash

Table 1. Detailed Study Flooding Sources (Continued)

Unnamed Channel	Wash G
Unnamed Wash No. 1	Wash H
Unnamed Wash No. 2	Wash I
Upper Boulders Wash	Wash K
Upper Fan 5	Wash K1
Union Pacific Railroad	Wash L
Union Pacific Railroad Ditch	Wash O
Union Pacific Railroad Spur	Wash P
Union Pacific Railroad (Watershed 4)	Wash Q
Valley Wash	Wash S2
Wagner Wash	Wash T1N-R5W-S04
Wagon Wash	Wash T1N-R5W-S04 Split
Wash 1 East	Wash T1N-R5W-S10
Wash 1 West	Wash T1N-R5W-S04 Split
Wash 2 East	Wash T1N-R5W-S10
Wash 2 East (North and South of the Central Arizona Project Canal)	Wash T1N-R5W-S15
Wash 2 East Tributary	Wash T1N-R5W-S18
Wash 2 West	Wash T1N-R5W-S22
Wash 2 West (North of the Central Arizona Project Canal)	Wash T1N-R5W-S28E
Wash 2 West Tributary 1	Wash T1N-R5W-S32
Wash 2 West Tributary 2	Wash T1N-R5W-S33E
Wash 3 East	Wash T1N-R5W-S33N
Wash 3 West	Wash T1N-R5W-S33W
Wash 4 East	Wash T1N-R6W-S1
Wash 5 East	Wash T1N-R6W-S11
Wash 6 East	Wash T1N-R6W-S12
Wash 6 East South	Wash T1N-R6W-S17
Wash 7 East	Wash T1N-R6W-S18
Wash 7 East East Split	Wash T1S-R2W-S32A (I63)
Wash 7 East Tributary	Wash T1S-R5W-S09W
Wash 7 East West Split	Wash T1S-R5W-S17
Wash 8 East	Wash T1S-R5W-S22N
Wash 9 (Rio Verde Wash 9)	Wash T1S-R5W-S22S
Wash 9 East	Wash T1S-R5W-S29
Wash 9 East-split	Wash T1S-R5W-S29W
Wash 10 East	Wash T1S-R6W-S05S
Wash 10 East Split 1	Wash T1S-R6W-S08
Wash 10 East Split 2	Wash T2N-R5W-S27
Wash 11 East	Wash T2N-R5W-S27N
Wash 12 East	Wash T2N-R5W-S27S
Wash 12 East Split	Wash T2N-R5W-S28
Wash 13 East	Wash T2N-R5W-S32
Wash 14 East	Wash T2N-R5W-S33E
Wash AG	Wash T2N-R5W-S33W
Wash B	Wash T2N-R6W-S02
Wash B Tributary	Wash T2N-R6W-S05E
Wash E2	Wash T2N-R6W-S05N
Wash F	Wash T2N-R6W-S05S
	Wash T2N-R6W-S05W
	Wash T2N-R6W-S22

Table 1. Detailed Study Flooding Sources (Continued)

Wash T2N-R6W-S28N	Wash T5N-R5W-S3B
Wash T2N-R6W-S36	Wash T5N-R5W-S10A
Wash T2N-R6W-S36W	Wash T5N-R5W-S11
Wash T2N-R7W-S20W	Wash T5N-R5W-S12
Wash T2N-R7W-S32E	Wash T5N-R5W-S13A
Wash T2N-R7W-S35W	Wash T5N-R5W-S13B
Wash T3N-R6W-S27W	Wash T5N-R5W-S14
Wash T3N-R6W-S32	Wash T5N-R5W-S14B
Wash T3N-R6W-S33	Wash T5N-R5W-S22
Wash T3N-R6W-S35	Wash T5N-R5W-S23A
Wash T4N-R2W-S9N	Wash T5N-R5W-S23B
Wash T4N-R2W-S15N	Wash T5N-R5W-S23C
Wash T4N-R3W-S07W	Wash T5N-R5W-S23D
Wash T4N-R3W-S08E	Wash T5N-R5W-S23E
Wash T4N-R3W-S08W	Wash T5N-R5W-S23F
Wash T4N-R3W-S09W	Wash T5N-R5W-S25A
Wash T4N-R3W-S10N	Wash T5N-R5W-S25B
Wash T4N-R3W-S10W Reach 1	Wash T5N-R5W-S25C
Wash T4N-R3W-S10W Reach 2	Wash T5N-R5W-S34C
Wash T4N-R3W-S16	Wash T5N-R5W-S35
Wash T4N-R3W-S17	Wash T6N-R4W-S33
Wash T4N-R3W-S18E	Wash T6N-R4W-S33A
Wash T4N-R3W-S18W	Wash T6N-R5W-S36
Wash T5N-R2W-S07	Wash T6N-R5W-S36A
Wash T5N-R2W-S11	Wash T6N-R5W-S36B
Wash T5N-R2W-S14N	Waterfall Wash
Wash T5N-R2W-S14S	Waterman Wash
Wash T5N-R2W-S14W	West Fork White Peak Wash
Wash T5N-R2W-S19E	West Garambullo Wash
Wash T5N-R2W-S19W	West Prong of Waterman Wash
Wash T5N-R3W-S01S	West Quilotosa Wash
Wash T5N-R3W-S07	West Split Flow Through El Mirage
Wash T5N-R3W-S15-1E (Trilby Wash Tributary 1 East)	White Granite Wash
Wash T5N-R3W-S15-1-1E (West Fork Trilby Wash Tributary 1 East)	White Granite Wash North Fork
Wash T5N-R3W-S19	White Peak Wash
Wash T5N-R3W-S24E	White Spar Wash
Wash T5N-R3W-S28-3W (Iona Tributary 3 West)	White Tanks Wash
Wash T5N-R4W-S3	White Tanks Wash No. 3
Wash T5N-R4W-S7A	White Tanks Wash Tributary 1
Wash T5N-R4W-S7B	Willow Springs Wash
Wash T5N-R4W-S7C	Willow Springs Wash Tributary 1
Wash T5N-R4W-S19	Willow Springs Wash Tributary 1A
Wash T5N-R4W-S20A	Willow Springs Wash Tributary 2
Wash T5N-R4W-S20B	Willow Springs Wash Tributary 2A
Wash T5N-R4W-S21	Willow Springs Wash Tributary 4
Wash T5N-R4W-S30	Willow Springs Wash Tributary 5
Wash T5N-R5W-S1	Willow Springs Wash Tributary 5A
Wash T5N-R5W-S3A	Willow Springs Wash Tributary 6
	Willow Springs Wash Tributary 6A
	Willow Springs Wash Tributary 6B

Table 1. Detailed Study Flooding Sources (Continued)

Willow Springs Wash Tributary 6C
 Windmill Wash
 Windmill Wash North Branch
 Windmill Wash South Branch
 Winters Wash
 Wittmann Wash
 Wittmann Wash North Split
 Wittmann Wash South Split
 Wittmann Wash Tributary
 Wittmann Wash Tributary 1
 Wittmann Wash Tributary 1 Breakout 1
 Wittmann Wash Tributary 1 Breakout 1 of Breakout 3
 Wittmann Wash Tributary 1 Breakout 2
 Wittmann Wash Tributary 1 Breakout 3
 Wittmann Wash Tributary 1 Breakout 4
 Yucca Flat Wash

Table 2. Approximate Study Flooding Sources

16 East (McMicken Wash)	Circle City Area Wash 6
191st Avenue Wash	Circle City Area Wash 7
Agua Fria River	Citrus Valley Wash
Aguila Farm Channel	Cline Creek
Airline Canal	Coles Wash
Amir Wash	Colony Wash
Amir Wash Tributary	Columbus Wash
Apache Wash	Consolidated Canal
Arrow Wash	Cooper Creek
Atchison, Topeka & Santa Fe Railroads Spur	Copper Wash
Beardsley Canal Wash	Copper Wash Tributary 1
Bedrock Wash	Corgett Wash
Bonita Dike Channel	Cotton Lane Wash
Buckeye Feeder Canal	Cottonwood Creek
Bullard Wash	Cross Cut Canal
Bullard Wash West Tributary	Daggs Wash
Camp Creek Tributary C1	Dave Buttes Detention Dike
Camp Creek Tributary C3	Deadman Wash Tributary 1
Camp Creek Tributary D	Deadman Wash Tributary 1 Lower Split
CAP Wash East	Deadman Wash Tributary 1 Upper Split
CAP Wash West	Deadman Wash Tributary 2
Castle Creek Wash	Deadman Wash Tributary 2A
Caterpillar Tank Wash	Delaney Wash Stock Pond Split
Cave Buttes Detention Dike	Desert Lake Wash
Cave Creek	Desert Lake Wash Tributary 2
Cave Creek Tributary	Dreamy Draw Detention Dike
Cave Creek Wash	Dreamy Draw Wash West
Cemetery Wash	Dysart Drain
Circle City Area Wash 1	East Fork of Cave Creek
Circle City Area Wash 4 Along Atchison Topeka & Santa Fe Railway	Eastern Canal
	Echo Canyon Canal

