

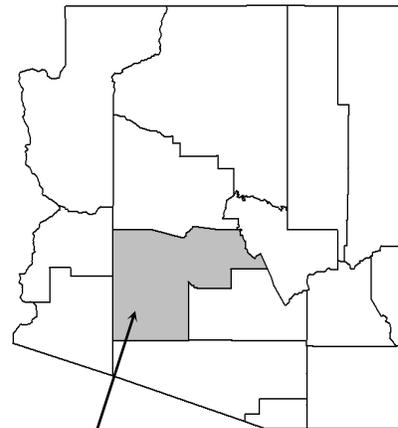
FLOOD INSURANCE STUDY



VOLUME 8 OF 32

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
AVONDALE, CITY OF	040038
BUCKEYE, CITY 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

PRELIMINARY
MONTH XX, XXXX



Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
04013CV008D

**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
Month XX, XXXX

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Unnamed Wash No. 1	Panels 1386P-1392P
Unnamed Wash No. 2	Panels 1393P-1398P
Upper Boulders Wash	Panels 1399P-1406P
Upper Fan 5	Panels 1407P-1415P

* Panel 1381P not printed

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VOLUME 23

EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

Valley Wash	Panels 1416P-1417P
Wagner Wash	Panels 1418P-1424P
Wagon Wash	Panel 1425P
Wash 1 East	Panels 1426P-1427P
Wash 1 West	Panels 1428P-1432P
Wash 2 East (North of the Central Arizona Project Canal)	Panels 1433P-1434P
Wash 2 East (South of the Central Arizona Project Canal)	Panels 1435P-1436P
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
Wash 7 East Tributary	Panels 1475P-1476P
Wash 7 East West Split	Panel 1477P
Wash 8 East	Panels 1478P-1480P
Wash 9 (Rio Verde Wash 9)	Panels 1481P-1484P
Wash 9 East	Panels 1485P-1492P
Wash 9 East Split	Panel 1493P
Wash 10 East	Panels 1494P-1497P
Wash 10 East Split 1	Panel 1498P
Wash 10 East Split 2	Panels 1499P-1500P
Wash 11 East	Panels 1501P-1510P
Wash 12 East	Panels 1511P-1514P
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VOLUME 24

EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

Wash 13 East	Panels 1516P-1518P
Wash 14 East	Panel 1519P
Wash AG	Panels 1520P(a)-1520P(d)
Wash B	Panels 1521P-1529P
Wash B Tributary	Panel 1530P
Mockingbird Wash Tributary 1	Panel 1531P
Wash F	Panels 1532P(a)-1532P(c)
Wash F Tributary 1	Panel 1533P
Wash G	Panels 1534P(a)-1534P(b)
Wash H	Panels 1535P-1536P(c)
Wash I	Panels 1537P-1538P(b)
Wash K	Panels 1539P-1542P
Wash K Tributary 1	Panel 1543P(a)-1543P(b)
Wash L	Panels 1544P-1545P(c)
Wash O	Panels 1546P-1547P(c)
Wash P	Panel 1548P
Wash Q	Panels 1549P-1551P(c)
Wash S2	Panel 1552P
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
Wash T4N-R3W-S09W	Panels 1569P-1571P
Wash T4N-R3W-S10N	Panels 1572P-1573P
Wash T4N-R3W-S10W-Reach-1	Panel 1574P
Wash T4N-R3W-S10W-Reach-2	Panel 1575P
Wash T4N-R3W-S17	Panels 1576P-1578P
Wash T4N-R3W-S18E	Panels 1579P-1582P
Wash T4N-R3W-S18W	Panels 1583P-1586P
Wash T5N-R2W-S07	Panels 1587P-1588P
Wash T5N-R2W-S19E	Panels 1589P-1590P
Wash T5N-R2W-S19W	Panels 1591P-1594P
Wash T5N-R3W-S01S	Panel 1595P
Wash T5N-R3W-S19	Panel 1596P
Wash T5N-R3W-S24E	Panels 1597P-1599P
Waterfall Wash	Panels 1600P-1607P

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EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

Waterman Wash	Panels 1608P-1620P(ac)
West Fork White Peak Wash	Panel 1621P
West Garambullo Wash	Panels 1622P-1623P
West Quilotosa Wash	Panels 1624P-1625P
West Split Flow Through El Mirage	Panels 1626P-1627P
White Granite Wash	Panels 1628P-1633P
White Granite Wash North Fork	Panels 1634P-1636P
White Peak Wash	Panels 1637P-1639P
White Tanks No. 3 Wash	Panels 1640P-1646P
White Tanks Wash	Panels 1647P-1653P

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EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

White Tanks Wash Tributary 1	Panels 1654P-1657P
Willow Springs Wash	Panels 1658P-1667P
Willow Springs Wash Tributary 1	Panels 1668P-1675P
Willow Springs Wash Tributary 1A	Panels 1676P-1679P
Willow Springs Wash Tributary 2	Panels 1680P-1683P
Willow Springs Wash Tributary 2A	Panels 1684P-1686P
Willow Springs Wash Tributary 4	Panels 1687P-1691P
Willow Springs Wash Tributary 5	Panels 1692P-1695P
Willow Springs Wash Tributary 5A	Panels 1696P-1698P
Willow Springs Wash Tributary 6	Panels 1699P-1701P
Willow Springs Wash Tributary 6A	Panel 1702P
Willow Springs Wash Tributary 6B	Panel 1703P
Willow Springs Wash Tributary 6C	Panel 1704P
Windmill Wash	Panels 1705P-1706P
Windmill Wash North Branch	Panels 1707P-1708P
Windmill Wash South Branch	Panel 1709P
Wittmann Wash	Panels 1710P-1721P
Wittmann Wash North Split	Panel 1722P
Wittmann Wash South Split	Panels 1723P-1724P
Wittmann Wash Tributary	Panels 1725P-1726P
Yucca Flat Wash	Panels 1727P-1728P(i)

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Coyote Pass Wash	Panel 1729P
Delaney Wash	Panels 1730P-1734P
Delaney Wash North Split	Panel 1735P
Delaney Wash South Split	Panel 1736P
Dickey Wash	Panels 1737P-1741P
Eastern Canal	Panels 1742P-1744P
Four Mile Wash	Panels 1745P-1756P
Four Mile Wash W1	Panel 1757P
Four Mile Wash W2	Panel 1758P
Gavilan Peak Wash	Panels 1759P-1761P
Kelley Road Wash	Panel 1762P
Lazy G Wash	Panels 1763P-1764P
Luke Wash East Main Split	Panel 1765P
Phillips Wash	Panels 1766P-1771P
Photo View Wash	Panels 1772P-1775P
Photo View Wash Breakout 1	Panel 1776P
Photo View Wash Breakout 2	Panel 1777P
Rio Verde Wash 7	Panels 1778P
Rio Verde Wash 10 Split 7 Tributary 1	Panels 1779P-1784P
Rio Verde Wash 10 Tributary 1	Panels 1785P-1786P
Rio Verde Wash 10 Tributary 2	Panel 1787P
Rio Verde Wash 10 Tributary 2 Split 1	Panel 1788P
Rio Verde Wash 10 Tributary 3	Panel 1789P
Rio Verde Wash 10 Tributary 4	Panel 1790P
Rio Verde Wash A Split 3	Panels 1791P-1793P
Rio Verde Wash A Split 4	Panel 1794P
Rio Verde Wash A Split 8	Panels 1795P-1801P
Rio Verde Wash A Split 9	Panels 1802P-1808P
Rio Verde Wash A Tank Spillway	Panels 1809P-1810P
Rio Verde Wash A Tributary 1	Panels 1811P-1813P
Rio Verde Wash A Tributary 2	Panels 1814P-1815P
Rio Verde Wash F Split 6	Panels 1816P-1819P
Rio Verde Wash F Tributary 2	Panels 1820P-1824P

*Panel 1765P not printed

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VOLUME 28

EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

Rio Verde Wash I	Panels 1825P-1839P
Rio Verde Wash I Split 4	Panels 1840P-1842P
Rio Verde Wash I Tributary 1	Panels 1843P-1845P
Rio Verde Wash I Tributary 3	Panel 1846P
Rio Verde Wash J	Panels 1847P-1849P
Rio Verde Wash K	Panels 1850P-1864P
Rio Verde Wash K Split 1	Panels 1865P-1866P
Rio Verde Wash K Split 3	Panels 1867P-1869P
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
Rio Verde Wash K Tributary 4A	Panels 1889P-1894P
Rio Verde Wash K Tributary 6	Panels 1895P-1903P
Rio Verde Wash K Tributary 6 Split 1	Panels 1904P-1907P
Rio Verde Wash K Tributary 6 Split 2	Panels 1908P-1912P
Rio Verde Wash K Tributary 6 Split 3	Panels 1913P-1915P
Rio Verde Wash K Tributary 6A	Panels 1916P-1923P

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VOLUME 29

EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

Rio Verde Wash K Tributary 6A1	Panels 1924P-1926P
Rio Verde Wash K Tributary 6A2	Panels 1927P-1928P
Rio Verde Wash K Tributary 6A3	Panel 1929P
Rio Verde Wash K Tributary 6B	Panels 1930P-1933P
Rio Verde Wash K Tributary 6C	Panel 1934P
Rio Verde Wash K Tributary 6D	Panels 1935P-1936P
Rio Verde Wash K Tributary 6D1	Panel 1937P
Rio Verde Wash K Tributary 7	Panels 1938P-1940P
Rio Verde Wash K Tributary 8	Panel 1941P
Rio Verde Wash K Tributary 9	Panels 1942P-1947P
Rio Verde Wash K Tributary 10	Panels 1948P-1949P
Rio Verde Wash K Tributary 11	Panels 1950P-1952P
Rio Verde Wash K Tributary 11A	Panels 1953P-1954P
Rio Verde Wash K Tributary 11B	Panel 1955P
Rio Verde Wash K Tributary 12	Panels 1956P-1957P
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
River Creek	Panels 1976P-1977P
Rough Rider Wash	Panels 1978P-1980P
Sharman Wash	Panels 1981P-1982P
Soda Springs Wash	Panels 1983P-1984P
Table Mountain Wash	Panels 1985P-1987P
Table Mountain Wash Tributary 6	Panels 1988P-1989P
Twin Peaks Lane Wash	Panels 1990P-1991P
Wash T1N-R5W-S04	Panel 1992P
Wash T1N-R5W-S04 Split	Panel 1993P
Wash T1N-R5W-S10	Panels 1994P-1995P
Wash T1N-R5W-S15	Panels 1996P-1997P
Wash T1N-R5W-S18	Panel 1998P
Wash T1N-R5W-S22	Panels 1999P-2000P
Wash T1N-R5W-S28E	Panel 2001P
Wash T1N-R5W-S32	Panel 2002P
Wash T1N-R5W-S33E	Panel 2003P
Wash T1N-R5W-S33N	Panel 2004P
Wash T1N-R5W-S33W	Panels 2005P-2006P

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EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

Wash T1N-R6W-S1	Panel 2007P
Wash T1N-R6W-S11	Panels 2008P-2009P
Wash T1N-R6W-S12	Panel 2010P
Wash T1N-R6W-S17	Panels 2011P-2012P
Wash T1N-R6W-S18	Panels 2013P-2014P
Wash T1S-R2W-S32A (I63)	Panels 2015P-2017P
Wash T1S-R5W-S09W	Panel 2018P
Wash T1N-R6W-S1	

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VOLUME 30

EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

Wash T1S-R5W-S17	Panels 2019P-2028P
Wash T1S-R5W-S22N	Panels 2029P-2032P
Wash T1S-R5W-S22S	Panels 2033P-2035P
Wash T1S-R5W-S29	Panels 2036P-2040P
Wash T1S-R5W-S29W	Panel 2041P
Wash T1S-R6W-S05S	Panels 2042P-2043P
Wash T1S-R6W-S08	Panels 2044P-2048P
Wash T1S-R6W-S27	Panels 2049P-2050P
Wash T2N-R5W-S27S	Panels 2051P-2052P
Wash T2N-R5W-S28	Panel 2053P
Wash T2N-R5W-S32	Panel 2054P
Wash T2N-R5W-S33E	Panels 2055P-2057P
Wash T2N-R5W-S33W	Panel 2058P
Wash T2N-R6W-S02	Panels 2059P-2060P
Wash T2N-R6W-S05E	Panels 2061P-2064P
Wash T2N-R6W-S05N	Panels 2065P-2068P
Wash T2N-R6W-S05S	Panel 2069P
Wash T2N-R6W-S05W	Panel 2070P
Wash T2N-R6W-S22	Panels 2071P-2072P
Wash T2N-R6W-S28N	Panels 2073P-2076P
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
Wash T2N-R7W-S35W	Panels 2085P-2088P
Wash T3N-R6W-S27W	Panels 2089P-2090P
Wash T3N-R6W-S32	Panel 2091P
Wash T3N-R6W-S33	Panel 2092P
Wash T3N-R6W-S35	Panel 2093P
Wash T5N-R3W-S15-1-1E (West Fork Trilby Wash Tributary 1 East)	Panels 2094P-2095P
Wash T5N-R3W-S15-1E (Trilby Wash Tributary 1 East)	Panels 2096P-2098P
Wash T5N-R3W-S28-3W (Iona Tributary 3 West)	Panels 2099P-2102P
Wash T5N-R4W-S3	Panels 2103P-2104P
Wash T5N-R4W-S7A	Panels 2105P-2106P
Wash T5N-R4W-S7B	Panel 2107P
Wash T5N-R4W-S7C	Panels 2108P-2109P
Wash T5N-R4W-S19	Panels 2110P-2112P

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VOLUME 30 (Continued)

EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

Wash T5N-R4W-S20A

Wash T5N-R4W-S20B

Panels 2113P-2118P

Panels 2119P-2120P

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EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

Wash T5N-R4W-S21	Panels 2121P-2125P
Wash T5N-R4W-S30	Panels 2126P-2127P
Wash T5N-R5W-S1	Panel 2128P
Wash T5N-R5W-S3A	Panel 2129P
Wash T5N-R5W-S3B	Panel 2130P
Wash T5N-R5W-S10A	Panels 2131P-2132P
Wash T5N-R5W-S11	Panel 2133P
Wash T5N-R5W-S12	Panel 2134P
Wash T5N-R5W-S13A	Panel 2135P
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
Wash T5N-R5W-S23B	Panels 2143P-2146P
Wash T5N-R5W-S23C	Panel 2147P
Wash T5N-R5W-S23D	Panel 2148P
Wash T5N-R5W-S23E	Panel 2149P
Wash T5N-R5W-S23F	Panel 2150P
Wash T5N-R5W-S25A	Panels 2151P-2155P
Wash T5N-R5W-S25B	Panels 2156P-2161P
Wash T5N-R5W-S25C	Panels 2162P-2167P
Wash T5N-R5W-S34C	Panels 2168P-2171P
Wash T5N-R5W-S35	Panels 2172P-2175P
Wash T6N-R4W-S33	Panel 2176P
Wash T6N-R4W-S33A	Panel 2177P
Wash T6N-R5W-S36	Panel 2178P
Wash T6N-R5W-S36A	Panel 2179P
Wash T6N-R5W-S36B	Panel 2180P
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White Spar Wash	Panels 2184P-2185P
Winters Wash	Panels 2186P-2192P
Winters Wash With Embankment	Panel 2193P
Wittmann Wash Tributary 1	Panels 2194P-2198P
Wittmann Wash Tributary 1 Breakout 1	Panel 2199P
Wittmann Wash Tributary 1 Breakout 1 of Breakout 3	Panel 2200P
Wittmann Wash Tributary 1 Breakout 2	Panel 2201P
Wittmann Wash Tributary 1 Breakout 3	Panel 2202P

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EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

Wittmann Wash Tributary 1 Breakout 4	Panels 2203P-2204P
Iona Tributary 1 West	Panels 2205P-2208P
Iona Tributary 2 West	Panels 2209P-2210P
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Wash T1S-R2W-S18B (J37)	Panels 2212P-2213P
Wash T1S-R2W-S31 (A56)	Panels 2214P-2216P
Wash T1S-R2W-S31B (I70)	Panel 2217P
Wash T1S-R3W-S24A (A60)	Panel 2218P
Wash T2S-R2W-S7A (A52)	Panels 2219P-2220P
Wash T2S-R2W-S7B (A51)	Panels 2221P-2222P
Amir Wash Tributary 1	Panels 2223P-2225P
Amir Wash Tributary 2	Panels 2226P-2227P
Amir Wash Tributary 3	Panels 2228P-2229P
Casandro Wash Southwest Split	Panel 2230P
Casandro Wash Val Vista Split	Panel 2231P
Cemetery Wash Tributary R	Panel 2232P
Cemetery Wash Tributary R-2A	Panels 2233P-2234P
Cemetery Wash Tributary R-4	Panels 2235P-2238P

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EXHIBITS - continued

Exhibit 1 - Flood Profiles - continued

Centennial Wash Field Overflow (Without Embankment)	Panel 2239P
Centennial Wash West Railroad Overflow (Without Embankment)	Panel 2240P
Flying E Wash Split	Panel 2241P
Flying E Wash Tributary 1	Panels 2242P-2243P
Flying E Wash Tributary 2	Panels 2244P-2245P
Flying E Wash Tributary 3	Panels 2246P-2249P
Flying E Wash Tributary A	Panel 2250P
Harquahala Drainage Channel	Panels 2251P-2252P
Hartman Wash Breakout	Panel 2253P
Hartman Wash Split	Panel 2254P
Hartman Wash Tributary 2	Panels 2255P-2257P
Little San Domingo Wash Tributary 1	Panels 2258P-2262P
Powder House Wash Side Channel	Panel 2263P
Sols Wash Tributary 1S	Panels 2264P-2266P
Sols Wash Tributary 2S	Panels 2267P-2269P
Wash AF	Panels 2270P-2271P
Wash HT07	Panels 2272P-2278P
Wash J	Panels 2279P-2281P
Wash M	Panels 2282P-2284P
Wash N	Panels 2285P-2290P
Yucca Flat Wash Tributary 1	Panel 2291P

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Flood Insurance Rate Map Index
Flood Insurance Rate Map

5.0 INSURANCE APPLICATIONS

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

Zone A

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

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone AR

Area of special flood hazard formerly protected from the 1-percent-annual-chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1-percent-annual-chance or greater flood event.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 1-percent-annual-chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, and to areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

7.0 OTHER STUDIES

FISs have been published prior to the initial countywide study for the following: City of Apache Junction (FEMA, September 30, 1982), City of Avondale (FEMA, August 3, 1982), City of Buckeye (FEMA, February 15, 1980), Town of Carefree (FEMA, unpublished), City of Chandler (FEMA, 1980), Town of El Mirage (U.S. Department of Housing and Urban Development, 1978),

Town of Gila Bend (FEMA, 1979), Town of Gilbert (FEMA, 1983), City of Glendale (FEMA, September 22, 1981), Town of Goodyear (FEMA, October 18, 1983), City of Mesa (FEMA, May 15, 1980), Town of Paradise Valley (FEMA, June 3, 1986), City of Peoria (FEMA, 1981), City of Phoenix (FEMA, 1984), City of Scottsdale (FEMA, December 4, 1984), Town of Surprise (FEMA, March 1, 1983), City of Tempe (FEMA, December 14, 1982), City of Tolleson (FEMA, January 16, 1980), Town of Wickenburg (FEMA, 1983), Town of Youngtown (U.S. Department of Housing and Urban Development, November 15, 1978), and the unincorporated areas of Maricopa County (U.S. Department of Housing and Urban Development, July 2, 1979). Historical Data relating to the maps prepared for each community, up to and including the April 15, 1988, countywide FIS, are presented in Table 7, "Community Map History." The Towns of Cave Creek, Fountain Hills and Queen Creek and the City of Litchfield Park were initially identified as communities after the initial April 15, 1988, countywide study.

FISs have been published for adjacent areas of La Paz County (FEMA, September 19, 1984), Yavapai County (FEMA, September 18, 1985), and Yuma County (FEMA, November 15, 1985), Revised FISs are being prepared for Pinal County (FEMA, Unpublished) and Pima County (FEMA, Unpublished). Approximate flooding areas in Yavapai and Pinal Counties were not studied in Maricopa County.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Avondale, City of	February 15, 1974	January 16, 1976	June 15, 1979	August 3, 1982 September 30, 1995 July 19, 2001 January 1, 2004 October 16, 2013 November 4, 2015
Buckeye, City of	February 15, 1980	None	February 15, 1980	September 4, 1991 September 30, 1995 July 19, 2001 January 1, 2004 October 16, 2013 November 4, 2015 Month XX, XXXX
Carefree, Town of	July 2, 1979	None	July 2, 1979	September 4, 1991 December 3, 1993 July 19, 2001 January 1, 2004
Cave Creek, Town of*	June 9, 1988	None	June 9, 1988	September 29, 1989 September 4, 1991 December 3, 1993

*Community was identified after the initial April 15, 1988, countywide revision

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

**MARICOPA COUNTY, AZ
AND INCORPORATED AREAS**

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Cave Creek, Town of* (continued)				July 19, 2001 January 1, 2004 October 16, 2013
Chandler, City of	May 24, 1977	January 17, 1978	July 16, 1980	December 3, 1993 July 19, 2001 January 1, 2004 October 16, 2013 November 4, 2015
El Mirage, City of	February 15, 1974	None	December 1, 1978	December 3, 1993 July 19, 2001 January 1, 2004 October 16, 2013
Fountain Hills, Towns of*	July 19, 2001	None	July 19, 2001	July 19, 2001 January 1, 2004 October 16, 2013
Gila Bend, Town of	January 18, 1974	December 24, 1976	December 4, 1979	December 3, 1993 July 19, 2001 January 1, 2004 November 4, 2015

*Community was identified after the initial April 15, 1988, countywide revision

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

**MARICOPA COUNTY, AZ
AND INCORPORATED AREAS**

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Gilbert, Town of	April 5, 1974	October 15, 1976	January 16, 1980	September 30, 1983 December 3, 1993 July 19, 2001 January 1, 2004 October 16, 2013 November 4, 2015
Glendale, City of	July 26, 1974	April 9, 1976	April 16, 1979	September 22, 1981 September 30, 1995 July 19, 2001 January 1, 2004 October 16, 2013
Goodyear, City of	March 15, 1974	April 30, 1976	July 16, 1979	October 18, 1983 September 4, 1991 September 30, 1995 July 19, 2001 January 1, 2004 October 16, 2013 November 4, 2015

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

**MARICOPA COUNTY, AZ
AND INCORPORATED AREAS**

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Guadalupe, Town of	April 15, 1988	None	April 15, 1988	September 30, 1995 July 19, 2001 January 1, 2004 October 16, 2013
Litchfield Park, City of*	September 29, 1989	None	September 29, 1989	September 30, 1995 July 19, 2001 January 1, 2004
Maricopa County (Unincorporated Areas)	July 2, 1979	None	July 2, 1979	September 29, 1989 September 4, 1991 December 3, 1993 September 30, 1995 July 19, 2001 January 1, 2004 October 16, 2013 November 14, 2015 Month XX, XXXX
Mesa, City of	April 13, 1973	April 22, 1977	May 15, 1980	December 3, 1993 July 19, 2001 January 1, 2004 October 16, 2014

*Community was identified after the initial April 15, 1988, countywide revision

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

**MARICOPA COUNTY, AZ
AND INCORPORATED AREAS**

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Mesa, City of (continued)				November 4, 2015
Paradise Valley, Town of	December 7, 1973	May 21, 1976	May 1, 1980	June 3, 1986 September 30, 1995 July 19, 2001 December 1, 2004 October 16, 2013
Peoria, City of	January 16, 1981	None	January 16, 1981	December 3, 1993 July 19, 2001 January 1, 2004 October 16, 2013
Phoenix, City of	January 28, 1974	September 12, 1975	December 4, 1979	June 1, 1984 September 4, 1991 December 3, 1993 September 19, 2001 January 1, 2004 October 16, 2013 November 4, 2015

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

**MARICOPA COUNTY, AZ
AND INCORPORATED AREAS**

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Queen Creek, Town of*	September 29, 1989	None	September 29, 1989	December 3, 1993 July 19, 2001 January 1, 2004 October 16, 2013
Scottsdale, City of	September 21, 1973	None	September 21, 1973	December 4, 1984 September 4, 1991 December 3, 1993 July 19, 2001 January 1, 2004 October 16, 2013 November 4, 2015
Surprise, City of	June 28, 1974	December 5, 1975	December 15, 1978	March 1, 1983 September 30, 1995 July 19, 2001 January 1, 2004 October 16, 2013 November 4, 2015
Tempe, City of	June 28, 1974	September 5, 1975	August 15, 1980	December 14, 1982 December 3, 1993 July 19, 2001

*Community was identified after the initial April 15, 1988, countywide revision

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Tempe, City of (continued)				January 1, 2004 October 16, 2013
Tolleson, City of	April 12, 1974	December 19, 1975	January 16, 1980	July 19, 2001 January 1, 2004 October 16, 2013 November 4, 2015
Wickenburg, Town of	February 1, 1974	October 10, 1975	January 5, 1978	March 29, 1983 September 29, 1989 September 4, 1991 July 19, 2001 January 1, 2004 October 16, 2013 Month XX, XXXX
Youngtown, Town of	December 28, 1973	December 5, 1975 May 21, 1976	November 15, 1978	July 19, 2001 January 1, 2004

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

**MARICOPA COUNTY, AZ
AND INCORPORATED AREAS**

COMMUNITY MAP HISTORY

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this FIS can be obtained by contacting FEMA, Federal Insurance and Mitigation Division, 1111 Broadway, Suite 1200, Oakland, California 94607-4052.

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10.0 REVISION DESCRIPTIONS

This section has been added to provide information regarding significant revisions made since the original FIS was printed. Future revisions may be made that do not result in the republishing of the FIS report. To assure that any user is aware of all revisions, it is advisable to contact the community repository.

10.1 First Revision

This study was revised on September 29, 1989, to include the restudy conducted for the Town of Wickenburg and surrounding unincorporated areas of Maricopa County; to include the newly incorporated Town of Cave Creek; and to include the revisions described below. As part of this revision, the conversion of the FIRM for Maricopa County, Arizona, and Incorporated Areas to the Map Initiatives format on a panel-to-panel basis was initiated. In the Map Initiatives format, all base flood elevations, cross sections, and floodplain and floodway boundaries are shown on the FIRM. The flood insurance zone designations were changed to reflect the Map Initiatives Format. The FIRM Index was revised to reflect the 1-percent-annual-chance flooding shown on all FIRM panels. In addition, the Township and Range Lines for Maricopa County and Incorporated Areas have been added to the FIRM and Flood Boundary and Floodway Map Index as requested by the FCDMC.

New River Below Skunk Creek

For the reach of the New River from the confluence with the Agua Fria River upstream to Skunk Creek, revised hydrologic and hydraulic analyses were developed by Coe and Van Loo Consulting Engineers, Inc. (CVL).

The hydrologic analysis developed by CVL for the reach of the New River between the confluence of the Agua Fria River and Skunk Creek was based on the 1984 USACE study. CVL modified the USACE study to reflect existing floodplain conditions, and developed the 10-, 2- and 0.2-percent-annual-chance discharges for this reach. These revised discharges are presented in Table 3 entitled "Summary of Discharges." The revised discharges reflect the construction of the Adobe, New River, and Cave Buttes Dams and the Arizona Canal Diversion Channel (ACDC). These data are presented in the technical report entitled "Hydrology Update, November 15, 1986, New River Below Skunk Creeks, Maricopa County, Arizona," prepared by CVL for the FCDMC.

The revised HEC-2 hydraulic analyses for this reach of the New River utilized cross-sectional data from the original USACE model for the New River based on 1982 topography. These cross sections were modified to include the following channelization projects:

- Glendale Municipal Airport
- Plaza Del Rio Development located south of Thunderbird Road
- Desert Harbor Development located from approximately 3,600 feet downstream of the Thunderbird Road Bridge to north of Greenway Road

The starting water-surface elevations were based on the slope/area method. The roughness factors ("n" values) were originally established by the USACE. CVL conducted a field investigation of the river and revised these factors. Based on the field investigation, CVL utilized the values established by the USACE. The revised floodway analysis was also based on the USACE model and utilized Method 1 encroachment. These data are presented in the technical report entitled "Flood Insurance Study, New River Below Skunk Creek, Maricopa County, Arizona," prepared by CVL for FCDMC, dated December 30, 1986.

The 1- and 0.2-percent-annual-chance floodplains and the 1-percent-annual-chance floodway boundaries were delineated on topographic maps at a scale of 1"=200', contour interval of 2 feet, entitled "New River Floodplain Delineation, Agua Fria River to Skunk Creek," prepared by CVL and revised July 1987. The maps were based on aerial mapping flown by Aerial Mapping Company, Inc., on November 20, 1981, at a scale of 1"=100', contour interval of 2 feet.

New River Upstream of New River Dam

The revised 1-percent-annual-chance hydrologic analysis for the reach of the New River upstream of the New River Dam to Rock Springs was developed by CVL using the USACE HEC-1 hydrologic computer model. These data are presented in the technical report entitled "Hydrology Report, Including Approval Letters for Flood Insurance Study,

New River, from New River Dam to Rock Springs, Maricopa County, Arizona,” prepared by CVL for FCDMC, dated December 1987. Only the 1-percent-annual-chance discharge was developed because the channel geometry for this reach of the New River is characterized by wide floodplains with numerous low-flow channels that are highly unstable. These channels change significantly during low-flow floods. The revised 1-percent-annual-chance discharge is presented in Table 3.

The hydraulic analyses were conducted by CVL utilizing the USACE HEC-2 hydraulic computer model. The starting water-surface elevations were based on the slope/area method. The high-water level in the New River Dam was not used due to difference in the time of peak flow. Cross-sectional data were based on 1"=200' topographic mapping prepared by Aerial Mapping Company, Inc., in March 1985 and December 1986.

Three split flow reaches of the New River and Sweat Canyon Wash were analyzed in addition to the main channel of the New River. The three split flow reaches of the New River are identified as New River East Split, New River Middle Split, and New River West Split. Roughness factors (“n” values) for the New River, the split flows of the New River, and Sweat Canyon Wash were established based on field investigation, topography, and photographs of the area. These values are presented in Table 4. No floodways were computed for these areas because of the unique topography.

The 1-percent-annual-chance floodplain boundaries were delineated using topographic maps at a scale of 1:4,800, contour interval of 4 feet, entitled “New River Floodplain Delineation, New River Dam Reservoir to Rock Springs,” and prepared by CVL.

Tables 1, 2, 3, and 4 have been revised to reflect these modifications to the flooding along the New River. The Floodway Data Table for the New River was also revised to reflect the revised hydraulic analysis. Due to the addition of cross sections for the reach between the Agua Fria River and Skunk Creek, the cross sections located upstream of Skunk Creek to the New River Dam were relabeled.

East Fork Cave Creek

The SFHA along a reach of East Fork Cave Creek, east of 7th Street, was modified based on a revised hydrologic analysis of the 1-percent-annual-chance discharge performed by NBS/Lowry Engineers and Planners (NBS/Lowry). This analysis is presented in reports prepared by NBS/Lowry entitled: “Upper East Fork Cave Creek, Area Drainage Master Study, Technical Submittals,” submittal number 4, dated June 30, 1987; “Upper East Fork Cave Creek, Area Drainage Master Study, Technical Submittals” (Executive Summary), undated, and “Upper East Fork Cave Creek, Area Drainage Master Study, Technical Submittals,” undated.

The revised hydrologic analysis was developed using the SCS TR-20 hydrologic computer model. The routing used in the analysis more accurately represents the existing flow conditions in the Upper East Fork Cave Creek drainage basin than that developed for the existing FIS. As a result of this analysis, the floodway was eliminated for the reach of East Fork Cave Creek east of 7th Street. The SFHA east of the 7th Street was revised to Zone A with the floodplain boundaries remaining as shown on the April 15, 1988, FIRM.

The Letter of Map Amendment (LOMA) issued on August 1, 1986, for the City of Phoenix for Lots 117 to 136 of Coral Gable Estates is shown on FIRM Panels 1655 and 1255. The LOMA stated that this property was not within the SFHAs. The 1-percent-annual-chance floodplain delineation along East Fork Cave Creek was revised to reflect this LOMA.

Buchanan Wash

Hydrologic and hydraulic analyses for Buchanan Wash from its confluence with Skunk Creek to the CAP Canal were conducted by AGK Engineers, Inc., for the FCDMC. These analyses are presented in the technical reports entitled "Hydrologic Analyses for Buchanan Wash, Maricopa County, Arizona," and "Flood Insurance Study for Buchanan Wash, from Skunk Creek to CAP Canal, Maricopa County, Arizona," both dated November 1987 and prepared by AGK Engineers, Inc.

Discharge-frequency relationships from historical flood records could not be developed for Buchanan Wash because no gaging stations are available in the watershed. Therefore, the USACE HEC-1 hydrologic computer model was utilized to develop the peak discharges, which are shown in Table 3.

Cross-sectional data for the HEC-2 hydraulic analyses were obtained from topographic maps at a scale of 1"=200', contour interval of 2 feet, prepared by Aerial Mapping Company, Inc., and flown in September 1986. Roughness factors ("n" values) were selected using engineering judgment and field observations. These values are listed in Table 4.

The USACE HEC-2 hydraulic computer model was used to develop the water-surface profiles. Starting water-surface elevations were obtained from the 1981 USACE study for Skunk Creek.

The floodway was computed on the basis of equal conveyance reduction from each side of the floodplain.

Andora Hills Wash

The SFHA along a reach of Andora Hills Wash located between a point north of Rancho Manana Boulevard and a point approximately 690 feet downstream of Rancho Manana Boulevard has been modified as shown on FIRM Panel 0805. This modification reflects the construction of a roadway crossing and culvert. In support of this revision, a technical report entitled "Application for Flood Plain Variance for Rancho Manana," undated, and Sheet 8 of 8 of certified "as-built" construction plans entitled "Rancho Manana Country Club Lots-Water, Sewer, Paving Plans," dated March 28, 1988, were prepared by American Engineering Company. The technical report contained a revised HEC-2 hydraulic computer model for this reach of Andora Hills Wash.

As a result of the roadway crossing and culvert construction, the base flood elevations and the floodway width increased between cross sections E and F.

Agua Fria River

The floodway boundary along a reach of the Agua Fria River in the vicinity of the Brookview Country Club was modified as shown on FIRM Panels 1165 and 1170. The basis for the revision was a revised HEC-2 hydraulic analysis presented in a technical report entitled "Request for Letter of Map Revision-Agua Fria River Floodway (Brookview Country Club)," prepared by Wildan Associates and dated December 1987. As a result of this analysis, the floodway boundary delineation was modified between cross sections BE and BF.

Granite Reef Aqueduct

The SFHA designated as Zone A along a reach of the Granite Reef Aqueduct, part of the CAP was revised to reflect the correct alignment of the Granite Reef Aqueduct. The basis for this modification was a topographic map submitted by the FCDMC which showed the correct alignment.

Cave Creek

A Letter of Map Revision (LOMR) was issued on May 12, 1988, for the City of Phoenix to reflect a channelization project along Cave Creek from 11th Avenue to Bell Road. In support of this request, certified "as-built" plans entitled "Grading, Drainage, Channel Grading, and Culvert Details, Bell Road Autopark," dated September 30, 1987, and a revised HEC-2 hydraulic analysis of Cave Creek were submitted by Amwest Engineering Company, Inc. As a result of this channelization project, the 1-percent-annual-chance flood is contained within the channel for this reach of Cave Creek.

Arizona Canal Diversion Channel

LOMRs were issued on May 17, 1988, for the Cities of Phoenix and Glendale, and the unincorporated areas of Maricopa County, to reflect the construction of the Arizona Canal Diversion Channel (ACDC) from the confluence with Skunk Creek to 47th Avenue. To support this request, the following data were submitted:

- Sheets 2 and 15 through 19 of 74 of the final construction drawings, entitled "Arizona Canal Diversion Channel, 29th Avenue to 47th Drive," prepared by the USACE, Los Angeles District, and dated July 19, 1987
- Sheets 2 and 4 through 8 of 30 of the final construction drawings, entitled "Arizona Canal Diversion Channel, 47th Drive to Cactus Road," prepared by the USACE, Los Angeles District, and dated September 10, 1986
- Sheets 2, 6 through 19, 27, and 27A of 38 of the final construction drawings, entitled "Arizona Canal Diversion Channel, Cactus Road to Skunk Creek," prepared by the USACE, Los Angeles District, and dated June 24, 1986
- A letter of certification, dated December 31, 1987, from the USACE, Los Angeles District, stating that the reach of the ACDC from Skunk Creek to 47th Avenue was built in conformance with the above-referenced construction drawings

The 1-percent-annual-chance flood is contained within the right-of-way of the ACDC in this reach. The Zone A floodplain boundaries along the north side of the ACDC have been revised to coincide with the right-of-way limits for the ACDC.

LOMRs were issued on September 15, 1988, for the Cities of Peoria and Glendale to reflect the completed portion of the ACDC at the confluence with Skunk Creek. To support these LOMRs, Sheets 2 and 3 of 10 of work maps entitled “Lower Skunk Creek, New River and Skunk Creek Areas, Arizona,” prepared by the USACE and dated February 4, 1980, were submitted by the FCDMC. As a result of the construction of the ACDC, the area previously designated as Zone A at the confluence of Skunk Creek and the ACDC has been revised to Zone X (shaded).

A LOMR was issued on October 4, 1988, for the City of Phoenix to reflect the construction of the ACDC from 47th Avenue to 29th. In support of this request, the following data were submitted:

- Sheets 2, 4, and 5 of 30 of the final construction drawings, entitled “Arizona Canal Diversion Channel, 47th Drive to Cactus Road,” prepared by the USACE, Los Angeles District, and dated September 10, 1986
- Sheets 2 and 5 through 19 of 74 of the final construction drawings, entitled “Arizona Canal Diversion Channel, 29th Avenue to 47th Drive,” prepared by the USACE, Los Angeles District, and dated July 17, 1987
- A letter of certification, dated August 19, 1988, from the USACE, Los Angeles District, stating that the reach of the ACDC from 47th Avenue to 29th Avenue was built in conformance with the above-referenced construction drawings

The 1-percent-annual-chance flood is contained within the right-of-way of the ACDC in this reach. The Zone A floodplain boundaries for the above-referenced reach of the ACDC have been revised to coincide with the right-of-way limits for the ACDC. The areas outside the right-of-way limits on the north side of the reach of the ACDC have been redesignated as Zone X (shaded).

The construction of the ACDC from 29th Avenue East to Black Canyon Freeway is also shown based on data provided by the USACE.

Indian Bend Wash

The Letter of Map Amendment (LOMA) issued on June 16, 1981, for the City of Phoenix for Phases 1 and 2 of Eagles Eyre III is shown on FIRM Panel 1680. The LOMA stated that Lots 1 to 5 and 27 to 36 were not within the SFHA as shown, and that Lots 6 to 26 and 37 to 47 were determined not to be within the SFHA. The 1-percent-annual-chance floodplain delineation along Indian Bend Wash was revised to reflect this LOMA.

Tenth Street Wash

A LOMR was issued on October 13, 1983, and LOMA issued on October 31, 1983, for the City of Phoenix. Based on data submitted by Curtis Engineering on behalf of Villa Santa Fe Condominiums, the SFHA located along Tenth Street Wash upstream of Cheryl Drive was reduced and the floodway eliminated. The LOMA issued for Villa Santa Fe, a

condominium conversion of Desert Cove Apartments, stated that the property was not within the SFHA. The 1-percent-annual-chance floodplain delineation has been revised to reflect this LOMR and LOMA.

Skunk Creek

The LOMA issued on January 15, 1988, for the City of Glendale as shown on FIRM Panel 1190. The LOMA stated that Creekside Market Place located at 67th Avenue and Bell Road was not in the SFHA. The 1-percent-annual-chance floodplain delineations along Skunk Creek were revised to reflect this LOMA.

10.2 Second Revision

This study was revised on September 4, 1991, to include the restudy of hydraulic conditions on Cave Creek, Galloway Wash, the Hassayampa River, Centennial Wash, Cemetery Wash, and Waterman Wash, as well as various requests for map revisions. The restudied streams flow through Maricopa County and several communities within the county including the Cities of Buckeye, Phoenix, Scottsdale, and Goodyear, and the Towns of Cave Creek, Carefree, and Wickenburg. The hydraulic analyses for the restudied streams were completed by Cella Barr Associates in 1989, under Contract No. EMW-88-C-2603. The portions of the streams now studied by detailed methods are shown in Table 1, Detailed-Study Sources.

Since the 1-percent-annual-chance flood is now contained within the channel, detailed flooding has been removed for this reach of Cave Creek, between the ACDC and Sweetwater Road.

Discharge values used in the reanalysis for these six streams have been incorporated into Table 3, Summary of Discharges. Roughness coefficients used in this restudy have been incorporated into Table 4, Range of Hydraulic Roughness Coefficients. Revised and additional flood profiles for the reanalysis have been incorporated into Exhibit 1, Flood Profiles. Information concerning the revision of the floodways along each restudied stream has been incorporated into Table 5, Floodway Data Table. The process of converting existing FIRMs from the standard format to the map initiatives format, as described in Section 10.1, is continued with this revision. Topographic information used in the analysis of these streams was developed in 1988 (Cooper Aerial Survey Company, Topographic Maps, Scale 1:2,400, 1988; Cooper Aerial Survey Company, Topographic Maps, Scale 1:4,800, 1988).

The topographic information along Cave Creek and a section of Centennial Wash from River Mile 22.42 to River Mile 31.61 was developed at a scale of 1:2,400, with a contour interval of 2 feet. The other streams restudied under this contract were revised using topographic information at a scale of 1:4,800, with a contour interval of 4 feet. Cross sections for all the streams were located no greater than 500 feet apart. Additional cross sections were located upstream and downstream of constrictions to flow, such as bridges. Hydraulic roughness coefficients (Manning's "n") were selected on the basis of field inspection and engineering judgment. The hydraulic analyses for this revision were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

Water-surface elevations for the portions of the streams studied by detailed methods were computed using the USACE HEC-2 step-backwater program (U.S. Department of the Army, September 1982). Only the 1-percent-annual-chance profile was computed for these streams. The floodways determined for the restudied streams were computed on the basis of equal conveyance reduction. No floodway was determined for Cave Creek.