Table 2. Approximate Study Flooding Sources (Continued)

Fan 6C	Lower Painted Rock Wash 145A
Flooding along East Embankment of Eastern Canal	Lower Painted Rock Wash 150A
Flying E Wash	Lower Painted Rock Wash 150B
Fourth Of July Wash	Lower Painted Rock Wash 155C
Fourth Of July Wash Tributary 1	Lower Painted Rock Wash 510A
Fourth Of July Wash Tributary 3	Lower Painted Rock Wash 520A
Gibson Wash	Lower Painted Rock Wash 525A
Gibson Wash Tributary 1	Lower Painted Rock Wash 525B
Gibson Wash Tributary 1A	Lower Painted Rock Wash 525C
Gibson Wash Tributary 3	Lower Painted Rock Wash 525D
Gibson Wash Tributary 5	Lower Painted Rock Wash 525E
Gibson Wash Tributary 5A	Lower Painted Rock Wash 530A
Gila Bend Canal	Lower Painted Rock Wash 530B
Gila River	Lower Painted Rock Wash 530C
Grand Canal	Lower Painted Rock Wash 545A
Granite Reef Aqueduct	Lower Painted Rock Wash 551A
Grass Wash	Lower Painted Rock Wash 585A
Hambug Creek	Lower Painted Rock Wash 615A
Harquahala Detention Dike	Lower Painted Rock Wash 615B
Hartman Wash	Lower Painted Rock Wash 646A
Hartman Wash Unnamed Tributary	Lower Painted Rock Wash 650A
Highline Canal	Lower Painted Rock Wash 650C
Holly Wash	Lower Painted Rock Wash 651A
Interstate 10 Wash	Lower Painted Rock Wash 790A
Interstate Highway 10	Lower Painted Rock Wash 790B
Iona Wash	Lower Painted Rock Wash 790C
Iona Wash East Split 1	Lower Painted Rock Wash 831A
Iona Wash Tributary	Lower Painted Rock Wash 833A
Jackrabbit Trail Channel	Lower Painted Rock Wash 835A
Jackrabbit Trail Wash	Luke Wash
Jackrabbit Wash	Luke Wash East Main Tributary
Jimmie Wash	Luke Wash East Sub Tributary
Kaiser-Aetna McCormick Ranch Drainage	Luke Wash Minor Tributary
Kyrene Branch Canal	Lum Wash Tributary T1S-R2W-S22 (J20)
Little San Domingo Wash	McMicken Dam Outlet Wash
Little San Domingo Wash Tributary	Mesquite Tank Wash
Little Squaw Creek	Mockingbird Wash Tributary
Little Squaw Creek Tributary 1	Monarch Wash
Little Squaw Creek Tributary 2	Monarch Wash Tributary
Little Squaw Creek Tributary 3	Montezuma Wash
Little Squaw Creek Tributary 4	Montezuma Wash Tributary 1
Little Squaw Creek Tributary 5	Montezuma Wash Tributary 1A
Loudermilk Wash	Montezuma Wash Tributary 2
Loudermilk Wash Tributary 1	Montezuma Wash Tributary 3
Lower El Mirage Wash	Moore Gulch
Lower El Mirage Wash Tributary	Moore's Gulch Tributary 1
Lower Painted Rock Wash 100A	Moore's Gulch Tributary 2
Lower Painted Rock Wash 135A	Moore's Gulch Tributary 3
Lower Painted Rock Wash 140A	Moore's Gulch Tributary 5
	Moore's Gulch Tributary 6

Table 2. Approximate Study Flooding Sources (Continued)

NCAP Iona Wash East Split 1	Reach SenE25
NCAP Iona Wash North	Reach SenE30
NCAP Wash 7 East	Reach SenE35
NCAP Wash T4N-R3WS08E	Reach SenF03
NCAP Wash T5N-R2W-S19E	Reach SenF05
New River	Reach SenF06
New River West Tributary 55 Tributary 20	Reach SenF07
New River West Tributary 55 Tributary 25 A1	Reach SenF10
New River West Tributary 55 Tributary 25 A2	Reach SenF15
New River West Tributary 55 Tributary 25 A3	Reach SenF20
Notbusch Wash	Reach SenF25
Notbusch Wash Tributary 1	Reach SenF30
Notbusch Wash Tributary 1A	Reach SenG05
Notbusch Wash Tributary 1B	Reach SenH03
Ocotillo Wash	Reach SenH05
Ocotillo Wash Tributary 1	Reach SenI05
Ox Wash	Reach SenI10
Padelford Wash	Reach SenI15
Padelford Wash Split 2	Reach SenJ05
Padelford Wash Split 3	Reach SenJ10
Padelford Wash Split 4	Reach SenJ15
Padelford Wash Tributary A	Reach SenK05
Padelford Wash Tributary B	Reach SenK15
Padelford Wash Tributary C	Reach SenK20
Phillips Wash	Reach SenK25
Picacho Wash	Reach SenK30
Powerline Wash	Reach SenK35
Prospect Wash	Reems Road
Quale Spring Wash	Rio Verde North Wash A
Quale Spring Wash Tributary 1	Rio Verde North Wash F
Quale Spring Wash Tributary 1A	Rock Springs Creek
Queen Creek	Roosevelt Canal
Rattler Wash	Rowe Wash
Reach SenA05	Rowe Wash Tributary 1
Reach SenB05	Rowe Wash Tributary 2
Reach SenB10	Saddle Back Mountain Detention Dike
Reach SenB20	Saddleback Outlet Channel
Reach SenB25	Salt River
Reach SenC05	San Domingo Wash
Reach SenC10	Sand Tank Wash
Reach SenC15	Sauceda Wash
Reach SenC20	SCAP Bonita Dike Channel
Reach SenC25	SCAP Wash 1 East
Reach SenC35	SCAP Wash 1 West
Reach SenC40	SCAP Wash 10 East
Reach SenC45	SCAP Wash 11 East (Padelford Wash)
Reach SenD05	SCAP Wash 13 East
Reach SenE10	SCAP Wash 14 East
Reach SenE15	SCAP Wash 2 East
Reach SenE20	SCAP Wash 2 West

Table 2. Approximate Study Flooding Sources (Continued)

SCAP Wash 3 East	Trilby Wash
SCAP Wash 9 East	Trilby Wash Detention Basin
Scatter Wash	Tub Spring Wash
Scatter Wash North Branch	Turtleback Wash
Sentinel Wash	Tuthill Dike Wash
Signal Butte Detention Dike	Twin Buttes Wash
Skunk Creek	Unnamed Stream
Skunk Creek Tributary 28.839	Unnamed Tributary to Cave Creek
Skyline Wash	Unnamed Wash
Sols Wash	Unnamed Wash No. 1
Sols Wash Tributary	Unnamed Wash No. 2
Sols Wash Tributary AH2	Unnamed Wash No. 3
Sols Wash Tributary AH3	Unnamed Wash No. 4
Sols Wash Tributary AH4	Unnamed Wash No. 5
Sols Wash Tributary Tributary	Unnamed Wash No. 6
Sonoqui Wash	Unnamed Wash No. 7
Southern Pacific Railroad	Unnamed Wash No. 8
Spook Hill Detention Dike	Unnamed Wash No. 9
Star Wash	Upper Buchanan Wash
Star Wash Tributary A	Verde River
Star Wash Tributary C	Verde River Tributaries (Washes 9, 10, and 11)
Star Wash Tributary D	Wash S05N East Split
Stream 2B	Wash S05N Split 1
Sunny Cove Wash	Wash S27 North Split
Sunset Wash	Wash S27 Southwest Salome
Sycamore Creek	Wash S32 Split East
Tank Wash South Branch	Wash T1S-R6W-S29 Reach 1
Tempe Canal	Wash T1S-R6W-S29 Reach 2
ThebaA05	Wash T1S-R6W-S29-1 Reach 1
ThebaB05	Wash T1S-R6W-S29-2 Reach 1
ThebaC05	Wash T1S-R6W-S29-2 Reach 2
ThebaC10	Wash T1S-R6W-S29-2 Tributary 1 Reach 1
ThebaC20	Wash T1S-R6W-S33 Reach 1
ThebaC25	Wash T1S-R6W-S33 Reach 2
ThebaC30	Wash T1S-R6W-S33 Reach 3
ThebaD05	Wash T1S-R6W-S33 Tributary 1 Reach 1
ThebaE05	Wash T1S-R6W-S33 Tributary 2 Reach 1
ThebaE10	Wash T1S-R7W-S19-1 Reach 1
ThebaE15	Wash T1S-R7W-S19-2 Reach 1
ThebaE20	Wash T1S-R7W-S25 Reach 1
ThebaE25	Wash T1S-R7W-S25 Reach 2
ThebaF05	Wash T1S-R7W-S25 Reach 3
ThebaG05	Wash T1S-R7W-S25 Reach 4
ThebaH05	Wash T1S-R7W-S25 Reach 5
ThebaI05	Wash T1S-R7W-S25 Tributary 1 Reach 1
ThebaJ05	Wash T1S-R7W-S25 Tributary 1 Reach 2
Tiger Wash	Wash T1S-R7W-S25 Tributary 1 Reach 3
Tiger Wash Detention Dike	Wash T1S-R7W-S25 Tributary 2 Reach 1
Tributary 1	Wash T1S-R7W-S25 Tributary 2 Reach 3

Table 2. Approximate Study Flooding Sources (Continued)

Wash T1S-R7W-S25 Tributary 3 Reach 1	Wash T1S-R8W-S9 Reach 2
Wash T1S-R7W-S25 Tributary 4 Reach 1	Wash T1S-R8W-S9 Reach 3
Wash T1S-R7W-S26 Reach 1	Wash T1S-R8W-S9 Reach 4
Wash T1S-R7W-S27-1 Reach 1	Wash T1S-R8W-S9 Reach 5
Wash T1S-R7W-S27-2 Reach 1	Wash T1S-R8W-S9 Tributary 1 Reach 1
Wash T1S-R7W-S27-3 Reach 1	Wash T1S-R8W-S9 Tributary 2 Reach 1
Wash T1S-R7W-S27-3 Reach 2	Wash T1S-R8W-S9 Tributary 3 Reach 1
Wash T1S-R7W-S27-3 Reach 3	Wash T1S-R8W-S9 Tributary 3 Reach 2
Wash T1S-R7W-S27-3 Reach 4	Wash T1S-R8W-S9 Tributary 3 Reach 3
Wash T1S-R7W-S27-3 Reach 5	Wash T1S-R8W-S9 Tributary 4 Reach 1
Wash T1S-R7W-S27-3 Reach 6	Wash T2S-R5W-S17 Reach 1
Wash T1S-R7W-S27-3 Reach 7	Wash T2S-R5W-S17 Reach 2
Wash T1S-R7W-S27-3 Tributary 1 Reach 1	Wash T2S-R5W-S17 Reach 3
Wash T1S-R7W-S27-3 Tributary 2 Reach 1	Wash T2S-R5W-S17 Reach 4
Wash T1S-R7W-S27-3 Tributary 2 Reach 10	Wash T2S-R5W-S17 Reach 5
Wash T1S-R7W-S27-3 Tributary 2 Reach 11	Wash T2S-R5W-S17 Tributary 1 Reach 1
Wash T1S-R7W-S27-3 Tributary 2 Reach 12	Wash T2S-R5W-S17 Tributary 1 Reach 2
Wash T1S-R7W-S27-3 Tributary 2 Reach 13	Wash T2S-R5W-S17 Tributary 1 Reach 3
Wash T1S-R7W-S27-3 Tributary 2 Reach 14	Wash T2S-R5W-S17 Tributary 1 Reach 4
Wash T1S-R7W-S27-3 Tributary 2 Reach 15	Wash T2S-R5W-S17 Tributary 1 Reach 5
Wash T1S-R7W-S27-3 Tributary 2 Reach 16	Wash T2S-R5W-S17 Tributary 2 Reach 1
Wash T1S-R7W-S27-3 Tributary 2 Reach 17	Wash T2S-R5W-S17 Tributary 3 Reach 1
Wash T1S-R7W-S27-3 Tributary 2 Reach 18	Wash T2S-R5W-S17 Tributary 4 Reach 1
Wash T1S-R7W-S27-3 Tributary 2 Reach 2	Wash T2S-R5W-S17 Tributary 4 Reach 2
Wash T1S-R7W-S27-3 Tributary 2 Reach 3	Wash T2S-R5W-S17 Tributary 4 Reach 3
Wash T1S-R7W-S27-3 Tributary 2 Reach 4	Wash T2S-R5W-S7-1 Reach 1
Wash T1S-R7W-S27-3 Tributary 2 Reach 5	Wash T2S-R5W-S7-2 Reach 1
Wash T1S-R7W-S27-3 Tributary 2 Reach 6	Wash T2S-R5W-S7-2 Reach 2
Wash T1S-R7W-S27-3 Tributary 2 Reach 7	Wash T2S-R5W-S7-2 Reach 3
Wash T1S-R7W-S27-3 Tributary 2 Reach 8	Wash T2S-R5W-S7-2 Reach 4
Wash T1S-R7W-S27-3 Tributary 2 Reach 9	Wash T2S-R5W-S7-2 Tributary 1 Reach 1
Wash T1S-R7W-S27-3 Tributary 3 Reach 1	Wash T2S-R5W-S7-2 Tributary 2 Reach 1
Wash T1S-R7W-S27-3 Tributary 3 Reach 2	Wash T2S-R5W-S7-2 Tributary 2 Reach 2
Wash T1S-R7W-S27-3 Tributary 3 Reach 3	Wash T2S-R5W-S7-2 Tributary 2 Reach 3
Wash T1S-R7W-S27-3 Tributary 4 Reach 1	Wash T2S-R5W-S7-2 Tributary 3 Reach 1
Wash T1S-R7W-S27-3 Tributary 5 Reach 1	Wash T2S-R5W-S7-2 Tributary 3 Reach 2
Wash T1S-R7W-S27-3 Tributary 6 Reach 1	Wash T2S-R5W-S7-2 Tributary 3 Reach 3
Wash T1S-R7W-S27-3 Tributary 7 Reach 1	Wash T2S-R5W-S7-2 Tributary 3 Reach 4
Wash T1S-R7W-S28 Reach 1	Wash T2S-R5W-S7-2 Tributary 3 Reach 5
Wash T1S-R8W-S24 Reach 1	Wash T2S-R5W-S7-3 Reach 1
Wash T1S-R8W-S24 Reach 2	Wash T2S-R6W-S2 Reach 1
Wash T1S-R8W-S24 Reach 3	Wash T2S-R6W-S2 Reach 2
Wash T1S-R8W-S24 Reach 4	Wash T2S-R6W-S2 Reach 3
Wash T1S-R8W-S24 Reach 5	Wash T2S-R6W-S2 Reach 4
Wash T1S-R8W-S24 Tributary 1 Reach 1	Wash T2S-R6W-S2 Reach 5
Wash T1S-R8W-S24 Tributary 2 Reach 1	Wash T2S-R6W-S2 Reach 6
Wash T1S-R8W-S24 Tributary 3 Reach 1	Wash T2S-R6W-S2 Reach 7
Wash T1S-R8W-S24 Tributary 4 Reach 1	Wash T2S-R6W-S2 Reach 8
Wash T1S-R8W-S9 Reach 1	Wash T2S-R6W-S2 Tributary 1 Reach 1

Table 2. Approximate Study Flooding Sources (Continued)