Specifics of the hydrologic and hydraulic analyses for each of the six restudied streams are presented below.

Cave Creek

Cave Creek was restudied from just south of the ACDC to its confluence with the Salt River. The ACDC was designed to convey all of the flow upstream of it northwesterly to the New River watershed. The reanalysis, therefore, considers only the flow generated for that portion of the watershed, 25 square miles, downstream of the ACDC. The Cave Creek watershed downstream of the ACDC is highly urbanized. Street elevations and grades, storm sewers, fences, walls, buildings, railroads, canals, and the freeway system substantially impact and control drainage patterns.

The levees along Cave Creek were constructed using unconsolidated soils. It was determined that the levees would not contain the 1-percent-annual-chance flow and were, therefore, not recognized as flood protection structures. The Southern Pacific Railroad embankment was not considered in the hydraulic analysis because it neither contains nor diverts the 1-percent-annual-chance flow. Peak discharges for Cave Creek south of the ACDC were computed using the USACE HEC-1 computer program. Runoff for the portion of the Cave Creek watershed between the ACDC and Grand Canal does not concentrate to a single flowpath. The flow follows several parallel drainage subarea flowpaths (primarily within streets). This portion of Cave Creek was analyzed using shallow flooding methods. The reach of Cave Creek from the Grand Canal to its confluence with the Salt River was studied by the detailed methods discussed previously.

The starting water-surface elevation for the detailed hydraulic analysis was taken at the confluence of the Cave Creek and the Salt River from the effective Salt River analysis.

The Manning's "n" values established for the urban areas were calculated by methodologies developed by the USGS (U.S. Department of the Interior, 1977). Due to lack of a topographical low point for the Cave Creek channel, the floodplain was located in the same general area as was presented in the September 29, 1989, FIS report for Maricopa County. Because the entire floodplain of Cave Creek within the City of Phoenix is developed, no floodway was computed for this reach of Cave Creek.

Galloway Wash

Galloway Wash, a tributary of Cave Creek in the upstream portion of its watershed (downstream of Ocotillo Road) in east-central Maricopa County, flows west through Maricopa County and the Town of Carefree. The tributary is formed by a middle and lower branch, which collectively drain an area of approximately 6.2 square miles. The watershed drains a mountainous area with a relatively steep gradient averaging 0.18 foot per mile. The stream was restudied from Pima Road to a point approximately 2.4 miles above Cave Creek. Peak discharges were calculated using the SCS TR-20 computer

program. The starting water-surface elevations used in the reanalysis were taken from the effective FIS.

The Hassayampa River

The Hassayampa River is a tributary of the Gila River located in the west-central portion of the county. The Hassayampa River flows south through Maricopa County and the City of Buckeye to the Gila River. The watershed drains approximately 1,504 square miles in Maricopa and southern Yavapai County with headwaters in the Bradshaw Mountains.

The entire reach of the Hassayampa River within Maricopa County was restudied by detailed methods. Levees have been constructed in the agricultural areas in the lower reaches of the Hassayampa River, upstream and downstream of old U.S. Highway 80. It was determined that these levees would not provide protection from the 1-percent-annual-chance flow.

Peak discharges for the Hassayampa River were developed from analyses of historic floods and stream gage records (U.S. Department of the Interior, 1978-1984). These records were then used to develop discharge-frequency relationships.

The starting water-surface elevation for the hydraulic analysis was taken at the confluence of the Hassayampa River and the Gila River from the effective Gila River analysis. In areas where levees were present, analyses were performed for conditions with and without the levees containing the 1-percent-annual-chance flow. The Floodway Data Tables and Flood Profiles present only the most conservative elevations for the channel and overbank areas.

Centennial Wash

Centennial Wash is a tributary of the Gila River, with headwaters at an elevation of 4,500 feet located in the Date Creek Mountains near Wickenburg, Arizona, approximately 50 miles northwest of the City of Phoenix. Runoff is generated within a 1,870-square-mile area. The Centennial drainage basin tends to flow in a southerly direction and passes through Yavapai, Maricopa, and La Paz Counties. The Centennial Wash watershed is characterized by mountain ranges of moderate elevation along the entire perimeter of the basin and by numerous poorly defined, highly dynamic, braided washes that create a poorly defined, dominant channel over the majority of the watershed. In most locations, the Centennial Wash channel is wide, shallow, and recognizable only by dense stands of native vegetation. In several other locations, the channel loses its definition and becomes part of the irrigated farmland that is prominent in several areas. The channel does not have the capacity to convey major flows. Large areas of the watershed are susceptible to shallow flooding due to the flatness of the valley floor. Channel slopes range from approximately 0.3 percent to 2.65 percent. Moderate to heavy growth of native vegetation covers most reaches of the channel and associated overbank areas.

Centennial Wash terminates at its confluence with the Gila River. The mean slope is 0.64 percent for the overall Centennial Wash drainage basin.

Flood-control structures within the Centennial Wash basin range from minor features such as spreading dikes and local diversion systems to detention structures and levees. As

determined through field investigation and reconnaissance, many of these structures were not designed for, or are not capable of, storing or diverting the 1-percent-annual-chance storm runoff. The following is a discussion regarding the more significant flood-control structures in the Centennial Wash basin.

Ritter Dam is located in the northeastern portion of the upper Centennial Wash watershed. Due to its relatively small size, it will provide flood protection only during low-flow events.

In 1956, the U.S. Department of the Interior, Bureau of Land Management, constructed seven detention structures adjacent to Centennial Wash between the Towns of Wenden and Aguila. Field investigation revealed that two of the basins on the upstream area had been breached at some time. No evidence was available to determine the design flow used for their construction. Therefore, these structures were not considered in the hydraulic analysis.

The Narrows Dam is located approximately 8 miles southeast of Salome in the Little Harquahala Mountains. This facility is under the jurisdiction of the Bureau of Land Management and of Maricopa County. As evidenced during field investigation, the dam is presently in good condition and functioning appropriately. However, its capacity to control the 1-percent-annual-chance discharge is marginal. The Tiger Wash Detention Structure is located north of Interstate 10, in the central region of the Centennial drainage basin. This facility detains peak runoff generated by the Tiger Wash drainage basin and outlets into Centennial Wash just upstream of Interstate 10. This project provides some flood protection to Interstate 10 and the CAP Canal.

The Harquahala Flood Retention Structure is also located north of Interstate 10 and lies to the east of the Tiger Wash Detention Structure. This facility detains peak runoff generated in the Big Horn Mountains. Outflow from this structure is conveyed to the Centennial Wash by means of the Saddleback Diversion System. This structure provides some flood protection to the downstream properties.

The 1-percent-annual-chance peak discharges for Centennial Wash were developed using the USACE HEC-1 computer program. The starting water-surface elevation for the hydraulic analysis was determined by the slope/area method of Centennial Wash.

Cemetery Wash

Cemetery Wash is a tributary of the Hassayampa River and flows east through Maricopa County and the Town of Wickenburg. The watershed is located in northwest Maricopa County. The wash is well defined, with steep banks, except for an area that lies just upstream from its confluence with the Hassayampa River. In this area, the floodplain widens out before overtopping the Atchison, Topeka and Santa Fe Railway bridge and joining the Hassayampa River floodplain.

The levees along Cemetery Wash, located just upstream and downstream of the Atchison, Topeka and Santa Fe Railway bridge do not contain the 1-percent-annual-chance flow. The peak discharges for the Cemetery Wash watershed were computed using the SCS TR-55 computer program. The starting water-surface elevation for Cemetery Wash was computed using the slope/area method. The levees located upstream and downstream of the Atchison, Topeka and Santa Fe Railway were considered in the hydraulic analysis.

Separate models were constructed to include the levees along each bank separately. The highest elevations in the channel and each overbank were then presented on the FIRM.

Waterman Wash

Waterman Wash is a tributary of the Gila River with headwaters in the Maricopa Mountains east of Gila Bend, approximately 45 miles southwest of the City of Phoenix. The drainage basin is bounded on the southwest by the Maricopa Mountains and on the northeast by the Sierra Estrella and Palo Verde Mountains. The Waterman Wash in this vicinity flows in a northwesterly direction, through the Mobile and Rainbow Valleys, in Maricopa and Pinal Counties.

The Waterman Wash drainage basin is elliptical in shape, with a total basin length of approximately 37 miles and a maximum basin width of approximately 20 miles, and is estimated at 401.6 square miles. The subject watershed is characterized by mountains of moderate elevations along the entire perimeter of the basin.

The lower portion of the watershed, downstream of the West Prong Waterman Wash, includes a wide, natural channel (approximately 100 to 150 feet wide) with a sandy bottom. Heavy growth of native vegetation, especially salt cedar, covers the primary channel banks and isolated sand bars within the channel. The channel slope in the lower portion is approximately 0.30 percent.

Portions of the Waterman Wash channel have been altered from its natural condition by local farmers who have excavated and widened the natural channel and built earthen dikes along the channel to protect their farms from flooding. Although this channel widening and construction of dikes may provide some protection during low-flow events, they are not considered effective during the 1-percent-annual-chance flood. The only area with some isolated, private residential properties located within the Waterman Wash watershed is near Mobile.

The 1-percent-annual-chance peak discharges for Waterman Wash were developed using the USACE HEC-1 computer program. The starting water-surface elevations for Waterman Wash were determined by the slope/area method at its confluence with the Gila River.

In addition to the aforementioned restudied streams, this revision presents updated information for the following flooding sources:

Agua Fria River

For the reach of the Agua Fria River from the confluence with the Gila River upstream to Waddell Dam, a revised hydraulic analysis for the riverine portions of this study and hydrologic and hydraulic analyses for ponding adjacent to the levees were developed by Jerry R. Jones & Associates, Inc. (JJA), for the FCDMC. The revised hydrology for the riverine portions of this study was developed by the FCDMC. These data are presented in the technical reports entitled "Flood Insurance Study, Agua Fria River, Maricopa County, Arizona," dated January 1989 and prepared by JJA for the FCDMC, and "Agua Fria River Hydrology," prepared by the FCDMC.

Several flood-control levees have been constructed since 1985 along the lower reaches of the Agua Fria by both the FCDMC and the USACE. These are found at the following locations:

- Along both sides of the Agua Fria River from Buckeye Road (approximately River Mile 3.7) to immediately upstream of Indian School Road (approximately River Mile 8). These are soil-cement levees built by the FCDMC.
- Along the west bank of the Agua Fria River from just below Lower Buckeye Road (approximately River Mile 1.9) upstream to Buckeye Road. This levee was built by the USACE.
- Along the eastern bank of the Agua Fria River just upstream of Lower Buckeye Road at the Rio Vista Subdivision. This levee was also built by the USACE.

The hydrologic analysis developed by the FCDMC for the riverine portions of this study was based on modifications to the USACE 1984 hydrologic analysis for the Agua Fria River from its confluence with the Gila River to the Waddell Dam site. The USACE data were modified to account for the loss of channel storage resulting from channelization, and to provide more gradual attenuation of flow from one reach to the next. Modified discharges are presented in Table 3, Summary of Discharges.

The hydrologic analysis of the ponded areas behind the levees was developed by the use of the USACE HEC-1 hydrologic computer model. The discharges used for the analysis of ponding areas were determined using the USACE computer program HEC-1. Watershed boundaries were based on a report, prepared by Simons, Li & Associates (SLA), for the determination of the size and number of the levee outlet structures at each ponding location. The watershed boundaries were field checked and modified where necessary to conform to present conditions. SCS methods (curve numbers, lag, unit hydrographs) were used to calculate the hydrograph at each ponding location. In some cases, all or a portion of the hydrograph at an upstream ponding location was added to a downstream ponding location because no ponding physically could occur at the upstream location. The upstream and downstream hydrographs were combined when one of the two scenarios below applied:

- There was no physical barrier to prevent the water ponding at one location from flowing along the landward side of the levee toward the next downstream ponding location;
- or,
- The water was unable to discharge through the levee outlet, due to the high water level in the river, and flowed along the landward side of the levee toward the next downstream ponding location.

Level-pool routing was used to route the flow through the outlet and into the main channel of the river. The 1-percent-annual-chance, 24-hour precipitation, as determined from the Region VIII NOAA Atlas, was used as the design storm.

The revised hydraulic analyses utilized cross-section data derived from topographic maps obtained from aerial photographs taken in 1987 and 1988. Bridge, culvert, and flume data

were obtained from structural plans and field checked to verify information. Additional elevations were obtained by field survey where necessary.

The hydraulic analyses were conducted by JJA by utilizing the USACE HEC-2 hydraulic computer model. The starting water-surface elevations were based on the effective water-surface elevations at the Gila River confluence. Channel and overbank roughness factors (Manning's "n" values) were chosen based on engineering judgment from field observations of the river channel and overbank areas. A clogging factor of 50 percent of the pier width was added to all pier widths to estimate the effects of debris accumulation on the piers.

Ponding elevations for the 1-percent-annual-chance flood were calculated using the level-pool routing method within HEC-1. The water-surface elevation within the Agua Fria River was assumed to be the 1-percent-annual-chance elevation and was assumed constant for the duration of the ponding. Elevation-discharge relationships were calculated for each outlet using Hydraulic Engineering Circular No. 5, entitled "Hydraulic Charts for the Selection of Highway Culverts," prepared by the U.S. Department of Commerce, Bureau of Public Roads, and dated December 1965. All outlets have one-way flapgates, and no water was assumed to discharge from the river into the ponding area.

The 1- and 0.2-percent-annual-chance floodplain and 1-percent-annual-chance floodway boundaries were delineated on topographic maps at a scale of 1:4,800, with a contour interval of 4 feet, entitled "Flood Insurance Study, Work Map, Maricopa County, Arizona," prepared by JJA and dated February 6, 1989. These maps were based on 1:4,800 topographic mapping prepared by Cooper Aerial Survey Company from photographs taken in May 1987. The 0.2-percent-annual-chance floodplain boundaries were delineated from the April 15, 1988, FIRM for Maricopa County, Arizona and Incorporated Areas.

The modeling of the flows at the Grande Avenue and Atchison, Topeka and Santa Fe Railway bridges was complex due to the inadequate capacity of the bridges to pass large flows. During a flood, water flows under the highway/railroad bridges located at the main channel and in the west overbank, and weir flow over the roadway and railway occurs near the smaller structures located in the west overbank area.

The El Mirage Landfill, an elevated landfill, was built along the west bank of the main channel downstream of the bridge. This landfill effectively separates the flows in the main channel from the flows passing through and over the bridges located in the west overbank. Several split flow analyses and backwater analyses were performed to develop a split flow rating curve.

Floodways were developed on both sides of the landfill. Because the landfill is in the middle of the combined floodplain, encroachment on the west floodplain was only from the west and encroachment on the east floodplain only from the east.

The revised floodway analysis was computed by using both Method 4 and Method 1 in the HEC-2 hydraulic computer model. Method 4, the equal-conveyance reduction method, was initially used with a target of 1.0 foot of rise allowed. After initial runs, Method 1 was used to "smooth out" the floodway and to ensure that the 1.0-foot allowable rise criteria was met.

This revision included the LOMRs issued on August 11, 1989, for the City of Avondale and the unincorporated areas of Maricopa County. These LOMRs were issued based on certification from the USACE, Los Angeles District, which stated that the levee along the western bank of the Agua Fria River and the levee located along the eastern bank of the Agua Fria River just upstream of Lower Buckeye Road at the Rio Vista Subdivision can convey the designed Standard Project Flood flow of approximately 140,000 cfs.

Wittmann Watershed Area

The hydrologic and hydraulic analyses for portions of Trilby Wash, McMicken Dam Outlet Wash, and the washes around the Circle City and Wittmann area, including the revision and extended hydraulic analysis of Wittmann Wash, were performed by The WLB Group, Inc., under contract to the FCDMC as part of the Wittmann Area Drainage Master Study (ADMS). This study was completed in December 1988.

This revised analysis included the following streams:

- Trilby Wash, which flows southeasterly from the Hieroglyphic Mountains to the Trilby Wash detention basin behind McMicken Dam in the north-central part of Maricopa County
- The McMicken Dam Outlet Wash, which flows south from the McMicken Dam Outlet channel to the Agua Fria River east of Sun City West
- Wittmann Wash, which flows through the unincorporated community of Wittmann in north-central Maricopa County
- A wash parallel to and along the Atchison, Topeka and Santa Fe Railway, which flows through the unincorporated community of Wittmann to its confluence with Wittmann Wash
- Several small washes, which flow southerly near the unincorporated community of Circle City northwest of Wittmann in Maricopa County

Trilby Wash detention basin (McMicken Dam) was completed in 1956. The detention basin was designed to contain the Standard Project Flood below the spillway with a capacity of 19,300 acre-feet. The capacity was checked with 1:4,800, 4-foot contour interval topographic mapping as part of the Wittmann ADMS. The recomputed capacity was 20,800 acre-feet below the spillway elevation. The detention basin was found to contain the 1-percent-annual-chance flood.

Peak discharge-frequency relationships for the Wittmann ADMS including Trilby Wash, Circle City area washes, Wittmann area washes, and the McMicken Dam Outlet Wash were computed using the USACE HEC-1 hydrologic computer model. These are presented in Table 3.

Cross-section data for Trilby Wash, McMicken Dam Outlet Wash, Circle City area washes, and Wittmann area washes were taken from topographic mapping at a scale of 1:2,400, compiled for the Wittmann ADMS, prepared by The WLB Group, Inc., dated December 1988.

The hydraulic analyses were conducted by The WLB Group, Inc., by utilizing the USACE HEC-2 hydraulic computer model. Channel and overbank roughness factors (“n” values) are shown in Table 4. Water-surface elevations upstream of culverts in the Wittmann and Circle City area washes were computed using the Bureau of Public Roads Hydraulic Engineering Circular Number 5. These elevations were inputted directly into the HEC-2 computer model. The 1-percent-annual-chance floodways were computed using Method in the HEC-2 hydraulic computer model.

The 1-percent-annual-chance floodplain on Wittmann Wash (formerly called Wittmann Drainage) was revised as a result of the Wittmann ADMS developed by The WLB Group, Inc. The 1-percent-annual-chance floodplain and floodway boundaries were delineated on topographic maps at a scale of 1:2,400, with a contour interval of 2 feet, entitled “Flood Control District of Maricopa County, Aerial Mapping for Wittmann ADMS,” prepared by The WLB Group, Inc. These maps were based on aerial topography flown by Cooper Aerial Survey Company between October 6 and December 11, 1986.

Gila River from Gillespie Dam to Bullard Avenue

For the reach of the Gila River extending from Gillespie Dam to just downstream of Bullard Avenue, a revised hydraulic analysis was developed by Dames & Moore (DM). This new analysis was performed to incorporate the results of the 1982 USACE hydrologic study of the Gila River below its confluence with the Salt River. The additional 1-percent-annual-chance discharges developed by the USACE are presented in Table 3. New topographic information, including the addition of bridge structures, was also incorporated into the revised hydraulic analysis.

Cross-section data for the hydraulic analysis was taken from topographic mapping derived from aerial photography. The aerial topographic mapping was developed by Aerial Mapping Company, Inc. (AMC), and by Kenney Aerial Mapping, Inc. (KAM), based on aerial photography dated March and May 1984, respectively. Selected cross sections were field verified by AMC in April and May of 1987.

Two new bridges and one expanded bridge were also included in the revised hydraulic model. New structures were built for Tuthill Road and Reems Road in 1981 and 1988, respectively. Also, the bridge over the Gila River at Arizona Highway 85 (U.S. Highway 80) was approximately doubled in length in 1982.

Water-surface elevations for the 10-, 2-, 1-, and 0.2-percent-annual-chance floodplains and 1-percent-annual-chance floodway were developed by using the USACE HEC-2 water-surface profile computer program. Manning’s “n” values were determined by field visit along the Gila River by DM and the FCDMC. Notes and photographs were taken and then used with stereoscopic aerial photographs to estimate the “n” values. The selected “n” values are presented in Table 4. Dames & Moore developed the revised 1-percent-annual-chance floodway analysis utilizing Method 1 encroachment in the HEC-2 hydraulic computer model.

The 1- and 0.2-percent-annual-chance floodplain and 1-percent-annual-chance floodway boundaries were delineated on topographic maps at a scale of 1:4,800, with a contour interval of 4 feet, entitled “Floodplain Delineation, Gila River, Gillespie Dam to Bullard

Avenue,” prepared by DM, dated May 1988, and revised on April 20, 1989. The maps were based on the aerial mapping produced by AMC and KAM.

Salt River Between Country Club Drive and Granite Reef Dam

For the reach of the Salt River from Country Club Drive to Granite Reef Dam, a hydraulic analysis was developed by Burgess and Niple, Inc. (B&N), for the FCDMC. This analysis is presented in the technical report entitled “Flood Control District of Maricopa County, Salt River Flood Delineation Study, Country Club Drive to Granite Reef Dam,” dated October 1988, and prepared by B&N. As a result of this analysis, new detailed 1-percent-annual-chance flooding and floodway were delineated for the Salt River.

Existing hydrologic data were utilized in this analysis. Cross-section data for the HEC-2 hydraulic analysis were obtained from topographic maps at a scale of 1:4,800, with a contour interval of 4 feet, prepared by KAM, and flown in 1984.

The USACE HEC-2 hydraulic computer model was used to develop the 1-percent-annual-chance water-surface profiles. The starting water-surface elevation at the upstream face of the Country Club Drive bridge was obtained from the USACE. The starting water-surface elevation was equal to the effective 1-percent-annual-chance base flood elevation at this location. The floodway was computed on the basis of equal conveyance reduction from each side of the floodplain.

Salt River Between Scottsdale and Hayden Roads

For the reach of the Salt River between Scottsdale and Hayden Roads, a revised hydraulic analysis was developed by Futura Engineering, Inc. (FE), and Hydrodynamics, Inc. The basis for this revision was better topographic data and a new bridge at Hayden Road. This analysis is presented in the technical report entitled “Documentation for Letter of Map Revision, Salt River between Scottsdale and Hayden Roads, City of Tempe, Maricopa County, Arizona,” dated May 13, 1988, and prepared by FE and Hydrodynamics, Inc. The revised 1-percent-annual-chance floodplain and floodway delineations were shown on a topographic map entitled “Proposed Encroachments, Salt River, Section 23.398 to 24.196,” at a scale of 1:2,400, prepared by FE and dated September 23, 1988.

As a result of these modifications, the base flood elevations increased in the vicinity of Hayden Road.

Salt River in the Vicinity of 75th and Southern Avenues

The 1-percent-annual-chance floodway delineation along a reach of the Salt River in the vicinity of 75th and Southern Avenues has been. This modification reflects a revised 1-percent-annual-chance floodway analysis developed by Mathews, Kessler & Associates, Inc. (MKA). The revised delineation was submitted on a topographic maps entitled “Study Map, Topography and Culture,” approximate scale 1:3,600, also prepared by MKA.

As a result of this analysis, the base flood elevations increased slightly, and the floodway width was decreased between cross sections O and S.

East Maricopa Floodway

This revision shows the effects of the construction of the East Maricopa Floodway (EMF), an SCS channel, from the Maricopa County/Pinal County boundary north to Brown Road. The EMF, which runs parallel to the Roosevelt Water Conservation District (WCD) canal located to the west of the EMF, was designed to collect floodwaters generated by the East Maricopa Watershed and the Queen Creek Watershed and convey these flows to the Gila River. In addition, the shallow ponded areas behind the Roosevelt WCD canal are collected by the EMF. To support this revision, the following data, all prepared by the SCS, were submitted:

- Sheets 2 through 15 of 24 entitled “R.W.C.P. Floodway – Reach 1,” dated July 1979
- Sheets 2 through 14 of 50 entitled “R.W.C.P. Floodway – Reach 2,” dated March 1982
- Sheets 2 through 16 of 50 entitled “R.W.C.P. Floodway – Reach 3,” dated March 1984
- Sheets 2 through 16 of 36 entitled “R.W.C.P. Floodway – Reach 4,” dated February 1986
- Sheets 1 through 14 of 30 entitled “East Maricopa Floodway Reach 5,” dated May 1987
- Sheets 1 through 11 of 25 entitled “East Maricopa Floodway Reach 6,” dated February 27, 1987
- A letter of certification dated July 10, 1989, from the SCS, stating that reaches 1 through 5 of the EMF, from the confluence with the Gila River (located south of the Maricopa County/Pinal County boundary) to Guadalupe Road, were built in conformance with the above-referenced construction drawings and that reach 6, from Guadalupe Road north to Brown Road, would be completed in July 1989. This letter also stated that the 1-percent-annual-chance flood will be conveyed in the channel and no ponding will occur along the east bank of the EMF. Construction of reach 6 of the EMF was confirmed by telephone with the FCDMC on August 10, 1989.

The 1-percent-annual-chance flood is contained within the right-of-way of the EMF from the Maricopa County/Pinal County boundary north to Brown Road. The Zone A floodplain boundaries have been revised to coincide with the right-of-way limits for the EMF. The areas outside of the right-of-way limits on the east side of the EMF have been redesignated as Zone X (shaded).

Washes 9 and 10 (Verde River Tributaries)

A LOMR was issued on May 24, 1989, for the unincorporated areas of Maricopa County to reflect a channelization and relocation project along Washes 9 and 10 in the vicinity of the Rio Verde. In support of this request, the following data, all prepared by Wiley and Associates, Inc., were submitted:

- A report entitled “Floodplain Study of Rio Verde, Arizona,” dated May 20, 1988
- Sheets 1 through 3 of topographic maps entitled “Rio Verde Flood Study,” dated May 20, 1988
- A blueprint of an aerial photograph entitled “Rio Verde Flood Study,” showing the Rio Verde Subdivision limits and channel locations, dated February 1987
- A drainage map entitled “Tonto Verde, Master Drainage Map,” dated November 1986
- A drainage map entitled “A Map for a Drainage Study, Rio Verde,” showing floodplain boundary delineations, dated February 1987
- A report entitled “Preliminary Drainage Report, November 1986, Tonto Verde Master Plan,” dated November 1986
- A topographic map entitled “McDowell Mountain Park Channel,” dated July 1987.

As a result of this project, the 1-percent-annual-chance flood boundaries designated as Zone A along Washes 9 and 10 were modified.

Cave Creek

The reach of Cave Creek from its confluence with the ACDC upstream to the Sweetwater Avenue alignment was revised based on data submitted by the FCDMC. The request for the revision was made in order to incorporate the effects of a channel modification project which included a concrete-lined channel along Cave Creek and a sediment basin at the upstream end just below Sweetwater Avenue. This revision was part of a larger request submitted by the FCDMC for Cave Creek from the ACDC upstream to Cave Butte Dam and approved in a Best Available Data Letter (BADL) dated February 4, 1991.

The revised hydrologic and hydraulic analyses for Cave Creek were performed by Burgess & Niple, Inc. (BN), for the FCDMC. The USACE HEC-1 flood hydrograph computer model was utilized to determine the 10-, 2-, and 1-percent-annual-chance flood discharges. The modeling was accomplished using the SCS Unit Hydrograph, Initial and Uniform Losses, and routing, combining and diversion of sub-basin hydrographs. The hydraulic analyses were performed with the use of the USACE HEC-2 hydraulic computer model. Water-surface profiles were calculated for the 10-, 2-, and 1-percent-annual-chance floods. Topographic maps, entitled “Work Map, Middle Cave Creek Floodplain Delineation Study, FCD 88-56, FCDMC,” Sheets 1 and 2 of 13, prepared by BN, dated January 31, 1990, were used to determine cross sections for use in the HEC-2 hydraulic computer model and also to plot the resulting 1-percent-annual-chance floodplain boundaries. The 1-percent-annual-chance flood was determined to be contained within the banks of the newly constructed concrete channel along Cave Creek.

Since the 1-percent-annual-chance flood is now contained within the channel detailed flooding has been removed for this reach of Cave Creek, between the ACDC and Sweetwater Road.

As a result of the revisions to Cave Creek, the 1-percent-annual-chance floodplain has been greatly decreased. The 1-percent-annual-chance floodplain boundaries have been added to the FIRM along the ACDC, from Black Canyon Highway to Dunlap Avenue. The 1-percent-annual-chance floodplain boundaries shown for this area follow the designated right-of-way for the ACDC.

A LOMR was issued on March 2, 1990, for the City of Phoenix to reflect a channel modification project along Cave Creek from Tierra Buena Lane to 11th Avenue. In support of this request, the following data were submitted by Amwest Engineering Company, Inc. (AEC):

- A copy of the effective HEC-2 hydraulic computer model including input and output listings for the study area along Cave Creek
- A copy of the revised HEC-2 hydraulic computer model including input and output listings for the study area along Cave Creek
- Sheets 1 through 5 of 8 of plans entitled “Paving Plan for Tierra Buena Lane,” prepared by AEC, dated July 1987, and revised November 3, 1988
- Sheet 6 of 8 of plans entitled “Culvert Plan, Paving Plan for Tierra Buena,” prepared by AEC, dated July 1987, and revised December 8, 1987
- Sheets 1 through 10 of 12 of plans entitled “Paving Plan for Greenway Parkway, 15th Avenue (alignment) to 7th Avenue,” prepared by AEC and dated December 1986
- Sheets 1 and 2 of 2 of work maps entitled “Cave Creek Section Location, Point Elevations and 500-Year Limit,” and “Cave Creek 100-Year and Floodway Limit,” prepared by AEC and dated October 11, 1989
- A topographic map entitled “Channel Cross Section Locations Tierra Buena Lane,” at a scale of 1:480, with a contour interval of 1 foot, prepared by AEC, and dated March 1988
- Sheet 1 and 2 of 2 of plans entitled “Shirmer Property Engineered Fill Grading Plan,” prepared by AEC and dated September 1989
- A copy of FIRM Panel 04013C1215 E, scale 1:12,000, showing the revised 1- and 0.2-percent-annual-chance flood boundaries and the 1-percent-annual-chance floodway boundary
- Revised Flood Profiles
- A community acknowledgment letter.

As a result of this channel modification project, the 1-percent-annual-chance flood and floodway are contained within the channel for this reach of Cave Creek.

Skunk Creek

A LOMR was issued on March 9, 1990, for the City of Phoenix to reflect channel improvements and grading along a reach of Skunk Creek between Pinnacle Road and 35th Avenue. This LOMR was a reissuance of the LOMR dated June 15, 1987. In support of the LOMR, the following data were submitted:

- A request form entitled “Request for Letter of Map Revision Involving Fill,” dated January 16, 1990
- A “Community Acknowledgment of Request for Letter of Map Revision” form, signed by the City of Phoenix and dated January 23, 1990
- A copy of FIRM Panel 1185 dated September 29, 1989, showing the approximate location of the North Canyon Ranch Industrial Park Subdivision
- A copy of recorded plat for North Canyon Ranch Industrial Park with an approximation of floodplain and floodway limits scaled from FIRM Panel 1185, dated September 29, 1989
- A copy of the previous LOMR, dated June 12, 1987, based on information from Collar, Williams and White (CWW)
- A copy of Sheet 7 of 9 of “Adobe Mountain Grading and Drainage,” prepared by CWW and stamped June 26, 1986, showing as-built spot elevations
- A copy of Sheets 1 through 4 of 4 of “Adobe Mountain-Skunk Creek Floodplain Analysis, Water-Surface Elevations,” prepared by CWW (Sheet 1 shows an approximate water-surface profile based on elevations for the 1988 and 1989 FIRMs)
- A copy of “Exhibit: Reflecting Changes in Floodplain Limits Caused by Proposed Grading Construction of Adobe Mountain,” prepared by CWW (one sheet)
- A copy of the report entitled “Adobe Mountain-Skunk Creek Floodplain Revision,” dated August 1986, prepared by CWW.

As a result of these modifications, the 1-percent-annual-chance floodplain delineations and BFEs have been revised.

Tempe Canal

The dual zone labels (Zone A and Zone AH) for the designation of the SFHA located upslope of the Tempe Canal within the City of Mesa were corrected. The incorrect Zone AH designation was removed. This zone designation was inadvertently not removed prior to final printing of the April 15, 1988, FIRM. The basis for this modification was notification by the Arizona Department of Water Resources of the dual zone labels.

10.3 Third Revision

This study was revised on December 3, 1993, to provide detailed flood hazard information for areas subject to alluvial fan flooding north of the Central Arizona Project Canal between the McDowell Mountains and Cave Creek, and to include the restudy of hydraulic conditions on Cave Creek, East Fork Cave Creek, Upper Centennial Wash, and Salt River, as well as various requests for map revisions based on newly studied streams and ponding areas. The restudied and newly studied flooding sources are located in the unincorporated areas of Maricopa County, the Cities of Peoria, Phoenix, Chandler, Mesa, Scottsdale, Tempe, and the Towns of Cave Creek, Carefree, Queen Creek, Gilbert, Gila Bend, and El Mirage.

The portions of streams studied by detailed methods were added to Table 1, Detailed-Study Sources.

The process of converting the existing FIRM panels from standard format to map initiatives format as described in Section 10.1 continues with this revision. Zone designations were revised as required by a given study. Additional reference marks and descriptions used in this study are shown on the map panels.

Specifics of the hydrologic and hydraulic analyses for all streams are presented below.

Flooding Effects from Basins 1 through 6 – Alluvial Fan Flooding North of the Central Arizona Project Canal between the McDowell Mountains and Cave Creek

Six major drainage areas were identified as the sources of flooding for the study area. The hydrologic analysis revealed that those six areas contained 13 distinct apexes (concentration points). The streams that drain the basins associated with each of those apexes are identified on the FIRM. Each stream is labeled with a number corresponding to one of the six major drainage areas, followed by a letter for streams draining areas having more than one distinct apex. A label identifying the source of flooding is provided on FIRM panels where the apex corresponding to the major drainage basin is shown on another panel.

The flood-frequency curves in this revision were taken to be log-normal. The means and standard deviations of the curves were computed from the 2- and 1-percent-annual-chance discharge values determined at each apex using the USACE HEC-1 computer program (U.S. Department of the Army, 1990). Discharge values for selected recurrence intervals are presented in Table 3.

Floods from Basins 6B and 6C flow within a well-defined network of channel reaches until they are approximately 0.5 to 1.0 mile downslope of Scottsdale Road. There are three points in that network where one reach splits into two. The flood-frequency curves at the three outlets of the network were estimated by simulating 10,000 floods from each of the two basins. The probability density function describing the percentage of flow that takes either the right or left path below each split was taken to be uniform. Floods from each basin were treated as independent. At each outlet, the resulting flow values and their frequency of occurrence from the simulations were fit to a log-Pearson Type III distribution by the method of least squares. Floodwaters passing Apex 5 can follow three different paths to Scottsdale Road. The flood-frequency curves for each of those paths were determined in the same way as those for flows from Basins 6B and 6C.

This revision reflects flood hazards associated with runoff from the watersheds above the apexes only. Therefore, it should be noted that runoff resulting from rain falling directly on the SFHAs has not been considered. Runoff generated on the SFHAs is usually conveyed downslope as shallow overland sheetflow that eventually flows into and down the many channels on the alluvial fan surface. The flood hazards associated with that kind of runoff are usually considered minimal (because of their relatively small drainage area contributing to any one channel). However, if shallow flows, which under natural conditions are distributed over a very large area, are somehow concentrated in a few small channels, the increase in flow depths and velocities and, consequently, the associated flood hazards, may be great.

The SFHAs presented in this revision were delineated using topographic maps, aerial photographs, and soil survey maps (References 66 and 79 through 88). The 1-percent-annual-chance flood depths and velocities were determined using the FEMA methodology for analyzing areas subject to alluvial fan flooding. The downslope limits of the SFHAs denote the boundaries, downslope of which the probability of a given point being inundated by more than 0.5 foot of floodwater is less than 0.01 in any given year. That probability will be exceeded within well-defined washes below the limits shown on the FIRM. Because the flood hazards within a well-defined wash are self-evident and because of map scale restrictions, the SFHAs within those individual washes are not delineated on the FIRM. Obviously, sound floodplain management requires that those washes remain unobstructed.

Also note that downslope of the SFHA limits, the hazards associated with alluvial fan flooding are just as severe as those upslope of the limits. The distinction between the zone designations downslope and upslope of the limits should be regarded as a distinction between flooding potentials and not a distinction between the severity of damages to be expected in the event of a flood.

Some of the areas subject to alluvial fan flooding are designated Zone AO.

Cave Creek from Cave Butte Dam to the Arizona Canal Diversion Channel

The revised hydrologic and hydraulic analyses for Cave Creek, which also includes an approximate 1.4 mile reach of East Fork Cave Creek from its confluence with Cave Creek to Central Avenue, were performed by BN, for the FCDMC. The results of these analyses are presented in Volumes 1 through 2 of 2 of the report entitled "Cave Creek Floodplain Delineation, Cave Buttes Dam to the Arizona Canal Diversion Channel, Final Hydrology Report," dated January 1990, and in the report entitled "Cave Creek, Floodplain Delineation Study, Cave Butte Dam to Arizona Canal Diversion Channel," dated January 1990. The purpose of this revision was to reflect increased urbanization of the watershed and improvements to the Cave Creek Channel. The most distinct channel improvement is the 1.86 mile concrete-lined channel recently constructed by the USACE north of the ACDC. A Best Available Data Letter was issued on February 4, 1991, for this study.

The total watershed area is approximately 34.7 square miles, which includes two basins not considered in previous studies. The watershed was modeled using the USACE HEC-1 computer model. The Muskingum method was applied in the upper and middle reaches of the watershed where the channel cross section varied substantially within the reach and

for routing down urban street alignments. The Normal Depth Channel, Modified Puls Method was used in the channel reaches in the lower portion of the East Fork Cave Creek basin, and for routing of Cave Creek flows from Bell Road South to the confluence with Moon Valley Wash, an area of more uniform cross sections and large storage volume capacity.

Cross-section data for the USACE HEC-2 hydraulic computer model were obtained from topographic maps at a scale of 1:2,400, with a contour interval of 2 feet, prepared in 1989 by Aerial Mapping Company, Inc. The starting elevation in the ACDC was obtained using normal depth. The floodway for this study was computed on the basis of equal-conveyance reduction from each side of the floodplain.

This revision shows the results of the determination issued in the LOMA dated November 23, 1992, for Lots 117 through 136, Coral Gables Estates Unit Six.

Cave Creek/Carefree

The hydrologic and hydraulic study for this portion of Cave Creek included Cottonwood Creek and tributaries, Flemming Springs Wash, North Tributary to Galloway Wash, Grapevine Wash, Ocotillo Wash and tributaries, Rowe Wash and tributaries, and Willow Springs Wash and tributaries. These streams are located in the unincorporated areas of Maricopa County, the Town of Cave Creek, and the Town of Carefree. The study entitled "Final Hydrologic and Hydraulic Report for Cave Creek/Carefree, Flood Delineation Study," dated March 1990, and Appendices A-C, were prepared by CH2M Hill for the FCDMC. Partial revisions to the study are dated April, September, and October of 1990, and June, July, and August of 1991. A Best Available Data Letter was issued on January 21, 1992, for this study.

Cave Creek and its tributaries drain the mountainous area of east-central Maricopa County flowing southwesterly to the confluence with the ACDC. Cave Creek flows are regulated by Cave Creek Dam located just north of Phoenix. This study area extends from Cave Creek River Mile 35.49, approximately 3.3 miles to the Tonto National Forest boundary.

Cottonwood Creek is the uppermost tributary to Cave Creek within the study area, along with two small tributaries. The Cottonwood system includes a total of 4.9 miles and flows westerly within well-defined channels to Cave Creek.

The Willow Springs drainage system includes Willow Springs and Tributaries 1, 1-A, 2, 2-A, 3-A, 4, and Flemming Springs. This drainage system includes a total of approximately 14.7 miles. The channels are generally well incised, steep mountainous streams.

Ocotillo Wash and its Tributaries 1, 1-A, 2, 3, and 4 extend from the previous study limits easterly to the headwaters of the basin. A total of approximately 10.1 miles were mapped. The lower portion of Ocotillo Wash is a wide, poorly defined, braided stream system. The tributaries are generally well-defined streams draining small watersheds.

The wash shown on USGS quadrangle maps as Grapevine Wash is included in this study extending from its confluence with Rowe Wash, easterly approximately 1.4 miles. Rowe Wash and Rowe Wash Tributaries 1 and 2 study reaches begin at the study limit of the

previous FIS. These streams extend easterly, to the Pima Road extension, totaling approximately 4.3 miles. The Rowe system is generally well incised and steep.

The North Tributary of Galloway Wash study reach extends from the confluence with Galloway Wash approximately 2.9 miles northeasterly to the Pima Road extension. The previous FIS included a study stream referred to as Grapevine Wash, which was a tributary to the current study reach of the North Tributary of Galloway. USGS quadrangle mapping and local anecdotal information, indicates that this small tributary, which originates at Grapevine Spring, was misnamed and should be referred to as Unnamed Tributary to Galloway.

No significant flood control levees or other control measures have been constructed within the area being studied.

The watershed was modeled using the USACE HEC-1 computer model. For areas studied by detailed methods, BFEs were computed using the USACE HEC-2 hydraulic computer model. Flood limits for the approximate study of Willow Springs Tributary 3-A were estimated using Manning's equation for normal depth.

The cross-section data for each of the streams were derived from topographic maps at a scale of 1:200, with a contour interval of 4 feet, prepared by Aerial Mapping Company, Inc., and from stereo topography dated August 1989. Ground control surveys and check profiles were provided by Greiner Engineering.

Starting water-surface elevations for those study reaches that are extensions of previously studied streams were taken from the effective FIS profiles. The starting water-surface elevations for all other streams were developed by using the slope/area method.

Floodways were modeled using Encroachment Method 6. This method was selected due to high velocities and incidence of critical and supercritical flow in the study reaches. The floodway was finalized by using Encroachment Method 1 at each cross section.