Wash T2S-R6W-S2 Tributary 2 Reach 1	Wash K
Wash T2S-R6W-S2 Tributary 3 Reach 1	Wash K Tributary
Wash T2S-R6W-S2 Tributary 4 Reach 1	Wash LPR510A
Wash T2S-R6W-S2 Tributary 4 Reach 2	Wash LPR520A
Wash T2S-R6W-S2 Tributary 4 Reach 3	Wash LPR525A
Wash T2S-R6W-S2 Tributary 5 Reach 1	Wash LPR525B
Wash T2S-R6W-S2 Tributary 6 Reach 1	Wash LPR525C
Wash T2S-R6W-S2 Tributary 7 Reach 1	Wash LPR525D
Wash T2S-R6W-S3 Reach 1	Wash LPR525E
Wash 1	Wash LPR530A
Wash 1 East	Wash LPR530B
Wash 1 West	Wash LPR530C
Wash 10	Wash LPR545A
Wash 10 East	Wash LPR551A
Wash 10 East Split 2	Wash LPR585A
Wash 11	Wash LPR615A
Wash 11 East (Padelford Wash)	Wash LPR615B
Wash 12	Wash LPR646A
Wash 13 East	Wash LPR650A
Wash 14 East	Wash LPR650C
Wash 15 East	Wash LPR651A
Wash 16 East (McMichen Wash)	Wash LPR790A
Wash 17 East	Wash LPR790B
Wash 2	Wash LPR790C
Wash 2 East	Wash LPR831A
Wash 2 West	Wash LPR833A
Wash 2 West Tributary 1	Wash LPR835A
Wash 3	Wash M
Wash 3 EAST	Wash M-4 Tributary
Wash 4	Wash M-5 Tributary
Wash 5	Wash M-6B Tributary
Wash 5 East	Wash M-7 Tributary
Wash 5 East	Wash M-8 Tributary
Wash 5 West	Wash M-9 Tributary
Wash 6	Wash M-10 Tributary
Wash 6 East South	Wash M-11 Tributary
Wash 7	Wash M-12 Tributary
Wash 7 East	Wash M-13 Tributary
Wash 7 East Tributary 1	Wash N
Wash 8	Wash X02
Wash 9	Wash X02A
Wash 9 East	Wash X04
Wash AF	Wash X06
Wash B	Wash X07
Wash F	Wash T1N-R5W-S04
Wash F03	Wash T1N-R5W-S10
Wash F05	Wash T1N-R5W-S15
Wash F25	Wash T1N-R5W-S22
Wash G	Wash T1N-R5W-S30

Table 2. Approximate Study Flooding Sources (Continued)

Wash T1N-R6W-S03E	Wash T1S-R2W-S2B(J48)
Wash T1N-R6W-S03W	Wash T1S-R2W-S2C(J47)
Wash T1N-R6W-S04E	Wash T1S-R2W-S31(A56)
Wash T1N-R6W-S05 (Dickey Wash South)	Wash T1S-R2W-S31A(I71)
Wash T1N-R6W-S05E	Wash T1S-R2W-S31B(I70)
Wash T1N-R6W-S05W	Wash T1S-R2W-S32A(I67)
Wash T1N-R6W-S07 (Delaney Wash)	Wash T1S-R2W-S32B(I58)
Wash T1N-R6W-S09E	Wash T1S-R2W-S33(I66)
Wash T1N-R6W-S11	Wash T1S-R2W-S34(I65)
Wash T1N-R6W-S16	Wash T1S-R2W-S9A(J39)
Wash T1N-R6W-S17E	Wash T1S-R2W-S9B(J40)
Wash T1N-R6W-S17W	Wash T1S-R3W-S24A(A60)
Wash T1N-R6W-S18	Wash T1S-R3W-S24B(A59)
Wash T1N-R6W-S20E (Fourmile Wash)	Wash T1S-R5W-S08
Wash T1N-R6W-S20W	Wash T1S-R5W-S09
Wash T1N-R6W-S22E	Wash T1S-R5W-S09W
Wash T1N-R6W-S22N	Wash T1S-R5W-S16
Wash T1N-R6W-S26	Wash T1S-R5W-S22S
Wash T1N-R6W-S27S	Wash T1S-R5W-S28W
Wash T1N-R6W-S29	Wash T1S-R5W-S29
Wash T1N-R6W-S30E	Wash T1S-R5W-S29E
Wash T1N-R6W-S30W	Wash T1S-R5W-S29W
Wash T1N-R7W-S01	Wash T1S-R5W-S33E
Wash T1N-R7W-S02	Wash T1S-R5W-S33N
Wash T1N-R7W-S05	Wash T1S-R5W-S33W
Wash T1N-R7W-S17	Wash T1S-R6W-S29S
Wash T1N-R7W-S21E	Wash T1S-R6W-S05E
Wash T1N-R7W-S21W	Wash T1S-R6W-S05N
Wash T1N-R7W-S26E	Wash T1S-R6W-S05S
Wash T1N-R7W-S26W	Wash T1S-R6W-S08
Wash T1N-R7W-S28E	Wash T1S-R6W-S13 (Phillips Wash South)
Wash T1N-R7W-S28W	Wash T1S-R6W-S27
Wash T1N-R7W-S35	Wash T1S-R6W-S28
Wash T1N-R7W-S36	Wash T1S-R6W-S28N
Wash T1N-R8W-S17	Wash T1S-R6W-S29 Reach 1
Wash T1N-R8W-S20	Wash T1S-R6W-S29E (Winters Wash)
Wash T1N-R8W-S20 Tributary 1	Wash T1S-R6W-S29S
Wash T1N-R8W-S29-1	Wash T1S-R6W-S29W
Wash T1N-R8W-S29-1 Tributary 1	Wash T1S-R7W-S18
Wash T1N-R8W-S29-2	Wash T1S-R7W-S19-1 Reach 1
Wash T1N-R8W-S34	Wash T1S-R7W-S21
Wash T1N-R8W-S8	Wash T1S-R7W-S21 Tributary 1
Wash T1N-R8W-S8 Tributary 1	Wash T1S-R7W-S21 Tributary 2
Wash T1S-R2W-S14(J14)	Wash T1S-R7W-S21 Tributary 3
Wash T1S-R2W-S17(J38)	Wash T1S-R7W-S22-1
Wash T1S-R2W-S18A(J27)	Wash T1S-R7W-S22-2
Wash T1S-R2W-S18B(J37)	Wash T1S-R7W-S22-2 Tributary 1
Wash T1S-R2W-S23(J14)	Wash T1S-R7W-S22-2 Tributary 2
Wash T1S-R2W-S27(J16)	Wash T1S-R7W-S25 Reach 1
Wash T1S-R2W-S2A(J46)	Wash T1S-R7W-S26 Reach 1

Table 2. Approximate Study Flooding Sources (Continued)

Wash T1S-R7W-S27-3 Reach 1	Wash T2N-R6W-S33E
Wash T1S-R7W-S28 Reach 1	Wash T2N-R6W-S33S
Wash T1S-R8W-S13-1	Wash T2N-R6W-S34
Wash T1S-R8W-S13-1 Tributary 1	Wash T2N-R6W-S35
Wash T1S-R8W-S13-1 Tributary 1 Reach 2	Wash T2N-R6W-S36
Wash T1S-R8W-S13-1 Tributary 1 Reach 3	Wash T2N-R7W-S02
Wash T1S-R8W-S13-1 Tributary 1 Reach 4	Wash T2N-R7W-S07E
Wash T1S-R8W-S13-1 Tributary 1 Reach 5	Wash T2N-R7W-S07S
Wash T1S-R8W-S13-1 Tributary 1 Reach 6	Wash T2N-R7W-S10
Wash T1S-R8W-S13-1 Tributary 1 Reach 7	Wash T2N-R7W-S15E
Wash T1S-R8W-S13-1 Tributary 2	Wash T2N-R7W-S15W
Wash T1S-R8W-S13-1 Tributary 3	Wash T2N-R7W-S18E
Wash T1S-R8W-S13-1 Tributary 4	Wash T2N-R7W-S18W
Wash T1S-R8W-S13-2	Wash T2N-R7W-S19E
Wash T1S-R8W-S13-2 Tributary 1	Wash T2N-R7W-S19W
Wash T1S-R8W-S24 Reach 1	Wash T2N-R7W-S20E
Wash T1S-R8W-S5	Wash T2N-R7W-S20W
Wash T1S-R8W-S9 Reach 1	Wash T2N-R7W-S25E
Wash T2N R6W-S36W	Wash T2N-R7W-S25S
Wash T2N-R5W-S04	Wash T2N-R7W-S25W
Wash T2N-R5W-S05E	Wash T2N-R7W-S26E
Wash T2N-R5W-S05W	Wash T2N-R7W-S26W
Wash T2N-R5W-S08	Wash T2N-R7W-S27E
Wash T2N-R5W-S19	Wash T2N-R7W-S27W
Wash T2N-R5W-S21	Wash T2N-R7W-S29
Wash T2N-R5W-S27S	Wash T2N-R8W-S01
Wash T2N-R5W-S28	Wash T2N-R7W-S30N
Wash T2N-R5W-S31W (Phillips Wash North)	Wash T2N-R7W-S30S
Wash T2N-R5W-S32	Wash T2N-R7W-S32E
Wash T2N-R5W-S33E	Wash T2N-R7W-S32N
Wash T2N-R5W-S33W	Wash T2N-R7W-S32S
Wash T2N-R6W-S02	Wash T2N-R7W-S32W
Wash T2N-R6W-S02 Split West 1	Wash T2N-R7W-S33N
Wash T2N-R6W-S05E	Wash T2N-R7W-S33S
Wash T2N-R6W-S05N	Wash T2N-R7W-S34E
Wash T2N-R6W-S05S	Wash T2N-R7W-S34N
Wash T2N-R6W-S05W	Wash T2N-R7W-S34S
Wash T2N-R6W-S18E	Wash T2N-R7W-S34W
Wash T2N-R6W-S18W (Old Camp Wash)	Wash T2N-R7W-S36E
Wash T2N-R6W-S19	Wash T2N-R7W-S36W
Wash T2N-R6W-S22	Wash T2N-R8W-S01
Wash T2N-R6W-S22 West 1	Wash T2N-R8W-S02E
Wash T2N-R6W-S27	Wash T2N-R8W-S02W
Wash T2N-R6W-S28	Wash T2N-R8W-S8-2
Wash T2N-R6W-S29W	Wash T2N-R8W-S9
Wash T2N-R6W-S30W	Wash T2N-R9W-S12-1
Wash T2N-R6W-S31N	Wash T2N-R9W-S12-2
Wash T2N-R6W-S31S	Wash T2N-R9W-S2-1
Wash T2N-R6W-S32E	Wash T2N-R9W-S2-2
Wash T2N-R6W-S32N	Wash T2S-R1W-S31(B46)

Table 2. Approximate Study Flooding Sources (Continued)

Wash T2S-R2W-S15(A37)	Wash T2S-R6W-S2 Reach 5
Wash T2S-R2W-S16A(A35)	Wash T2S-R6W-S2 Reach 6
Wash T2S-R2W-S16B(A15)	Wash T2S-R6W-S2 Reach 7
Wash T2S-R2W-S17A(A17)	Wash T2S-R6W-S2 Reach 8
Wash T2S-R2W-S17B(A63)	Wash T2S-R6W-S2 Tributary 1 Reach 1
Wash T2S-R2W-S20(A19)	Wash T2S-R6W-S2 Tributary 2 Reach 1
Wash T2S-R2W-S26(A41)	Wash T2S-R6W-S2 Tributary 3 Reach 1
Wash T2S-R2W-S35A(B58)	Wash T2S-R6W-S2 Tributary 4 Reach 1
Wash T2S-R2W-S35B(B29)	Wash T2S-R6W-S2 Tributary 4 Reach 2
Wash T2S-R2W-S6(A55)	Wash T2S-R6W-S2 Tributary 4 Reach 3
Wash T2S-R2W-S7A(A52)	Wash T2S-R6W-S2 Tributary 5 Reach 1
Wash T2S-R2W-S7B(A51)	Wash T2S-R6W-S2 Tributary 6 Reach 1
Wash T2S-R2W-S7C(A32)	Wash T2S-R6W-S2 Tributary 7 Reach 1
Wash T2S-R3W-S1(A54)	Wash T2S-R6W-S3 Reach 1
Wash T2S-R3W-S12A(A30)	Wash T3N-R5W-S20
Wash T2S-R3W-S12B(A27)	Wash T3N-R5W-S21N
Wash T2S-R5W-S17 Reach 1	Wash T3N-R5W-S21S
Wash T2S-R5W-S17 Reach 2	Wash T3N-R5W-S28N
Wash T2S-R5W-S17 Reach 3	Wash T3N-R5W-S28S
Wash T2S-R5W-S17 Reach 4	Wash T3N-R5W-S30
Wash T2S-R5W-S17 Reach 5	Wash T3N-R5W-S31
Wash T2S-R5W-S17 Tributary 1 Reach 1	Wash T3N-R5W-S32E
Wash T2S-R5W-S17 Tributary 1 Reach 2	Wash T3N-R6W-S14W
Wash T2S-R5W-S17 Tributary 1 Reach 3	Wash T3N-R6W-S15N
Wash T2S-R5W-S17 Tributary 1 Reach 4	Wash T3N-R6W-S16E
Wash T2S-R5W-S17 Tributary 1 Reach 5	Wash T3N-R6W-S16S
Wash T2S-R5W-S17 Tributary 2 Reach 1	Wash T3N-R6W-S16W
Wash T2S-R5W-S17 Tributary 3 Reach 1	Wash T3N-R6W-S18W
Wash T2S-R5W-S17 Tributary 4 Reach 1	Wash T3N-R6W-S19
Wash T2S-R5W-S17 Tributary 4 Reach 2	Wash T3N-R6W-S20
Wash T2S-R5W-S17 Tributary 4 Reach 3	Wash T3N-R6W-S21
Wash T2S-R5W-S7-1 Reach 1	Wash T3N-R6W-S21E
Wash T2S-R5W-S7-2 Reach 1	Wash T3N-R6W-S27S
Wash T2S-R5W-S7-2 Reach 2	Wash T3N-R6W-S27W
Wash T2S-R5W-S7-2 Reach 3	Wash T3N-R6W-S29
Wash T2S-R5W-S7-2 Reach 4	Wash T3N-R6W-S33
Wash T2S-R5W-S7-2 Tributary 1 Reach 1	Wash T3N-R7W-S05
Wash T2S-R5W-S7-2 Tributary 2 Reach 1	Wash T3N-R7W-S06
Wash T2S-R5W-S7-2 Tributary 2 Reach 2	Wash T3N-R7W-S09E
Wash T2S-R5W-S7-2 Tributary 2 Reach 3	Wash T3N-R7W-S09W
Wash T2S-R5W-S7-2 Tributary 3 Reach 1	Wash T3N-R7W-S11
Wash T2S-R5W-S7-2 Tributary 3 Reach 2	Wash T3N-R7W-S12
Wash T2S-R5W-S7-2 Tributary 3 Reach 3	Wash T3N-R7W-S15
Wash T2S-R5W-S7-2 Tributary 3 Reach 4	Wash T3N-R7W-S17
Wash T2S-R5W-S7-2 Tributary 3 Reach 5	Wash T3N-R7W-S20
Wash T2S-R5W-S7-3 Reach 1	Wash T3N-R7W-S24
Wash T2S-R6W-S2 Reach 1	Wash T3N-R7W-S26
Wash T2S-R6W-S2 Reach 2	Wash T3N-R7W-S28E
Wash T2S-R6W-S2 Reach 3	Wash T3N-R7W-S28W
Wash T2S-R6W-S2 Reach 4	Wash T3N-R7W-S31E

Table 2. Approximate Study Flooding Sources (Continued)