The 1-percent-annual-chance flood boundaries were designated as Zone A for the upstream reaches of Rowe Wash and Willow Springs Wash, and for the entire reaches of Rowe Wash Tributary 1 and 2, and Willow Springs Wash Tributary 3. These boundaries were developed from approximate hydrologic and hydraulic analyses.

The reach of Ocotillo Wash from Cross Section T at mile 2.03 on the profile of Ocotillo Wash to the upstream limit of study is shown on the map as Zone A, because of the uncertainty of the direction of the flows. This includes the 1.10 mile braided area of Ocotillo Wash upstream of mile 2.03.

Centennial Wash-Grass Wash-Aguila Farm Channel

The hydrologic and hydraulic study for Centennial Wash, Grass Wash, and Aguila Farm Channel, which includes the Centennial Wash North Branch, all located within the unincorporated areas of Maricopa County, was developed by URS Consultants. The results of their study are presented in the technical reports entitled "Flood Control District of Maricopa County, Hydraulic Report for Floodplain Delineation Study of Upper Centennial Wash, Grass Wash and Aguila Farm Channel," dated May 1990, and "Flood Control District of Maricopa County, Hydrology Report for Floodplain Delineation Study

of Centennial Wash, Grass Wash and Aguila Farm Channel,” dated April 1990. Portions of the Aguila Farm Channel and Grass Wash study reaches are restudied areas, while this reach of Centennial Wash and the North Branch are new detailed study reaches. A BADL was issued on April 26, 1991, for this study.

The contributing watershed and associated basins are located within the extreme northwest corner of Maricopa County. The watershed is bounded on the north by Harcuvar and Date Creek Mountains, on the east by Sols Wash watershed (not part of this study) and the Aguila Farm Channel watershed, and on the west by the Maricopa County/La Paz County Line. The combined runoff drains in the southwesterly direction to the county line. The watershed terrain varies widely. Mountain slopes range between 5 and 60 percent. The less steep areas within the study of the major drainage channels being studied have slopes ranging from 0.2 to 0.3 percent.

U.S. Highways 60/70 and 93, and State Route 71 do not alter the natural direction of the flow. The Atchison, Topeka and Santa Fe Railroad (AT&SF) drainage structures are adequately sized to allow runoff to pass throughout the elevated railbed. The numerous man-made structures of training dikes, spreader dikes, and stock tanks located throughout the watershed, generally consisting of unprotected fill, are poorly maintained and have no erosion protection. Historically, these structures have failed during significant flow events.

The USACE HEC-1 computer program was used to estimate peak discharges and channel routing of flows within the study area. Field measurements of the watershed’s physical and hydrologic characteristics were applied in the HEC-1 modeling.

Cross sections were digitized from aerial topographic mapping at a scale of 1:48,000, with a contour interval of 4 feet, prepared by Cooper Aerial of Phoenix, Inc., flown in July 1989. The USACE HEC-2 hydraulic computer model was used to compute the water-surface profiles.

The starting water-surface elevations for Grass Wash were estimated using an iterative approach beginning with the slope/area method. Immediately downstream (north) of the AT&SF railroad trestle over Grass Wash is an uncompacted berm or training dike without erosion protection, which serves to turn low flows to the west for several hundred feet. The HEC-2 analysis showed that the 10-percent-annual-chance flood would not overtop the berm; however, the 2- and 1-percent-annual-chance floods would. The analyses for the 2- and 1-percent-annual-chance floods used the top of the berm elevation as the starting water-surface elevation.

The starting water-surface elevations for Aguila Farm Channel were taken from water-surface elevations computed in the HEC-2 model at the confluence with Centennial Wash. The starting water-surface elevations for the Centennial Wash North Branch were computed using the slope/area method.

Flood profiles and flood boundaries were not estimated for the 0.2-percent-annual-chance flood for any of the detailed reaches herein.

Floodways were computed for each of the detailed study reaches on the basis of equal-conveyance. The Centennial Wash North Branch floodway and Grass Wash floodway were extended to join with the Centennial Wash/Aguila Farm Channel floodway.

The principal flood hazards within the study area result from a broad, sheetflow type of floodplain with multiple, distributary low flow channels or flow paths.

Morgan City Wash-Cline Creek-Rodger Creek

The revised hydrologic and hydraulic analyses for these streams located in the unincorporated areas of Maricopa County were developed by Michael Baker, Jr., Inc., for the FCDMC. Information is presented in the following reports: "Flood Delineation Study of Cline Creek and Tributary Washes," dated April 1990, "Exhibit 5, Printout of Floodway Calculation, Flood Delineation Study of Cline Creek and Tributary Washes," dated April 1990, "Morgan City Wash, Flood Delineation Study," dated April 1990, "Exhibit 5, Printout of Floodway Calculation, Morgan City Wash," dated April 1990, "Exhibit 5, Printout of Floodway Calculation, Rodger Creek, Flood Delineation Study," dated August 1990, and separate hydrology reports for Morgan City Wash and Rodger Creek, both dated December 1989, and Cline Creek, dated January 1990, and separate floodplain delineation maps for each of these three streams, dated August 16, 1990. A Best Available Data Letter for the data provided in these reports was issued on November 5, 1990.

The Morgan City Wash watershed is comprised of approximately 23 square miles of land in the Hieroglyphic Mountains, a complex series of low hills and ridges, between approximately 1,500 and 3,500 feet in elevation with an intricate pattern of deep washes and sharp divides. General stream flow is east-southeast on a gravel bed with near vertical banks. The only drainage structures are concrete box culverts at road crossings of the Lake Pleasant Road and Castle Hot Springs Road.

The Cline Creek watershed, an area of 16 square miles, with eight tributaries to Cline Creek, has an elevation range from approximately 2,000 feet at the Skunk Creek confluence to approximately 4,600 feet along the rim of New River Mesa. General stream flow is in the west to southwesterly direction. The tributaries are increasingly steep upstream from Cline Creek, with slopes ranging from 1 to 20 percent with supercritical flows in parts of the reach. Cline Creek crosses New River Road and Circle Mountain Road via dip crossings. No drainage structures exist in the watershed.

The Rodger Creek watershed has a drainage area of approximately 5.13 square miles with the land slope being generally westerly. Elevations range from approximately 1,900 feet at the confluence with Skunk Creek to approximately 3,600 feet on Elephant Mountain. The only drainage structure is a double 96" fiberglass pipe culvert where New River Road crosses. The steep stream slope results in subcritical and supercritical flow with high velocities predominant throughout the reach.

No structural flood protection measures exist or are planned within the watersheds of Morgan City Wash, Cline Creek, and Rodger Creek.

The hydrologic analyses for the watersheds of Morgan City Wash, Cline Creek, and Rodger Creek were performed using the USACE HEC-1 computer model to establish 1-percent-annual-chance peak flow rates for each stream and tributary delineated.

Cross-section data for the USACE HEC-2 hydraulic model were stereoscopically digitized from aerial photographs. Topographic maps, at a scale of 1:200, with a contour

interval of 4 feet, prepared in 1989 by McLain-Harbers Company, Inc., were also used for this study. The geometrics of Lake Pleasant Road and Castle Hot Springs Road culverts on Morgan City Wash, and the geometry for the New River Road on Rodger Creek were obtained by field survey.

The water-surface elevations for the 1-percent-annual-chance flood were computed using the USACE HEC-2 hydraulic model. The starting water-surface elevations for Morgan City Wash at the confluence with Agua Fria River were interpolated from the effective profiles for the Agua Fria River.

The starting water-surface elevations for Cline Creek and for Rodger Creek at the confluence with Skunk Creek were interpolated from the effective BFEs for Skunk Creek.

Floodways for these streams were developed from the HEC-2 hydraulic model using Encroachment Method 1.

Gila River from north of Gila Bend to Gillespie Dam

For the approximate 19.9 mile reach of the Gila River north of the Town of Gila Bend (at the east boundary of the Gila River Indian Reservation) upstream to Gillespie Dam, a new hydraulic analysis dated November 1990, was developed by Cella Barr Associates, for the FCDMC. The entire reach of the Gila River flows south through the unincorporated areas of Maricopa County. A BADL was issued on January 29, 1992, for this study.

New topographic mapping was used for this study reach at a scale of 1:400, with a contour interval of 2 feet. This served as the basis for establishing ground elevations along the modeled cross-sectional alignments. For the existing bridge crossing of the Gila River at old U.S. Highway 80 near Gillespie Dam, field surveys and measurements to determine "as-built" conditions were obtained.

The hydrologic data utilized for this study were developed by the USACE, Los Angeles District, and are presented in their report entitled "Gila River and Tributaries," dated May 1982. The USACE HEC-2 hydraulic model was used to develop the 1-percent-annual-chance water-surface profile. Backwater ponding extends for roughly 2.0 miles upstream of Painted Rock Dam. The floodway delineation for this study was computed using Encroachment Method 1 in the HEC-2 hydraulic model for the entire reach.

Gila Bend Canal

The approximate 23-mile-long reach of the Gila Bend Canal floodplain located east of Gila River, between Old U.S. Highway 80 and State Route 85 in the unincorporated areas of Maricopa County and the Town of Gila Bend, was revised based on data submitted by the FCDMC, and approved in a BADL dated March 26, 1992. The revised hydrologic and hydraulic analyses for the Gila Bend Canal were performed by Donohue and Associates, Inc., for the FCDMC, in November 1991 (Revised March 8, 1992). The results of their analyses are presented in Volumes 1 and 2 of 2 of the reports entitled "Gila Bend Canal Floodplain Delineation Study Gillespie Dam to Gila Bend," dated November 1991, and the reports entitled "Hydrology Report, Gila Bend Canal Floodplain Delineation Study, Gillespie Dam to Gila Bend," dated November 1991, and the report

entitled "Hydraulic Analysis and Floodplain Delineation, Gila Bend Canal Floodplain Delineation Study, Gillespie Dam to Gila Bend," dated November 1991. The USACE HEC-1 model was used to compute the 1-percent-annual-chance flood discharges and flood elevations. For a 1.25 mile reach of defined channel flow, the USACE HEC-2 hydraulic computer model was used to compute flood elevations.

The peak 1-percent-annual-chance flows arriving at the canal generally exceed the capacities of the cross-drainage structures, and excess flow is stored in ponding areas adjacent to the east berm of the canal. Major floods often result in some erosion or overtopping damage to the canal berms. The only measures in place which serve to reduce flood heights in the study area are the cross-drainage structures in the canal. Representative channel cross sections at intervals of 400 and 1,200 feet were obtained electronically from the three-dimensional CAD drawings.

Town of Gilbert- City of Chandler Area

The hydrologic and hydraulic analyses in the Town of Gilbert- City of Chandler area developed to study the effects of the Eastern Canal, Consolidated Canal, the Southern Pacific Railroad (SPRR), Rittenhouse Branch, and the SPRR along Arizona Avenue on flooding, were prepared for the FCDMC by Franzoy-Corey Engineering Company. The results are presented in the report entitled "Gilbert-Chandler Area, Maricopa County, Arizona," revised September 1990, and in the submitted design notebooks. A Best Available Data Letter was issued on February 21, 1991.

The study area of about 98 square miles, is bounded by the Superstition Freeway (SR 360) on the north, by Hunt Highway (Maricopa County Line) on the south, the East Maricopa Floodway on the east, and the SPRR paralleling Arizona Avenue on the west. The study covers the incorporated areas of the Town of Gilbert, parts of the Cities of Chandler and Mesa, and the unincorporated areas of Maricopa County.

The hydrologic analyses of the study area were performed using the USACE HEC-1 computer model modified by Haestad Methods Version 3.2c. Flow patterns in this study area, which contains no natural drainage channels, tend to develop ponds behind man-made roads, railroads, and canals. Outflow from the ponds is either by overflow of the road and canal embankments, which was computed using the weir formula, or by flows through culverts, which were computed by assuming inlet control.

Water-surface elevations in pond locations were computed utilizing the level pool reservoir routing routines in the USACE HEC-1 computer model. Water-surface elevations of flow along the hydraulic barriers between ponding sites were computed using the USACE HEC-2 hydraulic computer model.

Cross-section data were compiled from topographic mapping at a scale of 1:400, with a contour interval of 2 feet. Bridges and culverts were field surveyed to obtain elevation data and structural geometry.

The Letters of Map Revision issued on August 6, 1991, for the City of Gilbert; on August 23, 1991, and January 21, 1992, for the City of Chandler; on August 27, 1991, for the City of Mesa; and on September 5, 1991, and January 21, 1992, for the unincorporated areas of Maricopa County, were based on this study.

As a result of this study, the SFHAs have increased and decreased. Previously published SFHAs designated as Zone A have been revised to Zone AH with elevations, except for the revised 1-percent-annual-chance floodplain designated as Zone A between Superstition Freeway (SR 360) and Baseline Road and the Eastern and Consolidated Canals. These latter areas are within the City of Mesa.

The Letters of Map Revision issued on December 18, 1992, for the Town of Gilbert, Arizona, and the unincorporated areas of Maricopa County, Arizona, were included in this update. These two Letters of Map Revision show the effects of the construction of the Town of Gilbert's Cross Road Park Detention Basin. The basin is located at the intersection of the Eastern Canal and the SPRR in Section 21, Township 1 South, Range 6 East. As a result of the project, the SFHAs have been decreased along the SPRR, SPRR spur, the Consolidated Canal East Branch, and the Eastern Canal, except for the area located west of the intersection of McQueen Road and Western Canal.

Caterpillar Tank and Twin Buttes Washes

This study for Caterpillar Tank and Twin Buttes Wash from the Agua Fria River to the CAP Canal is for the area approximately 3 miles west of Lake Pleasant and six miles north of Deer Valley Drive, all in the unincorporated areas of Maricopa County. The watershed is 12.2 square miles, of which 3.4 miles is for Caterpillar Tank Wash, and 8.8 square miles is for Twin Buttes Wash with tributaries of White Peak Wash, West Fork of White Peak Wash, and East and West Garambullo Wash. The watershed drains generally from north to south. The study was performed by AGK Engineers, Inc., for the FCDMC, and approved in a Best Available Data Letter dated August 23, 1991. The results are presented in the report entitled "Flood Insurance Study for Caterpillar Tank and Twin Buttes Washes from Agua Fria River to C.A.P. Canal, Maricopa County, Arizona," and Appendices, dated June 1991, and the report entitled "Hydrologic Report for C.A.P. Overchutes, Agua Fria Floodplain Delineation Study, Maricopa County, Arizona," dated May 1991.

The watershed has rolling hills on the east and isolated rock hills north of the CAP Canal. There are no existing flood control structures or measures within the study area. Caterpillar Tank collects runoff from Caterpillar Tank Wash for stock grazing only.

The U.S. Bureau of Reclamation has certified the embankments associated with the CAP construction up to the top of the concrete lining. The levee analysis conclusion is that the canal is assumed to be adequate for withholding the flow resulting from a 1-percent-annual-chance storm. However, the pipe culverts under the canal will cause backwater and ponding effects to the area immediately north of the canal during the 1-percent-annual-chance event. A portion of the runoff from the upper watershed is shown intercepted by the canal and routed along the canal to Caterpillar Tank and Twin Buttes Wash through six pipe culverts under the canal.

Hydrologic modeling was performed by means of the USACE HEC-1 computer model. For computing the 1-percent-annual-chance water-surface elevations, the USACE HEC-2 hydraulic computer model was used. Starting water-surface elevations for both Caterpillar Tank and Twin Buttes Wash were obtained from the January 1989 Agua Fria FIS for the FCDMC.

The relationship among stage, storage, and outflow at the existing CAP culverts were developed from topographic maps at a scale of 1:200, with a contour interval of 2 feet, prepared in September 1990, by Aerial Mapping Company, Inc. Cross-section data for backwater analyses were also determined from the same topographic maps. Field verification supplemented mapping inadequacies in the determination of sub-area boundaries.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the floodplain.

As a result of this study, the 1-percent-annual-chance flood boundaries designated as Zone A along the CAP Canal were modified to Zone AH. New detailed 1-percent-annual-chance floodplain and floodway were delineated for the above-studied streams..

Jackrabbit Wash, Star Wash Tributary and Jackrabbit Wash Unnamed Tributary

The area included in this new hydrologic and hydraulic study for Jackrabbit Wash, from the CAP Canal to Vulture Mine Road, is located within the unincorporated areas of Maricopa County. The drainage area for the watershed is approximately 442 square miles, and is bounded on the north by the Vulture Mountains, on the east by the Vulture Mountains and the Hassayampa River, on the south by Interstate 10, and on the west and southwest by the Belmont Mountains.

The watershed is characterized by steep rugged mountainous terrain along the edges of the watershed, and much flatter desert valley in the middle and southerly portion of the watershed. The study was performed by BG for the FCDMC with detailed floodplains developed for Jackrabbit Wash from CAP Canal to Vulture Mine Road, along with two tributaries, Star Wash and an Unnamed Tributary. Also included were ponding areas along the CAP Canal for approximately 3.5 miles southwest and northeast of Jackrabbit Wash. A Best Available Data Letter was issued on April 25, 1991. The results of the analyses are presented in the reports entitled "Jackrabbit Wash, Floodplain Delineation Study, Technical Data Notebook, Hydraulics," dated February 1991, and "Jackrabbit Wash, Floodplain Delineation Study, Technical Data Notebook Hydrology," dated February 1991.

No flood protection measures exist upstream of the CAP Canal. The watershed was modeled utilizing the USACE HEC-1 computer model. Reservoir routing where water ponds against the CAP Canal was performed using the Modified Puls Method.

Only the 1-percent-annual-chance profile was computed for these streams using the USACE HEC-2 hydraulic model. The hydraulic analysis for the 1-percent-annual-chance flood is based upon unobstructed flow conditions. Flood elevations are valid only if the CAP Canal structures remain unobstructed and its embankment does not fail. Starting water-surface elevations were obtained using normal depth. CAP Canal structures serve to reduce downstream flood peaks by storing floodwater upstream of the canal.

Cross sections for the hydraulic analyses were digitized from aerial mapping at a scale of 1:4,800, with a contour interval of 4 feet, prepared in 1990 by Aerial Mapping Company, Inc.

The floodways determined for the studied streams were computed on the basis of equal-conveyance reduction. As a result of this study, the 1-percent-annual-chance flood boundaries designated as Zone A along the CAP Canal were modified to Zone AH.

Trilby Wash

The hydrologic and hydraulic study for Trilby Wash, from the CAP Canal for approximately 6.7 miles upstream to Grand Avenue near Circle City, was performed by P&D Technologies for the FCDMC. A BADL was issued for this study on May 14, 1992.

The results are presented in Books 1 through 2 of 2 entitled "Flood Insurance Study for Trilby Wash, from the CAP AQUEDUCT to Grand Avenue Near Circle City," dated February 6, 1992.

The watershed is located in the central portion in the Central Arizona Desert, approximately 30 miles northwest of Phoenix. Trilby Wash, with an elevation range from 1,543 feet at the downstream end to 1,849 feet at the upstream end, on an approximate slope of 1 percent, carries flow southeasterly into the McMicken Dam Storage Basin. There are no flood control structures. The CAP overchute and Patton Road Crossing are the two major man-made obstructions to the floodwater from the natural water courses. The Patton Road Crossing has 8-68 inch corrugated metal pipe culverts under the roadway and will cause backwater effects to the area immediately north during a 1-percent-annual-chance event.

Hydrologic analyses were conducted using the USACE HEC-1 computer model. The previous hydrologic analysis of Trilby Wash, dated August 1991, and prepared by the Hydrology Division for the FCDMC was also used as part of this study. Computations of the water-surface elevation were calculated only for the 1-percent-annual-chance storm by the use of the USACE HEC-2 hydraulic computer model. The starting water-surface elevation was assumed to be at critical depth.

Cross sections were digitized from topographic maps, at a scale of 1:200, with a contour interval of 2 feet, prepared specifically for this project by Cooper Aerial Mapping of Phoenix, Inc. The Patton Road Culvert Crossing and CAP overchute were surveyed to obtain elevation data and structural geometry.

The floodway delineation for this study was computed with the use of Encroachment Method 1 for the entire 6.7 river mile reach of Trilby Wash.

Queen Creek

The hydrologic and hydraulic analyses in the Queen Creek area of the unincorporated areas of Maricopa County, the City of Mesa, and the Towns of Gilbert and Queen Creek, were prepared for the FCDMC by Wood and Associates, Inc. The results are presented in the technical report entitled "Flood Insurance Study for Southern Pacific Railroad, Queen Creek Area, Maricopa County, Arizona," dated December 1989, revised February 1990, and in the Addendum No. 1 to this report, dated June 1990. A BADL for this study was issued on August 21, 1990.

The study area is traversed by a perched SPRR in a northwesterly-southeasterly direction (approximately 8.6 miles). Flows collect along the northeast side of the track and are

conveyed northwesterly to the East Maricopa Floodway (EMF). Several flood control structures have been constructed which affect flooding in the study area. The SCS-sponsored Powerline and Vineyard Road Flood Retarding Structures, and the USACE-sponsored Whitlow Ranch Dam were constructed for the purpose of providing flood protection to the study area.

Discharges for the flooding sources studied in detail were developed using the USACE HEC-1 model. The Muskingum Flood Routing option was employed to simulate flood wave movement through stream reaches and reservoirs.

The USACE HEC-2 hydraulic computer model was used to develop the water-surface elevations.

The starting water-surface elevation for the delineation shown on the work maps was based on computations started at critical depth. Cross-section data for the hydraulic analysis were obtained from topographic maps at a scale of 1:200, with a contour interval of 2 feet, prepared by Wood and Associates, Inc., dated October and November 1986.

As a result of this study, the 1-percent-annual-chance flood boundaries designated as Zones A and AH along the perched SPRR are added.

Wagner Wash

The new hydrologic analyses for a reach of Wagner Wash, from its confluence with the Hassayampa River upstream approximately 8.3 miles to the CAP Canal, and the determination of ponding of floodwaters on the north side of the CAP Canal, were performed by the FCDMC Hydrology Division Watershed Management Branch. These analyses are presented in the report entitled "Hydrology Analysis of Wagner Wash Watershed," dated April 1990, revised January 1991, prepared by the FCDMC. The hydraulic analyses were prepared by HDR Engineering, Inc., in April 1991. A BADL for this study was issued on September 26, 1991.

The watershed has a drainage area of 42 square miles and is located east of the Hassayampa River, all in the unincorporated area of Maricopa County. The elevation range is from 1,400 to 2,700 feet mean sea level, and is characterized with broad alluvial slopes prone to sheet flow. There are no flood protection measures, and none are planned in the foreseeable future.

The hydrologic modeling was performed using the USACE HEC-1 computer model. The normal-depth routing of the HEC-1 model was used for channel routing. The two overchutes located along the CAP allow the upper watershed to be drained to the lower watershed. The design storage capacity and peak flows obtained from the U.S. Bureau of Reclamation (design data dated 1980), were used in the model. One foot contour mapping, obtained from The Adams Group, a consulting firm, was used to obtain storage information for the contributing area behind the CAP.

Cross-section data for the hydraulic analyses were obtained photogrammetrically from aerial photographs obtained by aerial survey in September 1990. The topographic maps were prepared at a scale of 1:2,400, with a contour interval of 2 feet. All culvert crossings were field surveyed to obtain elevation data and structural geometry. Water-surface elevations were computed using the USACE HEC-2 hydraulic computer model. The

starting water-surface elevation for Wagner Wash was determined using the slope/area method.

The floodways shown in this study were computed on the basis of equal conveyance reduction from each side of the floodplain.

As a result of this study, the 1-percent-annual-chance floodplain boundaries designated as Zone A along the CAP Canal were modified to Zone AH with elevations.

Scatter Wash

The 1-percent-annual-chance SFHA was revised and BFEs were deleted for Scatter Wash, upstream of I-17 based on our re-examination of a determination made in a report prepared by the USACE, entitled "Draft Report, Flood Insurance Study, New River and Scatter Wash, Maricopa County, Arizona," dated September 1985. In their report, the USACE determined that the area upstream of I-17 should be designated as Zone B because of the numerous braided channels in the area and because no single channel could accurately be described as conveying all of the flow to I-17. The USACE supported their conclusion based on their field observations of the runoff pattern in the watershed. However, the USACE report acknowledged that the 1-percent-annual-chance flood ponds behind I-17, which results in overtopping of the highway. The area of ponding upstream of I-17 is based on the elevation of the top of the I-17 roadway.

Washes 1 through 8 downstream of Sun Valley Parkway

The new hydrologic and hydraulic analyses for Washes 1 through 8 were performed by A-N West, Inc., for the FCDMC. The results of these analyses are presented in the reports entitled "Sun Valley Parkway North Flood Insurance Study Hydrology Report," dated January 24, 1991, revised March 6, 1991; "Flood Insurance Study Sun Valley Parkway North Portion of Town of Surprise and Unincorporated Areas of Maricopa County, Arizona," dated September 1991, revised October 10, 1991; and "Technical Data Notebook for Sun Valley Parkway North Flood Insurance Study (Portion of Town of Surprise and Unincorporated Areas, Maricopa County, Arizona)," dated October 1991, all prepared by A-N West, Inc. The purpose of this revision was to develop the 1-percent-annual-chance floodplain delineation for eight washes north of White Tank Mountains, areas not previously studied. Two Letters of Map Revision were issued on April 15, 1993, for the unincorporated areas of Maricopa County, and for the Town of Surprise to incorporate the results of this study.

The total watershed area of the study is approximately 28 square miles. The watershed is bounded on the south by the White Tank Mountains, on the west by the divide between McMicken Dam and Hassayampa River, on the north by the CAP Canal and the floodplain of Trilby Wash and its tributaries, and on the east by the McMicken Dam floodpool. The watershed is currently unpopulated and undeveloped, except for the Sun Valley Parkway.

The USACE HEC-1 computer program was used to estimate peak discharges and channel routings of flow within the study area.

Cross sections were obtained from topographic maps prepared by Cooper Aerial of Phoenix, Inc., at a scale of 1:4,800 and a contour interval of 4 feet, flown September 28,

1990, and from topographic maps prepared by the WLB Group, Inc., and Cooper Aerial Survey Company, at a scale of 1:4,800, and a contour interval of 4 feet, compiled photogrammetrically from aerial photos flown on December 11, 1986.

The starting water-surface elevations were computed in the HEC-2 hydraulic computer model using the slope/area method.

The following Letters of Map Revision are also included in this revision:

Skunk Creek

The Letters of Map Revision issued on May 14, 1992, for the City of Peoria, Arizona, and on May 19, 1992, for the unincorporated areas of Maricopa County, Arizona, to show the effects of a channel improvement and bridge construction project along the reach of Skunk Creek from its confluence with the New River to approximately 600 feet downstream of its confluence with the ACDC. Based on a revised hydraulic analysis, submitted by the FCDMC, the SFHA has been decreased and the 1-percent-annual-chance flood is now contained in the channel for the above-mentioned reach.

Agua Fria River

The LOMR issued on February 20, 1992, for the Town of El Mirage to show the effects of a newly constructed levee along the western side of the Agua Fria River between Olive Avenue and Northern Avenue. Based on data submitted by the City of El Mirage, the 1-percent-annual-chance floodplain has been modified and the SFHA located landward of the levee has been removed.

New River

The LOMR issued on April 21, 1992, for the City of Peoria to show the effects of the USACE detailed hydraulic analysis of the newly constructed levee and channelization of the New River from Olive Avenue to approximately 1,300 feet upstream of Grand Avenue. As a result of this project, the 1-percent-annual-chance flood and floodway are now contained in the channel from Olive Avenue to approximately 1,300 feet upstream of Grand Avenue.

Arizona Canal Diversion Channel

The LOMR issued on May 5, 1992, for the City of Phoenix, to show the effects of the ACDC, built by the USACE, from Dunlap Avenue to the zone break for the Tenth Street Wash just upstream of Butler Drive. Based on the submitted data from the FCDMC, the SFHA increases in the vicinity of Central Avenue and Ruth Avenue, but flooding is still contained within the right-of-way of the ACDC for this reach.

Salt River

The LOMR issued on September 4, 1991, for the City of Phoenix to reflect the flood control levee along the north bank of the Salt River from Interstate 10 for 4,800 feet upstream to 40th Street. The revised analysis for this reach of Salt River was prepared by Cella Barr Associates on July 3, 1990, and August 22, 1990. The revised analysis shows an increase in the SFHA along the boundaries of the Salt River and a maximum increase

in the BFEs of 0.63 foot at approximately 2,200 feet upstream of 32nd Street. The floodway width decreases within the entire restudied part of this reach.

The LOMR issued on December 7, 1989, for the City of Phoenix for Lots 8 and 12, Arizona Industrial Park, Unit One, and Central Avenue Parcel 1, and Arizona Industrial Park Parcel 1, has been included in this update. The LOMR stated that Lot 8 and Central Avenue Parcel 1 have been removed from the SFHA based on fill. The 1-percent-annual-chance floodplain delineation along the Salt River was revised to reflect the fill in Lot 8. No change was made, however, to reflect the fill in Central Avenue Parcel 1

The LOMR issued on March 1, 1990, for the City of Phoenix for Lot 12, Arizona Industrial Park, Unit One, and Arizona Industrial Park Parcel 1, has been included in this update. The LOMR stated that the property would not be inundated by a 1-percent-annual-chance flood.

The LOMR issued on April 3, 1991, for the City of Phoenix for Lots 16 and 17, Arizona Industrial Park Unit One, and Arizona Industrial Park Parcels 2 and 3, has been included in this update. The LOMR stated that the property would not be inundated by a 1-percent-annual-chance flood.

The LOMR issued on June 11, 1991, for the City of Phoenix for Lots 14 and 15, Arizona Industrial Park, Unit One, stated that the property would not be inundated by a 1-percent-annual-chance flood.

Western Canal

The LOMR issued on October 25, 1991, for the City of Tempe, Arizona, to reflect the revised hydrologic and hydraulic analyses for the Zone A ponding SFHA located on the northern side of the Western Canal between McClintock Drive and Brice Road. Supporting data required to evaluate this request were submitted by Mr. James E. Bond, P.E., Senior Engineer, City of Tempe, and by Mr. Vincent A. Pedotto.

East Maricopa Floodway

The LOMR issued on January 21, 1992, for the Cities of Gilbert and Mesa and for the unincorporated areas of Maricopa County, to reflect the effects of a detailed hydraulic analysis of a 3-mile section of the East Maricopa Floodway channel between Guadalupe Road and Broadway Road. The East Maricopa Floodway is a joint effort between the SCS and the FCDMC. The analyses were prepared in September 1991. The modification is based on additional data regarding the alignment of flows leaving the culvert under Higley Road down to Broadway Road and the location of the East Maricopa Floodway right-of-way limits. Based on these hydraulic analyses, the SFHAs have both decreased and increased.

Highline Canal

The LOMR issued on November 13, 1992, for the City of Phoenix to show the effects of the removal of the Highline Canal west of 44th Street and north of Chandler Boulevard. As a result of the removal of the canal, the Zone A ponding west of 44th Street has been removed.

The LOMR issued on December 5, 1991, for the City of Phoenix for Lots 95 through 108, Mountain Crest Subdivision, has been included in this update. The LOMR stated that the property would not be inundated by a 1-percent-annual-chance flood. The 1-percent-annual-chance floodplain delineation along the Highline Canal was revised.

The LOMR issued on March 19, 1992, for the City of Phoenix for portions of Lots 85 through 94, Mountain Crest Subdivision, has been included in this update. The LOMR stated that portions of the property would not be inundated by a 1-percent-annual-chance flood. The 1-percent-annual-chance floodplain delineation along the Highline Canal was revised.

The LOMR issued on March 19, 1992, for the City of Phoenix for portions of Lots 1 through 23, Monarch Subdivision, has been included in this update. The LOMR stated that portions of the property would not be inundated by a 1-percent-annual-chance flood. The 1-percent-annual-chance floodplain delineation along the Highline Canal was revised.

Indian Bend Wash/Interceptor Channel

A LOMR was issued on October 16, 1992, for the City of Scottsdale to show the effects of the construction of the Indian Bend Wash/Interceptor Channel from Indian Bend Wash to Pima Road. This LOMR reissued the results of the LOMR dated November 7, 1986. As a result of the project, the 1-percent-annual-chance floodplain boundary has been revised to extend along the north side of the Interceptor Channel from Indian Bend Wash to Pima Road.

East Fork Cave Creek

The LOMR issued on October 1, 1992, for the City of Phoenix to show the effects of channel improvements along East Fork Cave Creek from Central Avenue to Seventh Street, construction of a six-barrel 12' x 12' reinforced concrete box culvert at Seventh Street, and the Greenway Channel improvements approximately 1,000 feet upstream of Seventh Street, has been included in this update. As a result of this project, the 1-percent-annual-chance flood is now contained in the channel from Central Avenue to a point approximately 1,000 feet upstream of Seventh Street.

The LOMR issued on May 19, 1992, for the City of Phoenix for portions of Coral Manor Units I and II, has been included in this update. The LOMR stated that these portions of Coral Manor Units I and II would not be inundated by a 1-percent-annual-chance flood. The 1-percent-annual-chance floodplain delineation along East Fork Cave Creek was revised.

The LOMA issued on March 15, 1991, for the City of Phoenix for Lots 1 through 91, Canyon View Subdivision, has been included in this update. The LOMA stated that Lots 38 through 52 and 54 through 91 would not be inundated by the 1-percent-annual-chance flood and were currently shown outside the SFHA. In addition, Lots 1 through 37 and 53 would not be inundated by the 1-percent-annual-chance flood. The 1-percent-annual-chance floodplain delineation along East Fork Cave Creek was revised..

The LOMR issued on January 12, 1993, for the City of Phoenix for Lot 88, Greentrails Subdivision, has been included in this update. The LOMR stated that the property would

not be inundated by a 1-percent-annual-chance flood. The 1-percent-annual-chance floodplain delineation along East Fork Cave Creek has been revised.

The LOMR issued on May 14, 1993, for the City of Phoenix for Lot 87, Greentrails Subdivision, has been included in this update. The LOMA stated that the property would not be inundated by a 1-percent-annual-chance flood. The 1-percent-annual-chance floodplain delineation along East Fork Cave Creek has been revised.

The LOMR issued on May 26, 1993, for the City of Phoenix for Lots 133 through 281, Moonlight Cove Two, has been included in this update. The LOMR stated that Lots 133 through 139, 173 through 176, 182, 183, 184, 204 through 219, 221 through 228, 255, 256, 263, 269, and 270 would not be inundated by a 1-percent-annual-chance flood and are already correctly shown outside the SFHA. In addition, the LOMR stated that Lots 140 through 172, 177 through 181, 185 through 203, 220, 229 through 254, 257 through 262, 264 through 268, and 271 through 281, would not be inundated by the 1-percent-annual-chance flood. The 1-percent-annual-chance floodplain delineation along East Fork Cave Creek was revised.

10.4 Fourth Revision

This study was revised on September 30, 1995, to include the restudy of hydraulic conditions on the Consolidated Canal East Branch, East Fork Cave Creek, Basin 5, Grand Avenue, an unnamed tributary to Cave Creek, Indian Bend Wash, Salt River, Arizona Channel, and Tenth Street Wash, as well as various requests for map revisions based on newly studied streams and ponding areas. The restudied and newly studied flooding sources are located in the unincorporated areas of Maricopa County, the Cities of Avondale, Buckeye, Glendale, and Litchfield Park, and the Towns of Goodyear, Guadalupe, Paradise Valley, and Surprise.

The portions of streams studied by detailed methods were added to Table 1, "Detailed-Study Sources."

The process of converting the existing FIRM panels from standard format to map initiatives format as described in Section 10.1 continues with this revision. Zone designations were revised as required by a given study. Tables 1 through 4, Floodway Data Table 5, and the Flood Profiles have been revised to reflect the new detailed flooding information.

Specifics of the hydrologic and hydraulic analyses for all streams are presented below.

Gila Bend Area

The areas included in this new hydrologic and hydraulic study for Sand Tank Wash, Scott Avenue Wash, Bender Wash, Unnamed Wash No. 1, Unnamed Wash No. 2, and ponding areas upstream of the Gila Bend Canal are located within the Town of Gila Bend and the unincorporated areas of Maricopa County.

The study was performed by BN for the FCDMC. A Best Available Data Letter was issued on March 5, 1993. The results of the analyses are represented in the reports entitled "Gila Bend Area Floodplain Delineation Study, Technical Data Notebook, Hydraulics," Books 1 and 2, both dated March 1992.

The hydrologic analysis for the Gila Bend Area was conducted using the USACE HEC-1 hydrologic model.

Only the 1-percent-annual-chance profile was computed for these streams using the USACE HEC-2 hydraulic model. The starting water-surface elevations were obtained using normal depth. Ponded flood boundaries for structures through the Gila Bend Canal not modeled above were obtained by routing the 1-percent-annual-chance storm through the structures.

Cross sections for the backwater analysis are digitized from aerial mapping at a 1:4,800 scale with a contour interval of 4 feet and a 1:2,400 scale with a contour interval of 2 feet. Manning's "n" values were obtained during a field reconnaissance October 4, 1991.

Luke Wash

The areas included in this new hydrologic and hydraulic study for Luke Wash are located in the unincorporated areas of Maricopa County.

The study was performed by Coe & Van Loo Consultants, Inc., for the FCDMC. A Best Available Data Letter was issued on July 2, 1993. The results of the analyses are represented in reports entitled "Luke Wash Flood Insurance Study, Technical Data Notebook," dated March 19, 1993; "Luke Wash Flood Insurance Study, Survey Data," dated December 19, 1992; "Luke Wash Flood Insurance Study, Hydrologic Analysis, Technical Data Notebook Section 3," dated November 30, 1992; "Luke Wash Flood Insurance Study, Hydraulic Analysis, Technical Data Notebook Section 4," dated March 18, 1993; and "Luke Wash Flood Insurance Study, N-Value Determination Report," dated November 23, 1992.

The hydrologic analysis for Luke Wash was conducted using the USACE HEC-1 hydrologic model. Portions of the Jackrabbit Wash HEC-1 model for which a BADL was issued on April 25, 1991, were used as a base for the Luke Wash hydrology.

Only the 1-percent-annual-chance profile was computed for Luke Wash using the USACE HEC-2 hydraulic model. Starting water-surface elevations were determined using the slope/area method. The water surface from Gila River was not used because of the difference in the time of peak flow. No floodway was delineated for this wash.

Manning's "n" values were established based on field investigations, topographic mapping, and photographs of the area.

The floodplain was delineated by interpolating between each cross section using topographic maps at a scale of 1"=200' with a contour interval of 2 feet. Bank stations at each cross section were offset from the channel thalweg based on aerial photographs, 1"=200' topographic maps, and field investigation.

Apache Wash and Tributaries

The areas included in this new hydrologic and hydraulic study for Apache Wash, Apache Wash (West Overflow Area), Apache Wash West Branch, Desert Hills Wash, Desert Hills Wash West Branch, Unnamed Wash (tributary to Desert Hills Wash), Desert Lake

Wash (Jonathan Wash), Mesquite Tanks Wash, Paradise Wash, Paradise Wash West Branch, and Ranieri Wash are located within the City of Phoenix and the unincorporated areas of Maricopa County.

The study was performed by Jerry R. Jones & Associates, Inc., for the FCDMC. A Best Available Data Letter was issued on September 8, 1993. The results of the analyses are represented in the reports entitled "Apache Wash, Flood Insurance Study, Exhibit 1," "Apache Wash, Flood Insurance Study, Contract FCD 89-66," and "Apache Wash Hydrologic/Hydraulic, Technical Data Notebook, Exhibit 4," dated August 1992.

The hydrologic analysis for Apache Wash was conducted using the USACE HEC-1 hydrologic model.

Only the 1-percent-annual-chance profile was computed for these streams using the USACE HEC-2 hydraulic model. Floodways were delineated for all streams.

Cross-section data were obtained in the field. Topographic maps of the study area were generated from aerial photos flown from July to November 1990.

Rainbow Wash and Tributaries

The areas included in this new hydraulic study for Rainbow Wash and its tributaries are located within the unincorporated areas of Maricopa County.

The study was performed by Simons, Li & Associates, Inc. (SLA) for the FCDMC. A Best Available Data Letters was issued on January 10, 1994. The results of the analyses are represented in the reports entitled "Rainbow Wash, Flood Insurance Study, Gila River through S.R. 95, Hydraulics Report," Volumes 1 and 2, both dated November 1992.

The hydrologic analysis for Rainbow Wash was provided to SLA by the FCDMC. The original hydrologic analysis was performed by Donahue & Associates and presented in a report entitled "Gila Bend Canal Floodplain Delineation Study Hydrology Report." The analysis was conducted using the USACE HEC-1 hydrologic model and was approved by FEMA with a BADL issued on March 26, 1992.

Only the 1-percent-annual-chance profile was computed for these streams using the USACE HEC-2 hydraulic model. The starting water-surface elevations for the Rainbow Wash tributaries were obtained from the 1-percent-annual-chance water-surface elevation in the Rainbow Wash mainstem. Floodways were delineated for these washes.

Cross-section data and topographic mapping for the study reach of Rainbow Wash were developed from a digital terrain model for the aerial photography performed in October 1991.

Powerline Wash and Tank Wash

The areas included in this new hydraulic study for Powerline Wash and Tank Wash are located in the unincorporated areas of Maricopa County.

The study was performed by Stanley Consultants, Inc., for the FCDMC. A BADL was issued on April 5, 1994. The results of the analysis are represented in the report entitled

“Flood Control District of Maricopa County, Powerline Wash and Tank Wash, Flood Delineation Study,” dated September 1993. The hydrology for this study was approved in a previous study for Jackrabbit Wash; the hydrology for Tank Wash did, however, need to be amended to estimate the separate peak flow for the South Branch. This amendment was performed by FCD staff using the USACE HEC-1 hydrologic model and the results provided to Stanley Consultants, Inc.

Only the 1-percent-annual-chance profile was computed for these washes using the USACE HEC-2 hydraulic model. Starting water-surface elevations for the two washes were taken from the Star Wash Study. The starting water-surface elevation for the South Branch of Tank Wash was analyzed using two methods: the tributary option in HEC-2 and the slope/area option in HEC-2. The slope/area method resulted in higher water-surface elevations. The study used this method. Floodways were delineated for both washes.