Wash T3N-R7W-S31S	Wash T4S-R1E-S20(E44)
Wash T3N-R7W-S31W	Wash T4S-R1E-S21(E45)
Wash T3N-R8W-S05E	Wash T4S-R1E-S23(F20)
Wash T3N-R8W-S05W	Wash T4S-R1E-S9(E49)
Wash T3N-R8W-S10	Wash T5N-R2W-S14N
Wash T3N-R8W-S11E	Wash T5N-R2W-S14S
Wash T3N-R8W-S11W	Wash T5N-R2W-S14W
Wash T3N-R8W-S12	Wash T5N-R2W-S19E
Wash T3N-R8W-S13E	Wash T5N-R3W-S24E
Wash T3N-R8W-S13S	Wash T5N-R5W-S10A
Wash T3N-R8W-S13W	Wash T5N-R5W-S16
Wash T3S-R1W-S15A(G40)	Wash T5N-R5W-S33
Wash T3S-R1W-S15B(D39)	Wash T5N-R5W-S23A
Wash T3S-R1W-S22A(D42)	Wash T5N-R5W-S34A
Wash T3S-R1W-S22B(G39)	Wash T5N-R6W-S30
Wash T3S-R1W-S25A(D31)	Wash T5N-R7W-S09
Wash T3S-R1W-S25B(D32)	Wash T5N-R8W-S13
Wash T3S-R1W-S26(D33)	Wash T6N-R4W-S15
Wash T3S-R1W-S3(H29)	Wash T6N-R4W-S3
Wash T3S-R1W-S4A(H71)	Wash T6N-R8W-S35-B
Wash T3S-R1W-S4B(H73)	Wash T7N-R10W-S13
Wash T3S-R1W-S5(B45)	Wash T7N-R1E-S26-2B
Wash T3S-R1W-S9(B12)	Wash T7N-R2E-S6N
Wash T3S-R2W-S1(B54)	Wash T7N-R2E-S6N Tributary 1
Wash T3S-R2W-S11(B37)	Wash T7N-R2E-S6S
Wash T3S-R2W-S2A(B33)	Wash T7N-R2E-S7
Wash T3S-R2W-S2B(B65)	Wash T7N-R4W-S20
Wash T3S-R2W-S2C(B38)	Wash T7N-R4W-S28
Wash T3S-R2W-S2D(B35)	Wash T7N-R8W-S12
Wash T3S-R2W-S2E(B33)	Wash T7N-R8W-S18
Wash T3S-R2W-S6(B47)	Wash T7N-R8W-S1A
Wash T4N-R3W-S08E	Wash T7N-R8W-S1B
Wash T4N-R7W-S28S	Wash T7N-R8W-S1C
Wash T4N-R7W-S28W	Wash T7N-R8W-S1D
Wash T4N-R7W-S30	Wash T7N-R8W-S1E
Wash T4N-R7W-S32	Wash T7N-R8W-S1F
Wash T4N-R7W-S33N	Wash T7N-R8W-S2
Wash T4N-R8W-S28E	Wash T7N-R8W-S7
Wash T4N-R8W-S28W	Wash T7N-R8W-S9
Wash T4N-R8W-S29E	Wash T7N-R8W-S30
Wash T4N-R8W-S29W	Wash T7N-R9W-S17
Wash T4N-R8W-S31E	Wash T7N-R9W-S22
Wash T4N-R8W-S31N	Wash T7N-R9W-S25A
Wash T4N-R8W-S31S	Wash T7N-R9W-S25B
Wash T4N-R8W-S31W	Wash T7N-R9W-S25C
Wash T4N-R8W-S33	Wash T7N-R9W-S25D
Wash T4N-R8W-S35E	Wash T7N-R9W-S25E
Wash T4N-R8W-S35N	Wash T7N-R9W-S4
Wash T4N-R8W-S35W	Wash T8N-R2E-S31
Wash T4S-R1E-S15A(F34)	Wash T8N-R2E-S31 Tributary 1

Table 2. Approximate Study Flooding Sources (Continued)

Wash T8N-R2E-S31 Tributary 2	Willow Spring Wash
Wash T8N-R2E-S31 Tributary 3	Willow Spring Wash-Tributary 3
Wash T8N-R2E-S31 Tributary 4	Willow Springs Wash
Wash Tributary 2	Winters Wash East 4
Waterman Wash	Winters Wash West 1
West Castle Creek	Winters Wash West 2
West Prong Wash	Winters Wash West 3
Western Canal	Winters Wash West 4
White Tanks Flood Retarding Structure No. 3	Woolsey Wash
White Tanks Flood Retarding Structure No. 4	Yellow Medicine Wash
White Tanks Wash	Yellow Medicine Wash Tributary 1
White Tanks Wash No. 3	Yellow Medicine Wash Tributary 2
White Tanks Wash Tributary No. 2	Yucca Flat Wash

2.2 Community Description

Maricopa County, encompassing a total area of 9,238 square miles, is located in south-central Arizona. Adjacent counties are Yavapai County on the north, Gila County on the northeast, Pinal County on the east, Pima County on the south, Yuma County on the west, and La Paz County on the northwest. The incorporated communities within the county cover an area in excess of 100 square miles and an additional 3,330 square miles of the county are Government-owned lands. The 2008 population estimate for the county was 3,954,598 (U.S. Census Bureau, 2009).

The terrain throughout Maricopa County varies in character from numerous rugged mountain ranges to plains and deserts. An abundance of small intermittent streams and washes traverse the major portion of the county. Residential and agricultural development is concentrated along the major streams.

The climate in Maricopa County is mild, with short winters and long, hot summers.

The Gila River, which is the largest tributary to the lower Colorado River, flows southwesterly through the southern half of the county. The river basin includes the southern half of Arizona and part of southwestern New Mexico and contributes a drainage area of approximately 49,500 square miles at the Gillespie Dam, which is approximately 31 miles downstream from Goodyear.

The Agua Fria River, a tributary to the Gila River, rises in the Prescott National Forest and flows southerly for approximately 130 miles to its confluence with the Gila River. It drains an area of approximately 2,340 square miles. The river is usually dry because flows are regulated by the Carl Pleasant Dam and Lake Pleasant reservoir, approximately 18 miles north of El Mirage, in north-central Maricopa County (U.S. Department of the Army, 1968).

The New River, the major tributary of the Agua Fria River, rises in the Cook Mesa area of the New River Mountains and flows southerly to the Agua Fria River. It is approximately 48 miles long and has a drainage area of approximately 315 square miles (U.S. Department of the Army, 1967).

Skunk Creek flows southwesterly to its confluence with the New River, draining an area of approximately 110 square miles at its mouth.

Scatter Wash flows westerly through northern portion of the City of Phoenix to its confluence with Skunk Creek.

East Branch Scatter Wash is an overflow area from Scatter Wash. Floodwater flows along the southern Overbank of Scatter Wash just north of Black Canyon Highway, crosses the highway at the Deer Valley Road interchange, and rejoins Scatter Wash along Rose Garden Lane in the City of Phoenix.

The Salt River originates at the Theodore Roosevelt Lake in Gila County. The river flows westerly through east-central Maricopa County to its confluence with the Gila River. The Salt River has a wide, irregular, sandy streambed with several meandering channels throughout the study area. The river drains an area of 13,700 square miles at its mouth. The Salt River is regulated by four dams: Roosevelt, Horse Mesa, Mormon Flat,

and Stewart Mountain. The total capacity of the four reservoirs is 1.755 million acre-feet. Water from this system is used for irrigation of the Salt River Valley and for the generation of power (U.S. Department of the Interior, 1973). Granite Reef Dam, located on the Salt River 3.4 miles below its confluence with the Verde River, diverts water from the river to Arizona and Southern Canals. This water is for municipal use and irrigation.

Cave Creek and its numerous tributaries drain the mountainous areas of east-central Maricopa County. Cave Creek flows southwesterly to its confluence with the Salt River. Its tributaries include East Fork of Cave Creek and Andora Hills, Galloway, Rowe, Grapevine, Ocotillo, and Willow Springs Washes. Flows are regulated by Cave Creek Dam, located just north of Phoenix. East Fork of Cave Creek flows southwesterly to its confluence with Cave Creek, draining an area of approximately 14.4 square miles at its mouth. Andora Hills Wash flows westerly to its confluence with Cave Creek north of the City of Phoenix. Galloway Wash flows westerly to its confluence with Cave Creek north of the City of Phoenix. Rowe Wash and Grapevine Wash flow southwesterly to their confluences with Galloway Wash north of the City of Phoenix. Ocotillo and Willow Springs Washes flow southwesterly before joining Cave Creek north of the City of Phoenix.

The Hassayampa River flows southerly through northwestern Maricopa County before joining the Gila River 40 miles west of the City of Phoenix. The river, which drains an area in northwestern Maricopa County and southern Yavapai County, originates in the Bradshaw Mountains south of Prescott (U.S. Department of the Army, 1972). The terrain of the drainage basin consists of mountains with heavy forest cover in the northern one-third, rolling hills in the central one-third, and desert valley in the southern one-third. The stream gradient of the Hassayampa River ranges from an average of 20 feet per mile near River Mile 40 to approximately 400 feet per mile near Box Canyon in Yavapai County (U.S. Department of the Army, 1972).

Sols Wash originates in the Date Creek Mountains north of Wickenburg. It flows southeasterly, draining an area of 145 square miles at its confluence with the Hassayampa River. The basin is bounded by low, poorly defined ridges and hills extending to Twin Peaks. On the south and east, pronounced foothills and mountains distinguish the drainage divide. The Sols Wash basin is a mildly sloping desert plain. Tributaries to Sols Wash are Flying E, Hospital, Casandro, and Casandro Wash South Branch. Flying E Wash flows northeasterly, joining Sols Wash in western Wickenburg. Hospital Wash flows southerly to its confluence with Sols Wash within Wickenburg. Casandro Wash flows northeasterly to its confluence with Sols Wash in Wickenburg. Casandro Wash South Branch flows northeasterly to its confluence with Casandro Wash in southwestern Wickenburg.

Powder House Wash flows southwesterly in a well-defined channel, draining 2 square miles of desert highlands before discharging into the Hassayampa River at the Town of Wickenburg.

Martinez Wash flows southeasterly, joining the Hassayampa River at the Maricopa-Yavapai County line.