Cross sections were laid out by Stanley Consultants, Inc., on aerial topography provided by Kenney Aerial Mapping, Inc., and Aerial Mapping Company, Inc. The companies then digitized and compiled the cross sections into HEC-2 format. The mapping scale is 1"=200', with a contour interval of 2 feet.

Star Wash and Tributaries

The areas included in this new hydraulic study for Star Wash and its five tributaries (Tributaries A, B, C, D, and E) are located within the unincorporated areas of Maricopa County.

The study was performed by Wood, Patel & Associates, Inc., for the FCDMC. A Best Available Data Letter was issued on March 3, 1994. The results of the analyses are represented in the reports entitled “Star Wash & Tributaries, Flood Delineation Study, Technical Data Notebook, Hydraulics,” Books 1 and 2, both dated August 1993. The hydrology for this area was approved with a BADL issued on April 25, 1991.

Only the 1-percent-annual-chance profile was computed for these streams using the USACE HEC-2 hydraulic model. The hydraulic analysis for the 1-percent-annual-chance flood is based on unobstructed flow conditions. Starting water-surface elevations for Star Wash match the computed water-surface elevations for the Jackrabbit Wash Study. Starting water-surface elevations for the tributaries were obtained by matching the water-surface elevations of the mainstem wash. Floodways were delineated for all streams.

Cross sections for the hydraulic analyses were digitized from aerial mapping at a scale of 1:2,400, with a contour interval of 2 feet, prepared in 1992 by Aerial Mapping Company, Inc.

Daggs Wash

The areas included in this new hydraulic study for Daggs Wash are located in the unincorporated areas of Maricopa County. The study area is located west and northwest of the White Tank Mountains, and west of the Hassayampa River.

The study was performed by A-N West, Inc., for the FCDMC. A Best Available Data Letter was issued on March 28, 1994. The results of the analyses are represented in a

report entitled “Daggs Wash Floodplain Delineation Study, FCDMC No. 92-08, Technical Data Notebook,” dated August 1993.

The hydrology for Daggs Wash was performed as part of a previous study of Jackrabbit Wash that included delineating ponding along the Central Arizona Canal at Daggs Wash. It was approved with a BADL issued on April 25, 1991.

Only the 1-percent-annual-chance profile was computed for these streams using the USACE HEC-2 hydraulic model. The starting water-surface elevations were obtained using the slope/area method. Floodways were delineated for this wash.

Cross sections were digitized from topographic mapping that was compiled photogrammetrically from aerial photos. For the streams studied in detail, the 1-percent-annual-chance flood boundaries were delineated using topographic maps at a scale of 1:4,800, with a contour interval of 2 feet. Water-surface elevations for floods for the 1-percent-annual-chance recurrence interval were computed using the USACE HEC-2 step-backwater computer program. Starting water-surface elevations were determined using the slope/area method.

White Tanks/Agua Fria Area

The areas included in this new hydrologic and hydraulic study for the White Tanks/Agua Fria area are located in the City of Avondale, City of Buckeye, Town of El Mirage, City of Glendale, Town of Goodyear, City of Litchfield Park, City of Phoenix, Town of Surprise, and the unincorporated areas of Maricopa County.

The study was performed by The WLB Group, Inc., for the FCDMC. A BADL was issued on April 18, 1994. The results of the analyses are represented in Volumes 1 through 15 of the report entitled “Flood Study Technical Data Notebook for White Tanks/Agua Fria Drainage Master Study,” dated May 28, 1992.

The hydrologic methodology incorporated in the White Tanks/Agua Fria Area Drainage Master Study (ADMS) used the new “Hydrologic Design Manual for Maricopa County, Arizona,” dated April 1990. The USACE HEC-1 hydrologic model was used.

Only the 1-percent-annual-chance profile was computed using the USACE HEC-2 hydraulic model. This was prepared for the following streams, which were studied in detail: Beardsley Canal Wash; Cholla Wash; North Fork Cholla Wash; Waterfall Wash; White Tank #3 Wash; Bedrock Wash; North Fork Bedrock Wash; Jackrabbit Trail Wash; Tuthill Dike Wash; Bulldozer Wash; Osborn Road Wash; Tractor Wash; Diversion Dike Wash; White Granite Wash; North Fork White Granite Wash; 191st Avenue Wash; Perryville Road Wash; Bullard Wash; Atchison, Topeka and Santa Fe (AT&SF) Railway Channel; Lower El Mirage Wash; Lower El Mirage Wash Tributary; Interstate 10; and Dale Creek Wash. Floodways were delineated for these washes.

Detailed studies of ponding areas using the HEC-1 computer model were delineated for the following areas: Roosevelt Irrigation District Canal, Southern Pacific Railroad, Buckeye Canal, Agua Fria River Dike – West Side, and Litchfield Park Detention Facility.

Approximate delineations were computed using the HEC-2 model for the following areas: Cotton Lane Wash from Indian School Road to Olive Avenue, Cotton Lane Wash from Olive Avenue to Waddell Road, Bullard Wash from Gila River to the south end of Phoenix-Goodyear Municipal Airport, Bullard Wash from the south end of Luke AFB to Reems Road, Interstate 10 from Perryville Road to Jackrabbit Trail, Interstate 10 from RID Canal to Cotton Lane, Dysart Drain from Agua River to Reems Road, and AT&SF Railroad Spur from Northern Avenue north to Waddell Road.

Approximate delineations were also computed using normal depth calculations, approximation techniques, and the HEC-1 model for the following areas: ponding behind White Tanks Flood Retarding Structures #3 and #4, ponding behind Interstate 10, ponding behind Airport Canal, conveyance corridors behind Interstate 10, behind Southern Pacific Railroad where appropriate, Bullard Wash breakout west of Estrella Parkway and south of State Route 80, breakouts along the Dysart Drain onto Luke AFB, and Reems Road from Northern Avenue to Beardsley Road.

Cross sections for each stream studied in this ADMS were constructed from topographic mapping at a scale of 1"=400', with a contour interval of 2 feet, prepared for this study.

A section of the 1-percent-annual-chance floodplain for Bullard Wash was not delineated because of current development in this area.

Roosevelt Canal, Buckeye Canal, and Southern Pacific Railroad

The areas included in this new hydrologic and hydraulic study for Roosevelt Canal, Buckeye Canal, and the Southern Pacific Railroad from Hassayampa River to Dean Road are located in the City of Buckeye and the unincorporated areas of Maricopa County.

The study was performed by McLaughlin Kmetty Engineers, Ltd., for the FCDMC. A Best Available Data Letter was issued on June 17, 1994. The results of the analyses are represented in reports entitled "Buckeye Area Flood Delineation Study, Hydrology Report," dated May 1992 and revised July 1992, and "Buckeye Area Flood Delineation Study, Hydraulic Report and Technical Data Notebook," dated September 1992 and revised December 1992.

The hydrologic analysis for Roosevelt Canal, Buckeye Canal, and the Southern Pacific Railroad was conducted using the USACE HEC-1 hydrologic model.

Since flooding occurs as the result of ponding against raised embankments for the revised areas, the water-surface elevations were determined by using HEC-1 for the level-pool routing routine based on stage-storage-discharge data for each subbasin where ponding occurs. The hydraulic analyses for this study were based on unobstructed flow through the railroad trestles, using existing conditions at the time of survey. The flood elevations shown on the profiles are considered valid only if the hydraulic structures remain unobstructed, operate properly, do not fail, and the railroad embankment does not fail. The canal roads are earthen, and the flood elevations presented are considered valid only if the canal low points remain unobstructed and the canal embankment does not fail.

Consolidated Canal East Branch

A LOMR was issued on October 4, 1993, for the City of Chandler to reflect updated topographic information for Cooper Road and updated hydrologic analysis of the ponding areas just east of the Consolidated Canal East Branch. As a result of this revision, the floodplain was reduced along the ponding area east of the Consolidated Canal East Branch from just upstream of Frye Road to just downstream of Chandler Boulevard. This LOMR was, therefore, reissued on February 7, 1994.

East Fork Cave Creek

A LOMR was issued on January 11, 1994, for the City of Phoenix to reflect the construction of a detention basin and the channelization of East Fork Cave Creek. As a result of this LOMR, the floodplain was reduced along East Fork Cave Creek from Beardsley Road to Cave Creek Road. The 1-percent-annual-chance floodplain is now contained in the concrete, channelized portion of East Fork Cave Creek from Beardsley Road to Union Hills Drive and in the earthen, channelized portion of East Fork Cave Creek from Union Hills Drive to Cave Creek Road.

Basin 5

A LOMR issued on February 18, 1994, for the City of Scottsdale to reflect an incorrect zone designation along Basin 5 in Section 33. The SFHA designated Zone A along Basin 5 alluvial fan flooding was changed to Zone AO (depth 1 foot and a velocity of 3 feet per second). The basis for this modification was a letter submitted by the FCDMC which stated that the effective map was labeled incorrectly.

Grand Avenue

A LOMR issued on March 4, 1994, for the City of Glendale to reflect more detailed topographic information along Grand Avenue. As a result of this request, the floodplain width was decreased along Grand Avenue from approximately 4,000 feet southeast of the intersection of Bethany Home Road and Grand Avenue to approximately 3,000 feet northwest of this intersection, by a maximum of approximately 1,000 feet. In addition, the floodplain from the intersection of Bethany Home Road and Grand Avenue to approximately 3,000 feet northwest of this intersection, was redesignated from Zone AO (depth 2 feet) to Zone AO (depth 1 foot). Street names shown on this panel were corrected based on a street map submitted by the Arizona Department of Water Resources.

Cave Creek Unnamed Tributary

A letter was issued on March 25, 1994, for Maricopa County and Incorporated Areas. The study was performed by Gilbertson Associates, Inc. The results of the analysis are represented in the report entitled "Final Hydrologic and Hydraulic Study for Carefree Mountain Estates Unit One," dated December 23, 1992. As a result of this request, an SFHA has been added for the wash near the proposed Unit 1 of the Carefree Mountain Estates subdivision.

Indian Bend Wash

The LOMR issued on April 22, 1994, for the Town of Paradise Valley reflects the channel modifications along Indian Bend Wash from just upstream to approximately 2,000 feet upstream of Scottsdale Road. These modifications include the placement of fill in the floodway fringe along the south side of Indian Bend Wash, and excavation of the channel. As a result of this request, the BFEs, SFHA, and floodway top width have decreased for the revised reach of Indian Bend Wash.

The LOMRs issued on June 7, 1994, for the Town of Paradise Valley and the City of Phoenix reflect a channelization project along Indian Bend Wash from approximately 300 feet upstream to approximately 1,800 feet downstream of Shea Boulevard. As a result of this channelization project, the 1-percent-annual-chance flood will be contained within the identified channel banks from approximately 200 feet upstream to approximately 200 feet downstream of Shea Boulevard. The SFHA has been reduced along the remainder of the revised reach.

Salt River

The LOMRs issued on May 17, 1994, for the City of Phoenix and the City of Tempe reflect a channelization project on Salt River from approximately 6,600 feet downstream of State Route 143 to the Southern Pacific Railroad bridge. As a result of this request, the BFEs have decreased along the study reach, and the SFHA reduced because the 1-percent-annual-chance flood will be contained in the improved channel.

Arizona Channel

The LOMRs issued on June 3, 1994, for the Town of Paradise Valley and the City of Phoenix reflect the ACDC project along the Arizona Canal from 17th Street to the Limit of Detailed Study of Flynn Lane Wash and from approximately 30th Street to the Limit of Detailed Study of Echo Canyon Wash (Cudia City Wash). As a result of this revision, the SFHA is reduced and is now contained within the ACDC right-of-way along the revised reach.

East Fork Cave Creek

The LOMA issued on May 14, 1993, for the City of Phoenix removes Lot 87, Greentrails Subdivision, 948 East Grandview Road, from the SFHA.

The LOMR issued on May 26, 1993, for the City of Phoenix was based on placement of fill. This request determined that Lots 133 through 139, 173 through 176, 1982 through 184, 204 through 219, 221 through 228, 255, 256, 263, 269, and 270 were located outside of the SFHA and that Lots 140 through 172, 177 through 181, 185 through 203, 220, 229 through 254, 257 through 262, 264 through 268, and 271 through 281 would not be inundated by the 1-percent-annual-chance flood and were, therefore, removed from the SFHA.

The LOMR issued on March 8, 1994, for the City of Phoenix was a reissuance of the LOMR issued on May 26, 1993.

Point Loma

The LOMR issued on February 1, 1994, for the City of Phoenix was based on placement of fill in the Point Loma subdivision. This request determined that Lots 33 through 38 were located outside the SFHA. The existing structures on Lots 9, 10, and 11 were also located outside the SFHA. Lots 15 through 32 would not be inundated by the 1-percent-annual-chance flood and were removed from the SFHA. Finally, it was determined that the existing structures on Lots 2 and 3 would not be inundated by the 1-percent-annual-chance flood and were, therefore, removed from the SFHA.

Moon Valley Wash

A LOMR was issued on January 24, 1995, for the City of Phoenix to reflect a restudy completed under the Limited Map Maintenance Program. The revised area, previously designated as Zone AO (depth 2), has been modified to show BFEs along the revised reaches. The revised area includes Moon Valley Wash-North Branch, Moon Valley Wash South Branch, Moon Valley Wash-North Split, and the Diversion Channel.

Discharges used in this restudy were taken from previous FISs. No floodways were determined in this restudy. The downstream limit of Moon Valley Wash-North Branch is at Thunderbird Road. The starting water-surface elevation was taken from the effective Flood Profile Panel for Moon Valley Wash at Thunderbird Road.

Tenth Street Wash

During the review of a LOMR for the City of Phoenix, a discrepancy was discovered between a FIRM panel and a Flood Profile Panel. The street distances did not match. After a closer look, the map was determined to be correct. Therefore, a correction to the profile is shown the correct distances between the roads.

Indian Bend Wash

During the review of a LOMR for the City of Phoenix, a discrepancy was discovered between a FIRM panel and Flood Profile Panels with regard to the street distances and the locations of the cross sections. The profiles were corrected.

Kyrene Branch Canal

The LOMR issued on July 21, 1994, for the City of Chandler was based on the effects of the construction of Ray Road and a 48-inch concrete pipe from Ray Road to approximately 1,700 feet downstream of Ray Road that conveys the flooding associated with Kyrene Branch Canal through the Warner Ranch 4 subdivision. This LOMR follows up on a February 24, 1994. As a result of this revision, a portion of the 1-percent-annual-chance flood discharge is contained within Ray Road and the remaining flood discharge continues downstream within the 48-inch pipe and along Kyrene Branch Canal. The depth of the 1-percent-annual-chance flood within Ray Road and along Kyrene Branch Canal is less than 1 foot; therefore, the Special Flood Hazard Area, designated as Zone A, has been changed to Zone X (shaded).

Granite Reef Aqueduct

The LOMR issued on July 12, 1994, for the City of Scottsdale was based on the effects of updated hydrologic analysis to incorporate more detailed data for unnamed desert washes upstream of Granite Reef Aqueduct encompassing the area along Granite Reef Aqueduct from approximately 2,400 feet northwest of Cactus Road to approximately 3,700 feet southeast of Cactus Road. As a result of this revision, the Special Flood Hazard Area has shifted northwesterly by a maximum of 800 feet.

Cave Creek

The LOMR issued on April 12, 1994, for the City of Phoenix was based on the correction of a computational error in the determination of the shallow flooding depths along Cave Creek between Bethany Home Road and Northern Avenue. As a result of this revision, the zone designation has been changed from Zone AH to Zone X (shaded).

The LOMR issued on May 26, 1995, for the City of Phoenix was based on the effects of construction of Cave Creek Overflow Channel (also known as Bellvue Wash Channel) and lowering of 7th Avenue along Cave Creek. As a result of this revision, the BFEs decrease along Bellvue Channel. The SFHA increased and decreased along Cave Creek Overflow Channel. An area previously designated as Zone AE was redesignated as Zone X.

The LOMR issued on May 26, 1995, for the City of Phoenix was based on the effects of a cut and placement of fill along Cave Creek, from approximately 200 feet upstream to approximately 800 feet upstream of Bell Road. As a result of this revision, the BFEs increased and decreased and the SFHA and floodway decreased along the revised reach.

10.5 Fifth Revision

This study was revised on July 19, 2001, to include numerous map revision requests based on newly studied streams and ponding areas and to convert the FIRM for Maricopa County and Incorporated Areas to digital format. The newly studied flooding sources include Deadman Wash and Tributaries; Iona, Bullard, and Rio Verde North Washes; the Hassayampa River Tributaries; Sols Wash Tributaries; numerous washes in the Fountain Hills and White Tanks areas; and Skunk Tank and Valley Washes.

The process of converting the existing FIRM panels from standard to map initiatives format, as described in Section 10.1, has been completed with this revision.

The Town of Fountain Hills has been included in this revised FIS.

Digital Conversion

The mapping for Maricopa County and Incorporated Areas has been prepared using digital data. Previously published FIRM data produced manually have been converted to vector digital data by a digitizing process.

Locally owned digital base map data have been provided by the unincorporated areas of Maricopa County and the Cities of Chandler, Scottsdale, and Tempe.

Road and highway name and centerline data for the remaining incorporated and unincorporated areas of Maricopa County have been obtained from the Maricopa County Transportation Department Geographic Information Systems Group. The centerline data were computer plotted with the digitized floodplain data to produce the countywide FIRM.

Deadman Wash and Tributaries

The hydrologic and hydraulic study for Deadman Wash, Deadman Wash Stream No. 4, Deadman Wash Stream No. 7, and Deadman Wash Stream No. 12 was developed by Howard Needles Tammen & Bergendoff. The results of the study are presented in technical reports entitled “Deadman Wash Floodplain Delineation Study, FCD 90-65, Technical Data Notebook Hydrology,” dated July 1992, revised December 1992; “Deadman Wash Floodplain Delineation Study, FCD 90-65, Technical Data Notebook Hydraulic Analysis,” dated July 1992, revised December 1992; and “Deadman Wash Floodplain Delineation Study, FCD 90-65, FEMA Forms RSD-1,” undated, and shown on the topographic maps entitled “Flood Control District of Maricopa County, Floodplain Delineation Study of Deadman Wash, FCD Contract No. 90-65,” undated. A Best Available Data Letter was issued on February 23, 1995, for this study.

Iona Wash

The hydraulic study for Iona Wash was developed by CH2M Hill. The results of the study are presented in a technical report entitled “Iona Wash Floodplain Delineation Study, Technical Data Support Notebook,” dated October 5, 1993, and shown on the topographic maps entitled “Iona Wash: From Trilby Wash to State Route 89,” dated October 4, 1993. A BADL was issued on July 14, 1994, for this study. Hydrologic calculations for Iona Wash were taken from the Wittmann Watershed Area study completed in December 1988.

Bullard Wash

The hydraulic study for Bullard Wash was developed by The WLB Group. The results of the study are presented in the HEC-2 hydraulic computer model entitled “White Tanks/Agua Fria Drainage Master Study, 100-year Storm Event Floodplain Run File: ‘BULL-RID.H2I,’ Bullard Wash, Wash 10, Roosevelt Irrigation District Canal (RID Canal) to Indian School Road Reach,” dated January 25, 1995, and shown on the topographic maps entitled “Bullard Wash FIS Work Map,” dated January 30, 1995. A BADL was issued on March 3, 1995, for this study.

Rio Verde North Washes

The hydraulic study for Rio Verde North – Washes A, A South, F, and I was developed by BN. The results of the study are presented in technical reports entitled “Rio Verde – North Floodplain Delineation Study, FCD 93-06, Technical Data Notebook Hydraulics,” dated March 1995, and “Rio Verde – North Floodplain Delineation Study, FCD 93-06, Technical Data Notebook Hydrology,” dated October 1994, and shown on the topographic maps entitled “Flood Control District of Maricopa County, Flood Delineation Study of Rio Verde North, FCD Contract No. 93-06,” dated August 1994. A BADL was issued on May 9, 1995, for this study.

Hassayampa River and Sols Wash Tributaries

The hydrologic and hydraulic study for Amir, Calamity, and Blue Tanks Washes; Mockingbird Wash and tributaries; Cemetery Wash and tributaries; Little San Domingo, San Domingo, Ox, and Turtleback Washes; Flying “E” Wash and tributaries; Sunset and Sunny Cove Washes; Hartman Wash and tributaries; and several unnamed washes was developed by Black & Veatch, Inc., and Coe & Van Loo Consultants, Inc. The results of the study are presented in the technical report entitled “Wickenburg Area Drainage Master Study: Technical Documentation Report and Appendices 1.1 through 6.20,” dated May 1994, updated January 4, 1995, and shown on the topographic maps entitled “Flood Control District of Maricopa County – Floodplain Delineations for Wickenburg Area Master Drainage Study – Contract FCD 89-79,” dated June 1994. A BADL was issued on February 21, 1995, for this study.

Fountain Hills Area

The hydrologic and hydraulic study for Arrow, Ashbrook, Balboa, Caliente, Escalante, Hesperus, Legend, Oxford, and Tulip Washes was developed by George V. Sabol Consulting Engineers, Inc. The results of the study are presented in technical report volumes entitled “Fountain Hills North, Floodplain Delineation Study, FCD 92-04,” dated April 1995. The hydrologic and hydraulic study for Cereus, Chukar, colony, Cyprus Point, and Emerald Washes; Fountain Channel; Gresytone, Jacklin, and Kingstree Washes; Laser Drain; Logan Wash; Malta Drain; and Mangrum, North Colony, Powder, Sunburst, and Sycamore Washes was developed by AGK Engineers, Inc. The results of the study are presented in technical report volumes entitled “Fountain Hills South, Floodplain Delineation Study FCD 92-05,” dated February 1996, revised November 1996. A LOMR was issued on October 21, 1997, to show the Special Flood Hazard Area (SFHA) delineations associated with these studies.

White Tanks Area

The hydrologic and hydraulic study for White Tanks Wash and White Tanks Wash Tributary Nos. 1, 2, and 3 was developed by Harding Lawson and Associates. The results of the study are presented in technical report volumes entitled “White Tanks Wash Flood Insurance Study, FCD 90-64,” dated January 30, 1996. A LOMR was issued on November 18, 1997, to show the SFHA delineations associated with these studies.

Skunk Tank and Valley Washes

The hydrologic and hydraulic study for Skunk Tank and Valley Washes was developed by EEC/MKE. The results of the study are presented in a technical report entitled “Skunk Tank Wash Floodplain Delineation Study, FCD 96-05,” dated December 1997. A LOMR was issued on March 12, 1998, to show the SFHA delineation associated with this study.

Queen Creek

The hydraulic study for Queen Creek was developed by Collins/Pina Consulting Engineers, Inc. The results of the study are presented in a technical report entitled “Queen Creek LOMR (Hawes Road to SPRR),” dated July 25, 1997. A LOMR was issued on April 16, 1998, to show the SFHA delineations associated with this study.

Table 3, "Summary of Discharges," Table 6, "Floodway Data," Table 7, "Community Map History," and Exhibit 1, "Flood Profiles," were revised as a result of the newly studied streams.

10.6 Sixth Revision

This revision is dated January 1, 2004. This study was revised to include numerous map revision requests based on newly studied streams and ponding areas.

Conversion to DFIRM Format

All the FIRMs were converted to digital FIRMs by the Flood Control District of Maricopa County (FCDMC) through a Cooperating Technical Partner (CTP) agreement. The FIRMs were converted following the April 2003, Guidelines and Specifications for Flood Hazard Mapping Partners. The FIRMs were prepared using orthophoto base maps provided by the FCDMC. The aerial photography is dated December 2000 to December 2002. Because of the use of the orthophoto base maps the new FIRMs reflect more detailed and up-to-date stream channel configurations than those shown on the previous FIRMs. The floodplains and floodways transferred from the previous FIRMs may have been adjusted to conform to the new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the FIRMs. The corporate limits were also updated as part of the conversion process to the DFIRM format.

The elevation reference marks (ERMs) shown on previous editions of the FIRM maps have all been removed and replaced with bench marks obtained from the National Geodetic Survey (NGS). To obtain elevation, description, and/or location information for any bench mark shown on the FIRM panels contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit their website at <http://www.ngs.noaa.gov>.

Jackrabbit Trail Wash

A LOMR effective on October 9, 2001, for Maricopa County (Unincorporated Areas) reflects channelization along Jackrabbit Trail Wash from approximately 3,600 feet downstream of I-10 to approximately 1,550 feet upstream of McDowell Road. This revision also included an existing concrete channel between the eastbound off-ramp and the westbound on-ramp of I-10, five existing 10-foot by 4-foot concrete box culverts, and the eastbound off-ramp of I-10, five existing 10-foot by 5-foot CBCs at the westbound on-ramp of I-10, and five existing 12-foot by 4.5-foot CBCs at McDowell Road. The FIRM has been modified to show changes in the elevation and floodplain and floodway boundary delineations for the 1-percent annual chance flood along Jackrabbit Trail Wash from approximately 400 feet downstream to approximately 1,550 feet upstream of McDowell Road; from approximately 1,800 feet downstream to approximately 600 feet downstream of I-10; and from approximately 2,500 feet downstream to approximately 2,000 feet downstream of I-10. As a result of the modifications, the Special Flood Hazard Area and the regulatory floodway were removed throughout the revised reach. The centerline of the channel along the revised reach shifted to the west. Effective BFEs that previously were not shown on the FIRM were added at approximately 1,600 feet upstream and approximately 1,750 feet upstream of McDowell Road.

Sols Wash Tributaries

The LOMR effective October 15, 2001, for Maricopa County (Unincorporated Areas) shows the effects of an approximate study of Tributary to Sols Wash AH2, Tributary to Sols Wash AH3, Sols Wash AH4, Tributary to Amir Wash, Tributary to Sols Wash, Tributary to Tributary to Sols Wash, Tributary to Hartman Wash, Yucca Flat Wash, Holly Wash, Cemetery Wash, Turtleback Wash, Tributary to Mockingbird Wash, Wash 20T7R4, Wash 28T7R4, Wash 3T6R4, Wash 15T6R4, Wash G, San Domingo Wash, Tub Spring Wash, Ox Wash, Tributary to Monarch Wash, Tributary to Wash K, Monarch Wash, Tributary to Little San Domingo Wash, and Little San Domingo Wash. As a result of the modifications, SFHAs were added along Tributary to Sols Wash Tributary AH2 from approximately 2,000 feet upstream to approximately 20,000 feet downstream US 60, Tributary to Sols Wash Tributary AH3 from its confluence with Sols Wash Tributary AH3 to approximately 5,200 feet upstream; along Sols Wash AH4 from approximately 1,600 feet downstream to approximately 3,000 feet upstream of an unnamed road; along Tributary to Amir Wash from its confluence with Amir Wash to approximately 2,700 feet upstream; along Tributary to Sols Wash from its confluence with Sols Wash to approximately 4,200 feet upstream; along Tributary to Tributary to Sols Wash from its confluence with Tributary to Sols Wash to approximately 2,800 feet upstream; along Tributary to Hartman Wash from its confluence with Hartman Wash to approximately 6,500 feet upstream; along Yucca Flat Wash from approximately 4,500 feet downstream to approximately 4,400 feet upstream of the unnamed road; along Holy Wash from just upstream to approximately 4,000 feet upstream of the unnamed road; along Cemetery Wash from approximately 3,500 feet downstream to approximately 5,700 feet upstream of the unnamed road; along Turtleback Wash from approximately 17,500 feet downstream to approximately 2,000 feet upstream of the unnamed road; along Tributary to Mockingbird Wash from approximately 1,000 feet upstream to approximately 14,000 feet upstream of its confluence with Mockingbird Wash; along Wash 20T7R4 from its confluence with the Hassayampa River to approximately 7,700 feet upstream; along Wash 28T7R4 from its confluence with the Hassayampa River to approximately 20,300 feet upstream; along Wash 3T6R4 from its confluence with the Hassayampa River to approximately 23,100 feet upstream; along Wash 15T6R4 from its confluence with the Hassayampa River to approximately 18,400 feet upstream; along Wash G from approximately 5,000 feet upstream to approximately 10,000 feet upstream of its confluence with the Hassayampa River; along San Domingo Wash from approximately 12,000 feet upstream to approximately 44,000 feet upstream of its confluence with the Hassayampa River; along Tub Spring Wash from its confluence with San Domingo Wash to approximately 13,000 feet upstream; along Ox Wash from approximately 7,000 feet upstream to approximately 26,000 feet upstream of US 60 (and US 89 and Arizona 73); along Tributary to Monarch Wash from its confluence with Monarch Wash to approximately 16,000 feet upstream; along Tributary to Wash K from approximately 4,000 feet upstream to approximately 10,500 feet upstream of its confluence with Wash K; along Monarch Wash from its upstream limits of detailed study to approximately 10,000 feet upstream; along Tributary to Little San Domingo Wash from its confluence with Little San Domingo Wash to approximately 14,000 feet upstream; and along Little San Domingo Wash from approximately 21,000 feet downstream to approximately 23,000 feet upstream of Castle Hot Springs Road.

Tiger Wash

The LOMR effective on November 30, 2001, for Maricopa County (Unincorporated Areas) reflects a corrected zone. The study was performed by JE Fuller Hydrology/Geomorphology and was entitled “Approximate Floodplain Delineation Study for Portions of Tiger Wash Piedmont, Technical Data Notebook,” dated June 8, 2000. Boundary delineations for Zone D, unstudied areas where flood hazards are undetermined but possible, have been added to the panel. The basis for this modification was letters submitted by JE Fuller and the FCDMC.

Reems Road

The LOMR effective on November 2, 2001, for the City of Surprise reflects channel modifications and culvert construction along Reems Road from just upstream of Greenway Road to approximately 1,400 feet upstream of Waddell Road. The floodplain boundary delineations of the flood having a 1-percent annual chance of being equaled or exceeding in any given year along Reems Road is now contained in the channel and. The LOMR was performed by Clouse Engineering, FEMA Case No. 01-09-973P.

Dreamy Draw Wash West

A LOMR effective on October 15, 2001, for the City of Phoenix shows the effects of a revised hydraulic analysis and more detailed topographic information for Dreamy Draw Wash West that reflects the presence of the ACDC. As a result of the modifications, BFEs were established and the width of the SFHA decreased along the northeast side of the ACDC from the Myrtle Avenue alignment to the Griswold Road alignment and along Dreamy Draw Wash from the confluence with the ACDC to approximately 300 feet northeast of the intersection of 13th Street and Belmont Avenue. The SFHA previously designated Zone A, with no BFEs determined, was redesignated Zone AE, with BFEs determined.

Oak Street

The LOMR effective on August 1, 2001, for the City of Scottsdale shows the effects of storm drain improvements along Oak Street from approximately 1,300 feet west of Cross Cut Canal to Indian Bend Wash. Storm drains were constructed along Oak Street from 70th Street to approximately 4,300 feet east of 58th Street, along 64th Street from Oak Street to Hubbell Street; and along 66th Street from Oak Street to Auto Park Detention Basin. Improvements were also made to the Auto Park Detention Basin. FEMA Case No. 01-09-171P was modified to reflect the width reduction in the SFHA for the 1-percent-annual-chance flood along the Cross Cut Canal from McDowell Road to approximately 100 feet upstream of Oak Street. All data required to complete the review were submitted by the City of Scottsdale, and Engineering and Environmental Consultants, Inc.

Cave Creek

The LOMR effective on April 3, 2002, for the Town of Cave Creek shows the effects of a revised hydrologic analysis and correction of the discharge value in the effective hydrologic model for Cave Creek from its confluence with Cottonwood Creek to approximately 5,300 feet downstream. This request also included revised hydraulic

analysis for Cave Creek from approximately 1,000 feet north of the intersection of Spur Cross Road and Sierra Vista Road to just upstream of Morning Star Road. As a result of the modifications, the BFEs for Cave Creek decreased and the widths of the SFHA and the regulatory floodway have increased in some areas and decreased in other areas.

Lower El Mirage Wash

A LOMR effective on January 4, 2002, for the City of El Mirage reflects the construction of channels along Lower El Mirage Wash from just upstream of El Mirage Road to just downstream of Dysart Road and along Lower El Mirage Wash Tributary from just upstream of the confluence with the wash to just downstream of Dysart Road. The FIRM has been revised along the wash from just upstream of El Mirage Road to approximately 1,700 feet upstream of Dysart Road and along the tributary from just upstream of the confluence with the wash to approximately 100 feet downstream of Greenway Road. The BFEs for the wash decreased, the width of the SFHA increased in some areas and decreased in other areas and the width of the regulatory floodway decreased. The BFEs for the tributary and the widths of the SFHA and the regulatory floodway decreased. The base flood is contained in the channel along the wash from just upstream of Cactus Road to just downstream of Dysart Road and along the tributary from just upstream of the confluence with the wash to approximately 800 feet downstream of Dysart Road.

Cave Creek

The LOMR effective on January 14, 2002, for the City of Phoenix revises the FIRM along Cave Creek from approximately 200 feet upstream of Thomas Road to approximately 1,300 feet upstream of Thomas Road, east of 19th Avenue. The effective FIRM also eliminated a SFHA along Grand Canal from the intersection of Heatherbrae Drive and 21st Avenue to the vicinity of the intersection of Glenrosa Avenue and 19th Avenue. As a result of the modifications, the width of the SFHA decreased for Cave Creek and increased for Grand Canal.

Roosevelt Irrigation District (RID) Canal

The LOMR effective on January 15, 2002, for the City of Goodyear shows the effects of an additional hydraulic analysis along Roosevelt Irrigation District Canal from just downstream of New Litchfield Road to just upstream of the RID Canal Overchute and extending south to approximately 500 feet north of Thomas Road. As a result of the modifications, the width of the SFHA increased in some areas and decreased in other areas. An SFHA designated Zone AH, subject to shallow flooding with depths between 1 foot and 3 feet and with BFEs determined was removed from just downstream of New Litchfield Road to the RID Canal Overchute. In addition, an SFHA designated Zone A, with no BFEs determined, was added from the RID Canal Overchute to approximately 500 feet north of Thomas Road.

Indian Bend Wash

A LOMR effective on January 23, 2002, for the City of Scottsdale revises the FIRM at two locations along Indian Bend Wash; from approximately 400 feet upstream to approximately 1,000 feet upstream of Scottsdale Road and from approximately 400 feet downstream to approximately 700 feet upstream of Indian Bend Road. As a result of the modifications, the widths of the SFHA and the regulatory floodway for Indian Bend

Wash increased in some areas and decreased in other areas. Also, the floodplain and floodway boundary delineations shifted approximately 100 feet west from approximately 400 feet downstream of Indian Bend Road to just upstream of Scottsdale Road.

Reems Road

The LOMR (FEMA Case No. 02-09-165P) effective on February 19, 2002, for the City of Surprise shows the effects of channelization and culvert construction along Reems Road from Greenway Road to Bell Road and construction of a retention basin located west of Reems Road and approximately 900 feet upstream of Greenway Road. As a result of the modifications, the width of the SFHA along Reems Road decreased. BFEs and an SFHA designated Zone AH, an SFHA subject to shallow flooding with depths between 1 foot and 3 feet and with BFEs determined, were added for the retention basin. The channel, culverts and Reems Road contain the base flood.

Dale Creek Wash

A LOMR effective on March 5, 2002, for Maricopa County (Unincorporated Areas) shows the effects of placement of fill along Dale Creek Wash from just upstream to approximately 2,000 feet upstream of the Litchfield Park Detention Facility; channelization; and culvert construction, FEMA Case No. 01-09-1158P. The channelization project consisted of an earth-lined trapezoidal channel with 6:1 side slopes and a 20-foot bottom width from just upstream to approximately 2,000 feet upstream of the newly constructed culvert. The culvert project consisted of construction of two 4-foot by 8-foot reinforced-concrete box culverts beneath Bethany Home Road. This request also included and updated hydraulic analysis that incorporated more detailed topographic information to reflect existing watershed conditions along Dale Creek Wash from just downstream to approximately 2,000 feet upstream of the Litchfield Park Detention Facility. As a result of the modification, the BFEs for Dale Creek Wash and the widths of the SFHA and the regulatory floodway decreased.

Sheely Farms East/Agua Fria Interceptor Channel

A LOMR (FEMA Case No. 02-09-723P) effective on April 23, 2002, for the City of Phoenix shows the effects of construction of drainage channels associated with the development of Sheely Farms East and the recently constructed Agua Fria Interceptor Channel. The drainage channels were constructed along the eastern and northern boundaries of the project site and convey offsite flows and a portion of onsite flows to the Agua Fria Freeway Interceptor Channel along the western boundary of the site. As a result of the modifications, the width of the SFHA along the elevated top bank of the Roosevelt Irrigation District Canal decreased, and the SFHA and the water-surface elevation associated with the base flood are contained within the channels.

Agua Fria River Tributaries

A LOMR (FEMA Case No. 02-09-031P) effective on May 15, 2002, for Maricopa County shows the effects of new hydrologic and hydraulic analysis, updated topographic information, and a new floodplain delineation study for tributaries to the Agua Fria River: along Unnamed Wash 1 from approximately 240 feet upstream of its confluence with Unnamed Wash 2 to just downstream of State Route 74; along Unnamed Wash 2 from its confluence with the Agua Fria River to just downstream of SR 74; and along Unnamed

Wash 3 from its confluence with the Agua Fria River to approximately 24,000 feet upstream. The letter also requested to show the effects of approximate studies of Tributary 1 to Unnamed Wash 1 from its confluence with Unnamed Wash 1 to just downstream of SR 74; of Tributary 1 to Unnamed Wash 2 from its confluence with Unnamed Wash 2 to approximately 7,000 feet upstream of Tributary 2 to Unnamed Wash 2 from its confluence with Unnamed Wash 2 to approximately 2,400 feet upstream of SR 74; and of the upper reach of Unnamed Wash 2 from just upstream to approximately 7,400 feet upstream of SR 74. The letter also included a request to show the effects of approximate studies of the upper reach of Twin Buttes Wash from approximately 1,000 feet downstream to approximately 9,200 feet upstream of the Dove Valley Road alignment; of the upper reach of Caterpillar Tank Wash from approximately 600 feet upstream to approximately 2,000 feet upstream of the Dove Valley Road alignment; of Unnamed Wash 4 from its confluence with the Agua Fria River to approximately 7,100 feet upstream; of Unnamed Wash 5 from its confluence with the Agua Fria River to approximately 17,000 feet upstream; of Unnamed Wash 6 from its confluence with the Agua Fria River to approximately 8,200 feet upstream; of Unnamed Wash 7 from its confluence with the Agua Fria River to approximately 7,200 feet upstream; of the entire reach of Tributary 1 to Unnamed Wash 7; of Unnamed Wash 8 from its confluence with the Agua Fria River to approximately 7,900 feet upstream; and of Unnamed Wash 9 from its confluence with the Agua Fria River to approximately 200 feet upstream. FEMA has revised the FIRM to add SFHAs, designated Zone A, with no BFEs, along the approximate studied reaches of Tributary 2 to Unnamed Wash 2 from just upstream to approximately 2,400 feet upstream of SR 74; of the upper reach of Unnamed Wash 2 from just upstream to approximately 7,400 feet upstream of SR 74; of Unnamed Wash 2 from just upstream to approximately 7,400 feet upstream of SR 74; of Unnamed Wash 4 from its confluence with the Agua Fria River to approximately 7,100 feet upstream; of Unnamed Wash 8 from its confluence with the Agua Fria River to approximately 1,300 feet upstream; and of Unnamed Wash 9 from its confluence with the Agua Fria River to approximately 1,500 feet upstream.

Agua Fria River

A LOMR (FEMA Case No. 02-09-1008P) effective June 3, 2002, for the City of El Mirage states that FEMA discovered incorrect elevation numbers at two locations on the effective FIRM. FEMA revised the FIRM to modify the BFE along the Agua Fria River at two locations; approximately 4,600 feet downstream and approximately 5,100 feet downstream of Peoria Avenue respectively.

Rawhide Wash

A LOMR (FEMA Case No. 01-09-1199P) effective on June 5, 2002, for the City of Scottsdale shows the effects of new detailed hydrologic and hydraulic analyses and a new floodplain delineation study along Upper Rawhide Wash from approximately 1,800 feet downstream of Dynamite Boulevard to approximately 5,200 feet upstream of Carefree Highway alignment; along Rawhide Wash Tributary 1 (Tributary 1) from just upstream to approximately 5,700 feet upstream of its confluence with Rawhide Wash; along Rawhide Wash Tributary 2 (Tributary 2) from just upstream to approximately 7,500 feet upstream of its confluence with Rawhide Wash; along Rawhide Wash Tributary 3 (Tributary 3) from just upstream to approximately 3,900 feet upstream of its confluence with Tributary 2; and along Rawhide Wash Tributary 4 (Tributary 4) from just upstream to approximately 7,700 feet upstream of its confluence with Tributary 2. The FIRM has

been changed to reflect the addition of BFEs, floodway boundary delineations, and SFHAs.

Rock Springs Creek

A LOMR (FEMA Case No. 01-09-1060P) effective on June 13, 2002, for the City of Peoria shows the effects of a detailed study that included hydrologic and hydraulic analyses for Rock Springs Creek from approximately 2,300 feet upstream to approximately 17,800 feet upstream of the confluence with the New River. As a result of the modifications, BFEs, an SFHA, and a regulatory floodway were added to the FIRM along Rock Springs Creek from approximately 2,300 feet upstream to approximately 17,800 feet upstream of the confluence. An SFHA designated Zone A, with no BFEs determined, was added along the revised reach from the confluence to approximately 2,300 feet upstream. An SFHA designated Zone AO, and SFHA subject to shallow flooding with average flood depths of 1 foot to 3 feet, was added east of the revised reaches from approximately 750 feet upstream to approximately 3,300 feet upstream of the confluence.

Indian Bend Wash

A LOMR (FEMA Case No. 02-09-1064P) effective on June 28, 2002, for the City of Phoenix is based upon an earlier letter by the City of Phoenix requesting that the effective FIRM be revised by previous LOMRs dated May 15, 1998 (FEMA Case No. 98-09-253P), and August 22, 2000 (FEMA Case No. 00-09-617P), along Indian Bend Wash from just downstream to approximately 1,800 feet upstream of East Cactus Road. As a result of the modifications, the SFHA, and the regulatory floodway for Indian Bend Wash shifted approximately 50 feet south between 39th Way and East Cactus Road. In addition, Cross Sections AY was shifted to show its proper location.

Wash 10 and Wash 11

A LOMR (FEMA Case No. 02-09-068P) for Maricopa County (unincorporated areas) effective on August 21, 2002, shows the effects of construction along Wash 10 of an earthen trapezoidal channel from just upstream of the confluence with Wash 11 to approximately 200 feet upstream of Forest Road and six 10-foot by 4-foot concrete box culverts, construction along Wash 11 of an earthen trapezoidal channel from just downstream of an unnamed road to just upstream of Agua Verde Drive and four 10-foot by 4-foot concrete box culverts, and updated topographic information for the above referenced studied reaches of Washes 10 and 11. FEMA has revised the FIRM along Wash 10 from just upstream of the confluence with Wash 11 to approximately 600 feet upstream of Forest Road and along Wash 11 from just downstream of the unnamed road to just upstream of Agua Verde Drive. As a result of the modifications, the BFEs for Washes 10 and 11 and the widths of the SFHAs, and the regulatory floodways decreased. Also the base flood is contained in the channel and culverts along the above described reach of Wash 11 and along Wash 10 from just upstream of the confluence with Wash 11 to approximately 200 feet upstream of Forest Road.

Wash B

A LOMR (FEMA Case No. 02-09-1084X) for the City of Scottsdale, effective on October 24, 2002, shows the effects of new hydrologic and hydraulic analyses and

existing culverts along Wash B from Doubletree Ranch Road to approximately 3,800 feet upstream of Visa Linda and along Wash B Tributary from the confluence with Wash B to approximately 2,000 feet upstream. As a result of the modifications, the BFEs for Wash B from 116th Street (Extended) to the Hayden Rhodes Aqueduct increased, and the width of the SFHA increased in some areas and decreased in other areas. A regulatory floodway was added along Wash B from 116th Street (Extended) to the Hayden Rhodes Aqueduct. BFEs, SFHAs, and regulatory floodways were added along Wash B from Doubletree Ranch Road to 116th Street (Extended), along Wash B from approximately 1,100 feet upstream of the Hayden Rhodes Aqueduct to approximately 3,800 feet upstream of Via Linda; and along Wash B Tributary from the confluence with Wash B to approximately 2,000 feet upstream. An SFHA designated Zone A, with no BFEs determined, along Wash B was modified from the Hayden Rhodes Aqueduct to approximately 1,100 feet upstream.

White Tank Alluvial Fan

A LOMR (FEMA Case No. 02-09-386P) for Maricopa County (unincorporated areas) effective on September 16, 2002, shows the effects of a floodplain delineation study along the White Tank Alluvial Fan. The FIRM has been modified to show floodplain boundary delineations and zone designations from Interstate Highway 10 to the hydrographic apex, located approximately 24,000 feet upstream of I-10. The affected areas were previously designated Zone X. The active and inactive areas of the alluvial fan, where an approximate study was performed, have been designated Zone A, Zone A (Active Alluvial Fan Flooding-Administrative Floodway), and Zone A (Inactive Alluvial Fan Flooding), respectively, SFHAs with no BFEs determined that are subject to active and inactive alluvial fan flooding as those terms are defined in FEMA publication *Guidelines and Specifications for Flood Hazard Mapping Partners*, February 2002. Approximately 5.8 square miles of new floodplain within the White Tank Alluvial Fan were delineated.

East Fork of Cave Creek

A LOMR (FEMA Case No. 02-09-1208P) for the City of Phoenix effective on September 16, 2002, reflects more accurate delineation of the floodplain boundaries of the 1-percent annual chance flood along the East Fork of Cave Creek from approximately 1,500 feet downstream to just downstream of Greenway Parkway. Incorrect street alignments in the vicinity of the revised reach along East Fork of Cave Creek have also been revised. As a result of the modifications, the width of the SFHA increased in some areas and decreased in other areas..

Eastern Canal

A LOMR (FEMA Case No. 02-09-260P) for the City of Mesa effective on September 19, 2002, shows the effects of updated topographic information and detailed hydrologic and hydraulic analyses of flooding along the east embankment of Eastern Canal from just downstream of Baseline Road to approximately 1,000 feet upstream of East Hermosa Vista Drive. As a result of the modifications, BFEs were added, and the width of the SFHA, increased in some areas and decreased in other areas along the canal reach. Also, portions of the SFHA were designated Zone AH, an SFHA subject to shallow flooding with flood depths between 1 foot and 3 feet and with BFEs determined, and other portions were designated Zone AE, an SFHA with BFEs determined. The base flood is

contained in the channel from approximately 1,400 feet downstream to approximately 500 feet downstream of North Lindsay Road.

Tributaries to Lake Pleasant

A LOMR (FEMA Case No. 02-09-1138P) for Maricopa County (unincorporated areas) effective on October 17, 2002, shows the effects of an approximate study of tributaries to Lake Pleasant. The studied watercourses included Washes T6NR1ES4, T7NR1ES34, T7NR1ES35, T7NR1ES26-1, T7NR1ES26-2, T7NR1ES26-2A, T7NR1ES26-2B, and T7NR1ES26-3 of Watershed UU in the Upper Agua Fria River basin. The FIRM has been modified to add floodplain boundary delineations and zone designations of the base flood for the washes listed above in Watershed UU of the Upper Agua Fria River.

Fieldstone Estates

A LOMR (FEMA Case No. 02-09-248P) effective on October 30, 2002, for the City of Chandler shows the effects of the placement of fill and relocation of current ponding to designated retention basins in the Fieldstone Estates subdivision from approximately 1,300 feet north to approximately 2,500 feet north of Hunt Highway and from McQueen Road to approximately 1,300 feet west of McQueen Road. As a result of the modifications, the BFEs and the width of the SFHA, decreased within the area from approximately 1,300 feet north to approximately 2,500 feet north of Hunt Highway and from approximately 1,300 feet west to approximately 2,700 feet west of McQueen Road. Several retention basins, designated on the FIRM as Zone AH, SFHAs subject to shallow flooding with depths between 1 foot and 3 feet and with BFEs determined, were added at the following locations: an area approximately 1,500 feet north of Hunt Highway, extending from approximately 400 feet west to approximately 1,400 feet west of McQueen Road, along McQueen Road from approximately 1,300 feet north to approximately 1,500 feet north of Hunt Highway; along McQueen Road from approximately 1,800 feet north to approximately 2,220 feet north of Hunt Highway; and along McQueen Road from approximately 2,250 feet north to approximately 2,400 feet north of Hunt Highway. The base flood will be contained in the retention basins.

Galloway Wash/Andora Hills Wash

A LOMR (FEMA Case No. 02-09-1409X) effective on December 5, 2002, for the Town of Carefree responds to a request that a LOMR dated August 20, 2002, Case No. 01-09-1157P be corrected to show the correct elevation of the 1-percent annual chance flood with a BFE label of 2,164 along Galloway Wash approximately 400 feet downstream of School House Road; to include the correct names of Andora Hills Wash Split 1 and Andora Hills Wash Split 2; and to show corrected road names. The determination made in the December 5 LOMR remains valid. The determinations made for Case No. 01-09-1157P in separate LOMRs for the Town of Cave Creek and the City of Scottsdale that were also issued on August 20, 2002, and that will become effective on December 5, 2002, likewise remain valid. FEMA revised the FIRM to modify the elevations, floodplain and floodway boundary delineations, and zone designations of the base flood along Andora Hills Wash from approximately 1,300 feet downstream of Piedra Grand Drive to just downstream of Carefree Drive; along Galloway Wash from approximately 200 feet downstream of Scopa Trail to just downstream of the confluence with Galloway Wash South Branch; and along Galloway Wash South Branch from just upstream of the confluence with Galloway Wash to approximately 50 feet upstream of Pima Road. As a

result of the modifications, the BFEs for Andora Hills Wash increased, and the widths of the SFHA, and the regulatory floodway increased in some areas and decreased in other areas. BFEs, an SFHA designated Zone AE, with BFEs determined; and a regulatory floodway were added along Andora Hills Wash from approximately 400 feet downstream to just downstream of Carefree Drive. For both Galloway Wash and Galloway Wash South Branch, the BFEs and the widths of the SFHAs and the regulatory floodways increased in some areas and decreased in other areas.

Galloway Wash

A LOMR (FEMA Case No. 01-09-1157P) effective on December 5, 2002, for the City of Scottsdale shows the effects of revised hydrologic and hydraulic analyses and updated topographic information for Galloway Wash from approximately 200 feet upstream of the confluence with Cave Creek to just downstream of the confluence with Galloway Wash Lower Branch (Galloway Wash South Branch); for Galloway Wash South Branch from just upstream of the confluence with Galloway Wash to approximately 1,000 feet upstream of Pima Road; for an Galloway Wash Unnamed Tributary from just upstream to approximately 2,000 feet upstream of the confluence with Galloway Wash; and for Andora Hills Wash from approximately 500 feet upstream of the confluence with Cave Creek to just downstream of Carefree Drive. As a result of the modifications, the BFEs for Galloway Wash South Branch decreased; the width of the SFHA increased in some areas and decreased in other areas; and the width of the regulatory floodway increased from approximately 50 feet upstream to approximately 1,000 feet upstream of Pima Road. BFEs, and SFHA designated Zone AE, with BFEs determined, and a regulatory floodway were added along Galloway Wash South Branch from approximately 600 feet upstream to approximately 1,000 feet upstream of Pima Road. An area designated Zone X, will be added along Galloway Wash South Branch from approximately 50 feet upstream to approximately 1,000 feet upstream of Pima Road.

East Fork Cave Creek/Greenway Parkway Channel

A LOMR (FEMA Case No. 02-09-1253P) effective on November 27, 2002, for the City of Phoenix shows the effects of revised hydrologic and hydraulic analysis as well as updated topographic data for the East Fork of Cave Creek from a point approximately 1.8 miles downstream of Cave Creek Road to a point just downstream of Cave Creek Road. As a result of the modification, the 1-percent annual chance flood is now contained in the Greenway Parkway Channel.

Airline Canal

A LOMR (FEMA Case No. 02-09-272P) effective on January 21, 2003, for the City of Litchfield Park shows the effects of the removal and backfill of Airline Canal between Bullard Avenue and Litchfield Road; construction of retention basins at Millennium High School; and development of both the Litchfield Park, Phase I, and Palm Valley, Phase 3B, residential subdivisions. The SFHA was removed along Airline Canal from Bullard Avenue to approximately 500 feet west of New Litchfield Road. The SFHAs for onsite drainage are contained in retention basins. Flow is diverted from the retention basins to the Roosevelt Irrigation District Canal via open channels and culverts. In most of the revised area, the open channels and culverts do not contain the base flood. However, flows that are not contained in the open channels and culverts are less than 1 foot in

depth. These areas remain designated Zone X (shaded), areas that would be inundated by the base flood with average depths of less than 1 foot.

Agua Fria River

A LOMR (FEMA Case No. 03-09-0278P) effective on February 12, 2003, for the City of Avondale shows that the elevation of the base flood (1-percent annual chance) on the effective FIRM were shown incorrectly in two ponding areas along the right overbank of the Agua Fria River Levee. The ponding areas are located from approximately 100 feet upstream to approximately 600 feet upstream and from approximately 1,200 feet upstream to approximately 1,900 feet upstream of Van Buren Street. As a result of the modifications, the BFEs for the ponding areas decrease.

Moon Valley Wash

A LOMR (FEMA Case No. 03-09-0573) effective on March 25, 2003, for the City of Phoenix better reflects a LOMR that was issued on January 24, 1995 (Case no. 95-09-059P). FEMA was asked to revise the FIRM to redelineate the floodplains along Moon Valley Wash North Branch, from Thunderbird Road to approximately 700 feet upstream of Seventh Street; along Moon Valley Wash North Split from the downstream confluence to the upstream confluence with Moon Valley Wash North Branch; along Moon Valley Wash Diversion Channel; and along Moon Valley Wash South Branch from the confluence with Moon Valley Wash North Branch to approximately 700 feet upstream of Seventh Street. As a result of the modifications, the SFHAs shifted in various directions.

Cave Creek

A LOMR (FEMA Case No. 03-09-05050P) for the City of Phoenix effective on April 10, 2003, shows the effects of a LOMR dated May 8, 1996, for the reach of Cave Creek from just upstream of Bell Road to approximately 800 feet upstream of Union Hills Drive. As a result of the modifications, the widths of the SFHA, and the regulatory floodway for Cave Creek increased in some areas and decreased in other areas, and the SFHA and regulatory floodway also shifted in some areas.

Consolidated Canal

A LOMR (FEMA Case No. 02-09-950P) effective on April 17, 2003, for the City of Mesa shows the effects of new hydrologic analysis and updated topographic data along Consolidated Canal from approximately 800 feet south of McKellips Road to Baseline Road.

Agua Fria River Tributaries

A LOMR (FEMA Case No. 03-09-0302P) effective on April 24, 2003, for Maricopa County (unincorporated areas) shows the effects of an approximate study of tributaries to the Agua Fria River in Watershed UU. As a result of the study the following washes are now listed as Zone A; 7N2ES7, 7N2ES6S, 7N2ES6N, 7N2ES7N-T1, 8N2ES31, 8N2ES31-T1, 8N2ES31-T2, 8N2ES31-T3.

Kerby Estates Subdivision/Consolidated Canal East Branch

A LOMR (FEMA Case No. 03-09-0353P) effective on May 7, 2003, for the City of Chandler shows the effects of placement of fill and relocation of current ponding to designated retention basins in the Kerby Estates subdivision. The area of revision is bounded on the north by Ocotillo Road, on the south by Chandler Heights Road, on the west by Consolidated Canal East Branch (CCEB), and on the east by 118th Street. As a result of the modifications, the BFEs for the area just north of Chandler Heights Road, from CCEB to 118th Street (Retention Basin R-3) decreased; new BFEs were added for the area that extends from approximately 3,000 feet north of Chandler Heights Road to just south of Ocotillo Road, along the eastern side of CCEB (Retention Basin R-1) and for the area that extends from just north to approximately 1,600 feet north of Chandler Heights Road, along the eastern side of CCEB (Retention Basin R-2); and the width of the SFHA, increased in some areas and decreased in other areas. SFHAs designated Zone AH, subject to shallow flooding with average depths between 1 foot and 3 feet and BFEs determined, were removed in the revised area, and new SFHAs designated Zone AE, with BFEs determined, were added for Retention Basins R-1 and R-2. In addition, an SFHA designated Zone AH was redesignated Zone X (shaded), an area that would be inundated by the base flood with average depths of less than 1 foot, from approximately 1,600 feet north to approximately 3,000 feet north of Chandler Heights Road, along the eastern side of CCEB. The base flood is contained in the retention basins.

Consolidated Canal East Branch

A LOMR (FEMA Case No. 03-09-0917X) effective on May 12, 2003, for the City of Chandler redelineates the floodplain boundaries along Consolidated Canal East Branch from just downstream of Frye Road to Chandler Boulevard and from Cooper Road to 131st Street to better reflect the effects of a LOMR issued on July 15, 1996 (Case No. 96-09-914P). A LOMR dated April 14, 2003 (Case No. 03-09-0695P), omitted a statement specifying which lots would be inundated by the base flood. LOMR (Case No. 03-09-0917X) revises the April 14 LOMR. As a result of the modifications, the width of the SFHA for Consolidated Canal East Branch decreased. The floodplain boundaries within the Colonia Coronita subdivision have been modified to show that the base flood is contained within the street and parking areas of the subdivision, with the exception of Lots 4, 7, 330, 331, 332, 420, 421, 500, 501, 502, 550, 553 through 556, 559, 560, 581, and 582.

Agua Fria River

A LOMR (FEMA Case No. 01-09-017P) effective on May 15, 2003, for the City of El Mirage shows the effect of construction of a soil cement levee along the east side of the Agua Fria River from approximately 2,500 feet downstream to just downstream of Northern Avenue. As a result of the modifications, the BFEs for the Agua Fria River increased throughout the revised reach.

Tractor Wash

A LOMR (FEMA Case No. 03-09-0245P) effective on May 20, 2003, for the City of Buckeye shows the effects of realignment of Tractor Wash to the northwest from approximately 3,800 feet upstream to approximately 7,700 feet upstream of the

confluence with Tuthill Dike Wash and channelization along Tractor Wash from approximately 6,400 feet upstream to approximately 6,700 feet upstream of the confluence with Tuthill Dike Wash. As a result of the modifications, the BFEs and the widths of the SFHA and the regulatory floodway increased in some areas and decreased in other areas. All increases in BFE, SFHA width and floodway width are located on property owned by the Caterpillar Foundation in partnership with DMB White Tank LLC.

Southern Pacific Railroad Ditch

A LOMR (FEMA Case No. 02-09-190P) effective on May 22, 2003, for the City of Avondale shows the effects of updated topographic information, placement of levee pipes, excavation of a natural channel, placement of fill, and grading along the Southern Pacific Railroad (SPRR) Ditch from the confluence with the Agua Fria River to approximately 3,200 feet upstream of El Mirage Road. This project also included installation of multiple culverts throughout a golf course along the SPRR ditch from approximately 1,000 feet upstream to approximately 2,600 feet upstream of El Mirage Road. As a result of the modifications, the BFEs for the SPRR Ditch decreased, and the width of the SFHA increased in some areas and decreased in other areas.

Moon Valley Wash North Branch

A LOMR (FEMA Case No. 03-09-0508P) effective on May 28, 2003, for the City of Phoenix shows the effects of updated topographic information for Moon Valley Wash North Branch from 10th Place to approximately 200 feet upstream and of development of the 10th Place and Redfield Road subdivision, which included construction of a retaining wall and placement of fill along Moon Valley Wash North Branch. As a result of the modifications, the BFEs for Moon Valley Wash North Branch increased in some areas and decreased in other areas, and the width of the SFHA decreased. Because the increases and decreases in the BFE are too small to change the whole-foot BFEs shown on the effective FIRM, they will not be published.

Cave Creek

A LOMR (FEMA Case No. 03-09-0290P) effective on May 29, 2003, for the City of Phoenix shows the effects of a new hydraulic analyses and updated topographic data for Cave Creek along Grand Canal from approximately 200 feet upstream of the intersection of 19th Avenue and Grand Canal to just upstream of Seventh Avenue. As a result of the modifications the SFHA width and BFEs have decreased for Cave Creek.

Airline Canal

A LOMR (FEMA Case No. 02-09-1125P) effective on July 1, 2003, for the City of Glendale shows the effects of construction of a residential development along Airline Canal. The project includes grading; construction of an underground 48-inch-diameter corrugated-metal irrigation pipe, replacing the elevated Airline Canal from approximately 1,300 feet downstream of Bethany Home Road to just upstream of Colter Channel; and construction of a trapezoidal channel along 127th Avenue from Colter Channel to 250 feet south of Bethany Home Road. As a result of the modifications, the width of the SFHA for Airline Canal has increased in some areas and decreased in other areas. The SFHA

increased from approximately 900 feet to approximately 1,100 feet upstream of Colter Channel.

Target Southwest Distribution Center/SPRR Ditch

A LOMR (FEMA Case No. 02-09-943P) effective on July 17, 2003, for the City of Phoenix shows the effects of new hydrologic and hydraulic analyses associated with development of the Target Southwest Distribution Center north of the Southern Pacific Railroad (SPRR) Ditch. The project included construction of two retention/detention basins, a channel along Van Buren Street from just upstream of 75th Avenue to just downstream of 71st Avenue, a channel along 75th Avenue from just upstream of the Roosevelt Irrigation District Canal (RIDC) to just downstream of Van Buren Street, and a channel along 71st Avenue from just upstream of the RIDC to just downstream of Van Buren Street. As a result of the modifications, the BFEs for the SPRR Ditch and the width of the SFHA increased in some areas and decreased in other areas. New SFHAs designated Zone A, with no BFEs determined, were established to the two new detention/retention basins. The first basin is located 200 feet east of 75th Avenue and 100 feet south of Van Buren Street, and the second basin is located 1,500 feet east of 75th Avenue and 200 feet south of Van Buren Street.

Agua Fria River

A LOMR (FEMA Case No. 03-09-1014X) effective on August 28, 2003, for the Town of Youngtown shows the effects of a revised hydraulic analysis and updated topographic information along the profile baseline of the Agua Fria River from approximately 4,900 feet downstream of Grand Avenue to approximately 2,500 feet upstream of Bell Road; along West Split Flow through El Mirage from approximately 800 feet downstream to just downstream of Grand Avenue; and along the Atchison, Topeka, and Santa Fe (AT&SF) Railroad Channel from just upstream of Grand Avenue to approximately 1,200 feet downstream of Greenway Road. The effects of constructing three 8-foot by 3-foot concrete box culverts at an unnamed road; and channel realignment along the AT&SF Railroad Channel from approximately 7,700 feet downstream to approximately 1,100 feet downstream of Greenway Road were also asked to be revised by FEMA because of an incorrect case number reference. Case No. 02-09-857P was referenced in a letter dated May 13, 2003. The Case No. should have been referenced as 02-09-945P. As a result of the modifications, the BFEs for the Agua Fria River and the width of the regulatory floodway increased in some areas and decreased in other areas.

Arizona Canal

A LOMR (FEMA Case No. 03-09-0482P) effective on October 23, 2003, for the City of Scottsdale shows the effects of hydrologic and hydraulic analysis incorporating updated topographic information along the watersheds upstream of the Arizona Canal from just upstream of Invergordon Road to approximately 650 feet upstream of 68th Street. As a result of the modifications, increases and decreases in the SFHA width and establishment of BFEs for the revised area.

Unnamed Wash No. 1 and Unnamed Wash No. 2

A LOMR (FEMA Case No. 02-09-858P) effective on October 9, 2003, for the Town of Gila Bend shows the effects of updated topographic information along Unnamed Wash

No. 1 from approximately 1,700 feet downstream to approximately 1,200 feet upstream of South Main Street and along Unnamed Wash No. 2 from approximately 2,000 feet downstream to approximately 2,500 feet upstream of South Main Street and of construction of two 3-barrel concrete box culverts with barrel spans of 6 feet and a rise of 4 feet under South Main Street at Unnamed Wash No. 1 and Unnamed Wash No. 2. As a result of the modifications, the BFEs for Unnamed Wash No. 1 and Unnamed Wash No. 2 increased, and the widths of the SFHA and the regulatory floodways increased in some areas and decreased in other areas.

New River at New River, AZ and Black Wash

A LOMR (FEMA Case No. 02-09-1240P) effective on November 13, 2003, for Maricopa County (unincorporated areas) shows the effects of updated topographic information a new hydraulic analysis for New River from approximately 2,200 feet downstream of the southbound lane of I-17 to approximately 4,600 feet upstream of New River Road. The hydraulic analysis for New River was updated to reflect bridges that were replaced at the I-17 Frontage Road and at New River Road and the levee system that was constructed along the river from approximately 800 feet downstream to approximately 800 feet upstream of New River Road. The effects of a new detailed hydrologic and hydraulic analyses for Black Wash, a tributary to New River, from its confluence with New River to approximately 3,300 feet upstream of the southbound lane of I-17 was also included in this work. As a result of the modifications, the BFEs for the revised reach of New River increased, the width of the SFHA increased in some areas and decreased in other areas, and a regulatory floodway was established along the revised reach. BFEs, an SFHA and a regulatory floodway were added to the FIRM for Black Wash in the studied reach.

Central Arizona Project (CAP) Canal

A LOMR (FEMA Case No. 03-09-0522P) effective on November 13, 2003, for the City of Phoenix shows the effects of placement of fill, detailed hydrologic and hydraulic analyses, and updated topographic information on the northeast side of the CAP Canal along Cave Creek Tributary from approximately 650 feet upstream to approximately 3,400 feet upstream of its confluence with Cave Creek Tributary to approximately 1,300 feet upstream. The affected areas along the northeast side of the CAP Canal were previously designated Zone AE, with BFEs and Zone A, with no BFEs determined. As a result of the modifications, the width of the SFHA increased in some areas and decreased in other areas, and the BFEs increased in the revised Zone AE.

Citrus Valley Wash/Gila Bend Area Drainage Master Study

A LOMR (FEMA Case No. 02-09-807P) effective on November 13, 2003, for Maricopa County (unincorporated areas) shows the effects of detailed hydrologic and hydraulic analyses and updated topographic information along Citrus Valley Wash from approximately 300 feet downstream of Interstate Highway 8 (I-8) (westbound lane) to approximately 5,100 feet upstream of Gila Bend Canal; along Gila Bend Canal Wash from the confluence with Quilotosa Wash to the divergence from Hacker Wash; along I-8 Wash West from the confluence with Saucedo Wash to the divergence from West Quilotosa Wash; along Quilotosa Wash (East Split) from the confluence with Gila Bend Canal Wash to the divergence of Quilotosa Wash; along Quilotosa Wash from approximately 100 feet downstream of I-8 (westbound lane) to approximately 8,800 feet upstream of Gila Bend Canal; along Saucedo Wash from approximately 200 feet

downstream of I-8 (westbound lane) to approximately 6,500 feet upstream of Gila Bend Canal; and along West Quilotosa Wash from approximately 200 feet downstream of I-8 (westbound lane) to approximately 6,700 feet upstream of Gila Bend Canal. The request also incorporated two existing three-barrel concrete box culverts with barrel spans of 12 feet and a rise of 8 feet at each of the I-8 crossings of Quilotosa Wash, Saucedo Wash, and West Quilotosa Wash; two existing 10-foot by 8-foot concrete box culverts along Citrus Valley Wash at I-8; and the Southern Pacific Railroad bridges over Citrus Valley Wash, Quilotosa Wash, Saucedo Wash, and West Quilotosa Wash. The FIRM has been revised to add BFEs, floodplain and floodway boundary delineations, and zone designations along Citrus Valley Wash from approximately 500 feet upstream to approximately 5,100 feet upstream of Gila Bend Canal; along Quilotosa Wash (East Split) from approximately 1,700 feet upstream of the confluence with Gila Bend Canal Wash to the divergence from Quilotosa Wash; along Quilotosa Wash from approximately 2,700 feet upstream to approximately 8,800 feet upstream of Gila Bend Canal; along Saucedo Wash from approximately 1,300 feet upstream to approximately 6,500 feet upstream of Gila Bend Canal; and along West Quilotosa Wash from approximately 1,300 feet upstream to approximately 6,700 feet upstream of Gila Bend Canal. As a result of the modifications, BFEs, SFHAs, and regulatory floodways were added for Citrus Valley Wash, Quilotosa Wash, Quilotosa Wash (East Split), Saucedo Wash, and West Quilotosa Wash.

Bender Wash/Gila Bend ADMS

A LOMR (FEMA Case No. 02-09-857P) effective on November 13, 2003, for Maricopa County (unincorporated areas) shows the effects of detailed hydrologic and hydraulic analyses and updated topographic information along Bender Wash from approximately 200 feet downstream to approximately 8,800 feet upstream of Interstate Highway 8 (I-8); along Bender Wash North Tributary from just upstream to approximately 9,500 feet upstream of the confluence with Bender Wash; along Sand Tank Wash from approximately 100 feet upstream to approximately 7,300 feet upstream of I-8 (eastbound); along Scott Avenue Wash from approximately 100 feet upstream to approximately 9,300 feet upstream of I-8 (eastbound); along I-8 Wash East from just upstream to approximately 3,600 feet upstream of the confluence with Evans Wash; along Pioneer Cemetery Wash from just upstream to approximately 8,000 feet upstream of the confluence with Evans Wash; along Evans Wash from just upstream of the confluence with Hacker Wash to approximately 7,500 feet upstream of the Tucson, Cornelia and Gila Bend Railroad (TCGBRR); along Hacker Wash from approximately 500 feet downstream of Pima Street to approximately 2,200 feet upstream of the TCGBRR; and along Hacker Wash Diversion from approximately 100 feet downstream to approximately 2,000 feet upstream of Pima Street. FEMA revised the floodplain boundary delineations and zone designations of the base flood along Evans Wash from just upstream of Gila Bend Canal to approximately 1,300 feet downstream of the TCGBRR and along Hacker Wash from approximately 6,600 feet downstream to approximately 5,600 feet downstream of the TCGBRR, and to add new flood hazard information along the studied reaches of Bender Wash North Tributary, Bender Wash, Sand Tank Wash, Scott Avenue Wash, I-8 Wash East, Pioneer Cemetery Wash, Evans Wash, and Hacker Wash. As a result of the modifications, the effective SFHAs designated Zone A, with no BFEs determined, along Evans and Hacker Washes were redesignated Zone AE, SFHAs with BFEs determined; the widths of the SFHAs increased; and BFEs and regulatory floodways were added along Evans Wash from just upstream of Gila Bend Canal to approximately 1,300 feet downstream of the TCGBRR

and along Hacker Wash from approximately 6,600 feet downstream to approximately 5,600 feet downstream of the TCGBRR. BFEs, SFHAs, and regulatory floodways were added for Bender Wash North Tributary, Bender Wash, San Tank Wash, Scott Avenue Wash, I-8 Wash East, and Pioneer Cemetery Wash and for Evans Wash and Hacker Wash upstream of the aforementioned reaches.

Buchanan Wash

The LOMR (FEMA Case No. 02-09-290P) effective on September 9, 2004, for the City of Phoenix indicates that a hydraulic analysis was performed to incorporate updated topographic information and the effects of placement of fill along Buchanan Wash from the confluence with Skunk Creek to just downstream of the CAP Canal. This has resulted in a revised delineation of the regulatory floodway, increases and decreases in SFHA width, and increased and decreased BFEs for Buchanan Wash. This LOMR replaces all the information revised on LOMR 03-09-0934P, which was effective on March 25, 2004. Buchanan Wash used to have Cross Sections A to R, and with this LOMR (02-02-290P), it was changed to A to N for the same distance. The change to this LOMR replaces the one dated July 19, 2001.

Moon Valley Wash North Branch, Moon Valley Wash North Split, Moon Valley Wash Diversion Channel, and Moon Valley Wash South Branch

The LOMR (FEMA Case No. 03-09-0012P) effective on April 14, 2004, for the City of Phoenix better reflects the effects of a LOMR issued on January 24, 1995 (FEMA Case No. 95-09-059P). Information was received that better demonstrates that all building pads for Lots 274 and 276 through 279, as shown on the plans entitled “Moon Valley, Book 92, page 2, Maricopa County Recorder,” dated January 4, 2004; Lots 581 and 582, as shown on the plans entitled “Moon Valley II, Book 92, page 27, Maricopa County Recorder,” and Lots 303 and 304, as shown on the plans entitled “Moon Valley, Book 92, page 1, Maricopa County Recorder,” both dated December 31, 2003; Lot 88, as shown on the plans entitled “Moon Valley Cluster Homes, Book 168, page 47, Maricopa County Recorder,” dated January 5, 2004; and Lot 85, as shown on the plans entitled “Moon Ridge Estates, Book 120, page 21, Maricopa County Recorder,” dated March 3, 2003, are outside the SFHA.

Padelford Wash – From CAP Canal to State Route 74

The LOMR (FEMA Case No. 03-09-0315P) effective on March 25, 2005, for Maricopa County (unincorporated areas) reflects the following revised reaches: Padelford Wash from just upstream of the CAP Canal to approximately 4,300 feet north of State Route 74 (SR 74); Padelford Wash (Split 1) from just upstream to approximately 10,900 feet upstream of the CAP Canal; Padelford Wash (Split 2) from just upstream of the CAP Canal to approximately 2,600 feet upstream of Dove Valley Road; Padelford Wash (Split 3) from just upstream of the CAP Canal to approximately 3,700 feet upstream of Dove Valley Road; Padelford Wash (Split 4) from just upstream to approximately 3,400 feet upstream of the CAP Canal; Padelford Wash (Split 5) from just upstream to approximately 5,700 feet upstream of the CAP Canal; Padelford Wash (Tributary A) from the confluence with Padelford Wash to just downstream of SR 74; Padelford Wash (Tributary B) from the confluence with Tributary A to just downstream of SR 74; and Padelford Wash (Tributary C) from the confluence with Padelford Wash to just

downstream of SR 74. Since this revision request also affects the City of Glendale, a separate LOMR for that community was issued on the same date as this LOMR.

Moon Valley Wash North Branch

The LOMR (FEMA Case No. 03-09-448P) effective on March 10, 2005, for the City of Phoenix reflects an updated hydraulic analysis performed for Moon Valley Wash North Branch from just upstream of 7th Street to just downstream of 11th Place. This has resulted in increases and decreases in SFHA width, and increased and decreased BFEs for the revised reach of Moon Valley Wash North Branch. Information provided demonstrates that all building pads for Buildings A through G, as shown on the plans entitled “Grading & Drainage Plans, Moon Valley Corporate Center, Book 662, page 33, Maricopa County Recorder,” dated April 28, 2004, are outside the SFHA, the area that would be inundated by the base (1-percent annual chance) flood.

Indian Bend Wash

The LOMR (FEMA Case No. 04-09-0654X) effective on June 24, 2004, for the City of Phoenix, reflects a study area from approximately 200 feet upstream of North Squaw Peak Freeway to just downstream of the intersection of Acoma Road and 32nd Street. A hydraulic analysis was performed to incorporate updated topographic information, a storm drain, and levee for Indian Bend Wash. This has resulted in a revised delineation of the regulatory floodway, increases and decreases in SFHA width, and increased and decreased BFEs for Indian Bend Wash.

Sonoran Wash

The LOMR (FEMA Case No. 03-09-1019P) effective September 23, 2004, for the City of Phoenix, reflects modified flood elevation determinations for Sonoran Wash. A detailed hydraulic analysis was performed for Sonoran Wash to incorporate a new hydrologic analysis and floodplain delineation study from just upstream to approximately 18,400 feet upstream of its confluence with Skunk Creek. This has resulted in increases in SFHA width and the establishment of a regulatory floodway, an additional SFHA, and BFEs along the revised reach of Sonoran Wash.

Jackrabbit Wash – Watershed “00”

The LOMR (FEMA Case No. 03-09-1020P) effective May 7, 2004, for Maricopa County (unincorporated areas) shows the effects of new hydrologic and hydraulic analyses, new topographic data, and a new floodplain delineation study for the following tributaries to the Hassayampa River: TW-R5-S2, T3-R5-S1, T4-R4-S30, T5-R4-S7-A and –B, T5-R4-S20-A and –B, T5-R4-S21, T6-R4-S27, and T6-R4-S33; for the following tributaries to Daggs Wash: T5-R4-S19, T5-R5-S13-A and –B, T5-R5-S14, T5-R5-S25-A through –C, and T6-R5-S36; for the T3-R5-S33 tributary to Jackrabbit Wash; for the T4-R5-S33 tributary to Star Wash; for the T5-R5-S34-C tributary to Star Wash – Tributary A; for the T5-R5-S35 tributary to Star Wash – Tributary B; for the following tributaries to Star Wash – Tributary C: T5-R5-S34-A and –B; for the T5-R5-S33 tributary to Star Wash – Tributary D; for the following tributaries to Tank Wash: T4-R6-S1 and T4-R5-S7-A and –B; for the T4-R6-S2 tributary to South Branch of Tank Wash; for the following tributaries to Powerline Wash: T5-R6-S30 and T5-R6-S33-A and –B; and for Box Wash.

In addition, based on updated orthographic photos, the FIRM was revised to modify the floodplain and floodway boundary delineations of the base flood along the Hassayampa River from approximately 6,600 feet upstream to approximately 20,000 feet upstream of the Tonopah-Salome-Highway; from approximately 27,000 feet upstream to approximately 30,300 feet upstream of the Tonopah-Salome-Highway; from approximately 7,400 feet downstream to approximately 23,700 feet upstream of the CAP Canal; from approximately 26,800 feet upstream of the CAP Canal to approximately 3,000 feet downstream of the Atchison, Topeka, and Santa Fe Railway (AT&SF); and approximately from approximately 19,000 feet upstream to approximately 25,000 feet upstream of the AT&SF. The FIRM was also revised to modify the floodplain and floodway boundary delineations of the base flood along Daggs Wash from approximately 7,800 feet upstream of the confluence with the Hassayampa River to approximately 3,700 feet downstream of the CAP Canal and from approximately 1,300 feet downstream of the CAP Canal to approximately 200 feet upstream of Peakview Road; along Daggs Wash West Breakout from the convergence with Daggs Wash to the divergence from Daggs Wash; along Daggs Wash East Split Flow from the convergence with Daggs Wash to the divergence from Daggs Wash; along Jackrabbit Wash from the confluence with the Hassayampa River to approximately 6,500 feet downstream of Wickenburg Road and from approximately 14,500 feet upstream of Wickenburg Road to just upstream of Vulture Mine Road; along Jackrabbit Wash Unnamed Tributary from the confluence with Jackrabbit Wash to just downstream of Vulture Mine Road; along Powerline Wash from the confluence with Star Wash to approximately 2,700 feet upstream of Vulture Mine Road; along Tank Wash from the confluence with Star Wash to approximately 4,800 feet upstream of the confluence with South Branch of Tank Wash; along South Branch of Tank Wash from the confluence with Tank Wash to approximately 4,600 feet upstream; along Star Wash from the confluence with Powerline Wash to approximately 100 feet upstream of the Jomax Road alignment; along Star Wash – Tributary A from the confluence with Star Wash to just downstream of the Jomax Road alignment; along Star Wash – Tributary B from the confluence with Star Wash – Tributary A to approximately 3,000 feet downstream of the Jomax Road alignment; along Star Wash – Tributary C from the confluence with Star Wash to just downstream of the Jomax Road alignment; along Star Wash – Tributary D from the confluence with Star Wash to just downstream of the Jomax Road alignment; along Star Wash – Tributary E from the confluence with Star Wash – Tributary D to just downstream of the Jomax Road alignment; along White Tanks Wash from approximately 8,300 feet upstream to approximately 10,000 feet upstream of Indian School Road; along Little San Domingo Wash from the confluence with the Hassayampa River to approximately 400 feet upstream of U.S. Highways 60, 70, and 89 (US 60/70/89); along Turtleback Wash from approximately 8,000 feet upstream to approximately 10,500 feet upstream of the AT&SF; along Wash K from the confluence with the Hassayampa River to approximately 500 feet upstream of US 60/70/89; and along Wash L from just upstream of Palm Lake Spillway to approximately 1,500 feet upstream of US 60/70/89. As a result of the modifications, the SFHAs, regulatory floodways, BFEs, cross sections, and stream lines shifted in various directions. Since this revision request also affects the City of Buckeye, a separate LOMR for that community was issued on the same date as this LOMR.

Aguila ADMP (Aguila Farm Channel and Grass Wash)

The LOMR (FEMA Case No. 03-09-1190P) effective on October 12, 2004, for Maricopa County (unincorporated areas) shows the effects of new detailed hydraulic analyses, new topographic data, an existing culvert under State Route 71 (SR 71), and a new floodplain

delineation for Aguila Farm Channel from approximately 1,000 feet downstream to approximately 32,100 feet upstream of SR 71. This revision also included new hydrologic and hydraulic analyses, new topographic data, and a new floodplain delineation study for the following tributaries to Aguila Farm Channel: T7-R8-S1A, T7-R8-S1B, T7-R8-S1C, T7-R8-S1D, T7-R8-S1E, T7-R8-S1F, T7-R8-S2, T7-R8-S7, T7-R8-S9 and 10, T7-R8-S18, and T7-R9-S12; the following tributaries to Centennial Wash: T7-R9-S4, T7-R9-S17, and T7-R10-S13; Grass Wash from approximately 19,500 feet upstream to approximately 23,900 feet upstream of Black Eagle Road; and the following tributaries to Grass Wash: T7-R8-S30, T7-R9-S22, T7-R9-S25A, T7-R9-S25B, T7-R9-S25C, T7-R9-S25D, and T7-R9-S25E.

The FIRM and FIS report were revised to establish elevations, floodplain and floodway boundary delineations, and zone designations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Aguila Farm Channel from approximately 1,000 feet downstream to approximately 32,100 feet upstream of SR 71 and to establish floodplain boundary delineations and modify zone designations of the base flood along all the other studied reaches listed above. The affected areas, previously designated Zone D, areas in which flood hazards are undetermined but possible, were redesignated Zone X (shaded), areas that would be inundated by the base flood with average depths less than 1.0 foot. As a result of the new study, a SFHA designated Zone AE, with BFEs determined, and a regulatory floodway were added for Aguila Farm Channel. Also as a result of the new study, SFHAs designated Zone A, with no BFEs determined, were added for all the other studies reaches above.

Upper Agua Fria River – Watersheds 3 & 4

A LOMR (FEMA Case No. 03-09-1312P) effective on January 19, 2004, for Maricopa County (unincorporated areas) shows the effects of new hydrologic and hydraulic analyses, new topographic data, and updated bridge and culvert information along Moores Gulch, Moores Gulch Tributaries 1 through 6, Little Squaw Creek, Little Squaw Creek Tributaries 1 through 5, and Wash 8N2ES16. On the effective FIRM, the SFHA, the area that would be inundated by the flood having a 1-percent annual chance of being equaled or exceeded in any given year (base flood), along Moores Gulch from just upstream to approximately 31,300 feet upstream of its confluence with the Agua Fria River is designated Zone A, an SFHA with no BFEs determined. The effective FIRM also shows an SFHA designated Zone A along Little Squaw Creek from just upstream to approximately 23,500 feet upstream of its confluence with the Agua Fria River. In addition, the effective FIRM shows an area designated Zone D, an area in which flood hazards are possible but undetermined, along Moores Gulch from approximately 43,000 feet upstream to approximately 49,500 feet upstream of its confluence with the Agua Fria River.