Mockingbird Wash is a tributary of the Hassayampa River approximately 2 miles southeast of the Town of Wickenburg. The wash is well defined, with steep sidewalls. Mockingbird Wash flows southwesterly, draining approximately 7 square miles of desert

highland.

Little San Domingo Wash is a small, well-defined wash near the unincorporated area of Morristown in northern Maricopa County. It flows southwesterly, draining 6.2 square miles of desert highlands at the U.S. Highways 60, 70, and 89 interchange.

Aguila Farm Channel collects flood flows north of the Atchison, Topeka & Santa Fe Railway in northwestern Maricopa County and conveys them westerly across Aguila Farm to Grass Wash.

Grass Wash flows northwesterly through Aguila to its confluence with Centennial Wash in northwestern Maricopa County.

Sand Tank and Bender Washes flow northwesterly through the center of Gila Bend. Sand Tank and Bender Washes approach Gila Bend from the south in two separate channels, but during periods of heavy runoff the washes overflow their banks and the flows are intermixed. The combined flows join the Gila River approximately 3 miles north of Gila Bend.

Rodeo Wash and Rodeo Wash Tributary flow northwesterly through eastern Gila Bend.

Airport Wash flows northwesterly through the northeastern corner of Gila Bend.

Scott Avenue Wash flows northerly through western Gila Bend.

Lower El Mirage Wash and Lower El Mirage Wash Tributary flow easterly to the Agua Fria River near El Mirage.

The Atchison, Topeka & Santa Fe Railway Channel flows easterly to the Agua Fria River through the northern part of the town.

The elevated embankments of the Atchison, Topeka & Santa Fe Railway and the Southern Pacific Railroad impede the movement of floodwaters from the east and northeast, resulting in ponding and shallow flooding along the embankments throughout the county.

Echo Canyon Wash flows southwesterly through the Town of Paradise Valley, and Cities of Phoenix and Scottsdale to its junction with Arizona Canal.

Apache Creek, near Apache Junction, is on an alluvial fan at the base of the Superstition Mountains in southeastern Maricopa County.

A system of irrigation canals crosses the southern one-half of the county nearly parallel to ground contours. The system consists of the Arizona, Grand, Western, Tempe, Highline, Kyrene Branch, Gila Bend, Southern, Buckeye, Consolidated, Roosevelt, and Eastern Canals, and the Granite Reef Aqueduct.

2.3 Principal Flood Problems

The flooding history of Maricopa County indicates that large portions of the county are subject to destructive floods.

The principal flood hazard results from overflow of the major rivers; the overflow results in the inundation of the wide, flat floodplains, including any residential, commercial, or agricultural developments located within them. Erosion, combined with the development of new channels, adds to the potential hazard from inundation.

Areas adjacent to the floodplains of the major rivers, but not subject to overflow from the rivers, may be flooded due to the failure of earthen dikes and other retarding or diverting structures (U.S. Department of the Interior, 1973).

The upland areas of Maricopa County are also subject to flooding. Throughout the county, broad alluvial slopes lie between the steep mountains and major watercourses. These slopes are formed by the intermingling of alluvial fans from several streams and are traversed by many small channels that divide and reconverge at many places.

These channels are usually lined with small amounts of brush. Flooding occurs as a direct result of rainfall on the slopes or is caused by streams that drain from the mountains. Floods originating in the mountains often carry substantial amounts of rock debris, which are deposited on the alluvial slope. The debris may plug old channels and cause new ones to develop. Many of the lower slopes receive runoff only from precipitation that falls directly on the area involved because mountain runoff is completely on the upper slopes.

Much of the flood flow on the upland areas is unconfined and moves down slope as sheet flow. Generally, the sheet flow is less than 1.0 foot deep because the width of flow prevents water from building up to greater depths, except in depressions and where water ponds behind dikes, canals, and road fills that may divert the flow from its normal path. The concentrated flow may then break through at one spot, causing high velocities and deep flows immediately below the break or overflow area (U.S. Department of the Interior, 1974).

The type of sheet flow described above occurs on ground slopes of 1 to 5 percent. Slopes of less than 1 percent are too flat to carry water any significant distance. Ponding and rapid infiltration deplete the flood flows quickly. Slopes of more than 5 percent generally cause defined channels to form. Defined channels of minor tributaries may extend a considerable distance into slopes that are flatter than 5 percent, but will seldom reach slopes of less than 2 percent without distributaries channels forming. Water in these channels is generally 2.5 to 3 feet deep (U.S. Department of the Interior, 1974).

Floods have plagued the Gila River basin for many years. The flood of February 1891 produced a great flood on the Salt River; the estimated peak flood flow was approximately 300,000 cubic feet per second (cfs) at Arizona Dam (the present site of Granite Reef Dam). The largest flood involving the entire Gila River basin since that time was produced by the storms of January 1916. During that month, two Pacific storms occurring 10 days apart brought warm rain, which melted unusually heavy snow covers. The resultant flood ravaged the entire basin (U.S. Department of the Army, 1979).

Other large floods occurred in April 1905, February 1920, March 1938, August 1951, December 1965, December 1967, September 1970, and June 1972.

Heavy precipitation in the mountains north and east of the City of Phoenix caused five

floods in the Phoenix area from March 1978 to February 1980. The floods occurred in March 1978, December 1978, January 1979, March 1979, and February 1980 (approximately a 2-percent-annual-chance flood event) when the flows in the Salt, Verde, and Agua Fria Rivers exceeded the storage capacity of the reservoirs on the rivers. These floods made almost all river crossings on the Salt River impassable for weeks and cut Maricopa County practically in half. Because of major traffic delays, businesses suffered major income losses. The nuisance of traffic jams also affected the lives of residents in the Phoenix metropolitan area. There were major physical damages to roads and bridges that crossed the Salt and Agua Fria Rivers. The Sky Harbor International Airport runways were flooded, causing partial closure of operations. The other flood damages were to agricultural fields on the flat floodplain, to the sand-and-gravel-mining operations in the riverbed, and to commercial establishments in the river floodplains. Emergency assistance costs for local fire, police, and public services increased significantly. The overall flood damage estimate for March 1978 was approximately \$33.2 million; for December 1978, \$51.8 million; and for February 1980, \$63.6 million.

Figures 1, 2, 3, and 4 depict flooding along the Salt River during December 1965. Figure 5 shows flooding on the Agua Fria River near the City of Goodyear during the December 1965 flood.



Figure 1. Looking downstream on the Salt River During the December 1965 flood (Sky Harbor International Airport runways are in the center.)



Figure 2. Salt River flooding in December 1965 (The 40th Street bridge railing is visible at lower right; flow is from right to left.)



Figure 3. The Salt River Bridges in the City of Tempe, looking upstream (The flooded area in the upper center is now developed into athletic fields and parking lots for Arizona State University. Photograph was taken on December 31, 1965.)



Figure 4. The Salt River in the City of Tempe looking southwest (The flow is left to right. The buildings in the upper center of the photo are the Arizona State University. Scottsdale Road crosses the photo from the upper left to the lower right. Photograph was taken on December 31, 1965.)



Figure 5. Agua Fria River Flooding at U.S. Highway 80 and Southern Pacific Railroad Bridge near the City of Goodyear on December 22, 1965 (Direction of flow is right to left.)

2.4 Flood Protection Measures

Several flood-control structures exist in Maricopa County. Painted Rock Dam, which is 20 miles northwest of Gila Bend on the Gila River, was completed in 1959. It provides flood protection for approximately 360,000 acres downstream of the dam (U.S. Department of the Army, 1979).

Runoff on the Salt River and its tributary, the Verde River, has been reduced over the years by the construction of several dams: Granite Reef Dam (1908); Roosevelt Dam (1911); Mormon Flat Dam (1925); Horse Mesa Dam (1927); Stewart Mountain Dam (1930) on the Salt River; Bartlett Dam (1939); and Horseshoe Dam (1945) on the Verde River.

Carl Pleasant Dam was constructed at the Frog Tanks gage on the Agua Fria River in 1927. It controls runoff from an area of 1,457 square miles (U.S. Department of the Army, 1974).

Cave Creek Dam, built in 1920, provides protection from a 4-percent-annual-chance flood to parts of the City of Phoenix.

The Paradise Valley detention dikes, which are a feature of the Central Arizona Project (CAP), provide flood protection for the northeastern part of Phoenix and Scottsdale in excess of the 1-percent-annual-chance flood. The Paradise Valley detention dikes have 14 feet of freeboard to provide protection from the 1-percent-annual-chance flood (FEMA, 1984). Also part of the CAP is the Granite Reef Aqueduct, which consists of a concrete-lined channel and a series of levees.