As a result of the modifications, the width of the SFHA for Moores Gulch decreased from just upstream to approximately 12,400 feet upstream of its confluence with the Agua Fria River; a new SFHA designated Zone A was delineated along Moores Gulch from approximately 31,300 feet upstream to approximately 49,500 feet upstream of its confluence with the Agua Fria River; and a new area designated Zone X (shaded), an area subject to inundation by the base flood with the average depths of less than 1 foot, was added along Moores Gulch from approximately 43,000 feet upstream to approximately 49,500 feet upstream of its confluence with the Agua Fria River. Also as a result of the modifications, the width of the SFHA for Little Squaw Creek decreased from just

upstream to approximately 24,700 feet upstream of its confluence with the Agua Fria River, new SFHAs designated Zone A were delineated for Moores Gulch Tributaries 1 through 6, Little Squaw Creek Tributaries 1 through 5, and Wash 8N2ES16; and an area designated Zone X (shaded) was added along Moores Gulch Tributary 6 from just upstream to approximately 1,600 feet upstream of its confluence with Moores Gulch.

Wigwam Creek – Phase 2 and 2B

A LOMR (FEMA Case No. 03-09-1538P) effective on June 14, 2004, for Maricopa County (unincorporated areas), addresses channel relocation, culvert addition, placement of fill, and other storm drain issues. The revised reaches of this study affect El Mirage Channel, from just upstream of Colter Channel to approximately 1,300 feet upstream of Bethany Home Road; Greenbelt Channel, from just downstream of Wigwam Creek Boulevard to just upstream of Bethany Home Road; and Airline Canal, from approximately 500 feet downstream to just downstream of Colter Channel and from approximately 1,300 feet downstream to just upstream of Bethany Home Road. Since this revision also affects the City of Glendale, a separate LOMR for that community was issued on the same date as this LOMR.

Luke Wash – Watershed “PP”

A LOMR (FEMA Case No. 03-09-1562P) effective on May 7, 2004, for Maricopa County (unincorporated areas), as a result of the modifications, new SFHAs designated Zone A, SFHAs with no BFEs determined, were delineated for the following watercourses: T1N-R5W-S04, T1N-R5W-S10, T1N-R5W-S15, T1N-R5W-S22, T2N-R5W-S04, T2N-R5W-S05E, T2N-R5W-S05W, T2N-R5W-S21, T2N-R5W-S27N, T2N-R5W-S27S, T2N-R5W-S33E, T2N-R5W-S33W, T3N-R5W-S20, T3N-R5W-S21N, T3N-R5W-S21S, T3N-R5W-S28N, T3N-R5W-S28S, T3N-R5W-S32E, T1S-R5W-S22S, T1S-R5W-S29, T1S-R5W-S29E, and T1S-R5W-S29W. New SFHAs designated Zone A were delineated for the tributary streams to Luke Wash from just upstream to approximately 97,000 feet upstream of the SPRR; to Luke Wash Minor Tributary from just upstream to approximately 4,400 feet upstream of the SPRR; to East Main Tributary to Luke Wash from just upstream to approximately 24,000 feet upstream of the SPRR; and to East Sub-Tributary to Luke Wash from approximately 5,000 feet upstream to approximately 10,300 feet upstream of its confluence with East Main Tributary to Luke Wash. In addition, an SFHA designated Zone A was delineated for T1S-R5W-S22N from its confluence with East Main Tributary to Luke Wash to approximately 9,000 feet upstream.

Loop 303 White Tanks ADMP – Update Floodplain Delineations

The LOMR (FEMA Case No. 03-09-1653P) effective on December 30, 2004, for Maricopa County (unincorporated areas) indicates that hydrologic and hydraulic analyses were performed for Bullard Wash to incorporate existing watershed conditions, more detailed topographic information, and a floodplain delineation study from just upstream of Indian School Road to just downstream of Litchfield Road. This has resulted in the establishment of a regulatory floodway between Indian School Road and Camelback Road, a revised delineation of the regulatory floodway between Camelback Road and Bethany Home Road, increases and decreases in SFHA width, and increases and decreases in BFEs for Bullard Wash. Since these revisions also affect the City of

Glendale, City of Goodyear, and the City of Litchfield Park, a separate LOMR for those communities was issued on the same date as this LOMR.

Palm Valley Phase 1

The LOMR (FEMA Case No. 04-09-0274P) effective on November 26, 2004, for the City of Avondale and the City of Goodyear indicates the hydrologic and hydraulic analyses performed for the Roosevelt Irrigation District Canal, from approximately 1,500 feet downstream of McDowell Road to just downstream of Roosevelt Canal.

Southern Pacific Railroad Ditch

The LOMR (FEMA Case No. 04-09-0311P) effective on September 23, 2004, for Maricopa County (unincorporated areas) shows the effects of a hydraulic analysis that was performed to incorporate an updated hydrologic analysis, the effects of channelization and a culvert, and new topographic information for the Southern Pacific Railroad Ditch along the Glenhurst Project, from approximately 500 feet upstream of the confluence with the Agua Fria River to approximately 1,000 feet upstream of 115th Avenue. Since this revision also affects the City of Avondale, a separate LOMR for that community was issued on the same date as this LOMR.

Loop 303 White Tanks ADMP – Update Floodplain Delineations

The LOMR (FEMA Case No. 04-09-0318P) effective on December 30, 2004, for Maricopa County (unincorporated areas) reflects changes made by a detailed hydraulic analysis which was performed for Camelback Wash to incorporate a new hydrologic analysis and floodplain delineation study from the confluence with Bullard Wash to approximately 2,300 feet upstream of Curtis Road and 2,300 feet downstream of Reems Road. This has resulted in the establishment of an SFHA and BFEs for the revised reach of Camelback Wash. Since this revision also affects the City of Glendale and the City of Goodyear, a separate LOMR for those communities was issued on the same date as this LOMR.

North Gateway Transfer North Station

The LOMR (FEMA Case No. 04-09-0381P) effective on March 30, 2005, for the City of Phoenix indicates the effects of a new hydraulic analysis and provides new topographic data for Skunk Creek, from approximately 1,500 feet upstream to 6,400 feet upstream of Granite Reef Aqueduct.

Tuthill Dike Wash Channelization

The LOMR (FEMA Case No. 04-09-0544P) effective on May 27, 2004, for the City of Buckeye shows the effects of a hydraulic analysis that was performed to incorporate the effects of placement of fill, a new culvert, and channelization and relocation of Tuthill Dike Wash from approximately 2,800 feet downstream of Thomas Road to approximately 1,600 feet upstream of Indian School Road, and channelization and relocation of Tractor Wash from the confluence with Tuthill Dike Wash to approximately 2,800 feet upstream. This has resulted in a revised delineation of the regulatory floodway, increases and decreases in SFHA width, and increased and decreased BFEs for both watercourses.

CW Ranch

The LOMR (FEMA Case No. 04-09-0552P) effective on December 21, 2004, for Maricopa County (unincorporated areas) indicates that a hydraulic analysis was performed to incorporate an updated hydrologic analysis, the effects of channelization and a culvert, and new topographic information for Southern Pacific Railroad Ditch and an unnamed tributary, from approximately 200 feet upstream to approximately 1,000 feet upstream of 111th Avenue. This has resulted in a decrease in SFHA width and decreased BFEs for the Southern Pacific Railroad Ditch and the establishment of an SFHA along the unnamed tributary. Since this revision also affects the City of Avondale, a separate LOMR for that community was issued on the same date as this LOMR.

Osborn Road Wash Channelization

The LOMR (FEMA Case No. 04-09-0585P) effective on May 27, 2004, for the City of Buckeye, reflects the effects of a hydraulic analysis performed to incorporate the effects of placement of fill and channelization along Osborn Road Wash from the confluence with Tuthill Dike Wash to approximately 5,600 feet upstream of Caterpillar Proving Ground Road. This has resulted in a revised delineation of the regulatory floodway, increases and decreases in SFHA width, and increased and decreased BFEs for Osborn Road Wash. The aforementioned channelized portion of Osborn Road Wash contains the base flood.

Indian Bend Wash Channel Improvements at Hearn Road

The LOMR (FEMA Case No. 04-09-0654X) effective on June 24, 2004, for the City of Phoenix, follows up on a Conditional LOMR issued on March 17, 2002 (FEMA Case No. 03-09-0910P). This LOMR reflects the revision of the FIRM and FIS report, modifying the elevations and floodplain and floodway boundary delineations of the base flood along Indian Bend Wash. As a result of the modifications, the BFEs for Indian Bend Wash and the widths of the SFHA, the area that would be inundated by the base flood, and the regulatory floodway increased in some areas and decreased in other areas. A hydraulic analysis was performed to incorporate updated topographic information, a storm drain, and a levee for Indian Bend Wash. The areas affected by these modifications are approximately 700 feet upstream of North Squaw Peak Freeway, and approximately 1,000 feet upstream of North Squaw Peak Freeway.

Watershed "OO" Zone A Study – Coyote Wash and Jackrabbit Wash Tributaries

The LOMR (FEMA Case No. 04-09-0659P) effective on February 18, 2005, for Maricopa County (unincorporated areas) indicates the revisions to the FIRM showing the effects of new hydrologic and hydraulic analyses, new topographic data, and a new floodplain delineation study for T3-R6-S13; the following tributaries to Beer Bottle Wash: T4-R6-S27 and T4-R6-S35; the following tributaries to Coyote Wash: T3-R5-S12, Beer Bottle Wash, T4-R6-S22, T4-R7-S11, T4-R7-S13, and T4-R7-S22; the following tributaries to Dead Horse Wash: T5-R7-S8, T5-R7-S9, T5-R7-S10, T5-R8-S13, T5-R8-S28-A, T5-R8-S34-A and –B, T4-R8-S3, and T4-R8-S4; and the following tributaries to Upper Jackrabbit Wash: T4-R6-S5, T4-R6-S7, T4-R6-S8, Woodchopper Wash, T5-R6-S31, T5-R7-S23-A and –B, T5-R8-S36-A, Dead Horse Wash, T5-R7-S5, T5-R7-S11, T6-R7-S29, T5-R8-S2, T5-R8-S10-A and –B, T6-R8-S34, and T6-R8-S35-A and –B. A

portion of the area affected by this revision, although shown on the FIRM as in the unincorporated areas of Maricopa County, was annexed by the City of Buckeye.

The FIRM has been revised to establish floodplain boundary delineations and modify zone designations of the base flood along the studies reaches listed above. The affected areas, previously designated Zone D, areas in which flood hazards are undetermined but possible, were redesignated Zone X (shaded), areas that would be inundated by the base flood with average depths less than 1.0 foot. As a result of the new study, SFHAs designated Zone A, with no BFEs determined, were added to the FIRM. Administrative floodways were delineated along the newly studied reaches listed above for local management of flood hazards in designated areas. Since these revisions also affect the City of Buckeye, a separate LOMR for that community was issued on the same date as this LOMR.

Riverwalk Villages Phase 2A

The LOMR (FEMA Case No. 04-09-0716P) effective on June 22, 2004, for the City of Phoenix, indicates that new hydraulic analyses were performed to incorporate the effects of placement of fill along the south bank of the Salt River, in the vicinity of the Riverwalk Villages Phase 2 development, from approximately 800 feet downstream to just downstream of 51st Avenue. This has resulted in a decrease in SFHA width and decreased BFEs for the Salt River.

Approximate Floodplain Delineation of Watershed "OO"

The LOMR (FEMA Case No. 04-09-0756P) effective on October 8, 2004, for Maricopa County (unincorporated areas) shows the effects of new hydrologic and hydraulic analyses, new topographic data, and a new floodplain delineation study for the T5-R5-S25-B tributary to Dags Wash; the following tributaries to Star Wash: T4-R5-S33, T5-R5-S18, T5-R5-S29-A and -B, T5-R5-S33, T5-R5-S8, T5-R5-S21-A and -B, T5-R5-S34-A through -C, T5-R5-S16, T5-R5-S17, T6-R5-S21, T5-R5-S10-A, T5-R5-S23-A and -B, T5-R5-S35, T5-R5-S14, and T6-R5-S35; the following tributaries to Tank Wash: T5-R5-S31, T6-R6-S25, T4-R6-S1, T4-R5-S7-A and -B, T5-R6-S18, T5-R6-S12-A and -B, T5-R6-S13, and T6-R6-S22; the following tributaries to Powerline Wash: T5-R7-S14, T6-R7-S34, T5-R6-S30 and T5-R6-S33-A and -B; and Jimmie Wash.

Twin Buttes Wash and White Peak Wash Improvements

The LOMR (FEMA Case No. 04-09-0960P) effective on November 18, 2004, for the City of Peoria, shows the effects of a hydraulic analysis that was performed to incorporate more detailed topographic information and the effects of placement of fill along Twin Buttes Wash and White Peak Wash. This has resulted in a decrease in SFHA width and increased BFEs for Twin Buttes Wash and White Peak Wash. The following reaches were affected: Twin Buttes Wash, from approximately 3.668 miles upstream to approximately 4.621 miles upstream of the confluence with the Agua Fria River, and White Peak Wash, from approximately 0.491 mile upstream to approximately 0.852 mile upstream of the confluence with Twin Buttes Wash.

Carefree Drainage Master Plan

The LOMR (FEMA Case No. 04-09-1301P) effective on November 24, 2004, for the City of Scottsdale and the Town of Carefree shows the revised FIRM and FIS report, modifying the elevations, floodplain and floodway boundary delineations, and zone designations of the base flood along Galloway Wash Middle Branch, from approximately 200 feet upstream to approximately 1,000 feet upstream of Paint Pony Drive. The FIRM and FIS report have been revised to modify the zone designations and to establish BFEs and base floodplain boundary delineations along Galloway Wash Middle Branch Tributary from the confluence with Galloway Wash Middle Branch to approximately 700 feet upstream of Paint Pony Drive, along Cave Creek Unnamed Central Tributary from just upstream of Carefree Highway to approximately 100 feet downstream of Scottsdale Road, and along Windmill Wash from just upstream of Stagecoach Pass to just upstream of Pima Road. The FIRM and FIS report have been revised to modify the zone designations and to establish BFEs and base floodplain boundary delineations along Eastern Pima Wash from just upstream of Stagecoach Pass to approximately 600 feet upstream of Twilight Trail, along Cave Creek Unnamed Central Tributary from just upstream of Terravita Sunset Trail to just upstream of Carefree Highway and a portion approximately 100 feet downstream of Scottsdale Road, and along Stagecoach Pass Wash Unnamed Tributary from the confluence with Stagecoach Pass Wash to approximately 300 feet upstream of Wild Flower Road. The base flood is contained along Stagecoach Pass Wash Unnamed Tributary from approximately 300 feet upstream of Wild Flower Road to approximately 400 feet upstream of Romping Road; along Windmill Wash from just upstream of Pima Road to the confluence of Windmill Wash North Branch; along Windmill Wash North Branch from the confluence with Windmill Wash to approximately 1,900 feet upstream of Milky Way; and along Windmill Wash South Branch from the confluence with Windmill Wash to approximately 1,500 feet upstream of Milky Way. BFEs and SFHAs designated Zone AE were added to the FIRM for the reaches described above.

Bullard Wash Channel at Goodyear Planned Regional Center

The LOMR (FEMA Case No. 04-09-1512P) effective on March 10, 2005, for the City of Goodyear, indicates that a hydraulic analysis was performed to incorporate the effects of a new drop structure, channel relocation and channelization along Bullard Wash, from approximately 300 feet upstream of McDowell Road to just upstream of Thomas Road. This has resulted in a revised delineation of the regulatory floodway, increases and decreases in SFHA width, and increased and decreased BFEs for Bullard Wash.

Arizona Canal Floodplain Redelineation

The LOMR (FEMA Case No. 05-09-0403X) effective on February 4, 2005, for the City of Scottsdale, had the FIRM revised to redelineate the floodplain boundaries along the Arizona Canal from just upstream of Invergordon Road to approximately 650 feet upstream of 68th Street.

TABLE 8. LETTERS OF MAP CHANGE

<u>COMMUNITY AND CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
<u>City of Avondale</u>			
01-09-018P	Palmilla Apartments	Agua Fria River Levee Pond	July 24, 2001
01-09-497P	Roosevelt Irrigation District Canal Overchute	Roosevelt Irrigation District Canal (RID)	August 23, 2001
02-09-190P	Coldwater Springs – A portion of Parcel 15	Southern Pacific Railroad (SPRR) Ditch	May 22, 2003
02-09-257P	Roosevelt Irrigation District Canal	Roosevelt Irrigation District Canal (RID)	January 15, 2002
03-09-0278P	NE corner of Van Buren Street & Eliseo C. Felix Jr. Way – Parcel 2	Agua Fria River Levee ponding areas	February 12, 2003
04-09-0274P	Palm Valley Phase I	Roosevelt Irrigation District Canal	November 26, 2004
04-09-0311P	Channelization of Southern Pacific Railroad Floodplain Along Glenhurst Project	Southern Pacific Railroad Ditch	September 23, 2004
04-09-0522P	CW Ranch	Southern Pacific Railroad Ditch	December 21, 2004
<u>City of Buckeye</u>			
01-09-453P	White Tanks Flood Retarding Structure #4 Inlet Channel Improvements	Jackrabbit Trail Wash	October 9, 2001
02-09-386P	White Tank Fan, Site 36	White Tank Alluvial Fan 36	September 16, 2002
03-09-0245P	Tractor Wash Channelization	Tractor Wash	May 20, 2003
03-09-1020P	Approximate Delineation of Watershed “OO”	Washes T2-R5-S2, T3-R5-S1, T4-R4-S30, T5-R4-S3, T5-R4-S7-A, T5-R4-S7-B, T5-R4-S20-A, T5-R4-S20B, T5-R4-S21, T6-R4-S27, T6-R4-S33, T5-R4-S19, T5-R5-S13-A, T5-R5-S13-B, T5-R5-S14, T5-R5-S25-A, T5-R5-S25-B, T5-R5-S25-C, T6-R5-S36, T3-R5-S33, T4-R5-S33, T5-R5-S34-C, T5-R5-S35, T5-R5-S34-A, T5-R5-S34-B, T5-R5-S33, T4-R6-S1, T4-R5-S7-A, T4-R5-S7-B, T4-R6-S2, T5-R6-S30, T5-R6-S33-A, T5-R6-S33-B	May 7, 2004
04-09-0544P	Tuthill Dike Wash Channelization	Tuthill Dike Wash, Tractor Wash	May 27, 2004
04-09-0585P	Osborn Road Wash Channelization	Osborn Road Wash	May 27, 2004

TABLE 8. LETTERS OF MAP CHANGE - continued

<u>COMMUNITY AND CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
<u>City of Buckeye (continued)</u> 04-09-0659P	Watershed "OO" Zone A Study – Coyote Wash, and Jackrabbit Wash Tributaries	Washes T3-R6-S13, T4-R6-S27, T4-R6-S35, T3-R5-S12, Beer Bottle, T4-R6-S22, T4-R7-S11, T4-R7-S13, T4-R7-S22, T5-R7-S8, T5-R7-S9, T5-R7-S10, T5-R8-S13, T5-R8-S28-A, T5-R8-S34-A, T5-R8-S34-B, T4-R8-S3, T4-R8-S4, T4-R6-S5, T4-R6-S7, T4-R6-S8, Woodchopper, T5-R6-S31, T5-R7-S23-A, T5-R7-S23-B, T5-R8-S36-A, Dead Horse, T5-R7-S5, T5-R7-S11, T6-R7-S29, T5-R8-S2, T5-R8-S10-A, T5-R8-S10-B, T6-R8-S34, T5-R8-S35-A, T6-R8-S35-B	February 18, 2005
<u>Town of Carefree</u> 02-09-1409X	Floodplain Delineation Study of Andora Hills and Galloway Washes	Galloway Wash, Andora Hills Wash Split 1, Andora Hills Wash Split 2	December 5, 2002
04-09-1301P	Carefree Drainage Master Plan	Galloway Wash Middle Branch, Tributary to Galloway Wash Middle Branch, Cave Creek Unnamed Central Tributary, Windmill Wash	November 24, 2004
<u>Town of Cave Creek</u> 02-09-241X	Cave Creek Floodplain Revision	Cave Creek	April 3, 2002
02-09-1409X	Floodplain Delineation Study of Andora Hills and Galloway Washes	Galloway Wash, Andora Hills Wash Split 1, Andora Hills Wash Split 2	December 5, 2002
<u>City of Chandler</u> 02-09-248P	Fieldstone Estates	Southern Pacific Railroad	October 30, 2002
03-09-0353P	Kerby Estates	Consolidated Canal East Branch	May 7, 2003
03-09-0917X	Redelineation of Colonia Coronita Homes	Consolidated Canal East Branch	May 12, 2003

TABLE 8. LETTERS OF MAP CHANGE - continued

<u>COMMUNITY AND CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
<u>City of El Mirage</u>			
00-09-083P	Lower El Mirage Wash & Lower El Mirage Wash Tributary Channelization	Lower El Mirage Wash, Lower El Mirage Wash Tributary	January 4, 2002
01-09-017P	City of Glendale Recycling Facility	Agua Fria River	May 15, 2003
01-09-364A	Arizona Brisas Phase 3, Lots 17-18, 24, 28-30, 55-56, 60-61, 79-80, 82-84, 88-135, 142-151, 170-178, 183-190, 214-221, 223-230, 259-269, 320-309, 325-327, 341-357; Phase 2, Lots 403-427	Agua Fria River	April 13, 2001
02-09-337A	Walgreens, 15385 North Dysart Road	Lower El Mirage Wash Tributary	February 27, 2002
02-09-945P	Agua Fria Floodplain Delineation from Cactus Road to Bell Road	Agua Fria River, West Split Flow Through El Mirage, Atchison, Topeka and Santa Fe (AT&SF) Railroad Channel	August 28, 2003
02-09-1008P	Sundial 4	Agua Fria River	June 3, 2002
02-09-1049A	Arizona Brisas Phases I, II, III	Agua Fria River	August 28, 2002
02-09-1136X	Sundial 4, Lots 1458-1498, 1533-1536, 1679, 1706-1724, 1734-1770, 1772-1885	Agua Fria River	June 21, 2002
02-09-1199A	Sundial 4, Lots 1789 & 1790	Agua Fria River	August 21, 2002
<u>Town of Gila Bend</u>			
02-09-807P	Gila Bend ADMP/Floodplain Delineation Study	Citrus Valley Wash, Gila Bend Canal Wash, I-8 Wash West, Quilotosa Wash, Quilotosa Wash (East Split), Saucedo Wash, West Quilotosa Wash	November 13, 2003
02-09-857P	Gila Bend ADMP/Floodplain Delineation Study	Bender Wash, Bender Wash North Tributary, Evans Wash, Hacker Wash, Hacker Wash Diversion, I-8 Wash East, Pioneer Cemetery Wash, Sand Tank Wash, Scott Avenue Wash	November 13, 2003
02-09-858P	Gila Bend ADMP/Floodplain Delineation Study	Unnamed Wash No. 1, Unnamed Wash No. 2	October 9, 2003

TABLE 8. LETTERS OF MAP CHANGE - continued

<u>COMMUNITY AND CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
<u>City of Glendale</u>			
01-09-017P	City of Glendale Recycling Facility	Agua Fria River	May 15, 2003
02-09-1125P	Wigwam Creek, Phase 1	Airline Canal	July 1, 2003
03-09-1538P	Wigwam Creek, Phases 2 & 2B	El Mirage Channel, Greenbelt Channel, Airline Canal	June 14, 2004
03-09-1653P	Loop 303 White Tanks ADMP Update Floodplain Delineations	Bullard Wash, Bullard Wash West Tributary	December 30, 2004
04-09-0318P	Loop 303 White Tanks ADMP Update Floodplain Delineations	Camelback Wash	December 30, 2004
<u>City of Goodyear</u>			
01-09-497P	Roosevelt Irrigation District Canal Overchute	Roosevelt Irrigation Canal (RID)	August 23, 2001
02-09-257P	Roosevelt Irrigation District Canal	Roosevelt Irrigation Canal (RID)	January 15, 2002
02-09-272P	The Village of Litchfield Park, Phase I	Airline Canal	January 21, 2003
03-09-1653P	Loop 303 White Tanks ADMP Update Floodplain Delineations	Bullard Wash, Bullard Wash West Tributary	December 30, 2004
04-09-0274P	Palm Valley Phase I	Roosevelt Irrigation District Canal	November 26, 2004
04-09-0318P	Loop 303 White Tanks ADMP Update Floodplain Delineations	Camelback Wash	December 30, 2004
04-09-1512P	Bullard Wash Channel at Goodyear Planned Regional Center	Bullard Wash	March 10, 2005
<u>City of Litchfield Park</u>			
02-09-272P	The Village of Litchfield Park, Phase I	Airline Canal	January 21, 2003
03-09-1653P	Loop 303 White Tanks ADMP Update Floodplain Delineations	Bullard Wash, Bullard Wash West Tributary	December 30, 2004
<u>City of Mesa</u>			
02-09-260P	Eastern Canal North Flood Delineation Study	Eastern Canal	September 19, 2002
02-09-950P	Consolidated Canal Floodplain Delineation Study, FCD 99-09	Consolidated Canal	April 17, 2003
<u>Town of Paradise Valley</u>			
02-09-196P	Indian Bend Wash	Indian Bend Wash	January 23, 2002

TABLE 8. LETTERS OF MAP CHANGE - continued

<u>COMMUNITY AND CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
<u>City of Peoria</u>			
01-09-017P	City of Glendale Recycling Facility	Agua Fria River	May 15, 2003
01-09-1060P	Floodplain and Floodway Delineation for Rock Springs Creek	Rock Springs Creek	June 13, 2002
01-09-1111P	Desert Star Development		December 10, 2001
02-09-031P	North Peoria Area Drainage Master Plan	Caterpillar Tank Wash, Tributary 1 to Unnamed Wash 1, Tributary 1 to Unnamed Wash 2, Tributary 2 to Unnamed Wash 2, Tributary 1 to Unnamed Wash 7, Twin Buttes Wash, Unnamed Wash 1, Unnamed Wash 2, Unnamed Wash 3, Unnamed Wash 4, Unnamed Wash 5, Unnamed Wash 6, Unnamed Wash 7, Unnamed Wash 8, Unnamed Wash 9	May 15, 2002
02-09-1138P	Approximate Zone A Floodplain Delineation Study of Watershed UU (Upper Agua Fria)	Washes T6Nr1ES4, T7NR1ES34, T7NR1ES35, T7NR1ES26-1, T7NR1ES26-2, T7NR1ES26-2A, T7NR1ES26-2B, T7NR1ES26-3	October 17, 2002
03-09-0315P	Padelford Wash – From Central Arizona Project Canal to State Route 74	Padelford Wash, Padelford Wash Split 1, Padelford Wash Split 2, Padelford Wash Split 3, Padelford Wash Split 4, Padelford Wash Split 5, Padelford Wash Tributary A, Padelford Wash Tributary B, Padelford Wash Tributary C	March 25, 2005
04-09-0960P	Twin Buttes Wash and White Peak Wash Improvement	Twin Buttes Wash, White Peak Wash	November 18, 2004
<u>City of Phoenix</u>			
01-09-285P	Dreamy Draw Wash West at ACDC Zone AE Without Floodway	Dreamy Draw Wash West	October 15, 2001
01-09-526P	Cave Creek Channelization SEC 19 th Ave to Greenway Road	Cave Creek	December 12, 2001
01-09-1003P	Tramanto Master Planned Community – Skunk Creek	Skunk Creek	September 10, 2001
02-09-117P	2969 North 19 th Avenue Unit 44	Cave Creek and Grand Canal	January 14, 2002
02-09-290P	Buchanan Wash Restudy	Buchanan Wash	September 9, 2004

TABLE 8. LETTERS OF MAP CHANGE - continued

<u>COMMUNITY AND CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
<u>City of Phoenix (continued)</u>			
02-09-723P	Sheely Farms East	Roosevelt Irrigation District (RID) Canal	April 23, 2002
02-09-943P	Target Southwest Distribution Center	Southern Pacific Railroad Ditch	July 17, 2003
02-09-1064P	Flood Plain Delineation for Indian Bend Wash	Indian Bend Wash	June 28, 2002
02-09-1208P	Grandview Road	East Fork of Cave Creek	September 16, 2002
02-09-1253P	E. Fork Cave Creek – Upper East. Fork Cave Creek Channel/Greenway Parkway Channel	East Fork of Cave Creek	November 27, 2002
03-09-0012P	Moon Valley Wash LOMR	Moon Valley Wash, Moon Valley Wash North Branch, Moon Valley Wash North Split, Moon Valley Wash Diversion Channel, Moon Valley Wash South Branch	April 14, 2004
03-09-0290P	Grand Canal Floodplain Restudy	Cave Creek and Grand Canal	May 29, 2003
03-09-0448P	Moon Valley Corporate Center	Moon Valley Wash North Branch	March 10, 2005
03-09-0505P	Cave Creek Map Error	Cave Creek	April 10, 2003
03-09-0508P	10 th Place and Redfield Subdivision	Moon Valley Wash North Branch	May 28, 2003
03-09-0522P	Eagle Bluff II	Cave Creek Tributary, Cave Creek Tributary Tributary	November 13, 2003
03-09-0573P	Moon Valley Wash Redelineation	Moon Valley Wash North Branch, Moon Valley Wash North Split, Moon Valley Wash Diversion Channel, Moon Valley Wash South Branch	March 25, 2003
03-09-1019P	Skunk Creek Watercourse Master Plan	Sonoran Wash	September 23, 2004
04-09-0179P	Charter Oak Road	Indian Bend Wash	December 17, 2003
04-09-0654X	Indian Bend Wash Channel Improvements at Hearn Road	Indian Bend Wash	June 24, 2004
04-09-0381P	North Gateway Transfer North Station	Skunk Creek	March 30, 2005
04-09-0716P	Riverwalk Villages Phase 2A	Salt River	June 22, 2004
<u>City of Scottsdale</u>			
01-09-1199P	Upper Rawhide Wash Floodplain Delineation Study	Rawhide Wash, Rawhide Wash Tributary 1, Rawhide Wash Tributary 2, Tributary 3 to Rawhide Wash, Rawhide Wash Tributary 4	June 5, 2002
01-09-171P	Thomas Road to McDowell Road	Cross Cut Canal	August 1, 2001
01-09-632P	DC Ranch	Beardsley Wash North, Beardsley Wash South, Beardsley Wash Breakout South	August 31, 2001
02-09-196P	Indian Bend Wash	Indian Bend Wash	January 23, 2002

TABLE 8. LETTERS OF MAP CHANGE - continued

<u>COMMUNITY AND CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
<u>City of Scottsdale (continued)</u>			
02-09-1084X	Doubletree Ranch Road to Via Linda; Wash B	Wash B, Wash B Tributary	October 24, 2002
02-09-1409X	Floodplain Delineation Study of Andora Hills and Galloway Washes	Galloway Wash, Andora Hills Wash Split 1, Andora Hills Wash Split 2	December 5, 2002
03-09-0482P	Arizona Canal Floodplain Redelineation	Arizona Canal	October 23, 2003
04-09-1301P	Carefree Drainage Master Plan	Galloway Wash Middle Branch, Eastern Pima Wash, Unnamed Central Tributary to Cave Creek, Unnamed Tributary to Stagecoach Pass, Windmill Wash, Windmill Wash North Branch, Windmill Wash South Branch	November 24, 2004
05-09-0403X	Arizona Canal Floodplain Redelineation	Arizona Canal	February 4, 2005
<u>City of Surprise</u>			
00-09-083P	Lower El Mirage Wash & Lower El Mirage Wash Tributary Channelization	Lower El Mirage Wash, Lower El Mirage Wash Tributary	January 4, 2002
01-09-973P	Channelization of Reems Road Floodplain – Greenway Road to Hearn Road	Reems Road	November 2, 2001
02-09-165P	Reems Road, Mountain Vista Ranch Development	Reems Road	February 19, 2002
02-09-945P	Agua Fria Floodplain Delineation from Cactus Road to Bell Road	Agua Fria River, Atchison, Topeka and Santa Fe Railroad Channel, West Split Flow through El Mirage	August 28, 2003
<u>City of Tolleson</u>			
02-09-943P	Target Southwest Distribution Center	Southern Pacific Railroad Ditch	July 17, 2003
<u>Town of Youngtown</u>			
03-09-1014X	Agua Fria Floodplain Delineation from Cactus Road to Bell Road	Agua Fria River, Atchison, Topeka and Santa Fe Railroad Channel, West Split Flow through El Mirage	August 28, 2003
03-09-1272A	Agua Fria Ranch, Lots 1-2, portion of Section 25, T3N, R1W, G.&S.R.B.&M.	Agua Fria River	September 10, 2003

TABLE 8. LETTERS OF MAP CHANGE - continued

<u>COMMUNITY AND CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
<u>Unincorporated Areas</u>			
00-09-083P	Lower El Mirage Wash & Lower El Mirage Wash Tributary Channelization	Lower El Mirage Wash, Lower El Mirage Wash Tributary	January 4, 2002
01-09-017P	City of Glendale Recycling Facility	Agua Fria River	May 15, 2003
01-09-184P	Zone A Floodplain Delineation Studies/ Wickenburg Area	Cemetery Wash, Holly Wash, Little San Domingo Wash, Monarch Wash, Ox Wash, San Domingo Wash, Sols Wash AH4, Tributary to Amir Wash, Tributary to Hartman Wash, Tributary to Little San Domingo Wash, Tributary to Mockingbird Wash, Tributary to Monarch Wash, Tributary to Sols Wash, Tributary to Sols Wash Tributary AH2, Tributary to Sols Wash Tributary AH3, Tributary to Tributary to Sols Wash, Tributary to Wash K, Tub Springs Wash, Turtleback Wash, Wash 3T6R4, Wash 15T6R4, Wash 20T7R4, Wash 28T7R4, Wash G, Yucca Flat Wash	October 15, 2001
01-09-453P	White Tanks Flood Retarding Structure #4 Inlet Channel Improvements	Jackrabbit Trail Wash	October 9, 2001
01-09-1158P	Dreaming Summit	Dale Creek Wash	March 5, 2002
01-09-1164X	Tiger Wash Alluvial Fan Study	Tiger Wash	November 30, 2001
02-09-031P	North Peoria Area Drainage Master Plan	Caterpillar Tank Wash, Tributary 1 to Unnamed Wash 1, Tributary 1 to Unnamed Wash 2, Tributary 2 to Unnamed Wash 2, Tributary 1 to Unnamed Wash 7, Twin Buttes Wash, Unnamed Wash 1, Unnamed Wash 2, Unnamed Wash 3, Unnamed Wash 4, Unnamed Wash 5, Unnamed Wash 6, Unnamed Wash 7, Unnamed Wash 8, Unnamed Wash 9	May 15, 2002
02-09-068P	Tonto Verde East Extension	Wash 10, Wash 11	August 21, 2002
02-09-241X	Cave Creek Floodplain Revision	Cave Creek	April 3, 2002
02-09-309X	Cave Creek Morning Star Road, Tonto National Forest, FCD 1999CO48-5	Cave Creek	January 3, 2002
02-09-386P	White Tank Fan, Site 36	White Tank Alluvial Fan	September 16, 2002

TABLE 8. LETTERS OF MAP CHANGE - continued

<u>COMMUNITY AND CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
<u>Unincorporated Areas (continued)</u>			
02-09-807P	Gila Bend ADMP/Floodplain Delineation Study	Citrus Valley Wash, Quilotosa Wash, Quilotosa Wash (East Split), Saucedo Wash, West Quilotosa Wash	November 13, 2003
02-09-857P	Gila Bend ADMP/Floodplain Delineation Study	Bender Wash, Bender Wash North Tributary, Evans Wash, Hacker Wash, Hacker Wash Diversion, I-8 Wash East, Pioneer Cemetery Wash, Sand Tank Wash, Scott Avenue Wash	November 13, 2003
02-09-858P	Gila Bend ADMP/Floodplain Delineation Study	Unnamed Wash No. 1, Unnamed Wash No. 2	October 9, 2003
02-09-945P	Agua Fria Floodplain Delineation from Cactus Road to Bell Road	Agua Fria River, West Split Flow through El Mirage, Atchison, Topeka and Santa Fe (AT&SF) Railroad Channel	August 28, 2003
02-09-1125P	Wigwam Creek Phase 1	Airline Canal	July 1, 2003
02-09-1138P	Approximate Zone A Floodplain Delineation of Watershed UU (Upper Agua Fria)	Washes T6NR1ES4, T7NR1ES34, T7NR1ES35, T7NR1ES26-1, T71ES26-2, T7NR1ES26-2A, T7NR1ES26-2B, T7NR1ES26-3	October 17, 2002
02-09-1240P	New River Upstream of I-17 Floodplain Delineation Study	New River, Black Wash	November 13, 2003
03-09-0302P	Approximate Zone A Floodplain Delineation of Watershed "UU" (Upper Agua Fria) FCD 2000C020	Washes 7N2ES7, 7N2ES6S, 7N2ES6N, 7N2ES7N T1, 8N2ES31, 8N2ES31 T1, 8N2ES31 T2, 8N2ES31	April 24, 2003
03-09-0315P	Padelford Wash – from Central Arizona Project Canal to State Route 74	Padelford Wash, Padelford Wash Split 1, Padelford Wash Split 2, Padelford Wash Split 3, Padelford Wash Split 4, Padelford Wash Split 5, Padelford Wash Tributary A, Padelford Wash Tributary B, Padelford Wash Tributary C	March 25, 2005

TABLE 8. LETTERS OF MAP CHANGE - continued

<u>COMMUNITY AND CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
<u>Unincorporated Areas (continued)</u>			
03-09-1020P	Approximate Floodplain Delineation of Watershed "OO"	Washes T2-R5-S2, T3-R5-S1, T4-R4-S30, T5-R4-S3, T5-R4-S7-A, T5-R4-S7-B, T5-R4-S20-A, T5-R4-S20B, T5-R4-S21, T6-R4-S27, T6-R4-S33, T5-R4-S19, T5-R5-S13-A, T5-R5-S13-B, T5-R5-S14, T5-R5-S25-A, T5-R5-S25-B, T5-R5-S25-C, T6-R5-S36, T3-R5-S33, T4-R5-S33, T5-R5-S34-C, T5-R5-S35, T5-R5-S34-A, T5-R5-S34-B, T5-R5-S33, T4-R6-S1, T4-R5-S7-A, T4-R5-S7-B, T4-R6-S2, T5-R6-S30, T5-R6-S33-A, T5-R6-S33-B	May 7, 2004
03-09-1190P	Aguila ADMP	Washes T7-R8-S1A, T7-R8-S1B, T7-R8-S1C, T7-R8-S1D, T7-R8-S1E, T7-R8-S1F, T7-R8-S2, T7-R8-S7, T7-R8-S9, T7-R8-S10, T7-R8-S18, T7-R9-S12, T7-R9-S4, T7-R9-S17, T7-R10-S13, T7-R8-S30, T7-R9-S22, T7-R9-S25A, T7-R9-S25B, T7-R9-S25C, T7-R9-S25D, T7-R9-S25E, Grass Wash	October 12, 2004
03-09-1538P	Wigwam Creek Phases 2 & 2B	El Mirage Channel, Greenbelt Channel, Airline Canal	June 14, 2004
03-09-1312P	Approximate Zone A Floodplain Delineation Study of Upper Agua Fria River, Watersheds 3 & 4	Moore's Gulch, Moore's Gulch Tributary 1, Moore's Gulch Tributary 2, Moore's Gulch Tributary 3, Moore's Gulch Tributary 4, Moore's Gulch Tributary 5, Moore's Gulch Tributary 6, Little Squaw Creek, Little Squaw Creek Tributary 1, Little Squaw Creek Tributary 2, Little Squaw Creek Tributary 3, Little Squaw Creek Tributary 4, Little Squaw Creek Tributary 5, Wash 8HN2ES16	January 19, 2004

TABLE 8. LETTERS OF MAP CHANGE - continued

<u>COMMUNITY AND CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
<u>Unincorporated Areas (continued)</u> 03-09-1562P	Luke Wash Watershed (Watershed "PP")	Washes T2N-R5W-S04, T3N-R5W-S20, T3N-R5W-S21N, T3N-R5W-S21S, T3N-R5W-S28N, T3N-R5W-S28S, T1N-R5W-S04, T1N-R5W-S10, T1N-R5W-S15, T1N-R5W-S22, T2N-R5W-S05E, T2N-R5W-S05W, T2N-R5W-S21, T2N-R5W-S27N, T2N-R5W-S27S, T2N-R5W-S33E, T2N-R5W-S33W, T3N-R5W-S32E, T1N-R5W-S30, T1N-R5W-S32, T1N-R6W-S05 (Dickey Wash South), T1N-R6W-S11, T1N-R6W-S12, T1S-R5W-S17, T1S-R5W-S32, T1S-R6W-S13 (Phillips Wash South), T2N-R5W-S08, T2N-R5W-S19, T2N-R5W-S31 (Dickey Wash North), T2N-R5W-S31W (Phillips Wash North), T2N-R5W-S32, T2N-R6W-S35, T2N-R6W-S36, T2N-R6W, T3N-R5W-S30, T3N-R5W-S31, T1S-R5W-S08, T1S-R5W-S09, T1S-R5W-S09W, T1N-R5W-S28W, T1N-R5W-S28E, T1N-R5W-S33W, T1N-R5W-S33N, T1N-R5W-S33E, T1S-R5W-S22N, T1S-R5W-S16, T1S-R5W-S22S, T1S-R5W-S29, T1S-R5W-S29E, T1S-R5W-S29W	May 7, 2004
03-09-1653P	Loop 303 White Tanks ADMP Update Floodplain Delineations	Bullard Wash, Bullard Wash West Tributary	December 30, 2004
04-09-0311P	Channelization of Southern Pacific Railroad Floodplain along Glenhurst Project	Southern Pacific Railroad Ditch	September 23, 2004
04-09-0318P	Loop 303 White Banks ADMP Update Floodplain Delineations	Camelback Wash	December 30, 2004
04-09-0552P	CW Ranch	Southern Pacific Railroad Ditch	December 21, 2004

TABLE 8. LETTERS OF MAP CHANGE - continued

<u>COMMUNITY AND CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
<u>Unincorporated Areas (continued)</u> 04-09-0659P	Watershed "OO" Zone A Study – Coyote Wash, and Jackrabbit Wash Tributaries	Washes T3-R6-S13, T4-R6-S27, T4-R6-S35, T3-R5-S12, Beer Bottle, T4-R6-S22, T4-R7-S11, T4-R7-S13, T4-R7-S22, T5-R7-S8, T5-R7-S9, T5-R7-S10, T5-R8-S13, T5-R8-S28-A, T5-R8-S34-A, T5-R8-S34-B, T4-R8-S3, T4-R8-S4, T4-R6-S5, T4-R6-S7, T4-R6-S8, Woodchopper, T5-R6-S31, T5-R7-S23-A, T5-R7-S23-B, T5-R8-S36-A, Dead Horse, T5-R7-S5, T5-R7-S11, T6-R7-S29, T5-R8-S2, T5-R8-S10-A, T5-R8-S10-B, T6-R8-S34, T6-R8-S35-A, T6-R8-S35-B	February 18, 2005
04-09-0756P	Approximate Floodplain Delineation of Watershed "00"	Washes T5-R5-S25B, T4-R5-S33, T5-R5-S18, T5-R5-S29A, T5-R5-S29B, T5-R5-S33, T5-R5-S8, T5-R5-S21-A, T5-R5-S21-B, T5-R5-S34-A, T5-R5-S34-B, T5-R5-S34-C, T5-R5-S16, T5-R5-S17, T6-R5-S21, T5-R5-S10-A, T5-R5-S23-A, T5-R5-S23-B, T5-R5-S35, T5-R5-S14, T6-R5-S35, T5-R5-S31, T6-R6-S25, T4-R6-S1, T4-R5-S7-A, T4-R5-S7-B, T5-R6-S18, T5-R6-S12-A, T5-R6-S-12-B, T5-R6-S13, T6-R6-S22, T5-R7-S14, T6-R7-S34, T5-R6-S30, T5-R6-S33-A, T5-R6-S33-B, Jimmie Wash	October 8, 2004

10.7 Seventh Revision

This study was revised on October 16, 2013, to incorporate various LOMRs, to apply a datum conversion factor to convert the water surface elevations from NGVD 29 to NAVD 88, to incorporate changes due to Procedure Memorandums 34 and 43, to update imagery, and to incorporate restudy information from 13 restudied streams within the county. Information pertaining to the datum conversion can be found in Volume 2, Section 3.2, Vertical Datum of this FIS.

Some flood hazard information presented in prior FIRMs and in prior FIS reports for Maricopa County and its incorporated communities was based on flood protection provided by levees. Based on the information available and the mapping standards of the NFIP at the time that the prior FISs and FIRMs were prepared, FEMA accredited the levees as providing protection from the flood that has a 1-percent annual chance of being equaled or exceeded in any given year. For FEMA to continue to accredit the identified levees with providing protection from the base flood, the levees must meet the criteria of the Code of Federal Regulations, Title 44, Chapter I, Section 65.10 (44 CFR 65.10), titled “Mapping of Areas Protected by Levee Systems.”

On August 22, 2005, FEMA issued “Procedure Memorandum No. 34 – Interim Guidance for Studies Including Levees.” The purpose of the memorandum was to help clarify the responsibility of community officials or other parties seeking recognition of a levee by providing information identified during a study/mapping project. Often, documentation regarding levee design, accreditation, and the impacts on flood hazard mapping is outdated or missing altogether. To remedy this, Procedure Memorandum No. 34 provides interim guidance on procedures to minimize delays in near-term studies/mapping projects, to help our mapping partners properly assess how to handle levee mapping issues.

While documentation related to the Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10), titled “Mapping of Areas Protected by Levee Systems” is being compiled, the release of a more up-to-date FIRM for other parts of a community or county may be delayed. To minimize the impact of the levee certification process, FEMA issued “Procedure Memorandum No. 43 – Guidelines for Identifying Provisionally Accredited Levees” on March 16, 2007. These guidelines allow issuance of the FIS and FIRM while levee owners or communities compile full documentation which is required to show compliance with 44 CFR 65.10. The guidelines also explain that a FIRM can be issued while providing the communities and levee owners with a specified timeframe to correct any maintenance deficiencies associated with a levee and to show compliance with 44 CFR 65.10.

FEMA contacted the communities within Maricopa County to obtain data which was required under 44 CFR 65.10 to continue to show the levees as providing protection from a flood that has a 1-percent annual chance of being equaled or exceeded in any given year.

FEMA understood that it may take time to acquire and/or assemble the documentation necessary to fully comply with 44 CFR 65.10. Therefore, FEMA put forth a process to provide the communities with additional time to submit all the necessary documentation. For a community to take advantage of the additional time, it had to sign an agreement

with FEMA. Levees for which such agreements were signed are shown on the final effective FIRM as providing protection from a flood that has a 1-percent annual chance of being equaled or exceeded in any given year and were labeled as a Provisionally Accredited Levee (PAL). Communities have two years from the date of FEMA's initial coordination to submit to FEMA final accreditation data for all PALs. Following receipt of final accreditation data, FEMA will revise the FIS and FIRM as warranted.

An approximate floodplain analyses was conducted for the levees to indicate the extent of the approximate floodplain down grade of the levee. The methodology used in these analyses is discussed below.

The levees with inventory IDs #8, #11, #16 and #18 are located on the Agua Fria River. Approximate floodplains were delineated down grade of the levees using topographic data provided by the FCDMC and by extending the effective 1-percent-annual-chance BFEs for the Agua Fria River. However, under newly issued PAL agreements that extend through June 25, 2011, these floodplains will be shown as a provisionally protected Zone X until such time that the provisional accreditation can be verified or it expires.

The levee with inventory ID #19 is located on the Agua Fria River. An approximate floodplain was delineated down grade of the levee using topographic data provided by the FCDMC and by extending the effective 1-percent-annual-chance base flood elevations for the Agua Fria River.

The levees with inventory IDs #21 and #26 are located on the East Maricopa floodway. Approximate floodplains were delineated down grade of the levees using topographic data provided by the FCDMC. However, under newly issued PAL agreements that extend through June 25, 2011, these floodplains will be shown as a provisionally protected Zone X until such time that the provisional accreditation can be verified or it expires.

The levee with inventory ID #25 is located on the Tiger Detention Basin. An approximate floodplain was delineated down grade of the levee using topographic data provided by the FCDMC.

The levee with inventory ID #30 is located on New River. An approximate floodplain was delineated down grade of the levee using topographic data provided by the FCDMC. However, under a newly issued PAL agreement that extends through June 25, 2011, this floodplain will be shown as a provisionally protected Zone X until such time that the provisional accreditation can be verified or it expires.

The levees with inventory IDs #33, #41, and #42 are located on Salt River. Approximate floodplains were delineated down grade of the levees using topographic data provided by the FCDMC and by extending the effective 1-percent-annual-chance base flood elevations for Salt River. However, under newly issued PAL agreements that extend through June 25, 2011, these floodplains will be shown as a provisionally protected Zone X until such time that the provisional accreditation can be verified or it expires.

The levee with inventory ID #46 is located on Scatter Wash. An approximate floodplain was delineated down grade of the levee using topographic data provided by the FCDMC and by extending the effective 1-percent-annual-chance base flood elevations for Scatter Wash. However, under a newly issued PAL agreement that extends through June 25,

2011, this floodplain will be shown as a provisionally protected Zone X until such time that the provisional accreditation can be verified or it expires.

The levees with inventory IDs #1901064146 and #1901064147 located upstream of levee with inventory ID #46 on Scatter Wash. Under a newly issued PAL agreement that extends through July 5, 2014, the floodplain downgrade of the levees will be shown as a provisionally protected Zone X until such time that the provisional accreditation can be verified or it expires.

The levees with inventory IDs #51, #59, #66, #67a, and #68 are located on Indian Bend Wash. Approximate floodplains were provided by the City of Scottsdale. However, under newly issued PAL agreements that extend through June 25, 2011, these floodplains will be shown as a provisionally protected Zone X until such time that the provisional accreditation can be verified or it expires.

The levee with inventory ID #291 is located on the Pass Mountain Diversion. An approximate floodplain was delineated down grade of the levee using topographic data provided by the FCDMC. However, under a newly issued PAL agreement that extends through June 25, 2011, this floodplain will be shown as a provisionally protected Zone X until such time that the provisional accreditation can be verified or it expires.

The levee with inventory ID #310 is located on Cave Creek. An approximate floodplain was delineated down grade of the levee using topographic data provided by the FCDMC and by extending the effective 1-percent-annual-chance base flood elevations for Cave Creek. However, under a newly issued PAL agreement that extends through June 25, 2011, this floodplain will be shown as a provisionally protected Zone X until such time that the provisional accreditation can be verified or it expires.

Several levees within Maricopa County and its incorporated communities meet the criteria of the Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10), titled "Mapping of Areas Protected by Levee Systems." Table 9, "List of Certified and Accredited Levees" lists all levees shown on the FIRM that meet the requirements of 44 CFR 65.10 and have been determined to provide protection from a flood that has a 1-percent annual chance of being equaled or exceeded in any given year.

Table 9. List of Certified and Accredited Levees

Flooding Source

Portions of Levees along the New River
Portions of Levees along the Agua Fria River
Skunk Creek
Wash 12
Queen Creek

LOMRs accrediting levee segments include: 00-09-569P, 01-09-017P, 05-09-0394P, 06-09-B067P, 09-09-1385P, 10-09-0572P, 11-09-3216P, and 11-09-3523P.

The Skunk Creek Levee System within the City of Phoenix was accredited by a USACE certification letter.

FEMA coordinated with the local communities and other organizations to compile a list of Non-Levee Embankments that exist within Maricopa County. These Non-Levee Embankments shown on the FIRM required flood hazard revisions due to FEMA's Implementation of Procedural Memorandums 34 and 43.

An approximate floodplain analyses was conducted for the Non-Levee Embankments Maricopa County to indicate the extent of the approximate floodplain down grade of the embankment. Approximate floodplains down grade of the embankments were estimated using topographic data provided by the FCDMC. When effective 1-percent annual chance base flood elevations were available, the extent of the approximate floodplain was estimated by extending the base flood elevations to the contour line representing the base flood elevation.

Best Available Data Letters and Letters of Map Revision

The following FEMA cases were incorporated into this revision based on various Best Available Data Letters (BADL). A summary of the Letters of Map Revision (LOMR) that were incorporated into the Maricopa Countywide DFIRM are listed in Table 10.

FEMA Case No. 06-09-B012P – effective February 28, 2006, for Maricopa County (Unincorporated Areas) states that the best available data can be found amongst the data entitled, “Waterman Wash and Tributaries Floodplain Delineation Study,” dated March 2005.

FEMA Case No. 06-09-B011P – effective July 19, 2006, for Maricopa County (Unincorporated Areas) states that the best available data can be found on the draft work maps entitled “Palo Verde Zone A Floodplain Delineation Study,” dated October 2002.

FEMA Case – effective February 2007, for Maricopa County (Unincorporated Areas) states that the best available data can be found on the draft work maps entitled “Waterman Wash Flood Delineation Study,” dated January 2005.

FEMA Case No. 07-09-0574P – effective March 30, 2007, for the City of Buckeye, and Maricopa County (Unincorporated Areas) states that the best available data can be found on the draft work maps entitled “Figure 6B.12 – Stage 3 Floodplain Delineation Map,” dated October 2006.

FEMA Case No. 07-09-0966P – effective June 18, 2007, for Maricopa County (Unincorporated Areas) states that the best available data can be found on the draft work maps entitled “Lower Painted Rock Watershed Zone A Floodplain Delineation Study East Watershed, Sheets 1-23,” dated February 2007.

FEMA Case No. 07-09-1114P – effective June 26, 2007, for Maricopa County (Unincorporated Areas) states that the best available data can be found on the draft work maps entitled “Exhibit F, Floodplain Delineation Work Maps Sheets 1 to 18,” dated February 2007.

FEMA Case No. 07-09-1636P – effective August 30, 2007, for Maricopa County (Unincorporated Areas) states that the best available data can be found on the draft work maps entitled “Lower Centennial Watershed Phase II, Zone A Floodplain Delineation Study Sheets 1 to 25,” dated January 2006.

FEMA Case No. 07-09-1638P – effective August 31, 2007, for Maricopa County (Unincorporated Areas) states that the best available data can be found on the draft work maps entitled “Camp Creek Tributaries Flood Delineation Study Sheets 1 to 19,” dated April 2007.

FEMA Case No. 07-09-1634P – effective September 26, 2007, for Maricopa County (Unincorporated Areas) and the City of Surprise states that the best available data can be found on the draft work maps entitled “Flood Control District of Maricopa County, Wittman Area Drainage Master Study Update, Contract FCD 2002C029, Sheets B17, B18, C15 to C21, D13 to D26, E11 to E26, F11 to F26, G11, H10 to H22, I10 to I22, J12 to J19, K11 to K19, L09 to L18, M09 to M22, N10 to N22, O13 to O18, P13 to P18, Q13 to Q18 and R13 to R18,” dated July 2005.

FEMA Case No. 07-09-1887P – effective September 26, 2007, for the City of Surprise, City of Buckeye, and Maricopa County (Unincorporated Areas) states that the best available data can be found on the draft work maps entitled “Flood Control District of Maricopa County Wittman Area Drainage Master Study Update Contract FCD 2002C029 and Wittman Phase 2 Zone AE Floodplain Delineation Study Contract FCD 2004C066, Sheets B17, B18 C13 to C17, D11 to D16, E11 to E16, F14 and G13,” dated October 2006.

FEMA Case No. 07-09-1894P – effective October 24, 2007, for the City of Buckeye and Maricopa County (Unincorporated Areas) states that the best available data can be found on the draft work maps entitled “Approximate Zone A Floodplain Delineation Study of White Tank Fans 3, 13 & 16, Sheet 2 to 5, FCD2004 C049, Sun Valley Area Drainage Master Plan”; “Approximate Zone A Floodplain Delineation Study of White Tank Fans 4 & 5, Sheet 2 to 6, FCD 2004C049, Sun Valley Area Drainage Master Plan”; “Approximate Zone A Floodplain Delineation Study of White Tank Fan 6, Sheet 2 and 3, FCD 2004C049, Sun Valley Area Drainage Master Plan”; “Approximate Zone A Floodplain Delineation Study of White Tank Fans 17, 18 & 19, Sheet 2 to 4, FCD 2004C049, Sun Valley Area Drainage Master Plan” and “Approximate Zone A Floodplain Delineation Study of White Tank Fans 10, 11 & 20, Sheet 2, FCD 2004C049 Sun Valley Area Drainage Master Plan,” dated November 2006.

FEMA Case No. 08-09-0064P – effective October 31, 2007, for Maricopa County (Unincorporated Areas) states that the best available data can be found on the draft work maps entitled “Lower Painted Rock Watershed Zone A Floodplain Delineation Study West Watershed, Sheets 1-19,” dated September 2007.

FEMA Case No. 07-09-0866P – effective November 30, 2007, for the City of Buckeye states that the best available data can be found on the draft work maps entitled “Flood Control District of Maricopa County, Jackrabbit Wash and Wash T2N-R5W-S27N Floodplain Delineation Study, FDC. Contract No. 2004C001, Sheets 1-15,” dated October 2007.

FEMA Case No. 08-09-0227P – effective March 20, 2008, for the Town of Carefree states that the best available data can be found on the draft work maps entitled “North Scottsdale Floodplain Delineation Study FCD 2003C008,” dated April 2005.

FEMA Case No. 10-09-0465P – effective July 22, 2010, for the City of Goodyear states that the best available data can be found on the draft work maps entitled “Province Phase 1-At Estrella Mountain Ranch, Goodyear, Arizona,” dated October 29, 2009.

TABLE 10. LETTERS OF MAP CHANGE

<u>COMMUNITY</u>	<u>CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
Phoenix, City of	13-09-0280P	Skunk Creek Delineation from I-17 to Adobe Dam (Reissuance of LOMRs 03-09-0661P and 05-09-1291X)	Skunk Creek	April 8, 2013
Fountain Hills, Town of	13-09-0284P	Four Peaks Plaza Development (Reissues LOMR 03-09-1143P)	Cereus Wash, Laser Drain	January 22, 2013
Maricopa County (Unincorporated Areas); Peoria, City of	13-09-0703P	Tierra Del Rio Bank Stabilization Project Update (Reissues LOMR 10-09-1908P)	Agua Fria River, Happy Valley Wash	January 3, 2013
Maricopa County (Unincorporated Areas)	13-09-0285P	Cline Creek Floodplain Delineation (Reissues LOMR 05-09-0159P)	Cline Creek, Cline Creek Split 3	January 3, 2013
Maricopa County (Unincorporated Areas); Wickenburg, Town of	11-09-3181P	Wickenburg Area Drainage Study/Planning	Sunny Cove Wash, Sunny Cove Wash (Upper Reach), Sunset Wash, Sunset Wash (Upper Reach), Sunset Wash Tributary	August 24, 2012
Guadalupe, Town of; Maricopa County (Unincorporated Areas); Tempe, City of	11-09-3942P	Guadalupe FDS	Highline Lateral	August 10, 2012
Wickenburg, Town of	12-09-0272P	South Branch Casandro Wash RM 0.730 to 0.924	South Branch Casandro Wash	August 10, 2012
Maricopa County (Unincorporated Areas)	12-09-0405P	Kozlowski Floodprone Properties Assistance	Wash T4N-R2W-S08W	July 13, 2012
Maricopa County (Unincorporated Areas)	12-09-0273P	Circle City Wash 1 RM 0.000 to 0.344	Circle City Area Wash 1	July 13, 2012
Avondale, City of	12-09-1838P	Palmilla Apartments Update	Agua Fria River	June 26, 2012
Maricopa County (Unincorporated Areas); Wickenburg, Town of	11-09-3523P	Downtown Wickenburg Flooding Hazard Mitigation Project	Casandro Wash, Hassayampa River, Hospital Wash, Sols Wash	May 4, 2012
Maricopa County (Unincorporated Areas); Wickenburg, Town of	11-09-3216P	U.S. 93 Interim Wickenburg Bypass-Levee Accreditation	Hassayampa River, Powder House Wash	May 4, 2012
Buckeye, City of; Maricopa County (Unincorporated Areas)	11-09-3299P	Bulldozer Wash Channelization	Bulldozer Wash	April 27, 2012
Glendale, City of; Peoria, City of	11-09-3464P	The Reserve at Eagle Heights	New River	March 30, 2012
Peoria, City of	11-09-3985P	Vistancia Marketplace II	Twin Buttes Wash	November 29, 2011
Maricopa County (Unincorporated Areas); Peoria, City of	11-09-0647P	CAP 16 East Improvements Phase II	16 East (McMicken Wash)	October 7, 2011

<u>COMMUNITY</u>	<u>CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
Chandler, City of	11-09-2364P	Chandler Gilbert Flood Plain Delineation Study Phase 3	Southern Pacific Railroad	September 18, 2011
El Mirage, City of; Maricopa County (Unincorporated Areas)	11-09-0216P	Agua Fria River	Agua Fria River	September 16, 2011
Cave Creek, Town of	10-09-2786P	Floodplain Redelineation Study of Ocotillo Wash and Ocotillo Wash Tributary-2	Ocotillo Wash, Ocotillo Wash Tributary 2, Ocotillo Wash Tributary 3, Ocotillo Wash Tributary 4	June 24, 2011
Maricopa County (Unincorporated Areas); Surprise, City of	11-09-2157P	Surprise FDS Washes T4N-R2W-S15N and T4N-R2W-S09N	Wash T4N-R2W-S09N, Wash T4N-R2W-S15N	June 6, 2011
Tolleson, City of	10-09-3593P	Tolleson Industrial Warehouse (Home Depot Distribution)	Southern Pacific Railroad Ditch	April 18, 2011
Glendale, City of; Maricopa County (Unincorporated Areas); Surprise, City of	10-09-3150P	Reems Road Channel	Reems Road Channel	February 28, 2011
Maricopa County (Unincorporated Areas)	10-09-1720P	Wittmann Area Drainage Master Plan	Iona Stock Tank Wash, Iona Wash	February 4, 2011
Tempe, City of	10-09-2035P	Western Canal in Tempe	Ken McDonald Golf Course Storm Runoff Pond	January 21, 2011
Goodyear, City of; Maricopa County (Unincorporated Areas)	10-09-3046P	Cotton Lank Bridge	Gila River	December 24, 2010
Maricopa County (Unincorporated Areas); Peoria, City of	10-09-1908P	Tierra Del Rio Bank Stabilization Project	Agua Fria River	October 15, 2010
Maricopa County (Unincorporated Areas)	09-09-1387P	Rio Verde ADMP Floodplain Delineation Study	Multiple	October 15, 2010
Goodyear, City of	10-09-1335P	McDowell ID	Bullard Wash	July 30, 2010
Gilbert, Town of	10-09-0572P	Queen Creek Wash LOMR and Levee Accreditation	Queen Creek	July 30, 2010
Glendale, City of; Maricopa County (Unincorporated Areas)	09-09-2335P	North Intel Channel Improvements at White Tanks	Camelback Wash, North Inlet Channel, Perryville Road Wash	July 23, 2010
Buckeye, City of; Goodyear, Town of; Maricopa County (Unincorporated Areas)	10-09-1304X	Vista Norte/King Ranch Floodplain Redelineation	Gila River	April 30, 2010
Phoenix, City of	09-09-1059P	Dreamy Draw East Watershed	Dreamy Draw Wash East	April 30, 2010
Phoenix, City of	10-09-0146P	Lion's Gate	Buckeye Feeder Canal	April 28, 2010

<u>COMMUNITY</u>	<u>CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
Avondale, City of; Maricopa County (Unincorporated Areas); Phoenix, City of	10-09-0688P	Reissue of LOMR 04-09-0933P	Sunland Avenue Tributary, Buckeye Feeder Canal	March 29, 2010
Buckeye, City of; Maricopa County (Unincorporated Areas)	09-09-0764P	Buckeye Parkway Center	Tuthill Dike Wash	March 26, 2010
Phoenix, City of	09-09-1453P	Rio Salado (24 th Street and Salt River)	Salt River	March 18, 2010
Maricopa County (Unincorporated Areas); Surprise, City of	09-09-2388P	Desert Oasis 171 st Avenue Channel	Overflow Area from Wash 5 East	February 25, 2010
Phoenix, City of	10-09-0687P	Cave Creek Channelization-Sec 19 th Ave to Greenway Rd	Cave Creek	January 29, 2010
Mesa, City of	10-09-0357P	Red Mountain Freeway (202L) Power Road to University Dr, Spook Hill Flood Retarding Structures	Spook Hill Floodway	January 26, 2010
Cave Creek, Town of	09-09-2123P	Floodplain Delineation Study of Cave Creek West	Cave Creek Tributary 2, Cave Creek Tributary 2A, Cave Creek Tributary 2B, Cave Creek Tributary 2C	December 30, 2009
Chandler, City of	09-09-2490P	Chandler Airport Center	Overland Flow along Consolidated Canal	December 18, 2009
Maricopa County (Unincorporated Areas)	09-09-1385P	Vulcan Materials Company – Sun City Channelization Phase 1	Agua Fria River	October 22, 2009
Goodyear, City of; Maricopa County (Unincorporated Areas)	09-09-2042X	Estrella LOMR	Lum Wash 1S2WS9A (J39)	September 23, 2009
Phoenix, City of	08-09-1384P	Cave Creek Wash LOMR	Cave Creek Wash	September 11, 2009
Cave Creek, Town of	09-09-0432P	Cave Creek Tributaries Within Cave Creek	Cave Creek Tributary 1, Cave Creek Tributary 1A, Cave Creek Tributary 1B, Cave Creek Tributary 1C, Cave Creek Tributary 1D	August 13, 2009
Buckeye, City of; Goodyear, Town of; Maricopa County (Unincorporated Areas)	08-09-0929P	Vista Norte/King Ranch Floodplain Redelineation	Gila River	August 10, 2009
Cave Creek, Town of	09-09-0431P	Galloway Wash Tributaries	Galloway Wash Tributary 2, Galloway Wash Tributary 2A, Galloway Wash Tributary 2B	July 14, 2009
Avondale, City of; Maricopa County (Unincorporated Areas); Tolleson, City of	08-09-0655P	Roy's Place	Southern Pacific Railroad Ditch	July 10, 2009
Cave Creek, Town of	09-09-0129P	Galloway Wash Tributaries, Willow Springs Wash Tributaries, and Cave Creek Tributaries within Cave Creek, AZ	Willows Springs Wash Tributary 6, Willow Springs Wash Tributary 6A, Willow Springs Wash Tributary 6B, Willow Springs Wash Tributary 6C	June 18, 2009

<u>COMMUNITY</u>	<u>CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
Chandler, City of	09-09-1681P	Consolidated Canal	Sheet Flow along South Pacific Railroad	May 21, 2009
Maricopa County (Unincorporated Areas); Tolleson, Town of	09-09-0381P	91 st Avenue & McDowell	Ponding along R.I.D. Canal	May 15, 2009
Maricopa County (Unincorporated Areas)	08-09-1420P	Upper New River Area Drainage Master Plan FCD No. 2005Co20	Jenny Lin Wash	May 4, 2009
Cave Creek, Town of; Maricopa County (Unincorporated Areas)	08-09-1202P	Ocotillo Wash Floodplain Delineation	Ocotillo Wash, Ocotillo Wash Tributary 5	April 24, 2009
El Mirage, City of; Maricopa County (Unincorporated Areas); Surprise, City of	08-09-1516P	08037 Surprise Pointe	Direct Runoff, Lower El Mirage Wash	February 20, 2009
Cave Creek, Town of	08-09-0722P	Rancho Verde Del Rio	Andora Hills Wash	January 22, 2009
Peoria, City of	08-09-1474P	Peoria Avenue and 79 th – Wal-Mart	Ponding Area 1, Ponding Area 2	January 12, 2009
Phoenix, City of	09-09-0412P	Upper New River Area Drainage Master Plan FCD No. 2005Co20	Deadman Wash Tributaries 1, 1 Upper Split, 2, 2A and 1 Lower Split	December 22, 2008
Glendale, City of	08-09-1010P	Determination of Mapping and Flood Zone Changes and Elevation Certificates	Unnamed Wash along Burlington Northern Santa Fe Rail Road	December 12, 2008
Phoenix, City of	08-09-1412P	LOMR for the Salt River Bridge at 35 th Avenue	Salt River	November 28, 2008
Peoria, City of	08-09-1762X	McMicken Wash Improvements Phase 1	16 East (McMicken Wash)	October 31, 2008
Buckeye, City of	08-09-1209P	Sundance Parcels 47, 48, and 53	Unnamed Flooding Source along Roosevelt Irrigation District Canal, Roosevelt Irrigation District Canal	October 20, 2008
Maricopa County (Unincorporated Areas); Surprise, City of	08-09-0814P	Rio Rancho Estates	Wash 1 West, Wash 2 East	September 18, 2008
Glendale, City of; Maricopa County (Unincorporated Areas)	08-09-0346P	City of Glendale Public Safety Training Facility	Agua Fria River	September 12, 2008
Goodyear, City of; Maricopa County (Unincorporated Areas)	08-09-1566X	Estrella LOMR	Lum Wash 1S2WS9A (J39)	September 8, 2008
Glendale, City of	08-09-1009P	Determination of Mapping and Flood Zone Changes and Elevation Certificates	Along the north and east side of Grand Canal	July 31, 2008
Phoenix, City of	08-09-0680P	Tenth Street Wash Storm Drain	Tenth Street Wash	July 15, 2008
Maricopa County (Unincorporated Areas), Phoenix, City of	08-09-1151X	Cave Creek Floodplain Delineation Study	Cave Creek	June 12, 2008
Phoenix, City of	06-09-B582P	Cave Creek Floodplain Delineation Study	Cave Creek	April 3, 2008
Maricopa County (Unincorporated Areas); Queen Creek, Town of	07-09-1830P	Queen Creek Wash - Sossaman Road to Hawes Road	Queen Creek	April 1, 2008

<u>COMMUNITY</u>	<u>CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
Maricopa County (Unincorporated Areas); Surprise, City of Phoenix, City of	07-09-1938P	Greer Ranch	Ponding along Reems Road	February 25, 2008
Phoenix, City of	07-09-1713P	Metro Phoenix Area Drainage Master Study/FCD2004C040	Cave Creek	January 14, 2008
Phoenix, City of	07-09-1902P	North Gateway PCD Functional Unit 1	Sonoran Wash	January 7, 2008
Maricopa County (Unincorporated Areas)	07-09-1354P	Floodplain Delineation Study of Cline Creek Tributaries	Cline Creek Tributary C6, C8, X1, X1 – Overflow, X1 – Splitflow, X2, X3, X4A, X4B, X5	January 4, 2008
Buckeye, City of	07-09-1734P	Blue Horizons	Jackrabbit Trail Channel	December 19, 2007
Phoenix, City of	08-09-0353X	North Gateway PCD Functional Unit 1	Sonoran Wash	December 18, 2007
Maricopa County (Unincorporated Areas)	07-09-0412P	Waterman Wash FDS Channelization	Wash 1S2WS18A (J27) of the Waterman Wash FDS Study Area	October 1, 2007
Scottsdale, City of	07-09-1366P	Montalcino Estates	Ponding Behind Central Arizona Canal Levee (Reach 11 Dikes)	September 26, 2007
Maricopa County (Unincorporated Areas); Mesa, City of	07-09-0549P	Tempe Canal Floodplain Delineation Study	ADOT U.S. 60 Channel, North Tempe Canal Ponding, Ponding East of Temp Canal, South Tempe Canal Ponding, Southern Avenue Overtopping, Unnamed Channel	September 20, 2007
Maricopa County (Unincorporated Areas); Surprise, City of	07-09-0391P	White Tanks Culvert and Channelization	White Tanks Floodplain	July 23, 2007
Buckeye, City of; Maricopa County (Unincorporated Areas)	07-09-0135P	Buckeye/Sun Valley Area Drainage Master Study Area	Hassayampa River Tributaries 1E, 1E1, 3E and 4E, Tributary to Hassayampa River Tributary 4E, West Fork Hassayampa River Tributary 4E	June 28, 2007
Goodyear, City of	07-09-0032P	Palm Valley Phase 8	Shallow Flooding	April 23, 2007
Peoria, City of	07-09-0452P	New River Channel – Grand Avenue to Skunk Creek	New River	March 9, 2007
Chandler, City of	07-09-0151P	Hamilton Park	Gilbert-Chandler FIS	January 19, 2007
Maricopa County (Unincorporated Areas); Phoenix, City of	07-09-0474P	Riverwalk Villages Phase III	Salt River	December 28, 2006
Maricopa County (Unincorporated Areas)	06-09-B067P	New River Road Bridge Levee Update	New River	December 21, 2006
Surprise, City of	06-09-BF42P	Greer Ranch North	Unnamed Wash	November 28, 2006
Glendale, City of; Peoria City of	06-09-B380P	Columbia Communities	New River	October 26, 2008

<u>COMMUNITY</u>	<u>CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
Gilbert, Town of; Maricopa County (Unincorporated Areas); Queen Creek, Town of, Goodyear, City of	06-09-BE67X	Sonoqui Wash NGVD Conversion	Sonoqui Wash	October 17, 2006
	06-09-B034P	Goodyear Centerpointe	Bullard Wash, Unnamed Flooding West of Bullard Wash	October 17, 2006
Maricopa County (Unincorporated Areas)	06-09-B579P	Lower Centennial Wash Watershed Zone A Floodplain Delineation Study, Phase IV	Multiple Tributaries of Centennial Wash	August 28, 2006
Maricopa County (Unincorporated Areas)	06-09-B715P	Lower Centennial Wash Watershed Zone A Floodplain Delineation Study, Phase III	Multiple Tributaries of Centennial Wash	August 24, 2006
Gilbert, Town of; Maricopa County (Unincorporated Areas)	05-09-B885X	Sonoqui Wash NGVD Conversion	Sonoqui Wash	August 19, 2006
Gilbert, Town of	06-09-B999P	Mapping Update within the Town of Gilbert	Consolidated Canal	July 17, 2006
Goodyear, City of; Litchfield Park, City of	05-09-0791P	Palm Valley Phase 5 Bullard Wash LOMR	Camelback Road Channel, Bullard Wash, Indian School Channel	June 30, 2006
Avondale, City of	06-09-B472P	Avondale/Kachina	Unnamed Ponding Area just north of Roosevelt Irrigation District Canal and just east of 125 th Drive	June 30, 2006
Maricopa County (Unincorporated Areas)	05-09-0394P	Tonto Verde 9 & 10	Wash 12	April 27, 2006
Phoenix, City of	06-09-B520P	Biscuit Flat Area Approximate Zone A Floodplain Delineation Study	Ponding along CAP Canal, CAP Wash-East, CAP Wash-West, Upper Buchanan Wash	April 17, 2006
Paradise Valley, Town of; Phoenix, City of	05-09-1284P	Echo Canyon, Project No. 83130143	Echo Canyon Wash	March 16, 2006
Peoria, City of	06-09-B018P	Padelford Wash – From Central Arizona Project Canal to State Route 74	Padelford Wash, Padelford Wash – (Splits 1,2,3,4 and 5), Padelford Wash – Tributaries A, B and C)	March 16, 2006
Maricopa County (Unincorporated Areas)	06-09-B029X	Reissuance of Channelization of Southern Pacific Railroad Floodplain Along Glenhurst Project	Southern Pacific Railroad Ditch	February 6, 2006
Peoria, City of	06-09-B017P	Twin Buttes Wash and White Peak Improvement	Twin Buttes Wash, White Peak Wash	January 11, 2006
Phoenix, City of	05-09-0164P	Sweetwater Park	Cave Creek	December 29, 2005
Chandler, City of	04-09-1562P	Festival Court	Shallow Flooding	November 26, 2005

<u>COMMUNITY</u>	<u>CASE NO.</u>	<u>PROJECT</u>	<u>FLOODING SOURCE</u>	<u>EFFECTIVE DATE</u>
Maricopa County (Unincorporated Areas)	05-09-0236P	Floodplain Delineation Study of Upper Skunk Creek and Tributaries	Skunk Creek, Skunk Creek Tributaries 6B, 10A, 27.161, 28.839, Skunk Tank Wash, Apache Wash West Fork, Desert Lake Wash East Fork, Tributary C-6	November 10, 2005
Avondale, City of; Maricopa County (Unincorporated Areas)	06-09-B005X	CW Ranch	Southern Pacific Railroad Ditch, Unnamed Tributary to Southern Pacific Railroad Ditch	October 27, 2005
Maricopa County (Unincorporated Areas)	05-09-0159P	Cline Creek Floodplain Delineation Study	Cline Creek, Cline Creek Split 3	September 27, 2005
Fountain Hills, Town of	03-09-1143P	Four Peak Plaza Development	Cereus Wash, Laser Drain	August 25, 2005
Phoenix, City of	05-09-1291X	Skunk Creek Delineation from I-17 to Adobe Dam	Skunk Creek, Skunk Creek Breakout Area	August 15, 2005

10.8 Eighth Revision

This revision is dated November 4, 2015. This study was revised to include new studies and numerous physical map revision requests based on newly studied streams and ponding areas.

Upper Daggs/Star Wash Watershed

The Upper Daggs Wash and Star Wash and tributaries of the Hassayampa River are located in the northwest part of unincorporated Maricopa County approximately 10 miles south of the Town of Wickenburg. These washes flow southerly to the Hassayampa River. This study resulted in the delineation of 75 miles of Zone AE floodplains and 53 miles of floodway in the Upper Daggs/Star Wash watershed. These study washes were Zone A floodplains delineated previously as part of the Approximate Zone A Floodplain Delineation Study of Watershed "OO".

Revised hydraulic analyses for the upper-watershed tributaries to Daggs Wash and Star Wash as well as a few tributaries to the Hassayampa River in unincorporated Maricopa County was performed by Wood Patel & Associates, Inc. in association with JE Fuller/Hydrology and Geomorphology, Inc. and J2 Engineering and Environmental Design for FCDMC under contract number FCD 2006C008. The study was completed in September 2008.

No new hydrologic models were developed for this study. The 100-year peak discharge values were obtained from the Approximate Zone A Floodplain Delineation Study of Watershed "OO", Hassayampa River Tributaries and Lower Jackrabbit Wash Tributaries. Additional discharge concentration points have been added and discharge values have been updated at select locations based on more detailed hydraulic split flow analyses.

Two-foot contour data at a scale of 1"= 200' was prepared by CH2M Hill. The flight date was September 22, 2005.

FEMA Case No. 08-09-1883P – effective December 22, 2008, for Maricopa County states that the best available data can be found on the draft work maps entitled "Flood Control District of Maricopa County, Upper Daggs and Star Wash Zone AE Floodplain Delineation Study FCD 2006C008, Sheets 1 to 42" prepared by Wood, Patel & Associates, Inc. dated September 2, 2008.

Chandler Gilbert Phase I

This study resulted in the delineation of 11 linear miles of floodplain along the Eastern Canal between Baseline Road and Hunt Highway.

Hydrologic and hydraulic analyses for Chandler/Gilbert Phase 1 was performed by David Evans and Associates, Inc. for the Flood Control District of Maricopa County (FCDMC) under contract number FCD 2002C023. The study was completed in December 2007.

New hydrology was developed for this study. The 100-year 6-hour and 100-year 24-hour HEC-1 models were created using NOAA 2 rainfall data, Green and Ampt loss method, and Clark unit hydrographs.

Two-foot contour data at a scale of 1"= 200' was prepared by Stewart Geo Technologies, Inc. The flight date was April 12, 2003.

FEMA Case No. 08-09-1252P – effective February 6, 2009, for Maricopa County states that the submitted data meet the minimum floodplain management criteria and can be found on the draft work maps entitled “Chandler / Gilbert Floodplain Delineation Study, Phase 1, Eastern Canal Watershed prepared by David Evans and Associates, Inc., in association with Project Engineering Consultants, Ltd., dated December 12, 2007.

Luke Wash Watershed

The Luke Wash watershed is located in the western unincorporated Maricopa County, roughly from 371st Avenue alignment east to the Hassayampa River, and from the Gila River north to the CAP canal. Total contributing watershed area is approximately 90 square miles. Luke Wash and its tributaries flow southerly and join the Hassayampa River and the Gila River. There are ponding areas upstream of I-10 and the UPRR.

This study resulted in the delineation of 88 miles of Zone AE floodplains and 86 miles floodways in the Luke Wash watershed. These study washes include upgrading Zone A floodplains or redelineating existing Zone AE floodplain to address changes in hydrology.

Hydrologic and hydraulic analyses for Luke Wash and tributaries was performed by Wood Patel & Associates, Inc. for FCDMC under contract number FCD 2007C020. The study was completed in March 2009.

New hydrology was developed for this study. The 100-year 6-hour and 100-year 24-hour HEC-1 models were created using NOAA 14 rainfall data, Green and Ampt loss method, and S-graph unit hydrographs.

Two-foot contour data at a scale of 1"=200' was prepared by Wilson and Company. The flight date was December 2005.

FEMA Case No. 09-09-2126P – effective September 29, 2009, for Maricopa County states that the best available data can be found on the draft work maps entitled “Luke Wash Watershed Zone AE Floodplain Delineation Study FCD 2007C020, Sheets 1 to 68” prepared by Wood, Patel & Associates, Inc. dated March 24, 2009.

Chandler Gilbert Phase II

This study resulted in the delineation of 11 linear miles of floodplain along the Consolidated Canal between Baseline Road and Hunt Highway. Flow from the drainage area between the Eastern Canal and Consolidated Canal combines with overflow from the drainage area to the east of the Eastern Canal resulting in these ponding areas.

Hydrologic and hydraulic analyses for Chandler/Gilbert Phase 2 was performed by David Evans and Associates, Inc. in association with Project Engineering Consultants, Ltd. for FCDMC under contract number FCD 2002C023. The study was completed in November 2008.

New hydrology was developed for this study. The 100-year 6-hour and 100-year 24-hour HEC-1 models were created using NOAA 2 rainfall data, Green and Ampt loss method, and Clark unit hydrographs.

Two-foot contour data at a scale of 1"= 200' was prepared by Stewart Geo Technologies, Inc. The flight date was April 12, 2003.

FEMA Case No. 09-09-2674P – effective November 12, 2009, for Maricopa County states that the submitted data meet the minimum floodplain management criteria and can be found on the draft work maps entitled “Chandler / Gilbert Floodplain Delineation Study, Phase 2, Consolidated Canal Watershed prepared by David Evans and Associates, Inc., in association with Project Engineering Consultants, Ltd., dated November 25, 2008.

Gavilan Peak Wash Watershed

Gavilan Peak Wash and its tributaries are located in northern unincorporated Maricopa County in the vicinity of the New River community. Total watershed area is 8.5 square miles. Gavilan Peak Wash is 2.6 miles long and joins New River downstream. This study resulted in the delineation of 18 miles of Zone AE floodplains and floodways along Gavilan Peak Wash and 15 of its tributaries.

Hydraulic analyses for Gavilan Peak Wash and tributaries was performed by PBS&J for FCDMC. The study was originated under contract number FCD 2007C036 and completed under contract number FCD 2009C006. The study was completed in March 2010.

New hydrology was developed by RBF Consulting for this study. The 100-year 6-hour and 100-year 24-hour HEC-1 models were created using NOAA 14 rainfall data, Green and Ampt loss method, and S-graph unit hydrographs.

Two-foot contour data at a scale of 1"=200' was prepared by Stewart Geo Technologies. The flight date was August 2005.

HEC-RAS hydraulic models were created by PBS&J for the floodplain and floodway delineation. Technical review and FEMA approval was performed by Michael Baker Jr. Inc. on March 16, 2010 of the Gavilan Peak Floodplain Delineation Study Technical Data Notebook dated March 3, 2010 prepared by PBS&J.

Chandler Gilbert Phase III

This study resulted in the delineation of 12 linear miles of floodplain along the Union Pacific Railroad between US 60 and Hunt Highway and six linear miles along raised portions of Arizona Avenue (SR87) between US 60 and Hunt Highway.

Hydrologic and hydraulic analyses for Chandler/Gilbert Phase 3 was performed by David Evans and Associates, Inc. for FCDMC. The study was originated under contract number FCD 2002C023 and completed under contract number FCD 2008C042. The study was completed in June 2010.

New hydrology was developed for this study. The 100-year 6-hour and 100-year 24-hour HEC-1 models were created using NOAA 2 rainfall data, Green and Ampt loss method, and Clark unit hydrographs.