Dreamy Draw detention basin (1973) and Cave Buttes Dam (1980) provide additional flood protection for the City of Phoenix.

Trilby Wash detention basin (McMicken Dam) was completed in 1956. The detention basin has a capacity of approximately 19,300 acre-feet (U.S. Department of the Army, 1979). A levied outlet channel conveys flood releases from the detention basin to the Agua Fria River. The project provides some flood protection to Luke Air Force Base, Phoenix Litchfield Municipal Airport, and the Cities of Goodyear, Litchfield, Avondale, Surprise, and El Mirage.

Spook Hill Dam, Signal Butte Dam, Pass Mountain Dam, Powerline Dam, a diversion-structure to Powerline Dam, and Rittenhouse Dam control flooding in the southeastern part of the county (FEMA, 1980; FEMA, 1983).

Drainage structures in the I-8 embankment south of Gila Bend were designed, according to State criteria, for a 2-percent-annual-chance storm. This provides a shielding effect to Gila Bend because floodwaters from lower frequency storms will be detained by the highway, and flows exceeding the capacity of the highway structures will be diverted to the west (FEMA, 1979).

A storm water detention dike was built approximately 4 miles north of the Town of Buckeye under the auspices of FCDMC. This facility was designed and constructed to contain up to the 1-percent-annual-chance frequency storm runoff from the drainage areas north of the Roosevelt Canal. This facility provides some flood protection to the

Town of Buckeye (FEMA, 1981).

The channelization of portions of the Agua Fria, Gila, New, and Salt Rivers, Skunk Creek, and Scatter Wash has significantly reduced their respective floodplain areas. Adobe Dam was constructed in April 1982 on Skunk Creek across Deer Valley Drive, approximately 1 mile west of Black Canyon Highway. The embankment is a compacted-earth fill structure. The ungated outlet works are designed to release a discharge of 1,890 cfs when the water surface is at the spillway crest. The dam is designed to reduce the Standard Project Flood peak inflow of 66,000 cfs to an outflow of 1,890 cfs. The 1-percent-annual-chance base flood inflow of 39,000 cfs will be reduced to a 1,730-cfs outflow.

In addition, the construction of the New River Dam has reduced the peak flow downstream at the confluence with Skunk Creek from 58,000 cfs to 12,000 cfs.

Levees in the study area provide the community with some degree of protection from flooding. However, it has been ascertained that some of these levees may not provide 1-percent-annual-chance flood protection. The criteria used to evaluate 1-percent-annual-chance protection are: (1) adequate design, including freeboard; (2) structural stability; and (3) proper operation and maintenance. Levees that do not provide 1-percent flood protection are not considered in the hydraulic analyses of the 1-percent floodplain.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood, which equals or exceeds the 1-percent-annual-chance (100-year) flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the county at the time of completion of this study. Maps and flood elevations will be amended periodically to future changes.

3.1 Hydrologic Analyses

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

Peak discharges for the Hassayampa River were developed from discharge-frequency relationships of historic floods and gage records (U.S. Department of the Army, 1974).

In the absence of observed runoff data, present-condition, discharge-frequency values for Scatter Wash and the New River were used. Present-condition, discharge-frequency values for Scatter Wash and Skunk Creek below Adobe Dam were based on future

condition values modified to reflect present conditions (U.S. Department of the Army, 1982). Discharge-frequency values for the Agua Fria River were determined by routing balanced hydrographs, which were developed from Waddell Dam inflow-volume-frequency relationships, through the dam and downstream, and adding local flows as appropriate. Discharge-frequency relationships for the Salt River and Gila Rivers concentration points were determined by routing period-of-record flows through existing reservoirs using the HEC-5 computer model (U.S. Department of the Army, May 1982).

Peak discharge-frequency relationships for Cave Creek (below Cave Creek Dam), East Fork of Cave Creek, and Echo Canyon Wash were taken from the FIS for the City of Phoenix (FEMA, 1984).

Peak discharge-frequency relationships for Cave Creek (above Cave Creek Dam), Andora Hills Wash, Galloway Wash, Apache Creek, Rowe Wash, Grapevine Wash, Ocotillo Wash, Willow Springs Wash, Skunk Creek (above Carefree Highway), Mockingbird Wash, Little San Domingo Wash, Whitman Drainage, Aguila Farm Channel, Grass Wash, Sand Tank Wash, Bender Wash, Rodeo Wash and its tributary, Airport Wash, Scott Avenue Wash, and Martinez Wash were developed using the U.S. Soil Conservation Service (SCS) TR-20 program (U.S. Department of Agriculture, 1965). In addition, the SCS TR-55 computer program (U.S. Department of Agriculture, 1975) was used to determine flood peaks for Buckeye Feeder Canal; Atchison, Topeka & Santa Fe Railway Channel; Southern Pacific Railroad Spur at the City of Chandler; Southern Pacific Railroad at the Town of Buckeye and the Cities of Chandler, Gilbert, Goodyear, Tempe, and Tolleson; and Lower El Mirage Wash and its tributary.

The Town of Wickenburg requested a restudy for Sols Wash based upon studies performed by the SCS and PRC Toups Engineering (PRC) (U.S. Department of the Army, 1979). These studies yielded peak discharges significantly less than what had been assumed in the previous analysis for the effective FIS (FEMA, 1983).

The SCS computer model, TR-20, was selected to be used to estimate the 10-, 2-, 1- and 0.2-percent-annual-chance peak discharges for various concentration points along Sols Wash. The TR-20 model utilizes the method of analysis described in detail in the SCS National Engineering Handbook Section 4, Hydrology, 1972. This method allows for the prediction of surface water runoff, for an individual watershed, using rainfall-duration and intensity data. The TR-20 model provides a convenient means of predicting the results of storm runoff from multiple watersheds. The storm runoff for individual watersheds is computed and an outflow hydrograph simulated. Individual hydrographs may then be routed and combined to obtain the cumulative downstream effects (U.S. Department of Agriculture, 1965; U.S. Department of Agriculture, 1972; U.S. Department of Commerce, 1973; U.S. Department of Agriculture, July 1975; U.S. Department of Agriculture, December 1975; U.S. Department of Agriculture, 1974; U.S. Department of Agriculture, 1973; and U.S. Department of Agriculture, 1976).

The precipitation frequencies for the area were obtained from is pluvial maps prepared by the U.S. Weather Bureau. The SCS Type II rainfall distribution was used to model the rainfall, which was adjusted using an aerial reduction based upon the total drainage area. Such reduction is necessary to convert from the point aerial rainfall amount. Using soils maps of the area, prepared by the SCS, and from site investigation, runoff curve numbers were selected, based upon recent information developed by the SCS. Time of concentrations for steep and incised washes were computed using the Kirpich equation. For gently sloping alluvial plains, many of which occur on the upper northwest portion of the drainage basin, travel velocities were estimated assuming broad sheet flow and utilizing Manning's equation.

Because there is no gauging station on Sols Wash, and thus no accurate record of historic flooding, there is no means to provide calibration of the rainfall-runoff model, and therefore, only comparison with earlier studies can be made.

The discharge estimates obtained from the TR-20 analysis for this study correspond with the results from both the SCS and PRC analyses. The discharge-frequency curve developed by the USACE for the 1977 FIS has a steeper slope and results in a much larger 1-percent-annual-chance peak discharge than the other studies. The SCS, PRC, and CBA studies each employed the TR-20 model which might explain, in part, the consistency of the results, although the TR-20 is quite sensitive to changes in time of concentration, and each model employed different input parameters.

The calibration of the TR-20 model, by PRC, using streamflow data from the Hassayampa River, lends further credence to each of the study results. Therefore, results from the TR-20 model utilized in this restudy of Sols Wash have been employed in the hydraulic analysis.

Peak discharge-frequency relationships for Casandro, South Branch Cassandro, Flying E, Hospital, and Powder House Washes were taken from the FIS for the Town of Wickenburg (FEMA, 1983).

For the Stagecoach Pass Wash Overflow, 1-percent annual-chance flood discharge was previously developed in the North Scottsdale Floodplain Delineation Study (DEI Professional Services, 2005).

Peak discharge-drainage area relationships for flooding sources studied by detailed methods are shown in Table 3, "Summary of Discharges".

Elevations for floods of the recurrence intervals for multiple flooding sources are shown in Table 4, "Summary of Stillwater Elevations".