Two-foot contour data at a scale of 1"= 200' was prepared by Stewart Geo Technologies, Inc. The flight date was April 12, 2003.

Technical review and FEMA approval was performed by Michael Baker Jr. Inc. on February 24, 2011 for the "Chandler / Gilbert Floodplain Delineation Study, Phase 3, UPPR / Arizona Avenue Watershed prepared by David Evans and Associates, Inc., in association with Project Engineering Consultants, Ltd., dated March 31, 2009.

Wittmann Phase III

This study resulted in the delineation of 13 miles of Zone AE floodplains (without floodways) near Wittmann, Arizona.

Hydraulic analyses for Wittmann Phase 3 was performed by PBS&J for FCDMC. The study was completed under contract number FCD 2009C006. This work was completed in January 2011.

No new hydrologic models were developed for this study. The 100-year peak discharge values were obtained from Wittmann Area Drainage Master Study Update Addendum July 2005 prepared by Entellus.

No new mapping was completed for this study. The Wittmann Area Drainage Master Study Update two foot and four foot contour data developed by Stewart Geo Technologies with a flight date of April 2002 was used for the hydraulic analysis.

Technical review and FEMA approval was performed by Michael Baker Jr. Inc. on February 24, 2011 for the Wittmann Phase III Floodplain Delineation Study dated January 2011 prepared by PBS&J.

Theba Watershed

The Theba watershed is located in southwestern Maricopa County. The study area is bounded by the Painted Rock Mountains to the west, Gila River to the north, the Saucedo Wash watershed to the east and the Barry Goldwater Air Force Range to the south. The washes of the Theba watershed flow east and north and are ephemeral tributaries to the Gila River. This study resulted in the delineation of 30 miles of Zone A floodplains within the Theba Watershed.

Hydrologic and hydraulic analyses for the Theba watershed was performed by Project Engineering Consultants, Ltd. in association with LTM Engineering, Inc. for FCDMC under contract number FCD 2007C018. The study was completed in April 2010.

Peak flows for the 100-year storm were computed using the National Flood Frequency (NFF) model for ThebaA, ThebaB, ThebaC, ThebaD, ThebaE, ThebaF, ThebaG, ThebaH, and ThebaI. ThebaJ, Citrus Valley Wash, and Saucedo Wash used the Gila Bend Area Drainage Master Study and Floodplain Delineation Study 2003 to obtain the peak flow rates.

Ten-foot county-wide contour data was prepared by Stewart Geo Technologies, Inc as part of the Maricopa County orthophotography project in 2000 and 2001.

Technical review and FEMA approval was performed by Michael Baker Jr. Inc. on February 24, 2011 for the Theba Watershed Zone A Floodplain Delineation Study Technical Data Notebook dated December 2009 prepared by Project Engineering Consultants, Ltd.

Rio Verde Area Drainage Master Plan Floodplain Delineation 1-Dimensional

The Rio Verde watershed includes Wash A, Wash D, Wash F, Wash I, Wash J, Wash K, Wash L, Wash P, Wash 7, Wash 10, Wash 11, Wash 12 and their tributaries and is located in northeast Maricopa County. These washes flow easterly to join the Verde River. This study resulted in the delineation of approximately 32 miles of Zone AE floodplains within the Rio Verde Watershed.

Hydrologic and hydraulic analyses for Rio Verde Floodplain Delineation Study was performed by FCDMC in association with Dibble Engineering, Consultant Engineering, Inc., and JE Fuller Hydrology and Geomorphology, Inc. under contract number FCD 2001C056. This work was completed in December 2007.

New hydrology was developed for this study. The 100-year 6-hour and 100-year 24-hour HEC-1 models were created using NOAA 2 rainfall data, Green and Ampt loss method, and S-graph unit hydrographs.

Two foot contour data was obtained from several different mapping sources. These include Scottsdale Mapping (9/1/1993), Rio Verde North FDS (12/22/1993), Rio Verde North Extension (1/11/1999), Rio Verde Mapping (4/5/2002), Rio Verde South Wash 10, 11, and 12 FDS (Fall 2002), and Camp Creek Mapping (4/27/2003).

Technical review and FEMA approval was performed by Michael Baker Jr. Inc. on March 4, 2011 for the Rio Verde Area Drainage Master Plan Floodplain Delineation dated December 2007 prepared by Dibble Engineering.

Rio Verde Area Drainage Master Plan Floodplain Delineation 2-Dimensional

This study analyzed a 25 square mile area using FLO-2D with 25 foot x 25 foot grids.

New hydrology was developed for this study. Hydrographs from the 1D study area HEC-1 models were used as input to the FLO-2D models. The hydrology of the 2D area was performed by computing the rainfall excess for each grid using the same design storm that was used for the 1D HEC-1 models. The rainfall excess was then routed downstream as part of the 2D hydraulic computations.

Two foot contour data was obtained from several different mapping sources. These include Scottsdale Mapping (9/1/1993), Rio Verde North FDS (12/22/1993), Rio Verde North Extension (1/11/1999), Rio Verde Mapping (4/5/2002), Rio Verde South Wash 10, 11, and 12 FDS (Fall 2002), and Camp Creek Mapping (4/27/2003).

A portion of the 2D study area was approved as a LOMR FEMA Case No. 09-09-1387P – effective October 15, 2010. Technical review and FEMA approval was performed for the remaining 2D study area by Michael Baker Jr. Inc. on July 11, 2011 for the Rio Verde Area Drainage Master Plan 2 Dimensional Floodplain Delineation dated December 2007 prepared by Flood Control District of Maricopa County.

Palo Verde Watershed

The Palo Verde watershed includes Delaney Wash, Winters Wash, Four Mile Wash and tributaries and is located in northwest Maricopa County. These washes flow south and converge into Winters Wash south of Salome Highway. Winters Wash flows into Centennial Wash at the southern end of the watershed, and Centennial Wash eventually joins the Gila River. The study area includes the two small unincorporated communities of Tonopah and Wintersburg. The majority of the delineated floodplains in this study replace Zone A floodplains from the Palo Verde Watershed Zone A Floodplain Delineation Study.

Hydrologic and hydraulic analyses for Palo Verde watershed was performed by Entellus in association with Stantec and LTM Engineering, Inc. for FCDMC under contract number FCD 2008C046. The study was completed in November 2011.

New hydrologic analysis was prepared using HEC-1 for both the 100-year 6-hour and 100-year 24-hour duration as well as two separate conditions: “With Levee” and “Without Levee”. The “With Levee” scenario accounts for structures such as the Central Arizona Project Canal, Interstate-10, Palo Verde Power Plant, and Salome Highway. The “Without Levee” scenario does not account for the effects of those structures. The storm and condition resulting in the higher magnitude of discharge was used for floodplain delineation.

Ten-foot county-wide contour data was prepared by Stewart Geo Technologies, Inc as part of the Maricopa County orthophotography project in 2000 and 2001. Wilson and Company produced two-foot contour data as part of the Palo Verde Area Drainage Master Plan Mapping project.

Technical review and FEMA approval was performed by Michael Baker Jr. Inc. on November 30, 2011 for the Palo Verde Watershed Detailed Floodplain Delineation Study dated November 2011 prepared by Entellus.

Rainbow Valley Area Drainage Master Plan

This study resulted in the delineation of Zone A and Zone AE floodplains and floodways for Waterman Wash and its tributaries, as well as nearby tributaries to the Gila River. Portions of the study area are located in the City of Avondale, City of Goodyear, and the City of Buckeye.

Hydrologic and hydraulic analyses for Rainbow Valley Area Drainage Master Plan was performed by URS in association with Dibble Engineering and JE Fuller/Hydrology and Geomorphology, Inc. for FCDMC under contract number FCD 2006C029. This work was completed in January 2012.

New hydrology was developed for this study. The 100-year 6-hour and 100-year 24-hour HEC-1 models were created using NOAA 14 rainfall data, Green and Ampt loss method, and S-graph unit hydrographs. Two HEC-1 models were prepared for the Waterman Wash Study Area. In the first model, the Union Pacific Railroad acts as a levee (with railroad) and the second model (no railroad) the levee created by the Union Pacific Railroad embankment is ignored. The higher peak flow was used for floodplain delineation.

General Dynamics prepared two foot contour and four foot contour for 300 square miles in Rainbow Valley. The northern 260 square miles were mapped for two foot contours and the southern 40 square miles were mapped for four foot contours. The area was flown in 2005.

Technical review and FEMA approval was performed by Michael Baker Jr. Inc. on January 31, 2012 for the Rainbow Valley Area Drainage Master Plan Technical Data Notebook dated January 2012 prepared by URS.

Tres Rios North Levee Floodplain and Floodway Redelineation Salt and Gila Rivers

The Tres Rios North Levee is approximately 2.3 miles long along the north side of the Salt and Gila rivers from approximately 105th Avenue west to El Mirage Road. The Salt River flows west through the Phoenix metropolitan area until the Gila River confluence at approximately 115th Avenue. The Gila River flows in a westerly direction in the eastern half of Arizona until the towns of Florence and Coolidge where it turns in a northwesterly direction eventually joining the Salt River west of Phoenix.

This study resulted in the redelineation of approximately 5.2 linear miles of 100-year floodplain and floodway of the Salt and Gila Rivers with the constructed Tres Rios North Levee and related features in place. The Buckeye Feeder Canal and Sunland Avenue Tributary were mapped as part of the Dibble Engineering's Durango Area Drainage Master Plan. They are now being mapped due to the removal of the Salt/Gila River floodplain on the landward side of the levee.

Revised hydraulic analysis for segments of the Gila and Salt Rivers (from approximately 1.5 miles downstream of the confluence of the Salt and Gila rivers upstream to the 91st Avenue Treatment Plant) was performed by WEST Consultants, Inc. for FCDMC under contract numbers FCD 2010C027 and FCD 2012C005. This work was completed in September 2012.

This study used a variety of different mapping studies. Towill, Inc. prepared one foot contour data for the main channel area with a flight date of October 23, 2001. Sanborn Mapping Company prepared two foot contour data for the Gillespie Area Drainage Master Study in June and July of 2008 for the area downstream of El Mirage Road. Four foot contour data for portions of the overbank not covered by other studies was obtained from the Michael Baker 1999 Flood Insurance Study which was collected in 1991 and 1992. The Buckeye Feeder Canal and Sunland Avenue Tributary were mapped using the two foot contour data from the Durango Area Drainage Master Plan which was collected by Wood, Patel, and Associates beginning in March of 1994 as part of the Maryvale Area Drainage Master Study.

No new hydrologic analysis performed for this study. Study used the FIS peak discharges obtained from the 1996 U.S. Army Corps of Engineers hydrology report.

Technical review and FEMA approval was performed by Michael Baker Jr. Inc. on December 4, 2012 for the Tres Rios North Levee Floodplain and Floodway Re-Delineation Study prepared by West Consultants dated September 2012.

Wittmann Phase V

This study resulted in the delineation of over nine miles of limited detail Zone AE floodplain (no floodway) for Wash T5N-R3W-S15-1E (Trilby Wash Tributary 1 East), Wash T5N-R3W-S15-1-1E (West Fork Trilby Wash Tributary 1 East, and Wash T5N-R3W-S28-3W (Iona Tributary 3 West).

The Wittmann Area Drainage Master Study Update Hydrology Addendum July 2005 prepared by Entellus was used as the source of the hydrologic analysis. The peak flows for Iona Tributary 3 West were determined using the unit peak flows (cfs/ sq mi) obtained from the Wittmann ADMSU sub-basin and prorating based on the sub-basin area.

Landata Airborne Systems, Inc. two and four foot contour data prepared for the Wittmann ADMSU was used for this study. The flight date was April 2002.

A LOMR was issued for this study FEMA Case No. 12-09-2950P – effective April 5, 2013.

On April 17, 2014, 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, affected communities, and FEMA.

10.9 Ninth Revision

This revision is dated **Month XX, XXXX**. The study was revised to include new studies and numerous physical map revision requests based on newly studied streams and ponding areas.

Wickenburg Area Drainage Master Plan: Phase 2 East Floodplain Delineation Study

The Wickenburg Area Drainage Master Plan: Phase 2 East Floodplain Delineation Study was located in the northwest portion of Maricopa County. This study began on July 12, 2010 and included all tributaries east of the Hassayampa River and Amir Watershed. The floodplain study included new hydrology and the redelineation of 10.3 linear miles of Zone AE floodplain and floodway, redelineation of 1.4 linear miles of Zone A to Zone AE floodplains without floodways and 1.7 linear miles of new Zone AE floodplains without floodways for the various flooding sources within the Town of Wickenburg and Unincorporated Maricopa County.

Two-foot contour data was prepared by the FCDMC. The flight date was July 7, 2004. This data was augmented with USGS points for areas within Yavapai County from the National Elevation Dataset. The vertical datum of the topographic data is NAVD88 and its geographic coordinate system is State Plan Arizona Central (NAD83).

Revised hydrologic models were performed with HEC-1, Version 4.1. The Amir watershed was a separate HEC-1 model because it is west of the Hassayampa River. Wash P, Blue Tank Wash, Wash N, Powder House Wash, Wash AF, and Calamity Wash Watersheds are combined into one model. The study identified the 100-year, 6-hour and 24-hour peak discharges and compared the discharges along each wash to determine which produced the higher discharge. The peak discharge from the 500-year storm event was also produced for the study. Soil texture and land use data was also collected during this study which provided information regarding rainfall infiltration. The Green-Ampt infiltration equation was used to calculate the rainfall losses. The Phoenix Mountain S-graph was used to generate the unit hydrographs within each sub-basin. In general, the flows obtained during this study are higher than the previous studies. The increase can be attributed to higher precipitation in the new data and development in the studied area. USGS data for Arizona and regional regression equations were used to verify the peak discharges.

Revised hydraulic analyses were performed by the Flood Control District of Maricopa County (FCDMC) and the FCDMC's consultants under contract

number FCD2009C030. Effective Zone “AE” floodplains were previously delineated using the HEC-2 hydraulic model. However, HEC-RAS version 4.1 was used to analyze the 100-year floodplains of this study. HEC-RAS geometry data was obtained from the 2004 two-foot contour interval topographic mapping and was supplemented by additional survey. Elevations for this study are on the NAVD88 vertical datum. Manning’s roughness coefficients were chosen based on the District’s *Drainage Design Manual for Maricopa County, Volume II-Hydraulics* and the USGS *Selection of Manning’s Roughness Coefficient for Natural and Constructed Vegetated and Non-Vegetated Channels*. Manning’s roughness coefficients can be found in Table 11: Range of Hydraulic Roughness Coefficients (Manning’s “n”). Floodway modeling was performed on previously studied washes: Amir Wash Reaches 1-4, Wash P, Blue Tank Wash, Powder House Wash Reach 1-4, Powder House Wash Tributaries -1-2, and Powder House Wash Side Channel. Encroachment Method #4 was used as the first iteration, followed by Method #1 for floodway modeling.

Several special considerations were made during the engineering analysis and modeling, including the flow splits or islands within the floodplain. The study area is generally mountainous and some of the washes do not have the capacity to convey the 100-year flow within the top of banks. Ineffective flow and structures such as culverts, bridges, and levees were also considered during the modeling.

The study was converted to a Physical Map Revision (PMR), FEMA case number 13-09-2483P, effective October 24, 2013. Data and supporting material can be found by contacting FEMA library and/or the FCDMC.

Wickenburg Area Drainage Master Plan: Phase 2 West Floodplain Delineation Study

The Wickenburg Area Drainage Master Plan: Phase 2 West Floodplain Delineation Study is located in the northwest portion of Maricopa County. This study began on July 12, 2010 and included all tributaries south of Sols Wash and west of the Hassayampa River. The floodplain study includes new hydrology and the restudy of 41 linear miles of Zone AE floodplain and floodway, restudy of 8.1 miles of effective Zone A to Zone AE floodplains without floodways and 14.9 linear miles of new Zone AE floodplains without floodways for the various flooding sources within the Town of Wickenburg and Unincorporated Maricopa County.

Two-foot contour data was prepared by the FCDMC. The flight date was July 7, 2004. The vertical datum of the topographic data is NAVD88 and its geographic coordinate system is State Plan Arizona Central (NAD83)

Revised hydrologic models were performed with HEC-1, Version 4.1. The hydrologic models for Hassayampa and Sols Wash West Tributaries identify the 100-year, 6-hour and 24-hour peak discharges and compared the discharges along each wash to determine which produced the higher discharge. The peak discharge from the 500-year storm event was also produced for the study. Soil texture and land use data was also collected during this study which provided information regarding rainfall infiltration. The Green-Ampt infiltration equation was used to calculate the rainfall losses. The Phoenix Mountain S-graph was used to generate the unit hydrographs within each sub-basin. In general, the flows obtained during this study are higher than the previous studies. The increase can be attributed to higher precipitation in the new data and development in the studied area.

Revised hydraulic analyses were performed by FCDMC and the FCDMC's consultants under contract number FCD2009C030. Additional tasks completed were data collection, hydrology, hydraulics, and floodplain delineation. Effective Zone "AE" floodplains were previously delineated using the HEC-2 hydraulic model. However, HEC-RAS version 4.1 was used to analyze the 100-year floodplains of this study. HEC-RAS geometry data was obtained from the 2004 two-foot contour interval topographic mapping and was supplemented by additional survey. Elevations for this study are on the NAVD88 vertical datum. Manning's roughness coefficients were chosen based on the District's *Drainage Design Manual for Maricopa County, Volume II- Hydraulics* and the USGS *Selection of Manning's Roughness Coefficient for Natural and Constructed Vegetated and Non-Vegetated Channels*. Manning's roughness coefficients can be found in Table 11: Range of Hydraulic Roughness Coefficients (Manning's "n"). Floodway modeling was performed on previously studied washes: Flying E Wash Reaches 1-6, Hartman Wash Reaches 1-4, Hartman Wash Split, Wash AG, Yucca Flat Wash Reach 3 & 4, Casandro Wash Reaches 2-5, South Casandro Wash Reaches 1 & 2, Cemetery Wash Reaches 2-4, Cemetery Tributary R-1, Cemetery Tributary R-2 Reach 1, Cemetery Tributary R-3, and Wash Q. Encroachment Method #4 was used as the first iteration, followed by Method #1 for floodway modeling.

Several special considerations were made during the engineering analysis and modeling, including the flow splits or islands within the floodplain. The study area is generally mountainous and some of the washes do not have the capacity to convey the 100-year flow within the top of banks. Ineffective flow and structures such as culverts, bridges, and levees were also considered during the modeling. Within the West Tributaries, there are nineteen culverts and eight bridges, the majority of these were not modeled previously.

The study was converted to a PMR, FEMA case number 13-09-2573P, effective April 30, 2014. Data and supporting material can be found by contacting the FEMA library and/or FCDMC.

Centennial Wash Floodplain Delineation Study: Gila River to La Paz County

The Centennial Wash Floodplain Delineation Study: Gila River to La Paz County covered the portion of Centennial Wash located in western Maricopa County from the La Paz County line downstream to the confluence with Gila River. This study included updated hydrologic and hydraulic modeling and the redelineation of 40 linear miles of Centennial Wash and 13 linear miles of Centennial Wash Left Overbank in unincorporated Maricopa County.

The final topography used for this floodplain mapping was developed by six different topographic data sources. Two-foot contour interval data was prepared by the following sources: Stewart Geo Technologies, Vertical Mapping Resources, Wilson & Company, Inc., the District's Palo Verde Area Drainage Master Plan Mapping Survey, the District's topography developed for this study, and the District's Gillespie ADMP Mapping Survey. Each of these data sources have been reviewed in terms of the national mapping accuracy standards.

Hydrologic data for this study was created from a CLOMR (FEMA case number 12-09-0043) and the previously effective HEC-1 model. The CLOMR was based on the addition of 20 years of gage record, statistical methods, and comparison to the USGS Regional Regression Equations. The resulting peak flow values from the CLOMR were applied as the flow change locations for the hydraulic modeling and are shown in Table 12. Using the peak flow values from the CLOMR and the previously effective HEC-1 model, an input hydrograph was created for the hydraulic model.

Table 11: Range of Hydraulic Roughness Coefficients (Manning's "n")

Flooding Source	Channel	Overbanks
Amir Wash	0.027-0.04	0.042-0.055
Amir Wash Tributary 1	0.031	0.051
Amir Wash Tributary 2	0.031	0.047
Amir Wash Tributary 3	0.027	0.061
Blue Tank Wash	0.027-0.031	0.047-0.054
Calamity Wash	0.025-0.035	0.049-0.062
Casandro Wash	0.025-0.036	0.041-0.064
Casandro Wash South Branch	0.016-0.08	0.016-0.08
Casandro Wash Southwest Split	0.05	0.065
Casandro Wash Val Vista Split	0.033	0.042-0.048
Cemetery Wash	0.027-0.043	0.044-0.065
Cemetery Wash Tributary R	0.027-0.03	0.053-0.064
Cemetery Wash Tributary R-1	0.036-0.044	0.055
Cemetery Wash Tributary R-2	0.025-0.029	0.05-0.061
Cemetery Wash Tributary R-2A	0.027	0.059
Cemetery Wash Tributary R-3	0.033	0.051
Cemetery Wash Tributary R-4	0.043	0.051
Centennial Wash	0.018-0.2	0.016-0.062
Centennial Wash Field Overflow	0.035-0.111	0.025-0.111
Centennial Wash Left Overbank	0.018-0.2	0.016-0.062
Centennial Wash West Railroad Overflow	0.025-0.2	0.016-0.2
Flying E Wash	0.043	0.052-0.053
Flying E Wash Split	0.035	0.041-0.042
Flying E Wash Tributary 1	0.029-0.036	0.041-0.051
Flying E Wash Tributary 2	0.029-0.032	0.041-0.05
Flying E Wash Tributary 3	0.034-0.043	0.048-0.053
Flying E Wash Tributary A	0.035	0.041-0.042
Harquahala Drainage Channel	0.018-0.2	0.016-0.062
Hartman Wash	0.029-0.049	0.041-0.072
Hartman Wash Breakout	0.035-0.043	0.053-0.055
Hartman Wash Split	0.039	0.048-0.063
Hartman Wash Tributary 1	0.03-0.034	0.05-0.054
Hartman Wash Tributary 2	0.029-0.033	0.042-0.052

Flooding Source	Channel	Overbanks
Holly Wash	0.032	0.051-0.053
Little San Domingo Wash	0.028-0.049	0.056-0.065
Little San Domingo Wash Tributary 1	0.03-0.033	0.056-0.063
Mockingbird Wash Tributary 1	0.032	0.042
Mockingbird Wash	0.027-0.031	0.038-0.063
Monarch Wash	0.028-0.04	0.055-0.074
Ox Wash	0.029-0.04	0.054-0.059
Powder House Wash	0.015-0.037	0.019-0.054
Powder House Wash Side Channel	0.015	0.019
Powder House Wash Tributary 1	0.035	0.052-0.054
Powder House Wash Tributary 2	0.035	0.052
San Domingo Wash	0.031-0.035	0.06-0.066
Sols Wash Tributary 1S	0.034-0.038	0.042
Sols Wash Tributary 2S	0.034	0.047
Twin Peaks Wash	0.043	0.052-0.053
Wash AF	0.026-0.042	0.05-0.064
Wash AG	0.029-0.03	0.035-0.038
Wash F	0.028-0.04	0.047-0.064
Wash F Tributary 1	0.029	0.061-0.067
Wash G	0.029	0.053
Wash H	0.029-0.037	0.053-0.066
Wash HT07	0.028-0.031	0.055-0.062
Wash I	0.035-0.041	0.044-0.1
Wash J	0.031	0.047-0.052
Wash K	0.034-0.042	0.053
Wash K Tributary 1	0.034-0.42	0.053
Wash L	0.029-0.038	0.041-0.059
Wash M	0.03-0.033	0.05-0.062
Wash N	0.03-0.038	0.038-0.054
Wash O	0.031-0.035	0.038-0.057
Wash P	0.027-0.038	0.052-0.071
Wash Q	0.036-0.058	0.041-0.074
Wash S2	0.03-0.036	0.049-0.051
Yucca Flat Tributary 1	0.043	0.05-0.053
Yucca Flat Wash	0.029-0.043	0.043-0.053

Table 12: Peak flows used in this study

Flooding Source and Location	Drainage Area (mi²)	10% Annual-Chance (cfs)	2% Annual-Chance (cfs)	1% Annual-Chance (cfs)	0.2% Annual-Chance (cfs)
Amir Wash					
Confluence with Hassayampa River	2.18	870	1,523	1,827	2,585
Upstream of Amir Wash Tributary 1	1.5	644	1,176	1,415	2,144
At Vulture Mine Road	1.12	423	833	1,041	1,592
Upstream of Amir Wash Tributary 3	0.68	377	664	805	1,165
Amir Wash Tributary 1					
Upstream of confluence with Amir Wash	0.09	106	171	201	275
Amir Wash Tributary 2					
Upstream of confluence with Amir Wash	0.3	223	377	453	646
Amir Wash Tributary 3					
At confluence with Amir Wash	0.045	247	384	446	602
Blue Tank Wash					
At confluence with the Hassayampa River	10.89	2,250	3,878	4,899	7,407
Calamity Wash					
At confluence with the Hassayampa River	4.28	1,497	2,965	3,544	4,984
Casandro Wash					
Upstream of Casandro Dam	1.2	802	1,368	1,637	2,293
Outflows from Casandro Dam	1.2	23	27	28	315
US Highway 60 crossing	0.62	561	913	1,080	1,484
At Railroad Crossing	0.34	229	291	326	409
At intake of 2-42' SD Pipes	0.14	183	284	330	488
Casandro Wash South Branch					
350 feet upstream of US60 crossing	0.37	395	642	754	1,028
Casandro Wash Southwest Split					
240 feet downstream of confluence with Casandro Wash South Branch	*	130	266	331	492
Casandro Wash Val Vista					
300 feet downstream of confluence with Casandro Wash	*	30	135	194	345
Cemetery Wash					
At confluence with Hassayampa River	9.17	4,621	7,876	9,387	12,960
Upstream of confluence with Cemetery Tributary R	7.94	4,316	7,340	8,685	11,962
Upstream of confluence with Cemetery Tributary R-1	6.86	3,882	6,664	7,878	10,776
Upstream of confluence with Cemetery Tributary R-2	3.69	2,109	3,631	4,312	5,946
Upstream of confluence with Cemetery Tributary R-3	1.74	1,105	1,838	2,167	2,954
Upstream of confluence with Cemetery Tributary R-4	0.77	635	1,056	1,243	1,653

Table 12: Peak flows used in this study (continued)

Flooding Source and Location	Drainage Area (mi²)	10% Annual-Chance (cfs)	2% Annual-Chance (cfs)	1% Annual-Chance (cfs)	0.2% Annual-Chance (cfs)
Cemetery Wash Tributary R					
At confluence with Cemetery Wash	0.66	605	921	1,380	1,064
Cemetery Wash Tributary R-1					
At confluence with Cemetery Wash	0.66	524	839	980	1,295
Cemetery Wash Tributary R-2					
At confluence with Cemetery Wash	3.03	1,924	3,181	3,723	5,023
Cemetery Wash Tributary R-2A					
At confluence with Cemetery Wash Tributary R-2	0.49	493	780	911	1,198
Cemetery Wash Tributary R-3					
At confluence with Cemetery Wash	1.1	921	1,480	1,748	2,333
Cemetery Wash Tributary R-4					
At confluence with Cemetery Wash	0.71	565	908	1,064	1,407
Centennial Wash					
At confluence with Gila River	1,870.3	*	*	44,590	*
At Railroad Bridge near Arlington	1,824.5	*	*	44,041	*
Near Baseline Road	1,398.1	*	*	38,552	*
At Centennial Levee Reach 2	1,109.7	*	*	34,347	*
Centennial Wash Field Overflow					
3960 feet downstream of confluence with Centennial Wash	*	*	*	17,287	*
Centennial Wash Left Overbank					
At confluence with Centennial Wash (2,450' upstream of Baseline Road)	*	*	*	16,875	*
Centennial Wash West RR Overflow					
8800 feet downstream of confluence with Centennial Wash	*			20,254	
Flying E Wash					
At confluence with Hassayampa River	10.49	4,212	6,952	8,249	11,464
US Highway 60 crossing	8.82	3,914	6,399	7,563	10,421
Upstream of confluence with Yucca Flat Wash	2.88	1,733	2,804	3,299	4,490
Upstream of confluence with Flying E Tributary 3	2.27	1,398	2,221	2,616	3,592
Upstream of confluence with Holly Wash	0.96	592	938	1,084	1,431
Upstream of George's Tank	0.79	587	885	1,024	1,387
Flying E Wash Split					
845 feet upstream of confluence with Flying E Wash	*	251	2846	5095	3532
Flying E Wash Tributary 1					
At confluence with Flying E Wash	0.49	379	621	731	993
Flying E Wash Tributary 2					
At confluence with Flying E Wash	0.58	446	737	869	1,183

Table 12: Peak flows used in this study (continued)

Flooding Source and Location	Drainage Area (mi²)	10% Annual-Chance (cfs)	2% Annual-Chance (cfs)	1% Annual-Chance (cfs)	0.2% Annual-Chance (cfs)
Flying E Wash Tributary 3					
At confluence with Flying E Wash	0.6	400	667	789	1,080
Flying E Wash Tributary A					
1,820 feet downstream of confluence with Flying E Wash	*	295	456	530	702
Harquahala Drainage Channel					
At confluence with Centennial Wash (8,600' downstream of W Van Buren Street)	*	*	*	6,034	*
Hartman Wash					
At confluence with Hassayampa River	7.38	2,628	4,485	5,398	4,984
Upstream of Hartman Wash Split	6.64	2,622	4,414	5,359	7,715
US Highway 60 crossing	5.53	2,539	4,373	5,226	7,323
Upstream of Confluence with Hartman Wash Tributary 1	1.96	1,235	1,987	2,293	3,041
Upstream of Confluence with Hartman Wash Tributary 2	0.83	591	975	1,152	1,584
Hartman Wash Breakout					
1940 feet downstream of confluence with Sols Wash	*	1,431	2,108	2,429	3,150
Hartman Wash Split					
1340 feet downstream of confluence with Hartman Wash	*	3,728	1,598	2,949	5,767
Hartman Wash Tributary 1					
At confluence with Hartman Wash	1.53	1,043	1,771	2,103	2,767
Hartman Wash Tributary 2					
At confluence with Hartman Wash	0.42	470	755	886	1,202
Holly Wash					
At confluence with Flying E Wash	0.98	830	1,388	1,645	2,243
Little San Domingo Wash					
At confluence with Hassayampa River	8.76	2,200	3,667	4,456	6,278
Upstream of confluence with Little San Domingo Wash Tributary 1	7.16	1,631	2,865	3,466	5,036
At Railroad crossing	6.77	1,535	2,733	3,360	4,840
At US Highway 60 crossing	6.27	1,510	2,709	3,314	4,722
At State Route 74 crossing	5.04	1,228	2,387	2,882	4,060
Little San Domingo Wash Tributary 1					
At confluence with Little San Domingo Wash	0.84	512	843	999	1,366
At US Highway 60 crossing	0.51	419	674	791	1,062
Mockingbird Wash					
US Highway 60 crossing / at confluence with Hassayampa River	6.5	2,572	4,382	5,482	7,840
Upstream of confluence with Mockingbird Wash Tributary 1	5.14	2,222	3,813	4,735	6,748
Mockingbird Wash Tributary 1					
At confluence with Mockingbird Wash	1.26	791	1,268	1,492	2,096

Table 12: Peak flows used in this study (continued)

Flooding Source and Location	Drainage Area (mi²)	10% Annual-Chance (cfs)	2% Annual-Chance (cfs)	1% Annual-Chance (cfs)	0.2% Annual-Chance (cfs)
Monarch Wash					
US Highway 60 crossing / at confluence with Hassayampa River	10.65	2,663	4,473	5,357	7,957
Ox Wash					
At confluence with Hassayampa River	8.47	2,932	4,824	5,734	8,092
At Railroad Crossing	6.93	2,385	3,957	4,726	6,692
At US Highway 60 Crossing	6.81	2,372	3,958	4,722	6,663
Powder House Wash					
At confluence with the Hassayampa River	1.95	1,320	2,143	2,652	3,675
Upstream of Constellation Road Split	1.83	1,352	2,164	2,610	3,670
Upstream of Powder House Tributary 1	1.06	764	1,265	1,527	2,240
Upstream of Powder House Tributary 2	0.62	610	972	1,143	1,576
Powder House Wash Side Channel					
270 feet downstream of confluence with Powder House Wash	*	1,320	2,143	2,652	3,675
Powder House Wash Tributary 1					
At confluence with Powder House Wash	0.19	167	285	342	495
Powder House Wash Tributary 2					
At confluence with Powder House Wash	0.16	140	251	300	436
San Domingo Wash					
US Highway 60 crossing / at confluence with Hassayampa River	20.49	6,044	10,611	12,949	19,326
Sols Wash Tributary 1S					
At confluence with Hassayampa River	1	748	1,209	1,424	1,949
Sols Wash Tributary 2S					
At confluence with Hassayampa River	0.77	483	830	988	1,376
Twin Peaks Wash					
At confluence with Yucca Flat Wash	2.44	1,077	1,828	2,158	3,056
Wash AF					
At confluence with Hassayampa River	0.31	520	769	881	1,162
Wash AG					
At confluence with Hassayampa River	0.21	249	388	452	609
Wash F					
US Highway 60 crossing / at confluence with Hassayampa River	0.26	315	494	577	768
Upstream of confluence with Wash F Tributary 1	0.13	157	246	287	382
Wash F Tributary 1					
At confluence with Wash F	0.1	119	186	218	290
Wash G					
US Highway 60 crossing / at confluence with Hassayampa River	0.41	308	518	620	856

Table 12: Peak flows used in this study (continued)

Flooding Source and Location	Drainage Area (mi²)	10% Annual-Chance (cfs)	2% Annual - Chance (cfs)	1% Annual-Chance (cfs)	0.2% Annual-Chance (cfs)
Wash H					
US Highway 60 crossing / at confluence with Hassayampa River	1.76	766	1,253	1,480	2,018
Wash HT07					
US Highway 60 crossing / at confluence with Hassayampa River	0.89	504	885	1,063	1,478
Wash I					
US Highway 60 crossing / at confluence with Hassayampa River	2.31	1,136	1,823	2,139	2,884
Wash J					
US Highway 60 crossing / at confluence with Hassayampa River	0.41	380	614	721	969
Wash K					
US Highway 60 crossing / at confluence with Hassayampa River	3.08	1,567	2,545	2,988	4,220
At confluence with Wash K Tributary 1	1.03	698	1,210	1,432	1,947
Wash K Tributary 1					
At confluence with Wash K	0.78	577	963	1,139	1,548
Wash L					
US Highway 60 crossing / at confluence with Hassayampa River	0.8	553	909	1,072	1,452
Wash M					
US Highway 60 crossing / at confluence with Hassayampa River	0.32	387	588	679	890
Wash N					
At confluence with the Hassayampa River	0.34	495	751	865	1,177
Wash O					
US Highway 60 crossing / at confluence with Hassayampa River	2.94	1,236	2,018	2,412	3,625
Wash P					
At confluence with the Hassayampa River	0.85	622	1,044	1,239	1,737
Wash Q					
At confluence with Hassayampa River	0.38	478	729	843	1,092
Wash S2					
At confluence with Little San Domingo Wash	0.3	224	382	461	786
Yucca Flat Wash					
At confluence with Flying E Wash	5.26	2,429	3,716	4,347	6,102
Upstream of confluence with Twin Peaks Wash	2.47	1,595	2,423	2,853	3,895
Upstream of confluence with Yucca Flat Tributary 1	0.78	812	1,268	1,478	1,982
Yucca Flat Tributary 1					
5200 feet downstream of confluence with Yucca Flat Wash	*	817	1,211	1,429	2,004

* Data not available

The hydraulic analyses were performed by FCDMC and the FCDMC's consultants under contract number FCD2012C004. Due to the complexity of floodplain mapping, a combination of one-dimensional and two-dimensional hydraulic modeling was used in this study. The two-dimensional modeling was completed first to provide input to the one-dimensional model. The one-dimensional steady state HEC-RAS, Version 4.1 model was used for the entire main branch of the Centennial Wash for floodplain and floodway delineation. FLO-2D was used to map floodplain boundaries in the area of the flow split in the upper reach of Centennial Wash. The conveyance capacity of the main channel decreases here and the flow spreads over a larger shallow area. The FLO-2D unsteady state model and the hydrograph mentioned previously were routed across the created grid and used as a basis for mapping special flood hazard areas in the flooding area.

Several special considerations were made during the engineering analysis and modeling, including the structures such as the Southern Pacific Railroad Bridge and triple-barrel culvert structure under Van Buren Road were included in the modeling effort. Ineffective flow areas were also significant in this model due to the wide, shallow nature of flow in this system.

The study was converted to a PMR, FEMA case number 14-09-1560P, effective April 18, 2014. Data and supporting material can be found by contacting the FEMA library and/or the FCDMC.

Wickenburg Area Drainage Master Plan: Phase 3 Floodplain Delineation Study

The Wickenburg Area Drainage Master Plan: Phase 2 East Floodplain Delineation Study was located in the northwest portion of Maricopa County. This study began on July 12, 2010 and included tributaries on the east side of the Hassayampa River, generally outside of the Town limits. This study included new hydrology and the restudy of 27.5 linear miles of Zone AE floodplain and floodway, restudy of 3.8 linear miles of Zone A to Zone AE floodplains without floodways and 1.4 linear miles of new Zone AE floodplains without floodways for the various flooding sources within the Town of Wickenburg and Unincorporated Maricopa County.

Two-foot contour data was prepared by the Flood Control District of Maricopa County. The flight date was July 7, 2004. Additional topographic data was flown in January 2013 to update mapping around Little San Domingo Wash. The vertical datum of the topographic data is NAVD88 and its geographic coordinate system is State Plan Arizona Central (NAD83)

Revised hydrologic models were performed with HEC-1, Version 4.1. The study identified the 100-year, 6-hour and 24-hour peak discharges and compared the discharges along each wash to determine which produced the higher discharge. The peak discharge from the 500-year storm event was also produced for the study. Soil texture and land use data was also collected during this study which provided information regarding rainfall infiltration. The Green-Ampt infiltration equation was used to calculate the rainfall losses. The Phoenix Mountain S-graph was used to generate the unit hydrographs within each sub-basin. In general, the flows obtained during this study are higher than the previous studies. The increase can be attributed to higher precipitation in the new data and development in the studied area

Revised hydraulic analyses were performed by FCDMC and the FCDMC's consultants under contract number FCD2009C030. Additional tasks completed were data collection, hydrology, hydraulics, and floodplain delineation. Effective Zone "AE" floodplains were previously delineated using the HEC-2 hydraulic model. However, HEC-RAS version 4.1 was used to analyze the 100-year floodplains of this study. HEC-RAS geometry data was obtained from the 2004 two-foot contour interval topographic mapping and was supplemented by additional survey. Elevations for this study are on the NAVD88 vertical datum. Manning's roughness coefficients were chosen based on the District's *Drainage Design Manual for Maricopa County, Volume II- Hydraulics* and the USGS *Selection of Manning's Roughness Coefficient for Natural and Constructed Vegetated and Non-Vegetated Channels*. Manning's roughness coefficients can be found in Table 11: Range of Hydraulic Roughness Coefficients (Manning's "n"). Floodway modeling was performed on previously studied washes: Wash O, Mockingbird Wash Reaches 1-2, Mockingbird Wash Tributary 1, Wash L, Wash K Reaches 1-2, Wash K-1, Wash I, Monarch Wash, Wash H, Wash G, Wash F Reaches 1-2, Wash F Tributary 1, San Domingo Wash, OX Wash, and Little San Domingo Wash Reach 2. Encroachment Method #4 was used as the first iteration, followed by Method #1 for floodway modeling.

Several special considerations were made during the engineering analysis and modeling, including the flow splits or islands within the floodplain. The study area is generally mountainous and some of the washes do not have the capacity to convey the 100-year flow within the top of banks. Ineffective flow and structures such as culverts, bridges, and levees were also considered during the modeling.

The study was converted to a PMR, FEMA case number 14-09-2457P, effective October 15, 2014. Data and supporting material can be found by contacting the FEMA library and/or the FCDMC.

This FIS also incorporates the determinations of letters issued by FEMA resulting in map changes (Letter of Map Revisions [LOMR]), as shown in Table 13, “Letters of Map Revision.”

Table 13: Incorporated Letters of Map Revision

Communities Affected	Flooding Source(s)	Effective Date	Case Number
Maricopa County	Amir Wash, Amir Wash Tributaries 1, 2, and 3, Blue Tank Wash, Calamity Wash, Powder House Wash, Powder House Wash Side Channel, Powder House Wash Tributaries 1 and 2, Wash AF, Wash N, and Wash P	October 24, 2013	13-09-2483P
Maricopa County	Casandro Wash, Casandro Wash South Branch, Casandro Wash Southwest Split, Casandro Wash Val Vista Split, Cemetery Wash, Cemetery Wash Tributary R, R-1, R-2, R-2A, R-3, R-4, Flying E Wash, Flying E Wash Tributaries 1, 2, 3, and A, Flying E Wash Split, Hartman Wash, Hartman Wash Breakout, Hartman Wash Split, Hartman Wash Tributary 1 and 2, Holly Wash, Sols Wash Tributary 1S, Sols Wash Tributary 2S, Twin Peaks Wash, Wash AG, Wash Q, Yucca Flat Wash, Yucca Flat Wash Tributary 1	April 30, 2014	13-09-2573P
Maricopa County	Centennial Wash	April 18, 2014	14-09-1560P
Maricopa County	Little San Domingo Wash, Little San Domingo Wash Tributary 1, Mockingbird Wash, Mockingbird Wash Tributary, Monarch wash, Ox Wash, San Domingo Wash, Wash F, Wash F Tributary 1, Wash G, Wash H, Wash HT07, Wash I, Wash J Wash K, Wash K-1, Wash L, Wash M, Wash O, Wash S2	October 15, 2014	14-09-2457P